

Ageing Differently: the health and independence of UK Thalidomide Survivors as they grow older

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Abstract

Background - In the late 1950s/early 1960s Thalidomide was given to thousands of pregnant women across the world to relieve morning sickness. The drug caused severe birth defects including missing/short limbs and sensory impairments, collectively referred to as Thalidomide Embryopathy (TE). However, Thalidomide is not just a historical tragedy, it is a contemporary disability issue. Across the world more than 5000 Thalidomide survivors are still living with TE.

Aim and Objectives - We know relatively little about the long-term effects of Thalidomide damage nor about the survivors' present day experiences. The aim of this study was to address this knowledge gap by exploring the changing nature of health and independence amongst UK Thalidomide survivors as they age.

Methods - A mixed methods grounded theory study, comprised of four stages: a scoping literature review; primary content analysis of semi-structured interviews with a sample of 38 Thalidomide survivors; a cross-sectional survey of all UK Thalidomide survivors (to which 375/75% responded); and secondary grounded theory analysis of the semi-structured interviews.

Findings - Whilst TE is regarded as a non-progressive condition, it is not static. As they age Thalidomide survivors are experiencing new Thalidomide-related health problems and deterioration in their original impairments alongside the accumulated disabling consequences of a life lived with a rare condition. Shifting impairment was leading to efforts to preserve function and the need to rethink independence, which in turn had implications for mental wellbeing.

Discussion - Thalidomide survivors are at a stage in their lives where disability and ageing are beginning to intersect. They are ageing differently to their peers in the general population but there are both differences and similarities to other people with early acquired disabilities. Importantly, what is happening to Thalidomide survivors, needs to be seen in the particular historical, social and economic context of their lives.

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Authors Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as References. Parts of this thesis have been published and presented, and these are listed in Appendices 10 and 14.

Abbreviations

DCBL	Distillers Company (Biochemicals) Limited
FDA	Food and Drug Administration
GT	Grounded Theory
ICF	International Classification of Functioning, Disability and Health
MM-GT	Mixed Methods Grounded Theory
MSK	Musculoskeletal
NAC	National Advisory Council (of the Thalidomide Trust)
(S)WEMWBS	(Short) Warwick Edinburgh Mental Wellbeing Scale
TE	Thalidomide Embryopathy

Chapter 1 Introduction

Thalidomide has become synonymous with ‘medical’ disasters and is frequently used as an example of how, in the past, the unchecked greed and arrogance of pharmaceutical companies led to tragic consequences (Ferber 2013). However, Thalidomide is not just a historical tragedy, it is a contemporary disability issue (Abrams 2014). Across the world, more than 5000 Thalidomide survivors (Johnson et al 2018) and their families, are still living with the consequences of the drug. Many have received little or no financial compensation. What is more, as they age, they are experiencing new Thalidomide-related health problems and deterioration in their original impairments, in addition to the accumulated disabling consequences of having a long term condition. However, we know relatively little about the long term effects of Thalidomide damage nor about the survivors’ present day experiences. The aim of my research was to address this gap in our knowledge, by exploring the changing nature of the health and independence of UK Thalidomide survivors as they grow older.

In this chapter and by way of context, I begin by briefly describing: the distribution of the drug; its consequences, both in terms of the number pregnancies affected and the birth defects it caused (collectively referred to as Thalidomide Embryopathy or TE); and its current uses. I then go on to provide an overview of the key issues in relation to ageing with TE. In the two subsequent sections I set the conceptual context by briefly discussing impairment, health and disability in relation to TE, and more broadly, ageing and the life course. I go on to define the study and provide an overview of how I conducted the research, before outlining why the study matters. I close the chapter with a note about terminology, and a description of the structure of the thesis.

1.1 The Impact of Thalidomide

Between April 1958 and December 1961 the drug Thalidomide was given to thousands of pregnant women in the UK to relieve morning sickness. At the time the drug’s teratogenic properties were not fully understood. However, evidence suggests that despite Chemie Grünenthal, the makers of Thalidomide, having early indications of its toxicity, they failed to take steps to assess the drug’s teratogenic effects (Knightly et al 1979). Many babies born to the women who took the drug were still born or died soon after birth, and many others died in early childhood (Sjostrom and Nilsson 1972). However, around 520 ‘Thalidomide babies’ survived to adulthood in the UK.

Globally there are no accurate estimates of the number of babies affected by Thalidomide, although a figure of over 10,000, across 46 countries is often quoted, based on the work

of Lenz and colleagues (Miller and Strömmland 1999; Lenz 1988). However, more recent work by Johnson et al (2018) has attempted to estimate not only the number of survivors (i.e. those who lived long enough to be registered under compensation schemes or would have been registered if schemes existed in their countries), and the number of Thalidomide-affected babies born, but also the number of pregnancies affected. To provide a sense of the scale of the 'tragedy', their estimates suggest that worldwide as many as 25,000 Thalidomide babies were born (c2000 in the UK), and in total between 87,600 and 275,000 pregnancies may have been affected. I discuss this topic in more detail in Chapter 2.

Thalidomide survivors were born with a range of impairments. Most commonly they have missing, or short and/or deformed limbs (Dysmelia), including unusually shaped joints. This has become the most symbolic and normative representation of 'thalidomide'. The most severely affected have damage to all four limbs, others to arms and hands or legs and feet. Other consequences, although significant, are less recognised in public discourse. These include damage to eyes and ears/hearing and facial disfigurement and, in rare cases, brain damage. Thalidomide damage can also be unseen and includes damaged or missing internal organs (e.g. heart defects, bowel deformities, small or missing kidneys, and damage to reproductive organs). Chapter 2 provides a brief history of Thalidomide. It also describes more fully the effects of TE and outlines the legal settlement and compensation arrangements for UK Thalidomide survivors. As we shall see, changes over the life course can further complicate the consequences of original impairments, adding to the person's sense of disability.

Given the scale of the Thalidomide 'tragedy' one might assume that Thalidomide is no longer licenced or has ceased to be used. It has, however, remained in regular use, albeit for the treatment of different conditions. Since 1965, it has been marketed in several countries (particularly in South America) for the treatment of erythema nodosum leprosum (ENL), a painful skin condition which is a complication of Hansen's Disease (leprosy). From the 1990s Thalidomide has also been prescribed in a number of countries for 'off-label' uses (e.g. the treatment of oral aphthous mouth ulcers in patients with HIV). More recently it has been approved for the treatment of a range of other conditions including certain cancers (e.g. multiple myeloma, prostate cancer and melanoma). Its use for other conditions (e.g. gastrointestinal and autoimmune diseases) is currently being explored (Vargesson 2015a). The continued use of the drug has created a new generation of Thalidomide survivors, particularly in poorer communities with limited access to healthcare. For example Castilla et al. (1996) reports that 33 thalidomide-affected children were born after 1965 in endemic areas for leprosy in Brazil.

1.2 Ageing with Thalidomide Embryopathy

The first generation of Thalidomide survivors have now been living with the consequences of the drug's damage for over 50 years. They have had to use their bodies in unusual ways in order to compensate for their original impairment (i.e. 'postural adaptation'). They have overused 'good' limbs or use their feet and teeth for tasks for which others would use their hands. As a result, they are increasingly experiencing secondary conditions (particularly musculoskeletal problems), linked to their original impairments (Newbronner et al 2012; Peters et al 2015; Hinoshita et al 2019). Some Thalidomide survivors in the UK and elsewhere (Newbronner et al 2012; Jankelowitz et al 2013) also report experiencing new, previously undiagnosed neuropathic symptoms (e.g. tingling, numbness, heat/cold and extreme fatigue). Other health problems which may be related to peoples' original damage or are affected by it, include cardiovascular, bowel and digestive problems, sight, hearing and dental problems and difficulties with weight management. Furthermore, these Thalidomide-related health problems and increased impairment, often make it more difficult for people to manage unrelated health problems such as diabetes and asthma. Many Thalidomide survivors also report worsening mental health which may be connected to declining physical health, increasing impairment and a growing sense of disability. These late on-set consequences and symptoms are important because they can have profound implications for peoples' independence and quality of life, but also because no account was taken of them in the original compensation settlements. The nature and extent of the health problems Thalidomide survivors in the UK and elsewhere are experiencing is discussed in much greater depth in Chapters 4, 5 and 6.

Whilst the effect of these health problems on individuals is clearly linked to the severity of their original Thalidomide impairments, many other factors are influencing peoples' response to their changing health and impairment, and their capacity to maintain their independence and quality of life. In understanding these processes a number of concepts are relevant. These are briefly discussed below and are explored and developed throughout this thesis, in particular in Chapters 7 and 8.

1.3 Impairment, Health and Disability in Relation to TE

It is useful to begin by thinking about how impairment, health and disability might be defined and understood in relation to ageing with TE. The drug caused a range of birth defects which constitute peoples' original impairments. As part of the process of obtaining compensation, these impairments were classified. However, there is a tension between the classification of impairment and the lived experience of impairment over the life course (and consequent experience of disability). Thalidomide survivors in the UK are in an

unusual, almost unique position in relation to this. The legal settlement which established the compensation arrangements for Thalidomide survivors involved them being given 'points' according to the severity of their impairments. Based on these points, they were also placed into one of five impairment bands, with people in Band 5 having the most severe impairments (see Chapter 2, section 2.7.7).

However, this classification has in no sense been a predictor of the boundaries of peoples' lives and it does not reflect the lived experience of their impairments and how these can have disabling consequences. Furthermore, this lived experience has changed over their life course. The International Classification of Functioning, Disability and Health (WHO 2001) or ICF as it is often referred to, draws a distinction between two constituent elements of impairment, body functions and body structures: "*Body functions are the physiological functions of body systems (including psychological functions)...Body structures are anatomical parts of the body such as organs, limbs and their components*". In effect chronic long standing conditions are a category or form of impairment. By this definition, Thalidomide survivors have two 'types' of impairment caused by the drug: the way in which it altered their body structure and the secondary health problems they are dealing with which are linked to it (e.g. arthritis and chronic pain). Kemp and Mosqueda (2004) suggest that people ageing with disability, experience three groups of 'health' problems (which could result in impairments related to body functions, and in turn can lead to disabling consequences):

- Secondary conditions which are a direct result of their original impairments. The authors use the example of people with spinal cord injuries being more likely to develop pressure sores. An example for Thalidomide survivors might be osteoarthritis in hip and shoulder joints resulting from the way people have had to use their bodies to cope with missing or short arms (Peters et al 2015).
- Associated conditions are those which are common in people with certain impairments. The authors give the example of the link between spina bifida and latex allergies. Similarly, hypertension appears to be far more prevalent amongst Thalidomide survivors than the general population, although the reasons for this are not fully understood (Schulte-Hillen 2017).
- Comorbid conditions which are unrelated to peoples' original impairments but might be more difficult to manage because of those impairments. Furthermore, people ageing with disability may be at greater risk of some 'lifestyle' related conditions (e.g. diabetes) because of the disabling barriers they face to healthy living (e.g. keeping active, eating well).

Thalidomide survivors have a range of secondary conditions, which are in turn changing their impairment (Newbronner et al 2012; Kruse et al 2013; Peters et al 2015). They also appear to have a number of associated conditions but often the evidence for the link between TE and the associated condition is limited or even contested. For this reason, throughout this thesis I largely used the terms 'secondary condition' or 'secondary health problems, and only refer to 'associated conditions' in specific circumstances. The other important point to note here is that Thalidomide survivors themselves often perceive that many of their 'health' problems are related to their Thalidomide damage. As such the boundary between impairment and health is blurred, and the relationship between impairment, health and disability is complex, contested and fluid.

Much has been written about what constitutes 'disability' (Thomas 2004). The United Nations Convention on Rights of Persons with Disabilities (CRPD 2006) – an international agreement intended to promote the rights of disabled people, provides a widely used definition: *"Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others"*. However, there are several 'models' of disability which seek to explain and operationalise definitions of disability. Berghs et al (2016) describe four broad models of disability (see p46). The one most closely aligned to the above definition is the Human Rights Model which focusses on the fundamental human rights of people with disabilities. In discussing the influential Social Models of disability, the authors note that these models draw a clear distinction between impairments and disability, seeing disability as the experience of social oppression. Critical Disability Studies models overlap with social models but a central concern is questioning the dualism between impairment and disability, while also acknowledging the potential of intersectionality. They also describe the Medical Model of disability which essentially views impairment as an individual problem, indicative of an 'abnormality' or 'deviation'.

It is not possible or appropriate to discuss these models in detail here. However, it is interesting to briefly consider how one of the key debates in the field - how the social model of disability might be 'reimagined' to more fully acknowledge the place of impairment in disability (Thomas 2004) - could inform our understanding of the experiences of Thalidomide survivors. In criticising the social model of disability for separating impairment from disability, and the notion that disability is entirely socially imposed, Shakespeare and Watson (2001) argue that impairment clearly plays a role in causing disability. They suggest that impairment and disability are on a continuum, and that disability, when seen as restricted activity, is the result of biopsychosocial factors.

Thomas (2004), in discussing their ideas, suggests that such non-socially imposed restrictions might best be conceptualised as ‘impairment effects’, which in later writing she defines as:

The direct and unavoidable impacts that ‘impairments’ (physical, sensory, intellectual, emotional) have on individuals’ embodied functioning in the social world. Impairments and impairment effects are always bio-social and culturally constructed in character, and may occur at any stage in the life course. (Thomas, 2010, p. 37)

This conceptualisation seems particularly helpful in relation to Thalidomide survivors. Shakespeare (2006) also make the point that the diverse nature of impairments is important - they can be static or episodic, degenerative and even terminal. He contends that the social model can only explain so much before the experiential realities of impairment have to be confronted. For Thalidomide survivors, particularly those with the most profound damage (i.e. short or missing arms and/or legs) it is illogical to argue that impairment plays no part in their disability but by the same token, the extent to which they have experienced disablement has been heavily influenced by psychological, cultural and socio-political factors. Moreover, the concept of ‘impairment effects’ is useful when thinking about the diverse and changing nature of the impairments Thalidomide survivors are living with. In particular, it enables a contextual approach to understanding the disabling consequences of impairment, which are not fixed in time, but can occur at different points across the life course.

More recently, in thinking about how models of disability might evolve, disability activists and academics have begun to think about a social model of human rights (Berghs et al 2019). They suggest that such a model might facilitate greater understanding of the intersection of identities across the life course. I return to the question of how the impaired body might be thought about in the context of ageing with disability and TE in particular, and the intersection of disability and ageing identities, in Chapter 8.

1.4 Ageing and the Life Course

In informal conversations about their early lives, Thalidomide survivors have often told me that when they were young, there was an assumption they would not have a long life and would certainly not reach old age. Sadly, a significant number of Thalidomide survivors did die in childhood but those who reached adulthood are now expected to have a near

normal life expectancy¹. The assumptions made about the life expectancy of Thalidomide survivors were in part a reflection of the lack of knowledge about TE, a completely new 'condition'. However, they also mirrored both general assumptions about disabled peoples' lives, and the demographic realities of the post-war period. It is really only in the last 30 years or so that researchers and demographers have recognised that there are now generations of people with various kind of early acquired disabilities, who will live into old age. In one of the first texts to explore ageing with disability, Treischmann (1987) sets out very clearly why the experience of ageing with from-birth disability, or disability acquired in childhood or early adulthood, is both similar and different, and why this difference matters:

...all of us are ageing, all of us experience decline in energy and altered physical function over time. For some, however, this very natural process is superimposed on other impairments that have imposed a physical, emotional, and financial penalty on daily life. Unfortunately for these people with major physical disabilities, the process of aging seems to increase the amount of penalty. (p5)

Despite the demographic imperative, we still have a limited understanding of experience of ageing with disabilities and the consequences of coping with impairment over many years (Hilberink et al 2017; Freedman 2014; Jeppsson Grassman et al 2012). Jeppsson Grassman et al (2012) contend that one reason for the lack of development in this field is the incorrect assumption that early acquired impairments are static and that once people have learned to cope with these impairments and have maximised their functional ability through rehabilitation, "there is no need to worry about additional consequences" (p96). There is, however, growing evidence that even in conditions which are regarded as 'static' (e.g. Cerebral Palsy), peoples' functional limitations can change across the life course, creating further potential for disability (Molton and Yorkston 2017). TE has also been regarded as a static condition, and similarly, many Thalidomide survivors have tried from a young age to maximise their functioning. Now after a lifetime of living with their impairments, maintaining this level of functioning is becoming increasingly difficult. As the research presented in this thesis will show, the combination of increasing impairment and secondary conditions has profound implications for both their physical and mental health.

Within disability research, relatively little attention has been paid to concepts of ageing and the life course but a few authors (Jeppsson Grassman and Whitaker 2013; Naidoo et al 2012; Priestley 2003; Zarb and Oliver 1993) have proposed that a life course approach

¹ There is no published information about the life expectancy of Thalidomide survivors but in informal correspondence the Thalidomide Trust have advised me that their working assumption is that most beneficiaries will have a near normal life expectancy.

might provide a productive and more holistic framework for thinking about how disability affects people at different points in their lives, including ageing with disability. Naidoo et al (2012) points out that *“age and disability are not defining traits of an individual but overlapping phenomena that occur throughout the span of the life course”* (p3). This echoes Berghs et al’s (2019) call, discussed above, for a better understanding of the intersection of identities across the life course. In Chapter 8, I draw on the life course perspective to inform our understanding of how Thalidomide survivors are ageing differently.

1.5 Origins and Objectives of the Study

The genesis of this study lies in my experience of working with Thalidomide survivors over a number of years, in particular the evaluation of the pilot Health Grant awarded to them by the UK government in 2010 (Newbronner et al 2012). I observed that the health and functioning of Thalidomide survivors was changing as they reached late middle age but there was limited evidence about the nature of these changes or the prevalence of different health problems. The research evidence that did exist appeared to be largely biomedical in focus and rarely explored the interaction between these health problems, the original impairment and the psychosocial and disabling aspects of the ageing process, nor the wider implications for Thalidomide survivors’ daily lives. Furthermore, whilst the combination of impairments experienced by Thalidomide survivors is rare, and the historical, social and legal context of their lives is unique, they are an identifiable group who are ageing together. I felt their experiences might offer new insights into ageing with early acquired disability more generally.

The overall aim of the study was to explore the changing nature and perceptions of health and independence amongst UK Thalidomide survivors as they age. To achieve this, the following thesis objectives were defined and addressed as the study progressed:

- To identify the health problems Thalidomide survivors are experiencing as they grow older, in particular Thalidomide-related secondary health problems
- To examine the perceived interaction between original impairment, secondary health problems and the ageing process
- To understand the implications of this interaction for Thalidomide survivors’ lives, including their health-related quality of life and independence
- To highlight any lessons that can be learned from Thalidomide survivors about the experience of ageing with early acquired disability

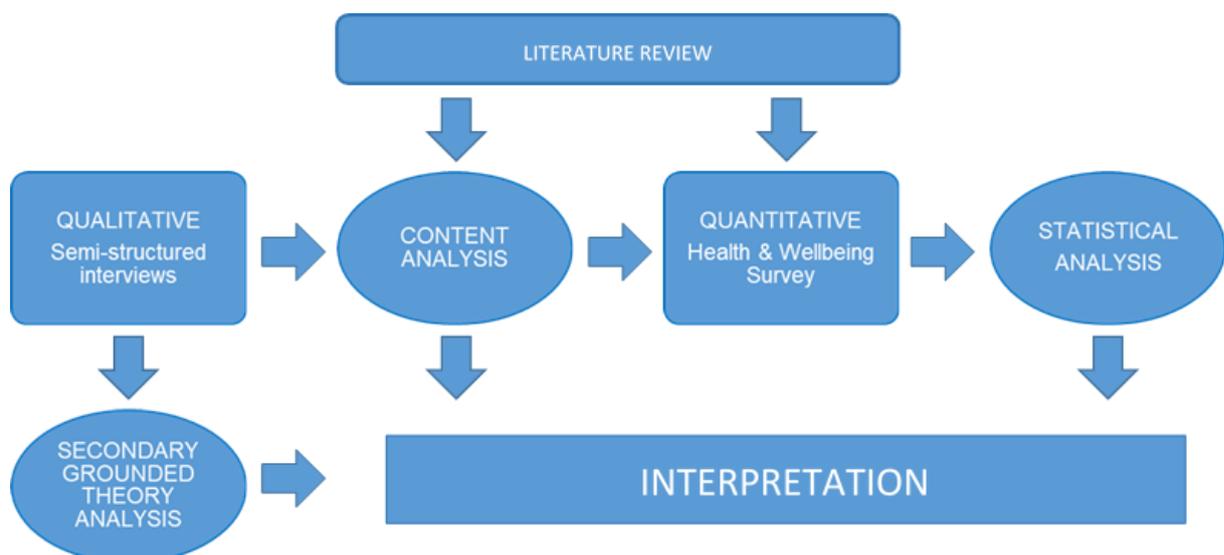
Alongside these objectives, I wanted to ensure that the research would benefit Thalidomide survivors in the UK and worldwide by:

- Increasing awareness of the secondary health problems and loss of function
Thalidomide survivors are experiencing and the implications of them for peoples' independence and quality of life
- Providing organisations and health professionals working with Thalidomide survivors with information which can be used to improve support and care, and inform treatment decisions
- Influencing how policy makers in health and social care might better respond to the needs of the growing number of people with early acquired disability who are reaching later life, and in particular how they might be supported to 'age well'.

1.6 Conducting the Research

Before moving on to the substantive chapters of this thesis, it is important to briefly describe my methodological approach (Chapter 3 provides a detailed account of my methods). To address the aim and objectives of the study, I felt that more than one method of inquiry would be needed. I therefore decided to use a mixed methods grounded theory approach. This comprised four stages: a scoping literature review; primary content analysis of semi-structured interviews; a cross-sectional survey; and secondary grounded theory analysis of the semi-structured interviews. Working through these stages I was able to: bring together and draw on existing research evidence; more fully understand the nature and extent of Thalidomide survivors' health problems and deteriorating impairment; and to do justice to the complexity of their experiences, particularly in relation to their independence and quality of life. Figure 1 provides an overview of my study design.

Figure 1 Mixed methods study design



From my previous work I was aware of a small number of studies from other countries, which had explored different aspects of the health of Thalidomide survivors as adults. However, there were no published literature reviews which brought this research and grey literature together. I decided to conduct a scoping literature review to map what was already known about ageing with Thalidomide damage. Chapter 4 describes the nature of the review and how I drew on grounded theory methods to collate and summarise the evidence. I used the findings from the review to inform the other stages of the study, in particular the content of the cross-sectional survey.

Around the time I was starting to think about my doctoral research, I was asked by the Thalidomide Trust (the body which distributes compensation funds to Thalidomide survivors in the UK) to support them in monitoring the new ten year Health Grant. In 2010 the four UK Departments of Health made a Health Grant to Thalidomide-impaired people (see section 2.7.8). The Grant was the culmination of years of campaigning by Thalidomide survivors and many see it as reparation for the UK government licensing of Thalidomide back in the late 1950's. Officially it is intended to help them address the health-related needs they are experiencing as they grow older. The initial three year pilot Health Grant was renewed for ten years in 2013. The monitoring project was essentially a descriptive study designed to examine how the health and health-related needs of Thalidomide survivors were changing over the lifetime of the Grant, and to understand how Thalidomide survivors were using their Health Grants to address these needs. The Trust intended to use the findings from the study to inform their work and to help build the case for the continuation of the Health Grant. The final plan for the first three years of the monitoring project included two main elements: semi-structured telephone interviews with a representative group of Thalidomide survivors; and a health and wellbeing survey of all UK born Thalidomide survivors.

The Health Grant monitoring project provided me with an ideal opportunity to gather much of the data I needed for my doctoral study, and so avoid placing an additional research burden on Thalidomide survivors. However, importantly, I was able to take a much more sophisticated analytical approach, and contextualise my findings in broader empirical and theoretical debates. Following discussions with the Director of the Thalidomide Trust and a formal application to the Trust's Research Committee, I was given permission to use the material gathered in the interviews (subject to participants consent) and the data from the survey, for my doctoral research. I discuss the interconnection with the Health Grant Monitoring project, and the benefits and challenges it created for my doctoral research more fully in Chapters 3 and 8. For clarity, I set out below in Box 1, a simple timeline of

the activities associated with my doctoral research and if/how they relate to the Health Grant Monitoring project:

Box 1 Timeline for Doctoral Research and Health Grant Monitoring Project	
December 2013	Health Grant Monitoring Project commissioned by the Thalidomide Trust
January 2014	Doctoral studies commenced
May 2014 to December 2019	On-going work on scoping literature review (from initial exploratory searches to final updating) for doctoral research independent of the Trust
June to August 2014	Conducted semi-structured interviews for use in the Health Grant Monitoring Project and doctoral research
September to December 2014	Content analysis of semi-structured interview data: <ul style="list-style-type: none"> • Descriptive summary report for the Trust • More detailed textual analysis for first draft of thesis chapter
January to July 2015	Development of Health and Wellbeing Survey based on specification of the Trust
August to October 2015	Conducted Health and Wellbeing Survey
November 2015 to May 2016	Initial analysis of survey data: <ul style="list-style-type: none"> • Descriptive report for the Trust • Presented initial results to PhD supervisors and discussed plans for further, more in-depth analysis for doctoral research
November 2016	Thalidomide Trust Health Grant Monitoring Project completed
November 2016 to May 2018	Further statistical analysis of survey data (including analysis of health related quality of life) for doctoral research and preparation of thesis chapter
April 2017 to December 2018	On-going research and writing-up of the historical and contemporary context material for doctoral research
August 2018 to January 2019	Secondary Grounded Theory analysis of the semi-structured interview data for doctoral studies
January 2019 to February 2020	Final writing-up of thesis

At this stage I envisaged that following the semi-structured interviews and the health and wellbeing survey, a further round of data collection (possibly in depth-case study interviews), would be required to properly explore some of the topics of interest to me. However, in undertaking the primary content analysis of semi-structured interviews, it became apparent to me that, in the majority of the interviews, there was sufficient depth of material for a more detailed interpretive analysis, consistent with the objectives of the thesis. Following discussion with my supervisors I therefore decided to undertake a secondary grounded theory analysis of the interviews. I discuss this decision more fully in Chapter 3.

To conclude this section, it is perhaps helpful to add a brief personal reflection. When I embarked on my doctorate, I saw my research as being firmly located in the discipline of health sciences. As such I envisaged it being quite practical and somewhat atheoretical in nature. However, as my research progressed I began to see that if I was to really understand the experiences of Thalidomide survivors I needed to draw on other disciplines, in particular disability studies and medical sociology. In truth, at the outset my knowledge of the debates and ideas in these disciplines was limited. Venturing into these fields certainly influenced how my research developed, and throughout the thesis I have tried to reflect on this process of evolution. It was also a learning journey for me, the culmination of which I hope is reflected in my Discussion.

1.7 Why this Study is Important

This study matters for a number of reasons. In the UK, the legal settlement which led to the establishment of the Thalidomide Trust, took place in 1974. At that point two very significant assumptions were made – first that the most severely affected Thalidomide survivors would have low life expectancy (some people were told that they would not live beyond their 30s), and second that the impairments on which the compensation settlements were based would be largely ‘static’. Neither of these assumptions have proved correct. Most Thalidomide survivors will live into older age but as they grow older it has become apparent that their impairments are not static, and they are developing secondary (physical and mental) health problems. Thalidomide survivors need information, advice and support in dealing with the changes in their health and impairment, and the potentially disabling consequences of these. This needs to be based on a sound understanding of the contemporary experiences of Thalidomide survivors.

Diageo (previously Distillers, the parent company of Distillers Company (Biochemicals) Limited, the distributors of Thalidomide in the UK) have supplemented the Trust Fund on a number of occasions over the years, in part in recognition of the longer life expectancy

and increasing needs of Thalidomide survivors. However, it is important to understand more fully the secondary health problems that people are experiencing, so that this can be taken into account in future uplifts of the Trust Fund. Furthermore, although the pilot Health Grant made to Thalidomide survivors in 2010 was renewed for 10 years in 2013, there is concern within the UK Thalidomide community that the financial support people have to enable them to manage and live with their health problems and disabilities will not keep pace with their rate of deterioration.

Globally the compensation arrangements for Thalidomide survivors vary considerably in their nature and scale. In some countries people have received no compensation. Currently, Thalidomide survivors internationally but particularly across Europe are campaigning for proper compensation from the drug's original manufacturer, Chemie Grünenthal. Whilst clearly the campaign is very much about reparation and social justice, it is important that it is informed by a full understanding not only of the original damage people experienced but also the related and resulting problems they are experiencing in later life.

Finally, because of inadequate control of the prescribing and management of Thalidomide in low and middle income countries, people continue to be born with Thalidomide damage. In the decades to come, as they age they too are likely to experience increasing Thalidomide related health problems. By better understanding the experiences of the 'first generation' of Thalidomide-impaired people, there might be a greater chance of later generations receiving the treatment and support they need.

1.8 Terminology

As part of this introduction it is important to say a few words about the terminology used throughout the thesis. People damaged by the drug Thalidomide use a number of terms to describe themselves, the most common being Thalidomide survivor, Thalidomide victim, and Thalidomider. Thalidomide survivors in the UK advised me that this is the term they prefer and therefore this is what I use throughout.

When referring to people who have from-birth disabilities or acquired disabilities as children or young adults, I use the phrase 'people with early acquired disabilities'². In using this phrase I am primarily concerned with people with physical impairments, rather than intellectual impairments (or both). This is because only a small minority of

² Strictly, 'early acquired impairments' would be more accurate but 'early acquired disability' is the phrase commonly used in disability literature.

Thalidomide survivors have intellectual disabilities, and so people with early acquired physical disabilities provide the most appropriate comparisons.

1.9 Structure of the Thesis

This introductory chapter has set the scene for the thesis as a whole. In Chapter 2 I set out the historical and contemporary context of Thalidomide in much greater depth, including the origins of the drug, the chronology and extent of the Thalidomide ‘tragedy’ and the nature of TE. This historical account says much about the present. The chapter also provides essential background information about the financial compensation paid to UK Thalidomide survivors and the role of the Thalidomide Trust, which is an important aspect of understanding current circumstances. Chapter 3 describes the process of conducting the research: I explain the rationale for my overall research design and the methods I have used; I describe how I carried out each stage of the research; and I reflect on the challenges I encountered. The methods and findings from my scoping literature are presented in Chapter 4. In Chapter 5 I set out the findings from the content analysis of the semi-structured interviews and explain how they informed the development of the Health and Wellbeing survey. Chapter 6 presents the survey results. Where appropriate I contextualise the results with the findings from the literature review (i.e. from studies with Thalidomide survivors in other countries), and/or by comparisons with either the general population or other groups with early acquired disabilities. In Chapter 7 I return to the semi-structured interviews to discuss the findings from the grounded theory secondary analysis. Finally, in Chapter 8, I discuss and summarise the findings from the whole study, present my emergent theory *Ageing Differently*, and discuss the implications for policy, practice and research.

Chapter 2 Historical and Contemporary Context

Chapter one provided a brief overview of the history of the Thalidomide ‘tragedy’ and the contemporary issues facing Thalidomide survivors. However, to fully understand the current situation for Thalidomide survivors (physically, emotionally and socially) it is necessary to look in more depth at the history of the drug, the damage it caused, and the nature and level of compensation received by those affected. This chapter begins by outlining the development of the drug and its early marketing, and then describes how evidence about the terrible effects of the drug emerged. It goes on to detail what is meant by the term ‘Thalidomide embryopathy’, and briefly describes how the health and social care system responded to the ‘Thalidomide children’. It then considers the action of the drug and its contemporary uses. The second half of the chapter focuses on the legal action to obtain compensation from the drug’s manufacturers and distributors, and more specifically on the financial and other support available to UK Thalidomide survivors. It closes by briefly discussing the wider impact of Thalidomide, in particular on drug testing and regulation, and on wider societal concerns such as freedom of the press.

Sarah Ferber (2013) describes the history of Thalidomide as “*emblematic of the advance then shocked reversal of the optimism of the ‘pharmaceutical revolution’ of the mid twentieth century, a long and painful process followed by the negotiated return of the drug*” (p133). She uses Thalidomide as a case study to consider the bioethics of the pharmaceutical industry from a historical perspective, and importantly suggests that historical research, particularly when undertaken in “*reflective mode... can help us to understand how attitudes to the past affect perceptions of the present*”. This has resonance for Thalidomide survivors because across the world, pharmaceutical companies are once again making substantial profits from Thalidomide and its analogues. The popular historical narrative, and one fostered by the company which originally manufactured the drug, focuses on the ‘Thalidomide children’ but Thalidomide survivors are still living with the damage the drug caused, some with little or no compensation. Furthermore, contemporary use of the drug is being extended to a growing number of conditions, and despite the existence of safety systems, many commentators (Timmermans and Leiter 2000) fear that it is only a matter of time before TE reappears.

2.2 Development and Marketing of the Drug

Thalidomide was developed by the West German pharmaceutical company, Chemie Grünenthal in the early 1950’s. The company was trying to find an inexpensive method for manufacturing antibiotics. In the course of their experiments they produced a new molecule, α -phthalimidoglutarimide, which they called Thalidomide (Brynnner and Stephens

2001). There has been speculation for some years that a form of the drug was initially developed during Second World War in National Socialist ('Nazi') Germany. In their recent book *The Thalidomide Catastrophe*, Johnson et al (2018) explore the origins of the drug and the backgrounds of its creators. Their research shows that a number of Chemie Grünenthal's senior scientists had connections to the National Socialist regime: Dr Heinrich Muckter, a doctor and pharmacologist who was the director of the company's scientific department, had been a medical scientist for the Wehrmacht, and was Medical Officer to the Superior Command of the German Occupation Forces in Poland; and Otto Ambros, a research director at the company, was a chemist at IG Farben, which manufactured Zyklon B pesticide for the gas chambers and was one of Farben's managers at its Auschwitz plant. However, they state that they found no proof that Thalidomide originated in National Socialist Germany. In their view, what was important were "*the patterns of behaviour established during the Nazi period which continued into the post-war period*" (p17) and which led to the corporate irresponsibility and corruption that allowed the Thalidomide 'catastrophe' to happen.

The patent application for the drug was made in early 1954 and in April of that year they began testing it on animals and humans. Even by the standards of the time, the animal tests were limited and lacked scientific rigour. The 'tests' in humans essentially involved Grünenthal distributing the drug to a number of doctors, some of whom were paid a retainer by the company, for them to use on their patients and note the results. Whilst the expectations of drug testing in the 1950s were very different from what they are today (both in terms of the science and ethics), the 'tests' conducted did not match the practices of other (reputable) pharmaceutical companies, and were very far from what we would recognise as a clinical trial (Knightley et al 1979). There was no use of control groups and no blinding, and many of the doctors involved had vested interests.

The drug was initially tested for its anticonvulsant, spasmolytic and local anaesthetic effects. Whilst early results showed that that it was unsuitable for these uses, trials of the drug found that it induced sleep, and crucially (given concerns about deaths from barbiturates at the time), overdose simply caused prolonged sleep, not death (Smithells and Newman 1992). Chemie Grünenthal went on to 'test' the drug on patients with a wide variety of conditions including tuberculosis, hypertension, hyperthyroidism, atherosclerosis, liver disease, gastric complaints, and influenza. There appears to have been little scientific basis for testing the drug on such a wide range of conditions, the company was simply attempting to find a use for it. Brynner and Stephens (2001) have described Thalidomide as "*a drug in search of a disease*" (p8). However, they go on to point out that whilst this may seem an unusual approach to developing a new drug, it is

not altogether uncommon. They cite the example of azidothymidine (AZT), which was originally developed as an anti-cancer drug in the early 1960's. It proved to be of no use for this purpose but in 1987 Burroughs Wellcome Co. found it was effective in treating patients with AIDS.

The idea that the drug might be used as a hypnotic or tranquilizer came from Herbert Keller, Grünenthal's pharmacologist, who thought that it was a structural analogue of barbiturates (Knightley et al 1979). In fact Thalidomide does not fit into any of the structural classes of sedatives but the idea was attractive, as a tranquilizer without toxicity would have had huge market value (Brynnner and Stephens 2001). It was influenza that led to the drug (combined with quinine, vitamin C, aspirin and phenacetin) first being marketed in 1956 under the name Grippex i.e. suggesting that it could be used to treat 'grippe' or respiratory infections. Again, it is unclear what (if any) evidence there was for this use. Information produced by the company at that time listed numerous indications for the drug ranging from stage fright and depression to PMT and gallbladder disorders. Importantly, however, it claimed that the drug was virtually free from side effects (Lenz 1988).

Thalidomide was first marketed as a non-addictive, non-barbiturate sedative in West Germany in 1957, under the name Contergan (Vargesson 2013). It was available without prescription. Soon after, Chemie Grünenthal began to promote the drug internationally. It was eventually made or sold under licence in 46 countries across the world (Sjostron and Nilsson 1972). The licensing arrangements and the use of Thalidomide in combination preparations meant that it was sold under around 70 different brand names (FfDN 2014). In the UK, Australia and New Zealand, the licence was owned by Distillers Company (Biochemicals) Limited (DCBL) and Thalidomide was marketed under the name Distaval. However, combination preparations were given other trade names, including Valgis and Tensival for a tranquilizer and Valgraine for a migraine treatment. The drug also appeared under these UK brand names in a number of Commonwealth countries where DCBL owned the license. In several countries in Europe (including Ireland, Spain, Portugal, the Netherlands, Finland and Switzerland) it was marketed as Softenol; in Canada and the USA it was known as Kevadon; in Brazil it was marketed under six different names; and in Japan it had ten different brand names. When the dangers of Thalidomide came to light, the marketing practice of using multiple brand names made it much harder for both patients and doctors to identify who had taken the drug, which in turn had implications for compensation claims.

Even in countries where the drug was not officially licensed, notably the USA, it was sometimes made available as samples, whilst in other countries, particularly less

developed nations, the drug may have been brought in and sold by individuals. For example in Africa the drug was officially available in seven countries - Angola, Ghana, Guinea, Mozambique, Somalia, Sudan and 'West Africa'. However, Klausen and Parle (2015) argue that it is almost certain that the drug entered more African countries (including the Republic of South Africa) via informal direct importing agents. Furthermore, whilst in the UK Thalidomide was a prescription drug, in some countries, notably Germany and Japan, it was available over-the-counter, which almost certainly led to it crossing borders.

From the outset, information for doctors and advertising emphasised the safety of the drug, as the picture below of a UK advert from the late 1950s illustrates (Figure 2).

Figure 2 Advertisement for Distaval and Valgraine from the late 1950's



Sjostron and Nilsson (1972) note that the assertion that Thalidomide was 'completely atoxic' was "based on the fact that it had been practically impossible to kill experimental animals by injecting any amount of the drug in a single dose" (p43). The lack of acute toxicity was a valuable attribute as it reduced the risk of accidental poisoning and overdose. However, as Sjostron and Nilsson (1972) go on to explain - "...low acute toxicity does not guarantee that a drug will be harmless when taken repeatedly in low doses over a prolonged period of time i.e. low acute toxicity by no means offers a guarantee of a low chronic toxicity" (p43). Even at the time, pharmacologists were very much aware of this risk and there were several compounds that were known to have low acute toxicity but serious toxic effects (including damage to the foetus) when used over a long period (Knightley et al 1979). Furthermore, recent historical research has uncovered

documents which suggest that Chemie Grünenthal may have been aware that the drug could cause birth defect before such concerns became public (Ferber 2013).

Relatively soon after Thalidomide was launched, reports of side effects began to emerge. In December 1958 a doctor from Frankfurt (Gustave Schmaltz) wrote to Chemie Grünenthal to report that Thalidomide had caused giddiness and disturbance of balance in his elderly patients. Throughout 1958 and 1959 a number of doctors and pharmacists across Germany raised concerns that Contergan was causing peripheral neuropathy in patients who had taken the drug for a prolonged period (Knightley et al 1979). In 1960, some doctors began to make their concerns public. In West Germany Dr Ralf Voss, a nerve specialist presented a paper to a medical conference in Dusseldorf (Knightley et al 1979), and in the UK Dr Leslie Florence (1960) wrote a letter to the British Medical Journal entitled *Is Thalidomide to Blame?* The letter described the symptoms experienced by four patients: marked paraesthesia affecting feet and hands; coldness and pallor in fingers and toes; occasional sight ataxia; and night time muscle cramps. Dr Leslie Florence went on to say – *“It seemed to me to be significant that each patient has been receiving thalidomide (“Distaval”) in a dose of 100mg at night, the period during which the drug had been given varying from eighteen months to two years”*. In 1961 Contergan was placed on prescription in three German states and lawsuits for compensation for the peripheral neuropathy caused by the drug were prepared.

The evidence from this time and from research into current uses of the drug (see section 2.6), clearly shows that prolonged use of Thalidomide can cause peripheral neuropathy, and that even when patients stop taking the drug, the damage may not be reversed. This issue has contemporary relevance because many Thalidomide survivors report experiencing the symptoms of peripheral neuropathy but there is disagreement as to the extent to which (if at all) this is caused by the drug.

The reports of Thalidomide causing peripheral neuropathy was one of the primary reasons why Thalidomide was never licenced in the USA. Frances Kelsey, a newly appointed Food and Drug Administration (FDA) physician and pharmacologist responsible for approving drug licenses, was assigned responsibility for reviewing a new drug application for Thalidomide. She had read the reports of peripheral neuropathy in patients taking the drug and was concerned about its safety. However, she also had concerns that no investigations had been made into the effect of the drug during pregnancy (Vargesson 2013). Richardson-Merrell, who owned the licence for Thalidomide (brand name Kevadon) in the North America applied to the FDA for a licence in September 1960. Kelsey very quickly identified a number of inadequacies in the application: the animal studies were not reported in sufficient detail; full details of the clinical studies were not

reported; data about chronic toxicity was incomplete; there was limited information about the stability of the drug; and its side-effects were not treated seriously (Knightley et al 1979). Kelsey demanded further information and evidence from animal studies.

Richardson-Merrell provided additional information in spring 1961 but Kelsey remained sceptical, noting later that she felt the company was not being entirely honest with her. Despite mounting pressure from Richardson-Merrell on Dr Kelsey and her seniors at the FDA throughout 1961, the drug was not licenced. In a fascinating paragraph from their book, Knightley et al (1979) speculate on the thinking behind Dr Kelsey's decision:

...did she get thalidomide right for the wrong reasons...what emerges from the record is that she got it right largely for the right reasons. True she did not predict that thalidomide would cause birth deformities, but she did ask the question. She was, by chance, especially interested in foetal damage because during the 1940s she had worked with her husband on the antimalarial drug quinine, which had been found to possess teratogenic activity. But the record clearly shows that this was not her main preoccupation. It was even more fundamental. She wanted to know – and was clearly never satisfied that she did know – about the way in which thalidomide behaved in the body; its stability, its effects on human metabolism, even its basic chemistry and pharmacology. (p110)

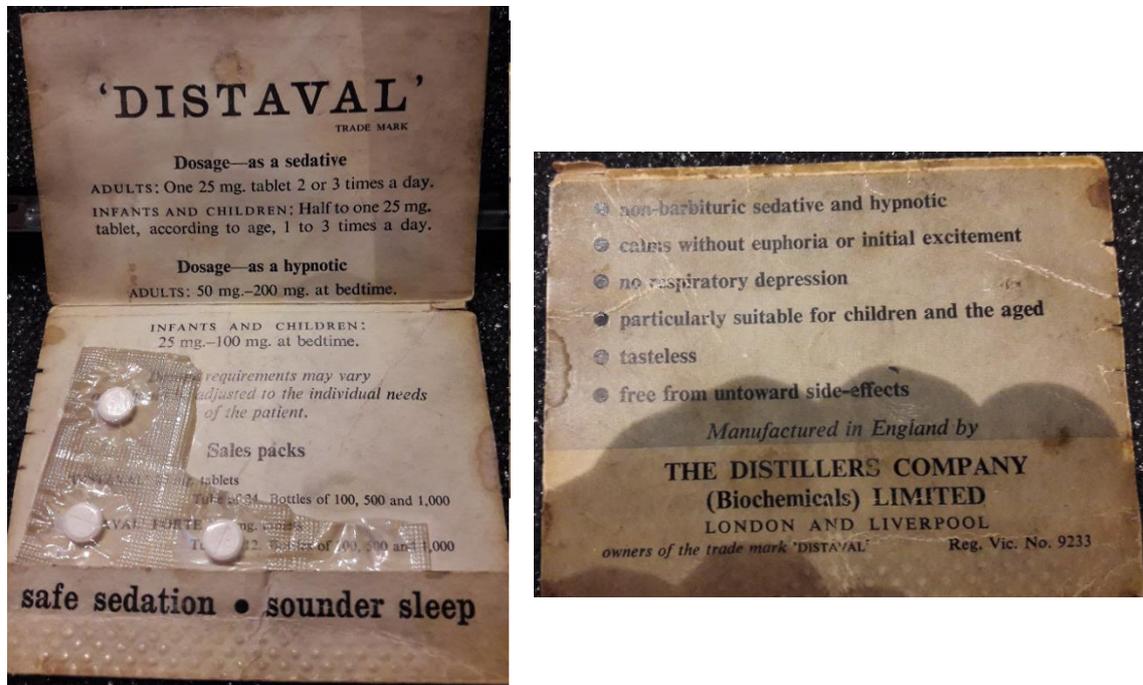
The exact action of the drug is still not fully understood and is the subject of on-going research (see section 2.6).

2.3 The Thalidomide 'Tragedy' – the Drug and Birth Defects

It was the claim that Thalidomide was 'completely safe' and had no side effects, together with its antiemetic properties, that led to the drug being given to pregnant women to alleviate morning sickness. Distaval went on sale in the UK on the 14th April 1958. As the photographs of the original UK Distaval packaging show (see Figure 3), it was promoted as a "safe sedative", "free from untoward side effects". Although it was not specifically marketed as a 'morning sickness pill' as is sometimes believed, information sent to doctors in the UK in 1961 did recommend its use in obstetrics and stated "*Distaval can be given with complete safety to pregnant women and nursing mothers, without adverse effects on mother or child...*" (Knightley et al 1979). In fact, Chemie Grünenthal had never carried out any experimental work to establish whether Thalidomide could have teratogenic effects. In a paper in *Teratology* in 1988, Widukind Lenz, who was instrumental in linking Thalidomide to birth defects notes that when Contergan went on sale in Germany in 1957, it was already well known that chemical substances with low acute toxicity in adults might damage the foetus. He goes on to make the point that: "*The*

assertion that nobody could have foreseen in 1956 a tragedy such as that caused by thalidomide does not become true by reiteration” (p203).

Figure 3 Photographs of original Distaval packaging



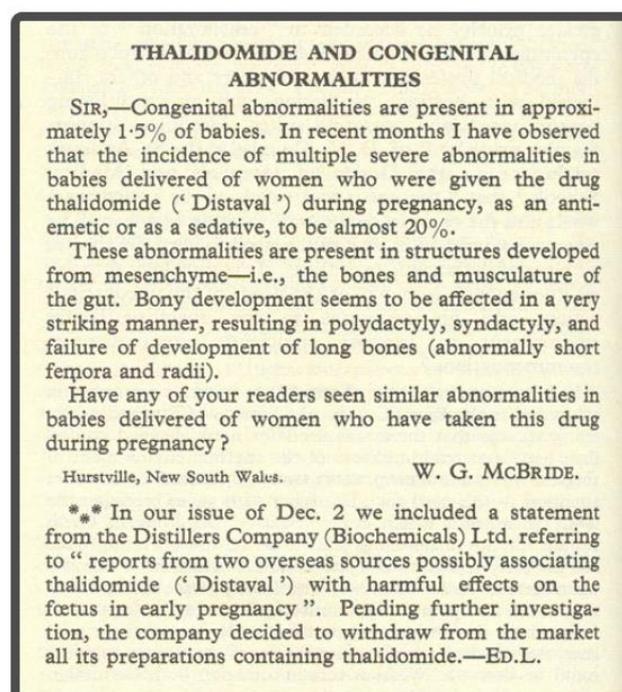
The first known case of birth defects caused by Thalidomide was a baby girl born in Stolberg, West Germany in December 1956. She had no ears. Her father worked for Chemie Grünenthal and had been given early samples of the drug for his wife. In the following four years there were growing reports of occurrences of severe birth defects, but it was not until 1961 that the link with Thalidomide was confirmed by two clinicians working on opposite sides of the world: Professor Widukind Lenz in West Germany and Dr William McBride in Australia (Vargesson 2015b). Lenz was head of the children's clinic at Hamburg University. In spring 1961 he was approached by a young lawyer from Menden near Munster who's own child and the child of his sister had been born with Dysmelia, just a few weeks apart. He agreed to look into the issue further and was startled to find that several colleagues working in the field had seen babies born with similar birth defects. He began working with an assistant to count the number of cases of such birth defects recorded in Hamburg hospitals (Lenz 1962).

McBride had a large and successful obstetrics practice in Sydney and often delivered babies at the Women's Hospital in Sydney. The hospital was run by a young obstetrician, John Newlinds, who had trained under Mc Bride. Distillers Company Biochemicals (Australia) Limited began to promote Thalidomide in Australia in 1960 and McBride first prescribed it the same year. However, in early 1961 three babies were born at the

Women's Hospital with severe and similar birth defects, including bowel atresia (no bowel opening). All of them died soon after birth. Newlinds and McBride were both extremely concerned that the congenital malformation rate for the hospital was now three times the national average. McBride examined the hospital records of all three mothers and the only common factor which emerged was that they had all taken Distaval (Thalidomide) during their pregnancy (Magazanik 2015).

McBride told Newlinds that he thought Thalidomide was responsible for the malformation and Newlinds immediately had the drug withdrawn from the hospital pharmacy. However, between June and September 1961, 23 women who had been given Thalidomide during pregnancy gave birth to healthy babies. This appeared to disprove McBride's theory. Furthermore, in September McBride heard that a paper he had submitted to *The Lancet* earlier in 1961 had been rejected. Then, in September 1961, two more babies were born with birth defects typical of Thalidomide. When McBride looked at their records he again found that they had taken Thalidomide in early pregnancy. We now know that the main risk period for Thalidomide is between the fifth and eighth week of pregnancy but at the time McBride could only deduce this from analysis of individual cases i.e. from simple descriptive epidemiology. In *Suffer the Children* (p128), Knightley et al (1979) describe McBride writing to *The Lancet* again in November 1961 – *"In view of his earlier rejection, he advanced no theories but simply noted what he had observed and sought further information"* (see Figure 4). The letter was published on 16th December 1961, three weeks after the drug was withdrawn from the market in the UK.

Figure 4 McBride's letter to the Lancet



McBride's letter drew the medical world's attention to thalidomide and the extensive damage the drug caused to babies when their mother took it during early pregnancy (Newbronner et al 2017), whilst in the same year in West Germany, Lenz pressed the company and the health authorities to withdraw the drug. The drug was eventually withdrawn from the market in West Germany on the 26th November 1961 and a few days later DCBL did the same in the UK.

Lenz (1988) went on to chart the 'epidemic' of birth defects caused by Thalidomide and linked it to the sales of the drug. He also attempted to estimate the number of babies born or affected by Thalidomide. He noted that the occurrence of birth defects caused by Thalidomide – "*closely followed the monthly sales figures by a distance of 7-8 month, as expected if the sensitive period is considered*" (p204-205). Eight to nine months after the withdrawal of the drug, there was a marked fall in the number of cases. However, in several countries the drug was not withdrawn until 1962 (e.g. Ireland, Italy, Canada and Brazil) and in Japan not until 1963. Furthermore, in a few countries such as Spain (which at the time was under the Franco dictatorship) there was a 'quiet' withdrawal i.e. the drug was no longer licenced but little effort was made to notify doctors and patients about its risks (described in the Spanish film *50 Years of Shame*).

There are no accurate figures for the number of babies affected by Thalidomide. There are a number of reasons for this. Firstly the neonatal survival rate varied between countries; Kida and Lenz (1968) suggest that it was as low as 40% in Japan but closer to 70% in West Germany. Secondly there are reports of increased miscarriage rates during the period Thalidomide was in use (McCredie 2009; Brynner and Stephens 2001), and in addition, not all the babies who did survive were recognised as Thalidomide affected.

A figure of over 10,000 affected babies (worldwide) is often quoted, based on the work of Lenz and colleagues (Miller and Strömmland 1999; Lenz 1988). However, recent work by Johnson et al (2018) presents much more detailed estimates of the number of survivors - those who lived long enough to be registered under compensation schemes or would have been registered if schemes existed in those countries (e.g. Spain); the number of Thalidomide-affected babies born; and the number of pregnancies affected. They note that there are just over 5000 verified survivors worldwide. In the UK, by 2010 the total number beneficiaries registered by the UK Thalidomide Trust had reached 520. The Federal Republic of Germany (i.e. West Germany prior to unification) had the highest number of Thalidomide affected babies, at around 3000 but significant numbers were born in other countries e.g. Japan c300; Sweden c147; Canada c122; Brazil c98; Italy c80; and Taiwan c36 (Lenz 1988). However, Johnson et al (2018) estimate that the true worldwide figure is probably more than 6200. This is based on the fact that where good data is

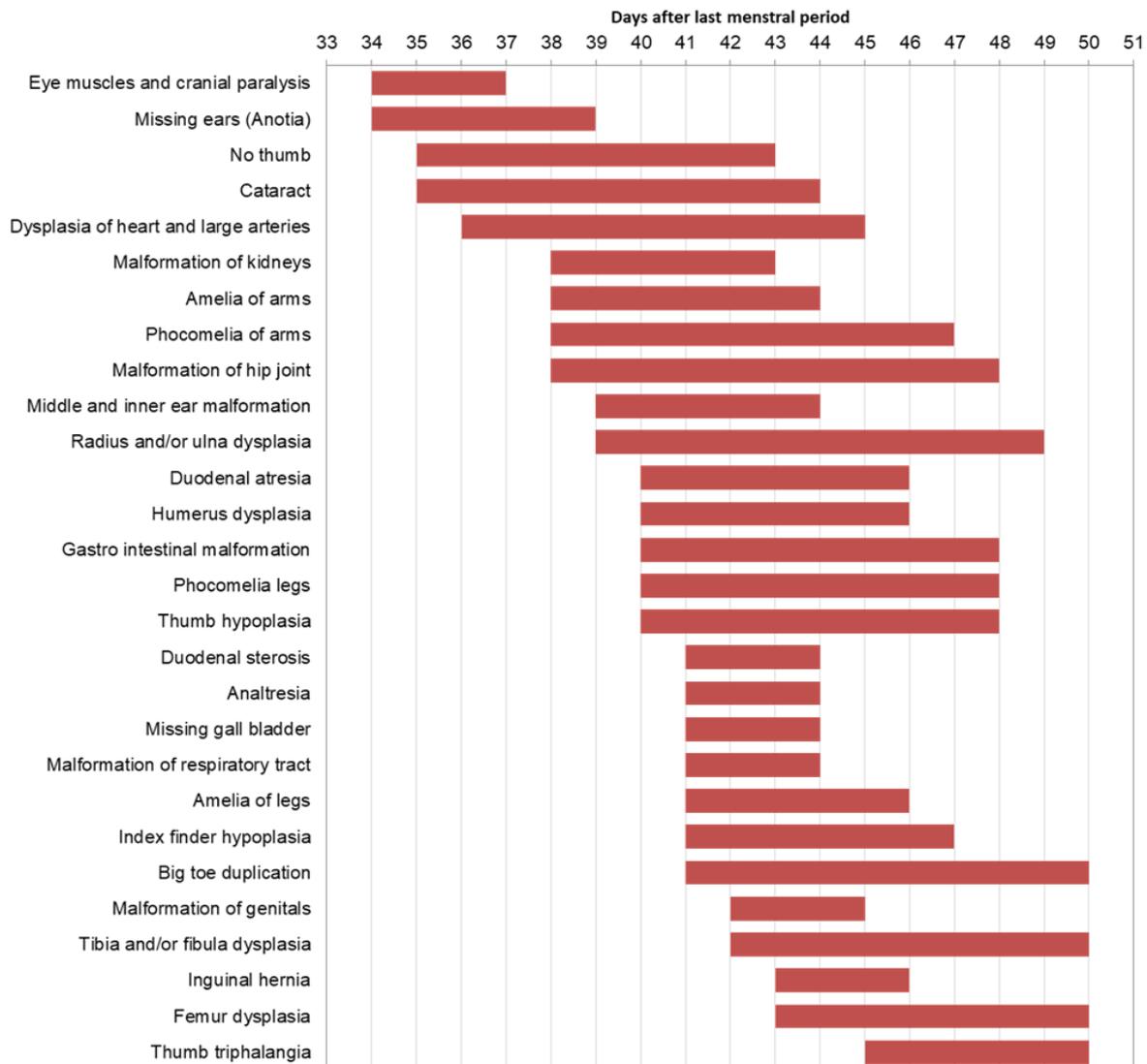
available, the ratio between a country's population and the number of survivors is remarkably consistent (e.g. the UK population in 1960 was approximately 50 million and 520 survivors had been registered by 2010; similarly Ireland had a population of 3.5 million and had 35 survivors).

They go on to explain that the personal accounts of Thalidomide survivors, their families and healthcare practitioners, strongly suggest that many more Thalidomide affected babies were born. Some died in infancy or early childhood of natural causes (and before they could be registered for compensation), but in several countries doctors and midwives have described how babies with very severe damage were sometimes left to die. Drawing on the work of Professor Richard Smithells, one of the doctors most closely involved in documenting the impact of Thalidomide in the UK, Johnson et al (2018) estimate that around 2000 Thalidomide babies were born in the UK, with three quarters dying before their teens. Based on this ratio they suggest that worldwide the figure must be in excess of 25,000 babies. Furthermore, they point to evidence from the UK and West Germany that estimates that live births represent only a proportion (between 10% and 40%) of the pregnancies affected. Taking these estimates together they suggest that the total number of pregnancies, babies and survivors affected worldwide could range from around 87,600 to 275,000. In short, the 5000 survivors still with us are the tip of the Thalidomide iceberg.

2.4 Thalidomide Embryopathy

Thalidomide is now known to be a very powerful human teratogen and the birth defects it causes are severe. However, because it can affect almost any tissue/organ in the forming body (Vargesson 2013), it can cause a wide variety of birth defects, none of which are unique to Thalidomide (Smithells and Newman 1992). For this reason, the combination of birth defects caused by exposure to the drug are usually collectively referred to as 'Thalidomide Embryopathy' or sometimes 'Thalidomide Syndrome'. The time sensitive window or 'critical period' in which Thalidomide causes damage to the foetus is relatively short – between 20 and 36 days after fertilisation or 34 to 50 days after the last menstrual period (Smithells and Newman 1992; Miller and Strömmland 1999). However, before the critical period the drug can induce miscarriage and within it, even a small dose (e.g. a 50mg tablet) appears to cause birth defects in 50% of pregnancies (Vargesson 2013). Different parts of the body are affected at different points in the time sensitive window. Figure 5 provides a detailed picture of this.

Figure 5 Time sensitive periods for different areas of damage (adapted from Peters et al 2015)



Vargesson (2015b) notes that the hallmarks or consistent features of TE were established by examining the children most severely affected by the drug. These diagnostic criteria are still in use today, although they have been up-dated and broadened following a WHO sponsored meeting of experts held in 2014. More recently, a diagnostic algorithm has been developed for TE by a team at St Georges Hospital, London, supported by the Thalidomide Trust (Sahar et al 2019), and is due to be made available worldwide in 2020.

2.4.1 Limb and joint damage

Dysmelia (missing, short and/or deformed limbs) is the most common feature of TE and, in the public mind, the one most strongly associated with the drug. Phocomelia is the most extreme form of Dysmelia. In their worldwide descriptive epidemiological study of phocomelia, Bermejo-Sánchez et al (2011) define phocomelia as:

...a rare congenital anomaly in which the proximal part of the limb (humerus or femur, radius or tibia, ulna or fibula) is absent or markedly hypoplastic, with normal or nearly normal hand or foot. True phocomelia is characterized by the total absence of the intermediate segments of the limb, with the hand or foot directly attached to the trunk. Etymologically, the term phocomelia comes from the Greek: φώκη— fóke—“seal,” plus μέλος—melos— “limb,” and it refers to the similarity of the patient’s limb shape to the flipper on a seal. (p305)

Amongst Thalidomide survivors, Dysmelia ranges in severity from slightly shortened limbs and/or damage to hands and feet (e.g. missing or extra digits and/or triphalangeal thumbs), to the complete absence of the long bones, with the hands or feet articulating directly from the body (Smithells and Newman 1992; Newman 1985). The majority of Thalidomide survivors have some limb damage, most often shortened limbs, and this is usually symmetrical. Symmetrical limb defects are one of main diagnostic indicators of TE, although there is some recognition that there can be differences in severity between one side of the body and the other (Vargesson 2015b).

The majority of Thalidomide survivors with upper limb damage have normal lower limbs but a minority have all four limbs affected. Lower limb damage alone is rare (Smithells and Newman 1992). According to data held by the Trust, around 1.5% of their beneficiaries have lower but not upper limb damage and a study in Germany found a similar proportion (Kruse et al 2013). Vargesson (2015b) notes that it is still unclear why upper limbs are more likely to be affected than lower limbs. However, he does note that:

...the lower limbs form slightly after the upper limbs, and we know that Thalidomide has a short half-life of activity, thus it is possible a single dose in the early stages of pregnancy could affect the upper limbs, whereas multiple doses over a few days may be required to affect the later forming lower limbs. (p143)

Many Thalidomide survivors also have damage to their joints. Shoulder joints are often misshapen, hip joints can be hypoplastic or even missing, and knees and ankles can be unstable. Changes to the vertebral column is also a feature of Thalidomide damage, particularly block vertebrae, and kyphosis (Smithells and Newman 1992; Ghassemi Jahani et al 2016a). The consequences of joint and spinal damage are increasing as Thalidomide survivors age, with early onset arthritis leading to the need for early joint replacement. This issue is discussed more fully in Chapters 4 and 6.

2.4.2 Sensory impairment and facial damage

The second most common group of impairments caused by the drug are to the eyes, ears and face (Smithells and Newman 1992). This is because the eyes and ears develop in the

embryo around the same time as the limbs. This group includes a wide range of damage, which can occur in different combinations but the most common are: facial disfigurement (e.g. irregular features, small jaw, small nose), facial palsy and cleft palate; missing or small eyes, damage to the iris and/or retina and the inability to form tears; and missing or small outer ears and narrow ear canal (ear defects are usually symmetrical).

2.4.3 Damage to internal organs

Vargesson (2013; 2015b) notes that all of the internal organs can be affected by Thalidomide but damage mostly commonly occurs to the heart, kidneys, genitals and bowels. Some of these problems were not apparent at birth and have only come to light in later life, so there are no accurate estimates of incidence (and they are less fully discussed in early writing about 'Thalidomide defects'). However, it has been suggested that severe damage to internal organs, particularly the heart and bowel, may have caused many intrauterine and postnatal deaths (Vargesson 2013)

2.4.4 Nerve damage

There is some evidence that Thalidomide survivors are more likely to have facial palsies (Sjogreen and Kiliaridis 2012) and cranial nerve abnormalities leading to conditions such as Duane's Syndrome, an eye movement disorder characterized by limited horizontal eye movement (Miller and Strömland 2011). It has also been suggested that autism and epilepsy may be more common amongst Thalidomide survivors but the evidence for this mixed (Strömland et al 1994; Imai et al 2014).

One of the conundrums of Thalidomide is the variability of Thalidomide induced damage between individuals. The drug is now known to be a very potent teratogen and yet it is estimated that the risk of birth defects from *in utero* exposure is 50% (Newman 1985 & 1986). Furthermore, the severity of damage caused by similar levels of exposure at similar points in the time sensitive window, can also vary. Vargesson (2013) suggests that this variability might be explained by the fact that individuals have different metabolic rates and react differently to drugs, which when combined with time of exposure to the drug, could lead to different consequences. There are a few congenital conditions which cause impairments similar to Thalidomide, notably Okhiro Syndrome and Holt-Oram Syndrome which both cause limb reduction, and Roberts Syndrome (also known as pseudothalidomide syndrome) which causes phocomelia in all four limbs, facial disfigurement and damage to internal organs (Bates 2001). Although all these conditions are rare, in cases where there is no confirmation of the mother taking Thalidomide during pregnancy, and without genetic testing, their existence can make diagnosing TE more difficult.

2.5 Response of Health and Social Care Services

As children, Thalidomide survivors were subjected to repeated medical examinations, tests and X-rays. Many had numerous surgical procedures, some of which were essential but many were cosmetic, such as attempts to create 'ears' for those children born without them, even though they remained deaf. Perhaps one of the saddest aspects of these early medical interventions was the number of amputations. Doctors often failed to see that even residual limbs and digits would be valuable later in life, as people found their own ways to use their bodies for everyday tasks. Conversely, for those Thalidomide survivors born without thumbs or with triphalangeal thumbs (i.e. a thumb that is like a finger) one of the most valuable operations performed was the creation of a thumb from a finger, as this gave people a grip function. Many Thalidomide survivors were also forced to use prosthetic limbs, and some even had the remnants of limbs they were born with amputated so that prosthetics could be fitted. These prosthetic limbs were heavy, cumbersome and often largely useless, as the photographs in Figure 6 suggest.

Figure 6 Examples of prosthetic limbs designed for Thalidomide children



The Thalidomide Society and the Wellcome Library have examples of these prosthetics, as well as photographs and film of Thalidomide survivors attempting to use them. From this archive it is not hard to see why many rejected them in preference for their own strategies for daily living. Rosaleen Moriarty-Simmonds, a four limb affected Thalidomide

survivor from Cardiff recounts the experience of being 'fitted' with artificial limbs in her book *Four Fingers and Thirteen Toes* (2009):

...the determined efforts of the medical profession to equip me with all sorts of mechanical paraphernalia in the misguided impression that it would improve my life. Sad to say it did not, and the process of wiring, bolting and screwing of all these contrivances on to my body was both unpleasant and painful. (p51)

Most Thalidomide survivors were brought up by one or both of their parents but some were placed in institutional care from an early age. A number went to Chailey Heritage Craft School and Hospital in West Sussex, an institution for children with severe disabilities. Despite the fact that the vast majority of Thalidomide survivors have no intellectual impairment, unfounded and negative assumptions were sometimes made about their academic ability, and some were sent to what were then referred to as 'schools for the educationally subnormal'. In many respect these attitudes reflected thinking and policy at the time but as the accounts of Thalidomide survivors and their parents show (see for example the Thalidomide Oral History project held by the Wellcome Library), most health and social care professionals had never encountered such profound impairments before and so did not know how best to support the children and their families. These childhood experiences have left many Thalidomide survivors mistrustful of the medical profession and reluctant to engage with the social care system, which in turn has implications for their willingness to seek help as adults.

2.6 Action of the Drug and Contemporary Uses

Thalidomide is a highly unusual drug. Most of its mechanisms of action, both in the adult system and in embryo development, are not fully understood. The following extract from Brynner and Stephens (2001) provides a very helpful explanation of why this is the case:

First, it does not readily dissolve in the body, a major problem for researchers (drugs that can't be put in solution are far more difficult to test). Second, when thalidomide is metabolised by the liver enzymes, it produces well over 100 breakdown products, making it difficult to determine which ones cause thalidomide's various actions. Third, the possible mechanisms of action of the drug in various tissues and various conditions are either completely unknown or are just now beginning to yield to investigation. (p164)

Over 30 separate models/theories have been proposed to explain the mechanisms of action underlying TE (Vargesson 2015b) and the teratogenic process of the drug remains a complex and controversial topic, well beyond the scope of this thesis. However, it is useful to very briefly note current theories, as they help to explain some of the

contemporary uses of Thalidomide. Currently the most commonly accepted theories focus on the drug's ability to inhibit the formation of new blood vessels (angiogenesis) and induce cell death, as well as its capacity to bind to molecular targets such as cereblon, a protein that alters the function of other molecules to regulate signalling in cells (Vargesson 2015a). In adults, Thalidomide has the ability to selectively inhibit the production of Tumor Necrosis Factor-alpha or TNF- α , a characteristic valuable in treating inflammatory and autoimmune conditions. In particular, it is the drug's ability (in adults), to inhibit the body's inflammatory response as well as prevent blood vessel formation that has led to its contemporary use to treat a number of conditions, including certain types of cancer and, more recently, ulcerative conditions such as Crohn's disease (Vargesson 2013).

Thalidomide has been used to treat ENL, which causes painful and inflamed skin lesions, since 1965, following a chance discovery by an Israeli doctor (Jacob Sheskin). It has been widely used in Brazil for this purpose. Sadly the areas of the country where leprosy is prevalent often have poor access to health services and medicine sharing is not uncommon. As a consequence there have been at least 36 cases of TE in Brazil since 1965 (Schuler-Faccini et al 2007), with some babies being born as recently as the 2006. However, this number is likely to be an underestimate as in poor and remote communities the birth of babies with Thalidomide damage will very likely not be registered through any national birth defects surveillance systems. Furthermore, since the early 2000s there has been an on-going debate amongst clinicians and with the WHO as to whether Thalidomide is still an appropriate treatment for ENL in Hansen's Disease. Some clinicians have argued that ENL is no longer a significant complication of Hansen's Disease and where it does occur other treatments are available, even preferable. They have also pointed out that in relatively poor or under regulated countries, safety and monitoring systems designed to prevent women of child bearing age being given the drug may be weak or patchy. However, the WHO continues to recognise the use of Thalidomide for ENL (Ferber 2013).

In the 1980s, few drugs were available for the treatment of AIDS and HIV. People began to experiment with Thalidomide, and found that it had some effect on aphthous ulcers and AIDS-related wasting disease. At the time, it was licenced for manufacture in Brazil and Mexico (and in small quantities and for restricted use by one company in the USA) for the treatment of ENL, and so in the USA and Europe it was only available on the black market (Ferber 2013). In the USA, 'buyers clubs' smuggled thalidomide and other drugs over the border from Mexico and then distributed them through an unofficial national network. By the early 1990, there was a huge 'unofficial' demand for Thalidomide. The USA Food and Drug Administration (FDA) were very concerned about its unregulated use and began to

crack down on the buyer's clubs. However, in 1994, as a result of a chance meeting between Gilla Kaplan, an immunologist working on Thalidomide and David Kessler the Commissioner of the FDA, and growing pressure from the AIDS/HIV community, the process of approving Thalidomide began (Brynnner and Stephens 2001). Thalidomide was out of patent and so it was Celgene, a then small pharmaceutical company based in New Jersey that approached the FDA about approval. In 1998, after a long process, including extensive consultation, which eventually included Thalidomide survivors, the drug was approved for the treatment of ENL. However, in the USA, drug regulations permit 'off label' use of FDA approved drugs. Effectively this means that once a drug had been approved for one use, doctors can legally prescribe it for the treatment of other conditions. Doctors treating AIDS and HIV patients could therefore use it legally but problems with the drug had already begun to emerge. Many patients with AIDS-related wasting disease could not tolerate the sedative effects of Thalidomide and new and more effective medicines had been developed (Johnson et al 2018).

As the demand for Thalidomide to treat AIDS and HIV declined, interest in the drug's potential to treat certain types of cancer and autoimmune diseases grew. In fact, in 2000 (just two years after its approval by the FDA) over 140 clinical trials were being conducted to assess its efficacy for these conditions (Ferber 2011). For some conditions, such as multiple myeloma, it has become a well-accepted and important treatment. Multiple myeloma is a cancer of white blood cells. Even with chemotherapy and stem cell replacement, survival rates are poor, but Thalidomide can prolong the lives of patients by up to 18 months. Two structurally-related analogues of Thalidomide – Lenalidomide and Pomalidomide – are currently being marketed for this use (Vargesson 2015a).

Thalidomide has also been prescribed for a number of autoimmune and inflammatory diseases, as well as rare skin conditions. It has been used to treat rare conditions such as Behcet's disease (an immune system induced vascular condition where vessels are destroyed causing bleeding and tissue damage), as well as graft versus host disorders (which occur for example in bone marrow transplants) but also for more common conditions such as Lupus, multiple sclerosis and Crohn's Disease (Vargesson 2013). It is these latter conditions, which can occur in a younger population (i.e. of child bearing age) that the biggest concerns about safety and prevention of pregnancy exist.

In 1997 when the FDA was considering whether to licence Thalidomide, a central concern was how to minimise the risk of birth defects. Celgene devised STEPS (System for Thalidomide Education and Prescribing Safety), now known as REMS (Risk Evaluation and Mitigation Strategy) (Celgene 2020). It requires doctors and pharmacists providing the drug to register and be trained in the programme, and for all patients who take

Thalidomide to be registered, to be educated about the effects of the drug, to agree to use two forms of contraception, and to sign a consent form stating that they know the risk associated with the drug. Specifically, the consent form states they will not share their medication and will return all unused tablets at the end of their treatment. American and Canadian Thalidomide survivors were actively involved in the development of STEPS and they feature in the patient education materials.

In a number of countries, including the UK, scientists are searching for a form of the drug that retains the clinical benefits without the side-effect of damage to the embryo (Newbronner 2017).

2.7 Legal Action and Compensation

The legal process to obtain compensation for Thalidomide survivors varied substantially from country to country. In part this was because of differences in the law between countries but it was also because in many countries Thalidomide had been sold under licence and the pharmaceutical companies who owned the licences responded differently. There are a number of accounts of the legal battles fought by the families of Thalidomide children and they make for fascinating, if disturbing, reading. More recently the film *50 Años de Vergüenza* (50 Years of Shame) has documented the fight by Spanish Thalidomide survivors for compensation. However, for this thesis, what is important is the level and format of the compensation awarded, and the implications this has had for Thalidomide survivors' ability to live with their impairments and manage their health. Three countries – Germany, Canada, and Sweden - show the different ways in which the law treated Thalidomide survivors and provide a comparison with the UK legal settlement. Importantly, in none of these cases, nor in the UK, did the idea of ageing with disability or the long term effects of the drug, inform discussions about the provision of compensation.

2.7.1 Germany

In 1961 the public prosecutor's office in North Rhine Westphalia started an investigation to establish whether there was a case for legal action against Grünenthal. There was no precedent for such an action in West German law and so the implications for the liability of German pharmaceutical companies were huge. Partly because of the significance of the case but also because of obstruction from Grünenthal, it took four years (to 1965) for the prosecutor to draw up the indictment charging Grünenthal's executives with intent to commit bodily harm and manslaughter (Sjostrom and Nilsson 1972). The trial began in 1968 but was suspended in 1970 when an out of court settlement was accepted by the parents of West German Thalidomide children. Grünenthal agreed to pay DM 114 million (about \$31 million) and the West German Government paid an additional DM 50 to 100

million (about \$13.5-\$27 million). Whilst the settlement meant that West German Thalidomide survivors received some financial assistance sooner than they might have done had the trial continued, especially if it had gone to appeal, it failed to provide a clear legal precedent because Grünenthal had neither been found guilty nor acquitted (Knightley et al 1979).

For many years, German Thalidomide survivors have argued that the monthly pension they receive from the compensation fund was inadequate and that Grünenthal have never been properly held to account for the damage they caused. In 2009, after a long campaign, Grünenthal paid an additional €50m in to the fund and in 2013 the German government agreed to substantially increase pension payments. A government controlled body, the Contergan Foundation, also has a €30m annual 'special needs' fund, which Thalidomide survivors can apply to for help to cover specific expenses such as wheelchairs, adaptations to homes and high cost health treatments. However, many Thalidomide survivors regard the Contergan Foundation as bureaucratic and obstructive, for example requiring people to provide proof that costs cannot be met by their health insurance providers. Furthermore the fund will not pay for assistance services such as cleaning and personal care. As a consequence, many Thalidomide survivors are deterred from applying to the fund and in 2014, just €2m was used out of the annual pot of €30m (The Guardian, 2015). In 2015, a new chair of the Foundation's Board of Trustees was appointed and since then some changes have been made in the way the organisation operates.

2.7.2 Canada

In Canada Richardson Merrell had the licence to distribute Thalidomide and in fact continued to market it until March 1962, three months after it had been withdrawn in the UK (Vermette and Benegabi 2013). The legal action against the company occurred in two stages. In 1968 Richardson Merrell agreed a legal settlement with ten families in Ontario. The law firm Spangenberg Traci negotiated \$2 million to be divided amongst the families but two conditions were imposed – the amount of money received by each family was to remain secret and the law firm had to agree not to represent any more Canadian Thalidomide children. The company's aim was to delay any more claims until the statute of limitations expired and this was exactly what happened to 26 Thalidomide survivors born in Quebec (Brynnner and Stephens 2001).

However, as Brynnner and Stephens (2001) explain, the families were introduced to Arthur Raynes who had represented the first US Thalidomide survivors. He proposed suing Richardson Merrell in New Jersey where they had a wholly owned subsidiary and which was one of only two states in the USA to have a doctrine of government interest. Raynes

argued that what happened in Canada was of interest to the state government of New Jersey and so the case could be tried there. Although Raynes won the case initially he lost on appeal in 1975. However, the threat of further legal action persuaded Richardson Merrell to settle out of court, and they agreed to pay \$15 million to the 26 families. The secrecy the company imposed in Canada makes it hard to know exactly how much compensation Thalidomide survivors there received and importantly, as the Thalidomide Victims Association of Canada explain, - *“resulted in wide disparity in the compensation amounts, with settlements for individuals with the same levels of disability varying by hundreds of thousands of dollars”*. In 1991, the Ministry of National Health and Welfare (now Health Canada), made small lump sum assistance payments to Canadian-born Thalidomide survivors but many continue to experience severe financial hardship (Vermette and Benegabi 2013).

2.7.3 Sweden

The first civil court case in Sweden was brought in 1965 by the parents of Thalidomide survivors from city of Sodertalje. The case was against Astra, the largest pharmaceutical company in Scandinavia, who owned the licence to distribute Thalidomide there. The prosecution faced a number of major problems. Firstly the Swedish Medical Board announced that the tragedy was ‘unavoidable’ and Astra was not to blame (Knightley et al 1979). Secondly, they had difficulty finding expert witnesses to testify against Astra, such as the company’s influence, and the German prosecutors did not want their witnesses to give evidence in Sweden before it was heard in the German criminal trial. Eventually, in 1969, Astra agreed an out of court settlement with the Association for the Parents of Thalidomide Children, of 70m Kroner (\$14m), which was more than could have been received under the law from a trial (Sjostrom and Nilsson 1972).

The compensation fund is administered by the Swedish Thalidomide Society (Föreningen för de Neurosedynskadade or FfDN), and Thalidomide survivors receive a twice yearly tax exempt payment. In 2005 the Swedish government made a lump sum payment to Thalidomide survivors amounting to €55,000 per survivor. In 2009, AstraZeneca also made a lump sum payment - the average payment was €120,000, with the most severely affected individuals receiving up to €380,000. Then in 2010, they put additional funding into the compensation scheme, which increased the annual payments by about 30%.

2.7.4 Other countries

In some European countries where there were smaller numbers of Thalidomide survivors, many obtained compensation via one of the bigger settlements, based on where their mothers had been prescribed or bought the drug. For example Thalidomide survivors in the Netherlands and Austria fall under the German scheme, whilst those in Finland and

Norway were part of the Swedish settlement. However, in Spain, which was under the dictatorship of General Franco in the 1960s, Thalidomide survivors have never received any compensation. The drug continued to be sold there under various brand names throughout the 1960 and 70s, and so the age range of Thalidomide survivors in Spain is much wider. Until 2008 the Spanish government denied ever importing Thalidomide but in 2011, after a long campaign by Avite (the Spanish Thalidomide group) they did pay limited compensation to 23 survivors (Sunday Times, 2015). In 2013 Avite won a civil case against Grünenthal but a year later the judgment was overturned on the grounds that too much time had elapsed. Like their peers in Spain, many Thalidomide survivors in the lower and middle income countries where the drug was distributed have received little or no compensation.

2.7.5 UK legal settlement

In the UK, the fight to get compensation for Thalidomide survivors was as much a moral battle as a legal one. Comparing the legal process in the UK to that in other countries, Brynner and Stephens (2001) offer this observation:

“It was a sprawling ordeal that had almost nothing in common with the cases in other countries. The issues it raised were fundamental assumptions about human society and British culture in particular, free enterprise and responsible capitalism, governance, politics, and most of all the law. But at its core the case was always about moral justice and the absence of it”. (p79)

A definitive account of the legal case in the UK and the events surrounding was published by The Sunday Times Insight Team in 1979 (Knightly et al 1979). Led by Harold Evans, then editor of the Sunday Times, the team were instrumental in making the case for compensation for Thalidomide survivors. In November 1962, the parents of 68 Thalidomide children filed a lawsuit against Distillers. They faced several major obstacles. They were reliant on public funding to pay their legal expenses and this was controlled by the Law Society, which from the outset had a negative view of the case. The solicitors and barrister who were funded changed and often served the families poorly. Then, as in the Swedish case, they found it difficult to obtain experts to testify, either because they were reluctant to speak against powerful interests in the pharmaceutical industry or because they were committed to the German trial. However, perhaps the biggest obstacle was that, as Knightly et al (1979) put it: *“the moment the writs were issued, the whole affair was sealed by the laws of contempt of court into a legal cocoon from which it did not emerge until 1977”* (p190). In effect this prevented the public (and therefore public opinion) knowing about the Thalidomide case but it also meant that the families of other UK

Thalidomide children were unaware of the class-action suit and so many of them did not come forward until years later.

In late 1967, just a few months before the case was due to go to court, the families had no expert witnesses willing to speak for them, and their lawyer, Desmond Ackner, advised them that they would probably lose the case and so should settle out of court. The settlement was decided by the High Court in 1969, based on two representative cases but it was not until 1971 that actual figures were agreed. Despite attempts to put forward actuarial evidence about loss of income and the impact of inflation on lump sum awards (Knightly et al 1979), the families were awarded just 40% of the maximum they could have received through a trial. However, perhaps equally cruel was the stipulation by Distillers that all the families had to accept the offer and if just one refused, they would withdraw it (Moriarty Simmonds 2009). Six families refused to settle, although for different reasons. The legal team representing the Thalidomide families tried to coerce the six families to agree by taking them to the High Court to have them removed as the legal guardians of their children and in March 1972 the court agreed to this. However, one parent, David Mason, had the money to meet the cost of an appeal and a month later the earlier judgement was overturned. As all the families had not agreed to the settlement, the whole case ground to a halt.

Despite the effective press embargo created by the laws of contempt of court, behind the scenes The Sunday Times had continued to investigate. The paper had obtained (through various routes) thousands of internal documents from Distillers and Grünenthal but if they had used them they would have given Distillers grounds to prevent publication. So they took a different tack and in 1972 published an article entitled "*Our Thalidomide Children: a National Shame*" which focused on the circumstances of the Thalidomide children and the minimal compensation they had received (Knightley et al 1979). A second article followed, other papers began to pick up the story and there was support from a small group of MPs but Distillers obtained an injunction to prevent a third article being published. However, by this time public outrage about the 'Thalidomide scandal' was growing and Distillers were facing a public boycott. In a forerunner of today's social media campaigns, posters began to appear which mimicked adverts for Distillers products but instead of Johnny Walker or Gordons Gin the labels on the bottles read 'Thalidomide'. This was followed by pressure from Distillers shareholders to provide a more generous settlement. Eventually in 1973, with their share value plummeting, Distillers agreed to pay £20 million in compensation, over ten years, into a charitable trust for the original 62 families and another 367 Thalidomide children who had been identified by that point. In 1974 the British

government donated a further £5 million, which was an offset of tax on the original £20 million paid in by Distillers.

For nearly three decades UK Thalidomide survivors received compensation payments from the original trust fund, for the birth defects caused by the drug (but not the long term consequences of them). However, the annual amounts paid were not substantial and payments were subject to tax. In 1996 the British government, without offering any particular reason, donated a further £7 million, and then in 2000, after a long campaign, they agree to tax exempt the compensation payments (Johnson et al 2018). In 2005, Diageo (the company which now owns Distillers) agreed a complex new multi-year financial settlement (estimated to cost in the order of £153 million) as additional compensation for Thalidomide survivors. The additional funding provided for covenant payments to be increased and for the payments to be extended from 2022 to 2037. This was calculated on the basis of the money required to double beneficiary annual payments from 2004 levels by 2022³. As a result of these changes, over the past two decades, the financial position of UK Thalidomide survivors has much improved.

2.7.6 Creation of Thalidomide Trust

In 1973 the Thalidomide Trust (or the Thalidomide Children's Trust as it was originally known) was set up to administer payments made by Distillers. The Trust is a discretionary trust and a registered charity. With discretionary trusts, a class of beneficiaries is named in the trust deed and the trustees have discretion as to how, when, and for whose benefit to use some or all of the capital and income of the trust fund. Importantly, the payments made by the trust are disregarded in calculating means tested benefits. The aim of the Trust is to provide *“relief and assistance to people who have disabilities caused by their mothers taking Thalidomide”*. Since 1973, the Trust has accepted 540 people as beneficiaries, though sadly 78 of them have since died⁴.

The Trust is responsible for administering two funds – the annual compensation payments from the Distillers (now Diageo) trust fund, and the Health Grants funded by the four UK Health Departments (see 2.7.8). As the Trust website states:

“In addition, the Trust provides information, advocacy and advice on health and broader wellbeing issues to support beneficiaries in maximising their health, independence and quality of life. An important role of the Trust is to support beneficiaries who lack the capacity to make decisions, to ensure that their needs are being appropriately met”.

³ Information provided by the Thalidomide Trust.

⁴ Information provided by the Thalidomide Trust

The Trust has ten Trustees. Three of them, including the Chair of Trustees, are external appointments made by the Lord Chief Justice of England, the President of the Royal College of Surgeons of Edinburgh and the President of the Institute of Chartered Accountants in England and Wales. The remaining Trustees are appointed through a structured recruitment process which directly involves beneficiaries of the Trust. The Trust also has National Advisory Council (NAC) which is made up of 12 beneficiaries, elected by all UK Thalidomide survivors.

2.7.7 Distribution of the compensation

In 1973, the Thalidomide survivors included in the original settlement were assessed by doctors to establish the damage caused by the drug. They were given 'points' according to the severity of their impairments, with total points ranging from 3.5 to 75 (most severe). The total number of points is referred to as their '6(iv) b figure', which refers to the section in the legal document which established the Trust. The size of the annual compensation payment each beneficiary receives is determined by the number of points they have. In 2018, annual compensation payments ranged from £3800 to just over £82,000.

Beneficiaries can take their compensation in a variety of ways. Most choose to receive it as an annual payment but the Trust can hold funds for beneficiaries (e.g. for the few who lack capacity) and make smaller more regular payments.

2.7.8 UK Health Grant

In March 2010 the English Department of Health confirmed it was to make a pilot Health Grant of £20 million to Thalidomide survivors in England. This sum was matched proportionately by the Scottish, Welsh and Northern Ireland administrations, creating a UK wide grant of £26.4 million. The grant was intended to help Thalidomide survivors address the *“exceptional health and health-related needs they are experiencing as they grew older”* (extract from the Department of Health letter to the Thalidomide Trust confirming the grant). It was distributed by the Trust over three years from April 2010, in the form of an annual Health Grant to individual Thalidomide survivors. When they confirmed the grant, the Departments of Health set down a number of conditions:

- It must only be used to meet health-related needs
- It must not be used to meet needs that were already being met through NHS funding
- The Trust must account to the Departments of Health for how the money was used
- The impact of the pilot scheme must be evaluated

The agreement to make a 'Health Grant' to Thalidomide survivors in the UK was the culmination of a number of years campaigning by a small group of Thalidomide survivors, supported by the Trust. They saw the grant very clearly as reparation for the UK

government licensing Thalidomide back in the late 1950s and early 1960s without adequate checks and controls. However, there was also an acceptance by many of those involved that it was politically expedient to refer to the payment made as a 'grant', and that referring to it as a 'Health Grant' went some way to recognising the health problems Thalidomide survivors are experiencing as they age.

It was important to the campaigners that individuals would not be expected to account to the Departments of Health for their expenditure and would be free to spend it as they wished in order to meet their health-related needs. As a result, the agreement reached with the Departments of Health simply set out seven categories of 'health-related needs' which Thalidomide survivors should use to 'guide their expenditure' (Newbronner et al 2011). The categories were set out in a guidance note sent to all UK Thalidomide survivors:

Independent mobility - (vehicles, vehicle adaptations, wheelchairs, etc.) ensuring that you can lead an independent life without subjecting yourself to unnecessary stress and strain, and reducing your vulnerability to harm.

Home adaptations - to ensure you can lead a safe and independent life in your own home as far as possible, also without subjecting yourself to unnecessary stress and strain or doing things that could be harmful.

Communications technology - systems relevant to your disability, again aimed at protecting your body (including sensory organs) from harm, and also reducing your vulnerability in general terms - or providing information to enable the Trust and others to support your health needs effectively.

Medical treatment costs - other than those already covered by the NHS. This could include various therapies found to be helpful of types not funded for you by the NHS.

Respite - therapeutic "breaks" for either yourself or your carer(s), intended to relieve such things as musculoskeletal pain, or the general stress experienced by people in unremitting care situations.

Personal assistance - including care in the general sense, but also the range of tasks needed at home or work that would otherwise involve putting your body at risk of further damage. Many of you will already receive personal assistance funded by your local authority or the Independent Living Fund; the Health Grant can be used to purchase additional personal assistance with activities not covered by existing funding.

Social activities - activities that help you get out, reduce isolation and improve your mental and physical well-being.

The use and impact of the Health Grant was evaluated and the results of the study were used by the Thalidomide campaigners and the Trust to make the case for the Health Grant to be continued. A new, and slightly increased ten year Health Grant was agreed in 2013. The Health Grant money is allocated on the same basis as the annual compensation payments (i.e. based on impairment 'points') and is around 75% of the annual compensation payment. In 2018, Health Grants ranged from £2500 to £53,700.

2.8 Wider Legacy of Thalidomide

Although the focus of this thesis is on the contemporary issues facing UK Thalidomide survivors, it is relevant to briefly reflect on the wider legacy of the 'Thalidomide tragedy', as the medical/clinical, legal and social changes it brought about are the backdrop against which Thalidomide survivors have lived their lives. One of the most significant and positive changes brought about by Thalidomide was the establishment of standards for clinical research, which were set out by the World Medical Association in the Helsinki Declaration in 1964. In Europe and North America there were also major changes in the procedures for approving and regulating medicines (Moro and Invernizzi 2017). However, in the UK in particular, Thalidomide and the campaign for compensation also led to major reforms in the law. In 1975 the Sunday Times decided to challenge English contempt of court law under the European Commission's Convention for the Protection of Human Rights. In 1977 the Commission found that the reporters had been denied their right to free speech, which ultimately resulted in changes to definitions of contempt in civil law cases (Brynnner and Stephens 2001). In the field of social policy, prior to Thalidomide there had been little public interest in the difficulties faced by families of disabled children, and no pressure for policy change (Bradshaw 1980). However, in 1973, as a result of the public campaign about Thalidomide, the Government established the Family Fund to help families of disabled children, both those affected by Thalidomide and others. The Family Fund still exists and is now the largest charity providing grants for families raising disabled or seriously ill children and young people in the UK.

2.9 Summary

This chapter sets the scene for the thesis as a whole. I began by describing the history of the drug: its development in West Germany by Chemie Grünenthal; the company's unscrupulous marketing of Thalidomide worldwide; and the magnitude of the Thalidomide 'tragedy'. I have described the birth defects caused by the drug, which include short, missing or deformed limbs (Dysmelia), sensory impairment and facial disfigurement, and

damage to internal organs. The combination and severity of these birth defects varies with each individual, but collectively they are referred to a 'Thalidomide embryopathy'.

Throughout their childhoods Thalidomide survivors were often subjected to repeated medical examinations, testes and procedure, some of which were of questionable benefit. This has left many with a distrust of doctors and reluctance to take part in research.

I have explained how, in different countries, Thalidomide survivors and their families sought to obtain compensation from Chemie Grünenthal and the distributors of the drug. It is particularly important to appreciate the legal and institutional obstacles UK Thalidomide survivors faced, and the nature of the legal settlement. The trust fund established in 1973 (and administered by the Thalidomide Trust) provided compensation for the damage caused by the drug, but annual payment were not substantial and did not take account of the long term consequences of the drug. The financial position of UK Thalidomide survivors has improved in the last two decades with uplifts in annual compensation payments, and (in 2010) the awarding of a Health Grant to Thalidomide survivors by the four UK Departments of Health. Understanding these past events and experiences provides some explanation of Thalidomide survivors' current situation. In Chapter 8 I discuss in more depth how the historical and social context of Thalidomide survivors' lives has influenced their experience of disability over the life course, and the implications of this for ageing with TE. The next chapter will outline the methods adopted to address the objectives of the study.

Chapter 3 Methods

Chapters one and two have set the scene in terms of the drug Thalidomide – its history, its use, the damage it caused to the unborn child, and the on-going consequences for the health and lives of Thalidomide survivors. Chapter 4 provides further context by mapping existing research about the health of the Thalidomide survivors as they age. In Chapter 1 I also described the genesis of this thesis and the objectives of the study, which were to:

- Identify the health problems Thalidomide survivors are experiencing as they grow older, in particular Thalidomide-related secondary health problems
- Examine the perceived interaction between original impairment, secondary health problems and the ageing process
- Understand the implications of this interaction for Thalidomide survivors' lives, including their health-related quality of life and independence
- Highlight any lessons that can be learned from Thalidomide survivors about the experience of ageing with early acquired disability

This chapter describes how I addressed these objectives through a mixed methods grounded theory approach (MM-GT). It begins by setting out the rationale for using a MM-GT approach, which is still relatively novel (Guetterman et al 2017). I then discuss the ethical considerations relevant to this study. This includes outlining my initial thought processes and explaining why I took the decisions I did. I go on to discuss the detailed methods used in the three phases of the study; the semi-structured telephone interviews and the initial content analysis of them; the cross-sectional self-report postal/online survey; and the secondary grounded theory analysis of the semi-structured telephone interviews. The methodology for the literature review is contained in Chapter 4.

Throughout the chapter I reflect on the methods, including practical and theoretical challenges. I consider the overall strengths and the limitations of the study further in Chapter 8.

3.1 Rationale for a Mixed Methods Approach

In developing my research design I felt that more than one method of inquiry would be needed to fully understand the health problems of Thalidomide survivors and to do justice to the complexity of their experiences. I therefore decided to use a mixed methods approach. However, mixed methods research (MMR) also appealed to me philosophically. Early definitions of mixed methods research (e.g. Green et al 1989) simply describe the mixing of qualitative and quantitative methods but later definitions focus on combining all phases of the research process, characterising mixed methods research as a separate

methodological orientation (Tashakkori and Teddlie 2003). Other writers have also emphasised that mixed methods research is about more than just 'methods' (Johnson and Onwuegbuzie 2004), seeing it as a 'research paradigm'. Creswell and Plano Clark (2017) prefer the term 'worldview'. They suggest that there are four worldviews in mixed methods research; post positivist; constructivist; transformative; and pragmatist. It is this last worldview that had resonance for me because, as Creswell and Plano Clark (2017) explain, it focuses "*on the consequences of the research, on the primary importance of the question asked rather than the methods, and on the use of multiple methods of data collection to inform the problem under study*" (p37). Ultimately, this pragmatic paradigm underpinned my whole study and so I chose a practical definition of MMR, put forward by Guetterman et al (2017) drawing on Plano Clark and Ivankova (2016):

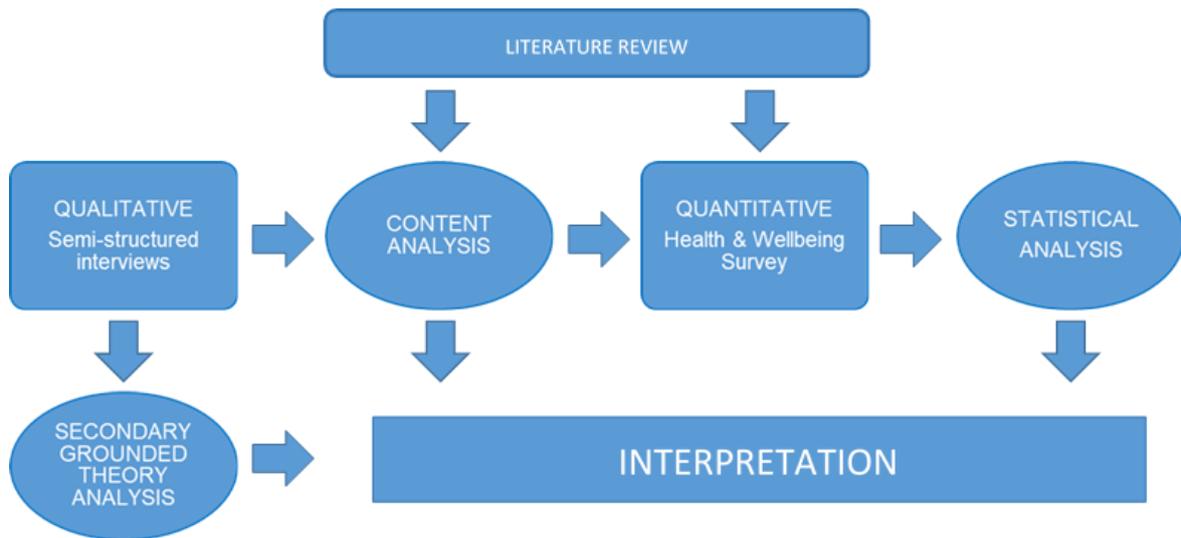
The process of integrating qualitative and quantitative data collection and analysis to best address the purpose of a research study (Plano Clarke & Ivankova, 2016). Drawing on the strengths of both approaches MMR provides a more complete understanding than either approach standing alone, through incorporating the depth of participants' lived experiences with broader, generalizable quantitative results. (p2)

The pragmatist worldview of MMR gives researchers the freedom to use whatever methods are necessary to address their research question (independent of the philosophies that underpin them). This perspective was the start point for designing my study, because the objectives of the study (as set out above) genuinely demanded a mix of methods. First I had to identify the types of health problems, particularly Thalidomide-related secondary health problems, that Thalidomide survivors were experiencing (qualitative). I then needed to establish a clearer picture of the prevalence of these health problems and with that, a sense of the consequences of them for Thalidomide survivors, including the impact on their health-related quality of life (quantitative). However, I also wanted to examine the interaction between original impairment, secondary health problems and the ageing process, and understand the implications of this interaction for Thalidomide survivors' lives (qualitative).

I adopted a three stage design which used two methods of data collection (semi-structured telephone interviews and an online/postal survey) and three approaches to data analysis (content analysis and secondary grounded theory analysis of the interviews and statistical analysis of the survey). Figure 7 illustrates this approach. I also conducted a literature review to map what was already known about ageing with TE. From my previous work and an initial scoping search of the literature, I was aware of a small number of studies from other countries, which had explored different aspects of the health

of Thalidomide survivors in late middle age. I also knew of several reports produced by or for organisations representing Thalidomide survivors, or by statutory organisation, which had examined health and quality of life more broadly. However, there were no published literature reviews which brought this research and grey literature together. The findings from the literature did inform the content analysis of the interviews but were primarily used to develop the health and wellbeing survey.

Figure 7 Mixed methods study design



As mixed methods research has evolved, a number of authors have developed typologies of mixed methods designs (Doyle et al 2009). It is not possible or appropriate to discuss these typologies in detail here but it is useful to locate my study design in one of the most commonly used typologies, originally developed by Creswell and colleagues in 2003. Based on the latest iteration of this typology (Creswell and Plano Clark 2017), my study would be classified as an *exploratory sequential design*. In this design qualitative data is collected and analysed first, and the findings are then used to inform subsequent quantitative data collection. This form of ‘integration’ or linking of methods of data collection and analysis is usually referred to as *‘building’* (Fetters et al 2013). However, my design is slightly complicated by the inclusion of a second stage of data analysis i.e. the secondary grounded theory analysis of the semi-structured interviews, and so could arguably be described as a multistage mixed methods design.

The grounded theory approach taken within the thesis is also part of the research design. Over the past decade, a few authors have begun to use the term ‘mixed method-grounded theory’ or MM-GT (Johnson et al 2010; Babchuk 2015) to describe studies which use grounded theory in the context of mixed methods research. In their systematic review of

the application of MM-GT, Guetterman et al (2017) conclude that MM-GT sits well with the grounded theory 'family of methods' (Charmaz 2014) but that in adapting grounded theory for use in larger studies, researchers often forgo some of the major features of grounded theory, in particular theoretical sampling. To some extent this was the case in my study. As I explain in section 3.6.2, secondary grounded theory analysis of the semi-structured interviews meant that it was not possible to theoretically sample in a conventional sense but I did find ways to partially overcome this limitation. Guetterman et al (2017) also recommend that in MM-GT studies "*Researchers should also clearly articulate their rationale for selecting MM-GT and their specific design decisions*" (p13). My decision to undertake a secondary grounded theory analysis came after I had collected my interview data and so in this respect I didn't select MM-GT at the outset but rather it emerged from a heuristic process. My rationale for using MM-GT nevertheless holds good.

This heuristic process was influenced by the interconnection with the Health Grant Monitoring project, which provided both huge opportunities but also methodological challenges. As I explain in Chapter 1, around the time I started thinking about my doctoral research, I was asked by the UK Thalidomide Trust to support them in monitoring the new ten year Health Grant, made to UK Thalidomide survivors in 2013. The objective of the monitoring project was to examine how the health and health-related needs of Thalidomide survivors were changing over the lifetime of the Grant, and to understand how Thalidomide survivors were using their Health Grants to address these needs. The plan for the first three years of the monitoring project did change over that time (mainly because of the changing requirements of the Trust and changes in the senior management of the organisation) but it eventually included two main elements – semi-structured telephone interviews with a diverse group of Thalidomide survivors and a health and wellbeing survey of all UK born Thalidomide survivors. As I describe in section 3.2, the Trust gave me permission to use the material gathered in the interviews and the data from the survey, for my doctoral research.

The Health Grant monitoring project provided me with an ideal opportunity to gather much of the data I needed for my doctoral study, whilst at the same time reducing the research burden on Thalidomide survivors. Working with the Trust also made it much easier to recruit Thalidomide survivors for the semi-structured interviews and engage them in the survey. On the other hand, linking my doctoral research to the Health Grant monitoring project did introduce constraints and involved some compromises. In particular, the timescales for the project meant that the semi-structured interviews had to be conducted and analysed relatively quickly, in order to inform the development of the survey. I also had to ensure that both the interviews and the survey addressed the Trust's core

requirements, as well as my own. I discuss the benefits and challenges of linking my doctoral research to the Health Grant monitoring project further in Chapter 8.

The two methods of data collection, shown in Figure 7 were therefore determined by the Health Grant monitoring project, as was the overall timetable for conducting the data collection. However, I had some latitude in terms of the topics addressed in the interviews, and the content of the survey, and I was largely able to determine my approach to the data analysis. I decided to use content analysis for the initial analysis of the interviews because it is a relatively simple, descriptive approach which allowed me to look across the interview data horizontally, and quite quickly draw out the themes and issues that were likely to be relevant to the development of the health and wellbeing survey. For the analysis of the survey data, I initially used descriptive statistics. To address my second and third research objectives, I then conducted additional analysis (using inferential statistics) to explore the relationship between health-related quality of life and other factors which the semi-structured telephone interviews and narrative responses in the survey had suggested might be important.

At the start of my doctoral research I had envisaged that following the semi-structured telephone interviews and the health and wellbeing survey, a further stage of qualitative data collection (possible in-depth case study interviews), which was not part of the Health Grant monitoring project, would be required to properly explore some of the topics of interest to me. However, as I worked with my interview transcripts for the content analysis, it became clear to me that there was the potential to learn much more from them by using a more interpretive approach. Once the survey was concluded, I therefore decided to undertake a secondary grounded theory analysis of the interviews. I describe my reasons for this decision and my approach to this secondary analysis in section 3.6.

3.2 Ethical Considerations

Many Thalidomide survivors were the subjects of research, particularly medical research, during childhood. Some feel that this research was intrusive and inappropriate, even unethical. As a result, there is sensitivity within the Thalidomide community about participating in research, and rightly most Thalidomide survivors will only support research which either has a direct benefit for Thalidomide survivors or others with similar impairments. For this reason, it was important to obtain support from the Trust and the National Advisory Council⁵ (NAC) for my doctoral study.

⁵ The National Advisory Council is comprised of 12 elected beneficiaries. It acts as an advisory body for the Trust and is the principal means by which the beneficiaries are able to influence the Trust's policies.

Within the Trust, the Research Committee (which has three NAC representatives) is the body responsible for giving approval to and overseeing all research (internal and external) that involves the Trust's beneficiaries. The Trust's Research Committee initially approved the Health Grant Monitoring Project, and was actively involved in agreeing key aspects of the work such as recruitment processes, research instruments, and approving reports for the Trust. In May 2014, I submitted a paper to the Research Committee requesting permission to use the data from the Health Grant Monitoring Project for my doctoral study. They agreed, on the understanding that individual consent would be obtained from the beneficiaries taking part in the interviews for their interview transcripts to be used in my thesis.

Written consent was obtained from all the Thalidomide survivors who volunteered to take part in a telephone interview for the Health Grant Monitoring project (the initial consent form is shown in Appendix 1). However, because the recruitment process for the project began before I commenced my doctoral research, the consent form did not include explicit consent for the data to be used for that purpose. To overcome this, I took two steps. First, when I contacted volunteers to confirm that they were still willing to take part in a telephone interview I explained that the Trust had given me overall permission to use the data from the Health Grant Monitoring Project for my doctoral study but that I needed specific consent to include their interview transcript in my analysis. The revised consent form is shown in Appendix 2. I made it clear that if they declined consent for my doctoral research (which two did), they could still take part in the project. Second, when I came to conduct the interviews, I verbally reconfirmed consent for both the project and my doctoral research, and this was recorded both digitally and in my interview notes.

In May 2014, I also applied for ethical approval from the University of York Health Sciences Research Governance Committee. The decision letter dated the 23rd May 2014 gave approval for the study. The letter (see Appendix 3) included six minor points of feedback, which they suggested I should discuss with my supervisor. Whilst approval was not contingent on addressing these points, I did respond to the Chair of the committee in June 2014 (see Appendix 3), following a discussion with my supervisor, and I revised the consent form. At the time approval for my doctoral study was given, the Trust was planning to use annual interviews to monitor the Health grant and had not taken the decision to undertake the Health and Wellbeing survey. In September 2015, once the Trust decided to go ahead with the survey, I submitted a substantial amendment to my original ethics application (see Appendix 4). This was approved the same month.

In addition to formal ethical approval there were a number of wider ethical issues to consider. I had worked with people in the Thalidomide community for several years and

had come to know a number of Thalidomide survivors personally. This had enabled me to build up a degree of trust within the community but it also brought with it the danger of over familiarity and bias. I discuss this further in Chapter 8 in relation to the strengths and limitations of the study. More specifically, I was very aware of the sensitivity within the Thalidomide community about participating in research. The Health Grant monitoring project was clearly of direct benefit to Thalidomide survivors in that the findings from it would potentially be used to support the arguments for the continuation of the Health Grant. However, this was not the case for my doctoral research and so I was especially careful to explain to the interview participants how their information would be used and why it would be of benefits to the Thalidomide community.

As far as possible I tried to make the interviews a positive experience. The interviews were arranged in advance at a time of the interviewees choosing. At the beginning of the interview I reminded them of the broad topics I hoped to cover but emphasised that they could tell me as much or as little as they wanted. I also explained that they could take a break at any time or stop the interview completely if they wished. None of the participants became distressed during the interviews but it was clear that some participants were dealing with difficult issues. In some cases I did encourage people to contact the Trust to see if they could provide support or advice.

I was also concerned about the potential research burden on Thalidomide survivors. The Health and Wellbeing survey was quite long, with 52 questions spread over 12 pages (see Appendix 5), although many of the questions were multiple choice. Based on the piloting I was able to reassure people that it would only take around 20 minutes to complete, and the online version had a 'save and continue later' facility which meant that people could complete it in stages. Perhaps more importantly, around the time of my data collection phases the Trust was supporting two other pieces of research – one about peripheral neuropathy and one about loss of earnings. In the light of this, being able to conduct secondary analysis of the telephone interviews, rather than a third stage of data collection, was an important step in reducing the research burden.

3.3 Involvement of Thalidomide Survivors

From my previous work I was very much aware of the sensitivity in the Thalidomide community about research. I knew that Thalidomide survivors would only be willing to participate in my research if it was seen as relevant and valuable to them. For this reason I felt it was essential to involve them in all stages of the study. However, Thalidomide survivors are also 'experts by experience' - they have lived with a rare condition and its consequences for over five decades. Many, but especially those who have been actively

involved in the Thalidomide Trust and Thalidomide Society, have developed a wider knowledge of Thalidomide Embryopathy and its medical and social consequences. It was very important to me that my research was informed by this knowledge and expertise. Below I briefly summarise the key 'PPI' or Patient and Public Involvement type activities within the study, both formal and informal. I also detail the involvement of Thalidomide survivors in the different stage of the study, in the relevant sections of this chapter.

Prior to embarking on my doctoral studies, I had informal conversations with three Thalidomide survivors I had come to know quite well, in order to gauge the likely acceptability and importance of my research proposals. They agreed that the topic was important and their personal reflections on ageing with TE were helpful in terms of setting out the rationale for the research. As I explain in the previous section, the first formal step was obtaining approval from the Trust's Research Committee for me to use data from the Health Grant Monitoring Project for my doctoral research. The Committee membership included three Thalidomide survivors who are nominated by the National Advisory Council (NAC). This Committee was also actively involved in shaping the research, in particular how the data collection was conducted, including:

- Approving all the letters, forms and information sent to participants
- Advised on the content of the topic guide for the interviews, which was then tested with a two Thalidomide survivors from outside the Committee
- Helping to shape the content and format of the survey questionnaire, including piloting the final draft (along with seven Thalidomide survivors who were not members of the Committee)
- Commenting on the data analysis and presentation of findings

Even after the Health Grant Monitoring Project was concluded, the Committee and NAC maintained their interest in my doctoral research. I presented the findings from my literature review to the Committee and as a result they asked me to produce an accessible summary for the Trust's website. At the analysis stages I again had informal conversations with current and former NAC members to 'sense check' what was emerging. I also presented initial findings from the survey and the secondary grounded theory analysis of the interviews to NAC Annual Conferences (which are attended by around 150 Thalidomide survivors). The feedback received at these events was particularly helpful in identifying implications for policy and practice.

3.4 Semi-structured Telephone Interviews

The semi-structured telephone interviews were the first step in gathering information about the health problems Thalidomide survivors were experiencing but also in exploring how they made sense of their changing health, and how these problems (and associated loss of function and increasing impairment) were affecting their lives (and disabling experience). In this section I discuss the rationale for using semi-structured interviews and for conducting them by telephone. I describe how the interview participants were recruited and the process of conducting the interviews. It is followed by section 3.4 in which I discuss my approach to the content analysis. The secondary grounded theory analysis is described in section 3.6, after the Health and Wellbeing Survey.

3.4.1 Rationale for using semi-structured telephone interviews

There are many different ways of generating data in qualitative research but one to one interviews are perhaps the most commonly used method (Barbour 2008). I chose to use interviews because I wanted to capture individual narratives in some depth. Thalidomide survivors are a heterogeneous group. From my previous work, I was aware that the nature of their impairments and their personal history and circumstances (e.g. home situation, job etc.) might influence the type of health problems they were experiencing and their response to them. I used semi-structured interviews rather than a completely open approach because the interviews were being undertaken as part of the Health Grant Monitoring project and as such I had to ensure that I covered the core topics of interest to the Trust. However, the semi-structured format still gave me flexibility to take account of the priority the interviewees placed on each topic, and enabled me to explore topics that were more closely aligned to my doctoral research. In fact, as I describe below, the semi-structured format elicited very full and reflective responses from many participants.

I decided to conduct the interviews by telephone rather than face to face for practical reasons. Thalidomide survivors are spread across the whole of the UK but the budget for the research was limited and did not allow for the time and travel costs involved in face to face interviews in peoples' own homes. Furthermore, I had used telephone interviews previously with Thalidomide survivors and found they were both acceptable and worked well. Aside from the practical and cost issues, telephone interviews have other advantages. They can be more convenient and less intrusive for the participant, and there is some evidence that telephone interviews generate data of similar quality and depth to face to face interviews (Bryman 2015). However, they also have disadvantages, in particular being unable to see the participant means that the interviewer cannot respond to body language or facial expressions and is reliant on non-visual cues such as tone of voice (Taylor and Francis 2013). In the case of my study the major disadvantage was that

they effectively precluded Thalidomide survivors who were totally deaf from taking part. A number of interviewees did have a hearing impairment and used hearing aids and other technology to take part in the interviews but none of the interviewees were completely deaf. With hindsight, I should have explored other ways (e.g. a face-to-face interview with a sign language interpreter) to enable those with no hearing to be involved. The Trust now uses a new service (Sign Live) which enables a hearing person to have a telephone conversation with a deaf person, using a sign language interpreter and either a smart phone, tablet or computer, but this was not available at the time I conducted the interviews. As a consequence, the experiences of deaf Thalidomide survivors are under-represented.

3.4.2 Recruiting and selecting the interview sample

Previous studies (Newbronner et al 2012; Peters et al 2015) suggested that the nature and severity of Thalidomide survivors' damage is one of main factors influencing the type of secondary damage they experience. It was therefore important that the interview sample included participants with a range of impairments. The original plan (for the Health Grant monitoring project) was to recruit a purposive sample of around 25 Thalidomide survivors, i.e. five in each of the five impairment severity bands, with roughly equal numbers of men and women (reflecting the gender balance of all UK Thalidomide survivors).

Three main approaches were used to recruit participants. All those Thalidomide survivors who took part in two earlier studies - the Health Grant Evaluation and a cost of disability study *Securing Our Futures* (NAC 2012), were asked if they would like to be involved in monitoring the Health Grant. In total 123 took part in the two studies, but some people (number unknown) took part in both studies. These Thalidomide survivors were already familiar with the Health Grant work to date and had some understanding of what would be required of them. A letter from me (Appendix 6) about the Health Grant monitoring project, and the initial consent form (Appendix 1) was sent to them by the Trust. The letter contained information about the overall project, what taking part in the interviews would involve and how the information would be used. The consent forms were returned directly to me in a freepost envelope.

Initially the Trust wanted to use this single approach to recruit participants but I was concerned that it might skew recruitment towards those who were more confident about taking part in research, and/or those with more knowledge about the Health Grant. I therefore agreed with the Trust that two further approaches would be used. Firstly, information about the study was distributed through the Trust's regular communications with its beneficiaries (e.g. the Directors quarterly newsletter). Second, the project was

promoted at the 2013 annual conference of the National Advisory Council. Those interested in being involved were invited to either return a consent form or to contact me directly by email or phone. It is impossible to know how many participants were recruited through each approach as some people may have received information about the project via all three routes.

Fifty-three beneficiaries indicated that they would be interested in taking part in the study – more than double the planned number. At this stage one option would have been to purposefully select 25 participants as originally planned. However, in discussion with the Trust it was decided that all the beneficiaries who had expressed in interest should be given the opportunity to take part. This was partly because the Trust wished to be inclusive. Historically, there has been some distrust of research within the Thalidomide community, and certainly researchers in other countries have experienced difficulties recruiting Thalidomide survivors to take part in research. For example, personal correspondence with a colleague working with Thalidomide survivors in Sweden revealed that she had encountered difficulties in getting the Swedish Thalidomide Society (FfDN) to support her research and this led to problems with recruitment. For this reason the Trust did not want to turn away willing volunteers at this early stage.

In addition, my experience of the Health Grant Evaluation, which also used semi-structured interviews, suggested that not all those who volunteered would ultimately take part. In fact, when I eventually contacted those who had expressed an interest in the study, to confirm that they still wished to be involved and to re-consent them, five people immediately withdrew for personal reasons such as ill health or family difficulties. When I came to contact people to make arrangements for the interviews, a further seven either did not respond or it proved impossible to arrange a date and time for their interview. In addition, one participant was clearly experiencing severe mental health problems at the time of the interview and so I terminated the interview and agreed with him that I would ask the Trust to contact him to provide advice and support. Forty Thalidomide survivors were eventually interviewed by telephone (and one responded in writing). Of these, two declined consent for their interview transcripts to be used as part of my doctoral research, and so the analysis of the interviews is based on 38 participants.

The make-up of the sample did have the diversity I wanted to achieve from the purposive sampling, in that the participants were drawn from all four UK nations, in very similar proportion to all UK Thalidomide survivors, and were spread across the Trust's impairment bands, although Thalidomide survivors in Band 2 are under-represented and those in band 5 over-represented. A comparison, by band, with all UK Thalidomide survivors is shown in Table 1. There was, however, an imbalance in the sample in relation

to gender. Whilst just over half the Thalidomide survivors in the UK are women, the interview group was made up of 68% (26) women and 32% (12) men.

Table 1 Proportion of interview sample in each impairment band compared to all UK Thalidomide survivors

	Band 1	Band 2	Band 3	Band 4	Band 5	Total
Number	5	6	12	7	8	38
Interview Sample	13%	16%	32%	18%	21%	
UK Overall	11%	26%	35%	15%	13%	

I did not collect data about age or ethnicity because the vast majority of UK Thalidomide were born between 1959 and 1962 (with just a handful born in the following three years) and the Trust estimates that only 15 of its 467 beneficiaries are from BME communities. In terms of home circumstances, seven lived alone, 26 lived with their partner (or their partner and children), and five lived with their children. No structured information was collected about social class but the group did include people from a range of occupational backgrounds, including a few who had never worked due to their disability, manual and semi-skilled workers, and those in managerial and professionals roles. At the time of the interviews, 26 participants were not working: sixteen said they were unable to work because of their health problems/disability; eight had given up work for a combination of health and personal reasons (e.g. family commitments, lifestyle); and two said they had decided not to work entirely for personal reasons. Ten were working part-time, and of these half said they no longer felt able to work full time because of their health problems/disability, and half said they had reduced their working hours for a mix of health and personal reasons. Two were working full-time. With hindsight I should have included a question about social class and ethnicity in the interview, although the Trust does not hold information about the social class or ethnicity of its beneficiaries and so it would not have been possible to make a comparison with all UK Thalidomide survivors.

3.4.3 Conducting the interviews

In this section I describe the development of the topic guide for the telephone interviews and the practical process of conducting them. The Trust asked me to address four main topics in the interviews:

- Current and recent health problems
- Use of the 2013/14 Health Grant
- Social Care Support

- Future Needs

Although the core topics were fixed, I had flexibility to explore them as I felt best. I developed a first draft of the topic guide which was reviewed by the Trust's Research Committee (which includes three Thalidomide survivors). After incorporating their comments, I piloted the topic guide with two Thalidomide survivors who had assisted with previous research but who were not involved in the Health Grant monitoring project. The final version of the topic guide (which is shown in Appendix 7) had 10 main questions in four short sections. *Section 1 Current and Recent Health Problems* asked about: the nature of any Thalidomide-related health problems; how these health problems were affecting people both practically and emotionally; and whether they had sought or received any treatment for their health problems. *Section 2 Social Care Support* simply asked if the interviewee had social care support and if they did, whether they had experienced any problems with the level of support provided. *Section 3 Use of the Health Grant* explored how people had used their 2013/14 Health Grant; the main reasons for choices/decisions; and any impact on their health and wellbeing. Finally *Section 4 The Future* asked interviewees about anticipated future health-related needs, and any plans for the use of their Health Grants in the longer term.

The semi-structured format worked well, ensuring that the core topics were covered. In addition, to ensure the interviews provided sufficient data for my doctoral study, alongside the ten main questions I identified a number of related topics or sub themes which I also explored. For example question 2 asked: *How have these health problems affected you?* My 'prompt' then read: *Explore: Physical and emotionally affects as well as practical affects (e.g. lifestyle/quality of life; impact on family; impact on employment)*. Many interviewees gave very full answers to the questions and naturally addressed a number of the sub-themes without me having to ask about them. However, for more reticent interviewees I used these 'prompts' to elicit fuller responses.

The interviews were conducted by telephone during June, July and August 2014 and lasted between 40 and 90 minutes. All except two were digitally recorded, with the Thalidomide survivors' consent, using an Olympus VN-5200PC Digital Voice Recorder. Two participants did not wish their interviews to be recorded, and so in these interviews I took detailed hand written notes. All recordings were transcribed (intelligent verbatim)⁶ in full using Microsoft Word. Twenty four were transcribed by me and 14 were transcribed by two different transcribers and then checked by me.

⁶ Intelligent verbatim transcription is a style of transcription that converts recorded speech into text while editing out the fillers (e.g. ah, um) and repetitions.

3.5 Content Analysis of the Interviews

Content analysis is a widely used method for analysing qualitative data in health research (Hsieh and Shannon 2005). However, even a limited examination of the literature reveals that definitions vary and there are different understandings of the characteristics of the approach. There is also confusion or blurring of the boundaries between content analysis and other approaches to qualitative data analysis, notably thematic analysis (Vaismoradi et al 2013), with some authors (e.g. Green and Thorogood 2009) conflating them into *'thematic content analysis'*. Generally, content analysis is split into two classifications. The first is quantitative content analysis, which Silverman (2013) suggests *"involves the establishing categories and then counting the number of instances when those categories are used in a particular text"* (p64). The second is qualitative content analysis which also focuses on the systematic examination of texts, using coding and categorising (Pope et al 2006) but which does not necessarily involve counts or frequencies. However, Hsieh and Shannon (2005) suggest that qualitative content analysis can include a summative approach, which begins with the researcher *"identifying and quantifying certain words or content in text with the purpose of understanding the contextual use of the words or content. This quantification is an attempt not to infer meaning but, rather, to explore usage"* (p1283). They go on to explain that if the researcher stopped at this point, the analysis would be quantitative, and so a summative approach to qualitative content analysis should go beyond counts to include interpretation of content. It is this description that best fits my approach to the qualitative content analysis of my interviews, although I began with interpretation and then moved on to counts.

The content analysis of the interviews had two main purposes: to prepare a report for the Trust from the first stage of the Health Grant monitoring project, structured around the four topics they were interested in; and to inform the development of the Health and Wellbeing survey. I began by up-loading the interview transcripts in to QSR International's NVivo 11 qualitative data analysis software. My analysis was then both deductive and inductive. I used the high level categories from the interview topic guide to provide an outline structure for the analysis i.e. they became my nodes (deductive). Within this structure I identified the key themes and issues to emerge from the interview transcripts as I read them, and then created sub-nodes for each of these (inductive). Table 2 provides an overview of the categories and themes.

The headline findings from this analysis were incorporated into the report for the Trust (Newbronner 2015). To address the first two objectives of my thesis (i.e. identifying the health problems Thalidomide survivors are experiencing and examining the interaction between original impairment, secondary health problems and the ageing process) I then

focused on the material relating to current and recent health problems. It is this part of the analysis that I report in Chapter 5.

The initial interpretive phase of the content analysis enabled me to identify the main health problems respondents were experiencing, and begin to understand: the language people used to describe their health problems; how they linked different problems; and any connections they made to their original Thalidomide damage. To gauge the relative importance or 'prevalence' of them, I counted the number of interviewees who reported experiencing different health problems. The findings from my literature review helped me think about how to group them but I was primarily guided by the data.

Table 2 Content analysis - categories from the topic guide and themes emerging from the analysis

High Level Categories	Themes
Background Information	Home circumstances; implications of changing family circumstances; giving up work or changes in employment; working and health problems
Current or recent health problems	Health Problems: Joint problems; Shoulders, arms and hands; Hips, knees and feet; Back and neck; Pain; Neuropathy symptoms; Mental and emotional health; Long term conditions/other health problems; Weight management; Sight and hearing problems Dental health Use of health services: access and availability; staff attitudes and service quality; knowledge and understanding of TE; effectiveness of treatments; and role of GP Growing older with disability
Social Care Support	Level of service; quality and flexibility; attitudes and seeking help
Use of Health Grant	Use of HG in 2013/14; rationale of using HG in this way; adequacy of HG; perceived impact of HG on health and wellbeing
The Future	Main health-related needs in near future; thoughts about using HG to address these needs

Initially I had eight main groups of health problems with just one for musculoskeletal (MSK) problems. However, it soon became apparent that the coding of these types of problems needed to be more fine-grained if I was to reflect the detail of what respondents were describing. I decided to cluster MSK problems by the areas of the body affected. There were three main reasons for this. Firstly, because so many of the interviewees were reporting MSK problems, having all the references under one heading became unwieldy. By splitting them into several groups the data became more manageable. Secondly, MSK

problems appeared to be in part related to the nature and severity of interviewees' limb difference, and this was potentially an important connection to be explored further in the Health and Wellbeing survey. Thirdly, the Trust was in the process of establishing a network of orthopaedic specialists who could diagnose and treat Thalidomide survivors, and so it was helpful for them to know what interviewees said about MSK problems in different areas of the body.

I eventually settled on four main groups for MSK problems but retained a separate group for 'pain' because this was so often a feature of respondents' experience. This gave me eleven groups of health problems:

- MSK problems - Joints
- MSK problems - Shoulders, arms and hands
- MSK problems - Hips, knees and feet
- MSK problems - Back and neck
- Pain
- Neuropathy symptoms
- Mental and emotional health
- Long term conditions/other health problems
- Weight management
- Sight and hearing problems
- Dental health

There is some overlap between the themes, especially between '*MSK problems – joints*' and the other MSK groups, and between MSK groups and '*Pain*' as often people described a range of problems and the pain they were experiencing as a result of them, together, in one segment of the interview. Table 3 provides an example of this and of how I moved from my raw data to the health problem 'groups' used for the count of health problems.

Table 3 Example of content analysis coding

Interview Text	Coding
<p><i>I'm quite fit and still quite mobile but I've got one leg longer than the other slightly, although it's not something that's ever been addressed, because it's so slight. But the last few years, I've been limping more because my foot turns over to compensate, so I get through loads of pairs of shoes – they wear down – and it does give me knee and hip pain – I think my hips aren't made properly either. I have had a lot of hip pain and more knee pain recently over the last couple of years.</i></p>	<p>MSK problems – hips, knees and feet MSK problems - joint Pain</p>
<p><i>The other thing I get is shoulder and neck pain where I'm reaching for things and bending and sort of my back. I've noticed that more and more as I'm driving. I've never really had trouble driving but I feel when I drive now, my shoulders hurt more and more, and I think that's probably wear and tear because we tend to put so much weight behind our shoulders because we don't have the strength in our arms.</i></p>	<p>MSK problems – shoulders arms and hands</p>

The qualitative content analysis also helped me to understand the language people used to describe their health problems and to explore what people perceived were the root causes of their Thalidomide related health problems. I anticipated that both these things would be important in shaping the Health and Wellbeing survey and this was the case. I discuss this further in Chapter 5.

3.6 Self-Completion Health and Wellbeing Survey

The content analysis provided a broad picture of the health problems Thalidomide survivors were experiencing but the analysis was based on the experiences of a limited sample of 38 Thalidomide survivors. To address the first aim of my doctoral research I needed to gain a much more detailed understanding of the prevalence of these health problems and with that, a sense of the consequences of them for Thalidomide survivors, including the impact on their health-related quality of life (the third objective of my research). For a number of reasons the Trust also wanted to gather information about health and wellbeing of its beneficiaries: to influence negotiations with Diageo about investment in the Trust Fund; to inform a new five-year strategy; to help shape their support services; and to provide baseline information for the monitoring of the Health Grant. In particular, they wanted information to be collected directly from Thalidomide survivors themselves, and they wanted quantitative data. Together we decided that a

cross sectional survey of all UK born Thalidomide survivors, administered online and by post would be the best way to gather this information.

3.6.1 Survey design

Bryman (2015) explains that survey research:

“comprises a cross-sectional design in relation to which data are collected predominantly by questionnaire or structured interview on a sample of cases drawn from a wider population and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with a number of variables (usually many more than two), which are then examined to detect patterns of association.” (p54)

Given this definition, survey research enabled me to address the objectives of my doctoral research (and meet the needs of the Trust) in a number of important ways. I wanted to collect data from as many UK born Thalidomide survivors as possible. At the time there were 467 and so the most practical and affordable way to reach them was via a survey. Although the Trust may repeat the survey (or a version of it) in the future, at the time it was seen as a ‘snapshot’ (i.e. the data were being collected at a single time point).

Furthermore, I wanted to collect quantitative or quantifiable data on a number of variables, with much of these data only being available from Thalidomide survivors themselves. Specifically I wanted to include both self-report questions (e.g. about the health problems people were experiencing) and self-report measures which would provide respondents subjective assessments of their health-related quality of life and mental wellbeing (Bowling 2005). There are risks in using self-report questions, in particular the accuracy of respondents’ recollections (Bowling and Ebrahim 2005), but there was no other practical way in which to collect the data needed. The Trust holds up to date postal addresses for all its beneficiaries and around two third had also indicated that they were happy for the Trust to contact them by email and so with the aim of increasing the response rate, I agreed with the Trust that we would give people the option to complete the survey by post or online. This is discussed further in section 3.6.4.

Overall then, collecting data I required through a postal and online survey made sense both from a study design and a practical point of view. However, online/postal surveys do have disadvantages (Fowler 2009). By their nature, self-completion questionnaires do not lend themselves to more than a few open questions, because respondents are usually reluctant to write a lot. Their usefulness can also be limited by poor response rates and/or poor response rates from certain groups, making them unrepresentative of the ‘population’ of interest. In this case, Thalidomide survivors had a strong incentive to complete the

survey, including open questions, as the findings from it could influence their future financial support and services. Ultimately I did include a small number of text boxes where respondents could add information and included a half-page comments box at the end of the survey, which yielded surprisingly rich data. Self-completion surveys can also experience problems with missing data if respondents choose not to answer a question, and inaccurate or contradictory data, if respondents misunderstand a question. This was certainly an issue in the Health and Wellbeing survey, despite (at the design stage) incorporating skip-logic into the online version and piloting both the online and postal versions. It was also possible to take some steps at the data analysis stage to help address this and I discuss this further in 3.6.5.

One particularly helpful aspect of this survey was that unlike much survey research, no sampling was required because the Trust wanted the survey to be sent to all UK born Thalidomide survivors and they had the administrative systems in place to do so. It was therefore easy and appropriate to include all of them in the survey. A small number of Thalidomide survivors lack capacity and have a family member or solicitor who acts on their behalf. However, we decided that this group should still be included in the survey as their guardians might be able to provide some useful information about their health and wellbeing. Four partially completed 'proxy' returns were received.

3.6.2 Development of the survey

PPI or the active involvement of Thalidomide survivors was central to the development and piloting of the survey. It was initially developed in conjunction with the Trust's Health and Wellbeing and Research Committees, which are made up of officers, trustees and Thalidomide survivors (nominated by the NAC). We began by agreeing the overall aims of the survey which were to:

- Quantify the different health problems Thalidomide survivors were experiencing
- Examine the mental and emotional wellbeing of Thalidomide survivors compared to the general population
- Explore if/how Thalidomide survivors health and wellbeing were related to the nature or severity of their Thalidomide damage or their personal circumstances
- Gather supporting socio-demographic information about the circumstances of Thalidomide survivors (e.g. housing and employment situations)

I then prepared a paper for the Health and Wellbeing Committee, which outlined the proposed broad content and format of the survey. The paper drew on the content analysis of the telephone interviews and evidence from my literature review, including the reports from the Health Grant Evaluation. These sources highlighted many of the topics that would need to be explored in the survey. For example, the content analysis pointed to the

importance of gathering background information about home and family circumstances, and employment, as many Thalidomide survivors were experiencing changes in these areas of their lives. They also flagged up many of the secondary health problems Thalidomide survivors were beginning to experience, and the related treatment choices. This informed the sections of the survey covering health problems and the use of health services. Lastly, the literature provided a number of potential comparisons, which could help set the experience of UK Thalidomide survivors in an international context.

Comments on the paper from the Health and Wellbeing Committee informed the development of the first draft of the survey. For some topics, they wanted to add questions to explore specific issues e.g. the reasons people felt they might need to move house in the next five years, and how well their GP understood their Thalidomide damage. Some new topics and questions were added e.g. a question about pension provision and another about future need for local authority social care support. The other important discussion was around which validated instruments to use to measure mental wellbeing, the impact of ill health/loss of function and/or health-related quality of life. We eventually agreed that two would be used: the short form of the Warwick and Edinburgh Mental Wellbeing Scale (WEMWBS) (Warwick Medical School 2018) to provide a baseline measure of mental wellbeing; and SF12 (Rand Health Care – no year given) to assess health related quality of life. I discuss the reasons for choosing these instruments in section 3.6.3.

The first full draft of the survey was circulated to the Research Committee and their comments were taken into account in a revised draft. This second draft was then piloted with ten Thalidomide survivors – five (one from each impairment band) selected from the 40 who took part in the Health Grant monitoring interviews, four who were members of the Health and Wellbeing and Research Committees, and an additional 'volunteer' who had held a senior role in a social research organisation and had particular expertise in questionnaire design. Two of them completed the survey on paper and the others completed the online version. As they completed the questionnaire, they were asked to note:

- How long it took them to complete the whole questionnaire
- Any questions they felt were unclear or any wording that could be improved
- Any instructions that they found confusing or unclear
- Overall how easy or difficult the questionnaire was to complete
- The overall look/format of the questionnaire and any ideas for improvement

They provided feedback in a variety of ways – through telephone discussions, via email and by annotating the paper and online versions with comments. This feedback was invaluable and greatly improved the questionnaire. The nature and extent of the comments provided varied hugely from four pages of detailed comments, from the Thalidomide survivor who had been a social researcher, to much briefer comments about the time it took to complete the survey and its general user friendliness. The quotations below illustrate the range of comments received:

“Question 24. ‘In the past 5 years, have you experienced any problems obtaining or receiving the health treatment/care you needed?’ I originally answered ‘no’ to this, but when I looked at the answer list on the follow-up question 25 (which I should have ignored if I’d followed the filtering instructions) I realised that I probably should answer ‘yes’ because nobody’s ever been able to give me a proper blood pressure reading (i.e. they don’t know how to interpret the figures for most people who have the pressure taken on the leg). In other words, I haven’t had a problem in the past five years because I’ve stopped asking for it, since I know they can’t do it!” (Pilot 8)

I only know that there is such a thing as a 6(iv) b figure⁷ but am not sure I have ever been told what it is. Are we supposed to know? (Pilot 10)

I completed it easily in 16 minutes including using the Save & Continue facility and the Print Response Facility, both of which worked well. I completed part of it on a tablet, part on a smart phone and part on a laptop and it worked well on all these devices. (Pilot 4)

The comments led me to remove some questions (e.g. asking respondents for their 6(iv) b impairments figure), and refine the wording of others. Whilst overall they reassured me that the survey was relatively easy and quick to complete, the very detailed comments from the Thalidomide survivor who had expertise in questionnaire design, really helped me improve the instructions on the paper version and the ‘skip logic’ in the online version. Following piloting, a final draft of the questionnaire was prepared and again circulated to the Research Committee. After a few further minor changes, the final version was agreed.

⁷ The ‘6(iv) b figure’ refers to the number of impairment ‘points’ Thalidomide survivors were given when they were originally assessed as beneficiaries of the Trust.

3.6.3 Content of the survey

A copy of the paper version of the survey is shown in Appendix 5. However, for ease of reference Table 4 below summarises the content of the survey. In the right hand column I indicate which variables I did and didn't use in my doctoral study.

Table 4 Summary of the survey sections and topics

Section	Topics	Included in Doctoral Study?
About You	Gender Highest educational level	Yes Yes
Family and Housing	Home circumstances Housing situation Planned adaptation Need to moving home	Yes Yes No No
Work and Pensions	Work situation Change in work situation Pension cover	Yes Yes No
Original Thalidomide Impairments	Limb damage Other damage	Yes Yes
Mobility and Equipment	Use of wheelchairs and mobility scooters Hearing aids/implants Adapted Vehicles	No No No
Health Problems	Current and recent health problems Steps to improve health or wellbeing	Yes No
Use of Health Services	Treatments in past 10 years Experience of GP services Problems with healthcare services	Yes Yes Yes
Social Care Support	Use of local authority social care Use of personal assistants Future needs for social care	Yes Yes Yes
Mental Wellbeing	Warwick Edinburgh Mental Wellbeing Scale Emotional wellbeing Social life	Yes No No
Health-related Q of L	Short Form 12 Health Survey	Yes
Future Concerns	Area of life of most concern for the future	Yes
Additional Comments	Box for anything respondents wanted to add	Yes

Before discussing the content of the survey, it is important to explain that ideally I wanted Thalidomide survivors to give their names on their survey forms, so that I could obtain (with their consent) three items of background information about them held by the Trust. These were gender, country of residence, and 6(iv) b (impairment) figure. This information was used to assess how representative the survey respondents were of the whole UK Thalidomide community, and for conducting additional analysis of the data. However, some of the questions were quite sensitive in nature. For example, the question about original Thalidomide impairment asked about damage to reproductive organs and the list of health problems included alcohol/drug misuse. I was concerned that if people felt they had to give their name, they would either skip questions or not return the survey at all. So, from both an ethical and practical standpoint it was important to give people the option to complete the survey anonymously. For those respondents who did not give their name I knew I would not be able to obtain information from the Trust, and so some background information was collected in the survey, notably gender and details of respondents' original Thalidomide impairments. As the quotation in the previous section illustrates, the Thalidomide survivors involved in developing the survey advised against asking respondents to provide their 6(iv) b figure, as an indicator of severity of impairment, because many do not know their figure or even what '6(iv)b figure' refers to.

Inevitably, some trade-offs had to be made between the data the Trust and I wanted to collect and the need to avoid making the survey too onerous to complete. The final survey had ten sections. The order of the sections was designed so that what might be seen as 'easy' biographical question came first. The questions about current or recent health problems came next, with the questions about use of health services and social care support naturally following on. I placed the two sections which used validated standard measures (about mental wellbeing and health-related quality of life) at the end of the survey, mainly because I thought that respondents might find these sets of questions the least 'user friendly'. However, there is evidence that preceding questions set the context for the questions which follow and this can effect survey results (Lavrakas 2008). I felt that asking people about their personal circumstances, and their health and support first, might help them judge their responses to the mental wellbeing and quality of life questions. It is impossible to say whether this created any positive or negative bias in the results.

Below I briefly describe the content of each section, the reasons for the choice of questions and the limitations/problems that emerged in relation to them when the survey went 'live'. Lastly, it is important to note that because the survey was primarily to meet the needs of the Trust, not all the data collected were relevant to my doctoral research (see Table 4). The data from a few question also had limitations from an academic perspective

and so I excluded these from my analysis. These issues are discussed in the relevant sections below.

About You

This section simply asked the respondent for their gender and the highest level of educational qualification they had obtained. I was interested in educational level for two reasons. Firstly, to facilitate comparisons with the general population – there is some evidence from Germany (Peters et al 2015) that, as a group, Thalidomide survivors there achieved a higher level of education attainment than their peers in the general population. Secondly, to examine whether educational level had any bearing on responses to other questions in the survey. Schneider (2011) notes that in the UK there is no standard way of measuring educational attainment but asking for the highest educational qualification (academic or vocational) achieved is a common approach. In this survey, respondents could tick one of eight categories, which are widely used in health research. However, at the analysis stage I had to merge some categories in order to facilitate comparison with Office of National Statistics data from the 2010 census. This involved me making judgements about what groups of qualifications to put together, creating the danger of different understandings and interpretations. It may therefore have been better to use fewer categories from the outset.

Family and Housing

There were six questions in this section. The semi-structured interviews suggested that Thalidomide survivors' home circumstances (e.g. whether they live alone, with a partner etc.) and housing situation (e.g. living in rented accommodation) might have an influence on their general wellbeing. There is evidence that in the general population these are risk factors for feelings of loneliness, which in turn has a strong relationship with poorer wellbeing (ONS 2015). So, the first two questions asked about home circumstances and housing situation. The remaining questions focused on housing adaptations and the possible need to move home. These were issues of operational interest to the Trust and are not discussed in this thesis.

Work and Pensions

There is evidence that the work situation of Thalidomide survivors has changed quite considerably in the last 10 to 15 years (Newbronner 2015; Vermette and Benegabi 2013; Kruse et al 2013), with proportionately fewer of them working than their peers in the general population. The content analysis suggested that this trend was accelerating as Thalidomide survivors approach their late 50's, and that being unable to work might be associated with poorer mental wellbeing. So, in this section I asked about respondents'

current work situation. The question had 10 answer choices which not only allowed respondents to indicate whether they were working full time, part time or not working but also why they were working part time or were not working (e.g. I work part time: because of my disability or health problems; to preserve my health/functioning; for family or personal reasons). This distinction was important because an employment survey of conducted for the Trust (Newbronner 2015) had indicated that the wellbeing of Thalidomide survivors might be affected by whether they *choose* not to work or to work part time, as opposed to feeling *unable* to work or only able to work part time because of their disability or health problems.

I also asked how their work situation had changed since 2000. That year was chosen partly because of research evidence about the onset of secondary health problems (Kennelly et al 2002; Newbronner et al 2011) but also because in the last 15 years there have been some important changes to UK Thalidomide survivors' financial support, in particular:

- In 2000 Annual Grants received by Thalidomide survivors as a result of the legal settlement with Distillers (now Diageo), were exempted from taxation
- In 2001 there was an uplift in Annual Grants (because of additional investment in the Trust Fund by Diageo)
- In 2010 the pilot Health Grant was introduced and then renewed for ten years in 2013

The evaluation of the Health Grant (Newbronner et al 2013) suggested that for some beneficiaries whose deteriorating health was affecting their ability to work and others who felt that working was having a detrimental effect on their health, the improvement in their financial position enabled them to change their work situation.

At the time of the survey, the Trust was establishing a working group to explore loss of earnings and pension provision amongst UK Thalidomide survivors and it was intended that data from this section of the survey would inform their work. The Trust wished to include a question about pension provision, but devising meaningful and reliable questions was difficult. I decided to include just one simple question which asked, '*If you have paid into an employers'/company or private pension (in addition to your state pension), approximately how many years of contributions do you have?*'. However, the question proved problematic, because where respondents left the answer box blank, it could either mean they didn't have an additional pension or they couldn't remember the number of years contributions they had. For this reason I have not used the data from this question in my thesis.

Finally, at the end of the work and pensions section there was a free text box where respondents could provide additional information. Ninety-one respondents chose to do this and their comments were very helpful in bringing to life the decisions and dilemmas they had faced.

Original Thalidomide Impairments

As was noted above, I anticipated that a proportion of respondents would choose to complete the survey anonymously. If this was the case, I would be unable to obtain any information about the severity of their original Thalidomide impairments. Furthermore, even for those respondents for whom I could obtain their 6(iv) b figure, I would only know the severity of their impairments, not the nature of them (e.g. upper and/or lower limb damage, sensory impairments etc.). The content analysis of the semi-structured interviews suggested that the nature of Thalidomide survivors' original impairments was a potentially important factor in their current health and wellbeing. I provide a more detailed explanation of this in Chapter 5 but for example, Thalidomide survivors with very short or no arms often use their feet for everyday tasks and this has implications for wear and tear of hip and knee joints. Research in Germany by Kruse et al (2013) also found that secondary musculoskeletal problems such as osteoarthritis, muscle weakness and muscle tension in upper limbs was clearly associated with severity of impairment. A number of studies discussed in my literature review appear to give only limited consideration to how the severity and nature of participants' original impairments might affect their health in later life, which to me seemed a significant omission.

However, developing the categories of impairments/damage to be used in the survey was difficult. Most UK Thalidomide survivors were assessed in the early 1970's as part of the compensation settlement, although over the years since, around 80 people have been assessed by the Trust to establish whether their impairments were caused by Thalidomide, and then accepted as beneficiaries. However, whilst the Trust holds detailed information in individual records, at the time of the survey it did not have an agreed standard classification of impairments/damage nor did it have readily available aggregate data about the number of its beneficiaries with different types of impairment.

In developing the categories for the survey, I used three approaches: I looked at the categories used in studies from other countries (see Vermette and Benegabi 2013 and Peters et al 2015); I drew on a draft classification being developed by the Trust's Medical advisor (and held discussions with her); and I tested draft categories with Thalidomide survivors. This final approach was partly to test peoples' understanding or interpretation of descriptions (e.g. minimal or no arm, damage to face and/or outer ear), but also to ensure

that the language I used was acceptable to Thalidomide survivors. For example, they preferred the word 'misshapen' to terms like 'deformed' or 'abnormality' which have been used in past studies (see O'Carroll 2011 and Bent 2007).

In relation to the International Classification of Functioning, Disability and Health or ICF (WHO 2001), gathering information about the nature and severity of respondents original damage provided an understanding of one element of their impairment i.e. body structures. However, it did not address the second element of the ICF – body function nor impairment effects (Thomas 2010) which is why it is important to set the information about respondents' Thalidomide damage in the context of the whole survey.

Overall, the final set of categories worked well, although a few respondents gave potentially contradictory answers (see section 3.6.5 for how I dealt with these). However, by the time I came to prepare the final report from the survey, the Trust had developed its classification and was able to produce aggregate data. Unfortunately, the Trust's categories did not fully match those used in the survey, so some adjustment had to be made to compare the impairments reported by survey respondents with those of all beneficiaries of the Trust. There were some discrepancies (see Tables 13 and 14) which it is important to acknowledge but none were so great as to invalidate the survey data.

Mobility and Equipment

For operational reasons the Trust was interested in gathering some brief information about mobility and equipment and so four questions were included, seeking information about the use of manual and electric wheelchairs, mobility scooters, and prosthetic limbs, hearing aids and hearing implants, and adapted cars. The Trust planned to use these data to inform the development of their support services. Whilst it was important for their work, it did not really add anything to my analysis and so I have not included it in results presented in Chapter 6.

Health Problems

The survey not only provided an opportunity to assess prevalence of secondary health problems identified in the content analysis, it also enabled me to explore co-morbidities, and other general health problems, the management of which might be affected by peoples' Thalidomide impairments. It also made it possible to examine whether there were differences between groups of Thalidomide survivors with particular impairments or characteristics. To simplify data collection and analysis I developed a list of health problems or groups of health problems, and respondents were then asked – *Are you currently experiencing or have you recently had any of the following health problems (please tick all that apply to you)?* There was also a free text box where respondents

could describe other health problems or add comments about their health. The list of health problems was discussed with the Research Committee, tested with Thalidomide survivors and was subject to several iterations. Overall, it worked well and generated valuable data. However, the question proved to have two important weaknesses.

First, the content analysis suggested that most people described their health problems using lay language. As this was a self-completion questionnaire, as far as possible I wanted to use this lay language rather than medical language when asking people to list their health problems. Whilst this worked well in terms of respondents understanding of the question, some of the descriptions used were inevitably a little imprecise (e.g. kidney problems). Later, when I came to compare Thalidomide survivors with the general population of a similar age, it was sometimes difficult to find suitable comparative data. With hindsight, I should have worked with the Trust to specify in more detail the areas where they wanted to make such comparisons, and as far as possible, found the comparator data I intended to use before finalising the survey. Secondly, the question used the phrase '*Are you currently experiencing or have you recently had...*' rather than specifying a time-period, such as '*in the last year*'. The reason for this was to give respondents some flexibility in reporting their experiences and to allow for people not being able to remember exactly when a problem had occurred. However, inevitably respondents will have interpreted the word '*recently*' slightly differently, and so without a fixed time-period (Gerstman 1998) the results can only provide an indication of prevalence. This also made comparisons with the general population and studies about the health of Thalidomide survivors in other countries more difficult. For example, Peters et al (2015) used both point prevalence and lifetime prevalence but their data were collected face to face in clinical interviews, which would have allowed for clarification.

Use of Health Services

This section had two parts to it. The first question asked respondents about the health treatments they had had in the past 10 years. I chose to use the term 'health treatments' because I wanted to identify the interventions (or broad groups of interventions) respondents had experienced but I did not want to use academic or technical language. Eighteen health treatments were listed and respondents could tick all that applied to them. The list of health treatments was informed by the findings from the Health Grant evaluation and as with the list of health problems, it was discussed with the Research Committee and tested with Thalidomide survivors. There was also a free text box for respondents to list other health treatments or add comments. In developing the question, I had several discussions with colleagues at the Trust about the most appropriate time-period to use. We chose ten years because the evidence suggested that the secondary

health problems experienced by Thalidomide survivors (and possibly their related need for treatments) have increased over this period. Whilst the accuracy of peoples' recollections of service utilisation is likely to decline with time this question was simply asking if they had used a treatment or not, and so we judged this was unlikely to create major problems with data accuracy.

The second group of questions was essentially concerned with the quality and appropriateness (in the broadest sense) and availability of health services. As part of its strategy, the Trust was working to raise awareness amongst health professionals of Thalidomide-related health problems, and the challenges that Thalidomide impairments can create when providing routine diagnostics and treatments (e.g. blood pressure measurement, diabetes management). They therefore wanted to use the survey to gather information about any problems Thalidomide survivors had experienced with health professionals and/or health services. This question listed ten 'problems' which Thalidomide survivors had reported in the Health Grant evaluation and respondents were asked to tick those that they had experienced. The Trust was also interested in perceptions of GPs understanding of Thalidomide damage and their willingness to refer Thalidomide survivors to a specialist with knowledge of Thalidomide damage. Ultimately, I excluded this last question from my analysis as I felt the responses were likely to be subject to too much conjecture.

Social Care Support

Within the Thalidomide community there had been discussions about the adequacy/flexibility of local authority social care support, and the Health Grant evaluation revealed that many Thalidomide survivors purchase personal and domestic support privately. For these reasons the Trust wanted to know what proportion of its beneficiaries were in receipt of local authority social care. They also wanted to gain a better understanding of Thalidomide survivors' use of both local authority and private social care support, now and in the future, to inform their support and information work with beneficiaries. This topic was also of interest to me as there is some evidence from research in Germany (Kruse et al 2013) that the ability to access and pay for appropriate social care support has an impact on Thalidomide survivor's mental wellbeing.

Mental Wellbeing

The Trust's National Advisory Council, which is entirely comprised of Thalidomide survivors, had a particular interest in mental wellbeing and one of the aims of the survey was to examine this issue in more depth. There is also evidence that people with disabilities are at greater risk of depression and/or anxiety (Meltzer et al 2012), and that

the mental wellbeing of people with early acquired disabilities may become more vulnerable as they age (Kemp and Mosqueda 2004). In discussion with the Trust and NAC members we agreed that this section should include a validated measure of wellbeing so that: the mental wellbeing of Thalidomide survivors could be compared to people in the general population of a similar age; and we had a baseline measure of the wellbeing at the start of the 10 year Health Grant, which could be used to assess changes in the mental wellbeing of Thalidomide survivors if the survey was repeated at a future date.

I suggested using the (short) Warwick and Edinburgh Mental Well-being Scale (WEMWBS), which was developed by Warwick and Edinburgh Universities in 2007 (Warwick Medical School 2018) and is validated for use in the UK. It has been used in the Health Survey for England since 2011 (NHS Digital 2011), so comparator data for the general population was available. The seven questions are positively worded, with just five response categories, making it easy to complete, and it is free to use. WEMWBS did enable me to compare the mental wellbeing of Thalidomide survivors with the general population, and it does provide a baseline from which to assess changes.

The Trust also wanted to include two bespoke questions about emotional wellbeing and social isolation, and an additional question (at the end of the WEMWBS) about how honest respondents felt they could be about how they were feeling/coping. I was concerned that these questions were too open to interpretation and could not be contextualised by comparison with the general population, and so I excluded them from my analysis.

Health-Related Quality of Life

Bowling (2005) notes that *“Health-related quality of life is one dimension of wider quality of life”* and that both are *“multi-level and amorphous concepts”* (p7). She goes on to suggest that, amongst researchers, there is no commonly accepted definition. Nevertheless, measures of health-related quality of life are frequently used in research studies and evaluations. There are many validated standard measures of health status and health-related quality of life. Bowling argues that *“Scales of broader health status are more stable, and have better reliability and validity than single item questions”* (p45). There is also a strong case for using general rather than specific indicators of health status in population surveys (Bowling 2005) and this made sense for my survey, as I was not looking at a particular illness or disease.

Including a well-tested and widely used measure of health-related quality of life within a broader survey can be very useful. It facilitates comparisons with the general population

and/or groups of people with similar conditions, and so helps to contextualising findings. If the measure is used internationally, inter-country comparison is also possible. However, selecting the most appropriate measure can be difficult because there are so many measures available; all have advantages and disadvantages; and some may work better with certain groups or in certain contexts. Two of the mostly widely used measures of health-related quality of life are the Short Form-36 Health Questionnaire (Rand Health Care – no year given) and the 12 item version of SF-36, SF12 (Jenkinson 1997). SF36 had been used in other studies of the health of Thalidomide survivors in Australia, Germany, and Sweden (Chorlton 2013; Peters et al 2015; Ghassemi Jahani 2016b), and I successfully used SF12 with UK Thalidomide survivors as part of the Health Grant evaluation (Newbronner et al 2012).

The Short Form 12 Health Survey is a 12-item version of the Short Form-36 Health Survey Questionnaire, which was originally developed by the Rand Corporation in the late 1980s (Rand Health Care – no year given). SF36 is now one of the most frequently used measure of generic health status in the world. SF12 consists of eight scaled sections (General Health; Pain; Physical Functioning; Role Limitation Physical; Mental Health; Role Limitation Emotional; Social Functioning; Vitality), which can be ‘aggregated’ into two domains – mental health-related quality of life and physical health-related quality of life. I chose to use SF12 because it has the advantage of being easier and quicker for people to complete. However, because it has fewer items, the scores are less precise (Jenkinson 1997). Nevertheless, the data from SF12 can be compared with that gathered using SF36. I therefore decided to use SF12 for a number of reasons:

- It would make possible valuable comparisons - with Thalidomide survivors in other countries, with the general population
- It would enable me to look at associations between both physical and mental health-related quality of life and other important characteristics
- Individually, the components of SF12 might yield some interesting data, for example about the impact of pain on peoples’ quality of life

Closing Questions

The final page of the survey asked respondents to indicate (from a list of 10) which areas of their lives were of most concern to them when they thought about the future. This question was really intended to help guide the Trust’s priorities for further work. There was also a free text box for respondents to add any further information about their health and wellbeing or highlight any concerns or issues. Ninety-eight respondents provided additional comments, many of which brought to life their responses to other questions. I

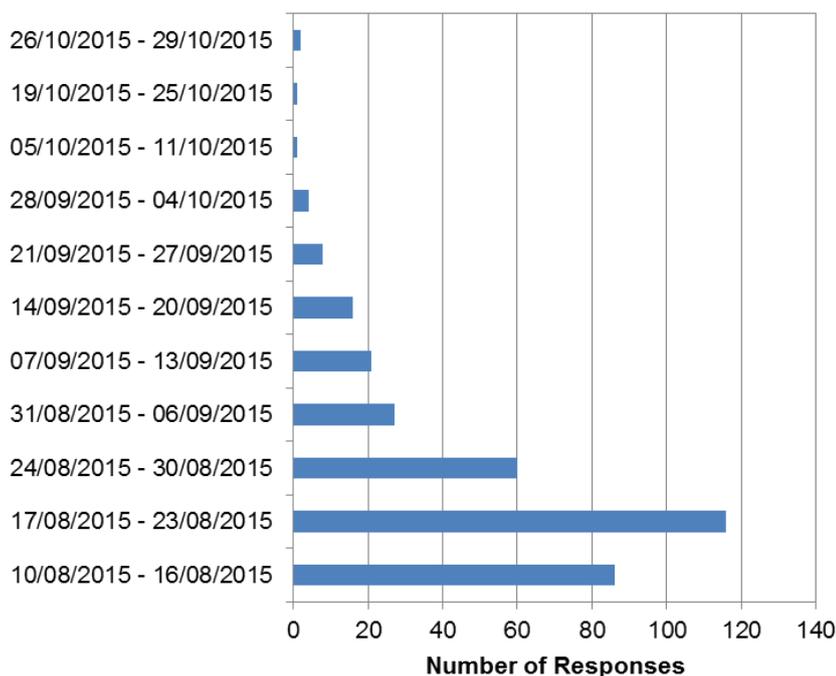
analysed these comments thematically. Some comments were linked to specific issues explored in the survey e.g. changes in employment status, and in Chapter 6 I use these in the relevant sections to illustrate the issues emerging from the quantitative data. Others reflected respondents' thoughts about the future, and so I have brought these together to conclude Chapter 6 and help set the scene for the analysis in Chapter 7. However, they do need to be treated with some cautions, because some groups of respondents may be more likely to add comments than others, and so they may not be representative of respondents as whole.

3.6.4 Survey distribution and response rate

The final version of the survey was printed as a 12 page A4 booklet and was sent by post, by the Trust to all beneficiaries (467 at the time of the survey) on the 11th August 2015. Enclosed with it was a brief information sheet (see Appendix 8), a covering letter from the Trust's Director and the Chair of the NAC Health and Wellbeing Committee (see Appendix 9) and a Freepost reply envelope addressed to me. Those beneficiaries who had previously informed the Trust that they were happy to be contacted by email were also sent an email, which included a live link to the online survey. The online survey was set up on Smart Survey and the first page contained the same information as the information sheet sent out with paper version. Both the information sheet and the covering letter also offered beneficiaries a further option to complete the survey on the telephone with me. The survey was publicised in a variety of other ways, including through the UK Thalidomide survivors Facebook page, at NAC meetings, 'word of mouth' by NAC members, in the Trust's newsletter, and by Trust staff encouraging individuals who rang the Trust's offices to complete the survey.

By the 7th September 300 beneficiaries had completed the survey. To improve the response rate further, after four weeks (10th September 2015) a reminder letter and email were sent by the Trust to all beneficiaries for whom no response was recorded (either because they had not responded or they had chosen not to give their name). The survey officially closed at the end of September 2015, although seven late responses that came in during October, were included. Figure 8 shows the response rate each week. The majority of responses were received in the first four weeks but the reminder did boost the response rate, taking it from 64% at the end of week four to the final figure of just over 75%. Bryman (2015) citing Mangione (1995: 60-1) suggests that a response rate of 70 to 85% for a postal survey can be regarded as 'very good'.

Figure 8 Number of survey responses received each week



In total, 351 responses were received – 232 on paper, 118 online and three completed on the telephone with support. These three included one respondent with multiple and extremely complex health problems, another with poor literacy and the other simply preferred to complete the survey on the phone. Four survey forms were filled in by a family member or guardian because the respondents were unable to complete it themselves. All of these were incomplete but it was possible to include the responses to the questions that were answered. Forty-nine respondents (13%) chose to complete the survey anonymously.

3.6.5 Data entry and analysis

The survey responses received by post or completed on the telephone were entered into an Excel spreadsheet. The responses received electronically were downloaded from Smart Survey as a CSV file and then initially transferred to an Excel spreadsheet. Once the survey had closed, the two spreadsheets were merged. Excel was used initially because, as part of the Health Grant Monitoring project, the Trust wanted access to some anonymised data from the survey and they asked that this be provided in Excel. Also a colleague, who assisted me with the data collection and data entry aspects of the survey, was familiar with and had easy access to Excel and so it was practically much easier to use this programme.

For those beneficiaries who had provided their name, I was able to obtain their 6(iv) b figure/impairment band and country of residence from the Trust (the latter being of interest

to the Trust). This data was then added to the main spreadsheet. Six questions had free text boxes where respondents could add further information or comments. These were also entered into the Excel spreadsheet and then transferred to a word document for thematic analysis.

To 'quality check' the data entry process my colleague and I took a random sample of 15 respondents and crosschecked the answers on the spreadsheet against their original paper submission. We did not find any errors. However, across the whole dataset, there was inevitably some missing data (e.g. questions not answered or not answered in full) and I note this where relevant in the results in Chapter 6. In addition, 27 respondents gave contradictory answers to the questions about original Thalidomide impairments (e.g. ticking 'arm shorter than elbow' *and* 'arm normal length' for the same limb). For this problem, where respondents had given their name, it was possible to clarify some of these responses by checking the answers given against the information held in the Trust's records. This was done in 19 cases. For the other eight cases I used the most severe impairment option.

The first stage of analysis was conducted in Excel, and included counts and descriptive statistics. My original intention had been to stop at this stage but the high response rate and representativeness of the respondents meant that further statistical analysis was appropriate. Following discussion with my supervisors, I transferred the data to SPSS (version 24) in preparation for a limited second stage of analysis using inferential statistics. The initial analysis helped me think about where to focus further analysis but I also examined the narrative comments which respondents added at the end of their survey forms, and briefly reviewed the findings from the content analysis and literature review, to identify any relationships or factors that it might be particularly relevant to explore, especially in relation to health-related quality of life (the third objective of my thesis). I began the analysis by simply looking at the relationship between key characteristics e.g. severity of impairment and musculoskeletal problems. I then examined the association between respondents' health-related quality of life and original impairment using Pearson Correlation. However, the narrative responses to the questions in the survey (and the content analysis and literature review) suggested that other factors, such as gender, living circumstances and employment status might be important in explaining variance in both physical and mental health-related quality of life. To explore the influence of these other factors (and with advice from a colleague) I used Hierarchical Regression, using three sets of variables: original impairment level (as indicated by the number of impairment points) (step 1); being unable/able to work and qualifications (step 2); and gender and living alone/living with others (step 3). Multicollinearity checks were

run on all predictor variables included in the models. Whilst this second stage of analysis was limited, it did provide new and valuable results. These are discussed in Chapter 6.

3.7 Secondary Grounded Theory Analysis of the Interviews

When I started my doctoral research, my original plan was to conduct a further round of qualitative data collection, (possible in-depth case study interviews), after the semi-structured telephone interviews and the health and wellbeing survey. However, as I was conducting (and transcribing) the semi-structured telephone interviews, my sense was that they were generating a great deal of rich material. This was further confirmed as I worked with the transcripts for the content analysis. I felt that I could learn much more from them than the content analysis had allowed, and that there was the potential to achieve the objectives of my study without the third round of data collection that I had initially envisaged. Following discussions with my supervisors, and after completing the Health and Wellbeing survey, I therefore decided to conduct a secondary analysis of the existing transcripts. Before setting out my rationale for the use of Grounded Theory in my secondary analysis, it is important to briefly discuss what is meant by secondary analysis and explain why I have used this term to describe what I have done.

Secondary analysis of quantitative data is a widely used and well accepted form of inquiry but over the last two decades there has been growing interest in secondary analysis of qualitative data. Perhaps because the field is still developing, definitions appear to vary significantly. Many authors (e.g. Bryman 2015; Boslaugh 2007) have suggested that secondary analysis is when data collected by one person is analysed by another. Under this definition my approach could not be described as secondary analysis. However, Heaton (1998) adopts a broader definition:

Secondary analysis involves the use of existing data, collected for the purposes of a prior study, in order to pursue a research interest which is distinct from that of the original work; this may be a new research question or an alternative perspective on the original question. (p1)

This definition allows for the possibility of the researcher who collected the data also undertaking the secondary analysis. She goes on to suggest that one form of secondary analysis (of qualitative data) involves additional in-depth analysis of a dataset with “a more intensive focus on a particular finding or aspect than was undertaken as part of the primary work” (p2). Szabo and Strang (1997) go further, suggesting that secondary analysis can involve exploring the same research questions using different methods of analysis. This was the case in my study. Both rounds of qualitative data analysis were exploring my overarching research questions but each brought a different perspective: the

initial content analysis enabled me to look across the data set to identify the main health problems respondents were experiencing, how they linked problems and how they described them, which informed the development of the survey; the secondary grounded theory analysis facilitated me looking deeper in to the data to understand how people experienced and made sense of their health problems, and how they affected them physically, mentally and practically, adding an explanatory element to my overall mixed methods design.

The context of my secondary analysis meant that some of the disadvantages commonly cited (Heaton 1998) did not arise or were not a major concern. There were no ethical issues because consent had been obtained for the interview transcripts to be used in the study. Data quality was also not a concern as I had largely had control over the data collection process. However, Whiteside et al (2012) highlights two other potential problems. The first is data fit i.e. the fit between the purpose of the secondary analysis and the nature of the original data. Overall the data fit was good but a more open interview topic guide would have probably generated slightly richer data, especially in relation to certain topics such as the emotional impact of health problems. The second is the relationship of the secondary analyst to the data. She suggests that "*Where the researcher is close to the primary dataset, there are benefits in regard to knowing the context of the study*" (p507) but there is also a risk that they might have preconceived or fixed ideas about the phenomena in the dataset. This was clearly a danger for me but as I explain in 3.7.2, the process of line by line (initial) coding pushed me to look at the data with fresh eyes. In 3.7.2 I also consider the specific challenges of secondary grounded theory analysis.

3.7.1 Rational for use of grounded theory

Sandelowski and Barroso (2003) suggest that research findings can be placed in a continuum from description to interpretation, based on the degree of transformation of the data during the data analysis process. Content analysis sits at the descriptive end of that continuum. In order to address my research questions, in particular examining the interaction between original impairment, secondary health problems and the ageing process, and the implications of this interaction for Thalidomide survivors' lives, I felt I needed to adopt a far more interpretive approach for my secondary analysis. After some further reading about different methods and discussion with my supervisors, I decided to use grounded theory for my secondary analysis. Reflecting the pragmatic approach to my study, this was in part an analytical choice. Grounded theory is a strongly interpretive approach but it is also a very structured approach to qualitative inquiry. The methods employed in grounded theory, particularly initial (line by line) coding, facilitated me going

deeper into my data and helped me to take a different perspective on it. Moreover, it brought back the individual voices, which had been partially lost in the content analysis.

In the fifty years since the publication of *The Discovery of Grounded Theory* (Glaser and Strauss 1967), grounded theory has become one of the most popular research designs in the world (Birks and Mills 2015). However, as Oliver (2012) notes “*there are significant differences in how grounded theory has evolved under different epistemological paradigms*” (p376) and the grounded theory tradition is now diverse (Sbaraini et al 2011). In recent years, much has been written about constructivist grounded theory (Mills et al 2006) and many researchers new to grounded theory, including myself, draw on the work of Kathy Charmaz, in part because her writing is so engaging and well written. However, I have never felt able to embrace her constructivist philosophy, which Birks and Mills (2015) define as “*a research paradigm that recognises that reality is constructed by those who experience it and thus research is a process of constructing that reality*” (p177). I find myself more in tune with critical realist ontology, which assumes that there is an objective reality (i.e. fixed structures and objects), although this may sit alongside the individual’s ability to construct their own reality and influence change (Birks and Mills 2015). So whilst I have greatly benefitted from reading her work, I retained my own ‘worldview’ in this stage of my study. Importantly, regardless of the researchers philosophical position, all approaches to grounded theory share common characteristics: Charmaz (2014) has described grounded theory as a “*constellation of methods*”; and Babchuck (2011) talks about the grounded theory “*family of methods*”. As such one of the attractions of grounded theory is that it offers a helpful set of strategies for collecting, managing and analysing qualitative data (Charmaz 2014).

3.7.2 Conducting the secondary grounded theory analysis

There are differing views about what constitutes a true grounded theory study. Charmaz (2014) suggests that what makes a grounded theory study is the actions of the researcher and she lists nine actions, the first five of which she sees as:

...evidence of a grounded theory study...:

- 1. Conduct data collection and analysis simultaneously in an iterative process*
- 2. Analyze actions and processes rather than themes and structures*
- 3. Use comparative methods*
- 4. Draw on data (e.g. narratives and descriptions) in service of developing new conceptual categories*
- 5. Develop inductive abstract analytic categories through systematic data analysis*

6. *Emphasize theory construction rather than description or application of current theories*
7. *Engage in theoretical sampling*
8. *Search for variation in the studied categories or process*
9. *Pursue developing a category rather than covering a specific empirical topic (p15)*

Birks and Mills (2015) highlight the following as “*essential grounded theory methods: initial coding and categorisation of data; concurrent data generation or collection and analysis; writing memos; theoretical sampling; constant comparative analysis; theoretical sensitivity; intermediate coding; identifying a core category; and advanced coding and theoretical integration*” (p10). Guetterman et al (2017) draw on Birks and Mills (2015) but refer to the “*founding principles of grounded theory*” (p3) within which they include: simultaneous data collection and analysis; memo writing; constant comparison; theoretical sampling (as a form of purposive sampling); development of concepts and categories; theoretical saturation; and theory construction and development. In short, there is no single definition of a grounded theory study but there are some core features which most grounded theorist would acknowledge. For clarity, I have listed below seven grounded theory methods which I have used either fully or partially. I then describe (with examples where appropriate) how I have used them, including discussing the limitations the secondary analysis imposed:

- Memo writing
- Theoretical sampling/concurrent data collection and analysis
- Initial and intermediate coding of the data
- Development of concepts and categories
- Constant comparison
- Theoretical saturation
- Theory construction

I did write memos at various points whilst planning and conducting my research. Although the memos varied in level of detail and coherence, it was very helpful to look back on them when I came to write-up certain sections of my thesis. However, with hindsight I should have used them more extensively to document my thinking.

As the preceding paragraphs illustrate, theoretical sampling and concurrent data collection and analysis, are regarded as a core features of grounded theory. Unfortunately, as Birks and Mills (2015) explain, the biggest challenge “*when using data from secondary sources in the inherent limitation this has for theoretical sampling*” (p82). Theoretical sampling involves the researcher simultaneously carrying out targeted data collection and analysis

but when using secondary data, this can only be done within the confines of a pre-existing dataset (Whiteside 2012). This means that if initial analysis reveals gaps in the data or unanswered questions, there is no scope to collect further data to address these i.e. a conventional approach to concurrent data collection and analysis is not possible.

Whiteside (2012) goes on to note that: “As a consequence of both these issues, data saturation of categories may not be possible and gaps may exist in the final theoretical construction” (p507). However, it is possible to partially offset these issues by working with a dataset that is of sufficient size to allow for a degree of theoretical sampling (Szabo and Strang 1997).

With 38 interview transcripts my dataset was large and so a form of theoretical sampling was possible. I began by taking five interviews which I knew were quite rich and detailed. I then created a word document for each interview with a column each for the raw data, the initial codes and the intermediate codes. First I line-by-line coded them and then having completed the set, I returned to each interview to explore the intermediate codes. Once I felt reasonably confident that this approach to coding was working, I took a further purposive sub-sample of 14 interviews and analysed them. Together these 19 interviews (half my dataset) were broadly representative of the whole dataset in terms of gender and impairment level. At the end of this process I reviewed the codes to see if any potential conceptual categories were emerging. From this first sub-sample of interviews I identified 11 possible conceptual categories. I then purposively selected and analysed another ten interviews (to include participants in different impairment bands), to see if these categories held good or needed modifying, and to explore further the conditions or properties of the categories and the relationships between them. This left nine interviews which I had not analysed. I could have stopped at this point because I felt reasonably confident that the conceptual categories were sound and it was unlikely that new codes relevant to them would emerge from the remaining data i.e. I had reached *theoretical saturation*. However, Hennink et al (2019) describe theoretical saturation as being about the sample having sufficient conceptual depth and richness to support theory development. So, I decided to continue and analyse the remaining interviews, partly for completeness and partly because I felt they might add further depth to the categories, which they did to a limited extent.

In her seminal paper ‘*Discovering’ chronic illness; using grounded theory* (1990) Charmaz discusses the process of coding and categorising data. She emphasised that codes and categories should not simply describe topics but rather reveal emerging ideas. She goes on to explain that:

The codes and categories then help the researcher to begin to take the data apart and frame analytic questions about it. In that way, the codes and categories help the researcher to build an analysis of the data rather than remain at a level of ethnographic description. (p1167).

At first I found the task of initial coding hard, partly because at times it did seem difficult to move beyond the descriptive. More importantly, because I had already worked with the data for the content analysis, I struggled to set aside preconceived ideas and assumptions about it. Gradually, however, the process of line by line coding pushed me to look at my interview data from a fresh perspective. I also adopted Charmaz’s suggestions to code for processes, actions and consequences rather than for topics, and to code with gerunds (i.e. a type of verb that ends in "-ing") (Charmaz 1990; 2014).

In relation to intermediate coding, Birks and Mills (2015) describe a number of different definitions put forward by different grounded theorists but in essence they all involve elevating or building on existing codes that have particular significance, and identifying patterns and relationships between codes. I began by looking for the intermediate codes in each of my interview transcripts but quite quickly I could see potential categories emerging and so as my analysis progressed, the process of intermediate coding and the development of categories and sub-categories became more intertwined, especially as I analysed the second half of my dataset. One of the most important analytic processes in developing conceptual categories is constant comparison between data (in my case the coded interview transcripts) but also between categories and sub-categories (Charmaz 1990) and so this ‘mixing’ felt appropriate. Table 5 provides an example of how I moved from the raw data, to initial and intermediate codes and the conceptual category.

Table 5 Example of coding process from interview with Alison

Raw Data	Initial Codes	Intermediate Code	Conceptual Category
<i>“I think back in October, when I’d hurt my shoulder in the May, and I didn’t feel like it was getting any better, even though I’d been attending physio – and they simply gave up on me – they didn’t know what else to do – and I think by September, I thought enough is enough – I’ve got to take control of the situation myself. So I</i>	Lacking confidence in NHS physio Feeling that HCPs had given up on her	Absence of diagnoses or explanations of problems	

Raw Data	Initial Codes	Intermediate Code	Conceptual Category
<i>booked the holiday and found myself an osteopath – and I did go back to the GP and said ‘Look, I’m in so much pain’. But the GP was really horrible, really horrible – very sharp, very unsympathetic. He didn’t seem to appreciate that having an injured shoulder had a massive knock-on effect to my ability – that things were difficult anyway, so that hurting myself made life even more difficult. I didn’t feel he appreciated that at all but he was the one that gave me the Tramadol, which did help a lot with the pain.”</i>	Deciding to take control of the situation Choosing own treatments GP not understanding implications of shoulder problems Daily life becoming more difficult and painful	Lack of confidence in HCP Using complementary therapies	Taking Control of Own Health

The analysis of the sub-sample of 19 interviews had generated eleven potential conceptual categories. However, some of them overlapped or could possibly be seen as sub-categories. I discussed this in some depth with my supervisors which helped to clarify my thoughts. By the end of analysing the second sub-sample of interviews I was focusing on just seven conceptual categories and I had renamed some of the retained categories. Table 6 show how the conceptual categories changed between the first and second phases of analysis.

Table 6 Development of conceptual categories

First round of conceptual categories	Second round of conceptual categories
Shifting Impairment	Shifting Impairment
Trying to Preserve Function	Preserving Function
Daily Living Getting Harder	Rethinking Independence
Striving to Keep Independence	
Life Becoming More Limited	Vulnerable Mental Wellbeing
Mental Wellbeing Increasingly Vulnerable	

First round of conceptual categories	Second round of conceptual categories
Taking Control of Own Health	Taking Control of Own Health
Ageing Prematurely	Ageing Differently
Fearing Growing Old with Thalidomide	
Money Making a Difference	Money Matters
Embracing Thalidomide Identity	<i>Integrated in to other categories</i>

At this stage I decided to write a description of each of the seven conceptual categories, using quotations to illustrate them. However, before I started I moved the coded transcripts into NVivo, partly to help me see the sub-categories more clearly but also manage my use of quotations and extracts. I felt the process of writing about them would crystallise my ideas but also help me begin to set out the properties of each category. Birks and Mills (2015) explain that categories and sub-categories “*have properties that need to be identified in the data and explained in full in order to develop conceptual depth and breadth*” (p95). Properties can include things like the conditions under which they operate, or the range of variance within the category or the relationship to other categories. At the end of the initial writing up process, which was indeed very helpful, I decided to reflect on what was emerging.

In terms of next steps in the Grounded Theory ‘process’, I found there were differing views about the necessity of identifying a ‘core category’. In the early seminal text identifying a ‘core category’ around which all the other categories are integrated (Strauss and Corbin 1990) was a key step. However, in later texts (Clarke 2005; Charmaz 2014) selecting a core category appears to be less important, with more focus placed on how categories and sub-categories fit together to form the grounded theory. Glaser (1978) described a core category as, generalizable, having ‘grab’, and suggests that a category will always emerge and ‘core out’. At this point I reviewed my conceptual categories alongside the findings from the literature review and the survey. In GT language this step would be described as theoretical sensitivity i.e. the ability to recognise and extract from the data elements that have relevance for the emerging theory (Birks and Mills 2015). I began to feel that *Ageing Differently* was a common thread. Charmaz (2014) suggests that part of the GT process is thinking about how your own theory relates to fundamental concerns and contested ideas in your field of study. For me *Ageing Differently* did this in relation to currently thinking about ageing with early acquired disability.

3.8 Summary

In this chapter I have described how I used a mixed methods grounded theory approach to address the objectives of my thesis. I began by explaining my rationale for choosing this approach; notably that more than one method of inquiry was needed to fully understand the health problems of Thalidomide survivors and to do justice to the complexity of their experiences. I have discussed in detail each element of my three stage design (see figure 7): the content analysis of the semi-structured telephone interviews with 38 Thalidomide survivors; the cross-sectional health and wellbeing survey; and secondary grounded theory analysis of the semi-structured telephone interviews. The semi-structured telephone interviews provided a practical method for capturing individual narratives. The initial content analysis of them enabled me to identify the main health problems Thalidomide survivors were experiencing, and informed the development of the self-completion survey.

I have described how the survey was developed, and in particular the active involvement of Thalidomide survivors in both designing and testing it. I have also discussed how conducting the survey for the Thalidomide Trust brought both constraints and advantages. In particular it helped me to achieve a very high response rate (75%), and ensured that the survey respondents were highly representative of the UK Thalidomide population as a whole. This chapter also describes the planned analysis of the survey data. The findings from the analysis, including comparisons with the general population, are presented in Chapter 6.

In the final section of the chapter I discuss my decision to undertake secondary analysis of the semi-structured telephone interviews, in particular the scope to learn much more from the data, without placing a further research burden on Thalidomide survivors. I also explain how using grounded theory enabled me to look at the data from a fresh perspective and adopt a far more interpretive approach to the analysis. This analysis generated seven conceptual categories, which I describe in detail in Chapter 7. I also drew on grounded theory methods in analysing the evidence in my literature review. Whilst the two processes were separate, using grounded theory in these two aspects of the study contributed to the overall consistency of my approach.

In my Discussion in Chapter 8, I bring the findings from all the elements of my study together in three integrative explanatory categories. Together these provide the framework or 'storyline' for my emergent theory – *Ageing Differently* - which explores the extent to which Thalidomide survivors experience of ageing at this point in the life course is different or similar to their peers in the general population and to other people with early acquired disabilities.

Chapter 4 Ageing with Thalidomide Embryopathy – A Review of the Literature

Chapter 2 set out the historical and contemporary context of the drug Thalidomide and the individual and societal consequences of its use. In this chapter, I review the literature about ageing with TE. However, it is interesting to begin by briefly describing the ‘history’ or evolution of the literature, as in part this mirrors the wider historical context of the drug. I then go on to describe the nature of the review, and the rationale for undertaking a scoping review. In particular, I explain why and how I drew on grounded theory methods in analysing the evidence. I go on to describe the literature searches, screening, study selection and results. To collate and summarise the evidence I have used two approaches, a numerical summary, describing the characteristics of the included studies and a descriptive thematic analysis. I then present a limited synthesis of the evidence in the form of ‘intermediate codes’. Finally, I close the chapter with my overall reflections on the literature, including what is missing from the current body of evidence.

4.1 Evolution of the Literature

In the 1960’s and 1970’s a great deal was written, especially in the medical press, about the drug Thalidomide, its teratogenic effects, and the nature of the damage it caused (McBride 1961; Lenz 1962; Millen 1962). In this same period in the UK, a number of reports, books and papers about the health and circumstances of Thalidomide children were published alongside coverage in the mainstream press, in particular by the Sunday Times (Knightly et al 1979). During the 1980 and 1990s there were a small number of studies involving Thalidomide survivors but these tended to examine narrow topics. For example, the ophthalmic damage caused by Thalidomide (Strömmland and Miller 1993); a review of prosthetics services for Thalidomide survivors (Mustapha 1990); and Thalidomide, pregnancy and renal failure (Brown 1990). It was only in the 2000’s, when Thalidomide approached its 50th ‘anniversary’ and Thalidomide survivors entered middle age, that research specifically about the health and quality of life of Thalidomide survivors as adults began to appear in academic journals and online. Over the past 20 years, several reports and papers have been published. Some focus on specific late onset health problems, others look more broadly at health and quality of life.

With the benefit of this historical perspective it is clear that these ‘phases’ in the evolution of the literature about Thalidomide reflect the changing medical, academic and public interest in the drug and its consequences. These began with identifying the link between the drug and birth defects, then moved to practical concerns about the needs of

Thalidomide children, and finally on to the health of Thalidomide survivors as adults. However, even in this final phase, the contours of the debate have remained relatively narrow, often focusing on specific health problems, with only limited exploration of the social consequences for Thalidomide survivors.

4.2. Nature of the Review

A number of the studies about ageing with TE begin with some examination of the literature but often this is restricted to the area of clinical interest. As a result, they present only a limited picture and fail to reflect the complexity of the health problems many Thalidomide survivors face, nor their implications for health-related quality of life across the life course. Until this review (see Appendix 10: Disability and Health Paper), there were no published reviews of the literature about the health of Thalidomide survivors as they age. As part of my thesis, I wished to address this gap in the knowledge base. More specifically, I used the findings from my review to inform and set in context my primary research, and to help me address my research objectives (in particular the first and third):

- Identify the health problems Thalidomide survivors are experiencing as they grow older, in particular Thalidomide-related secondary health problems
- Examine the perceived interaction between original impairment, secondary health problems and the ageing process
- Understand the implications of this interaction for Thalidomide survivors' lives, including their health-related quality of life and independence

I therefore decided to conduct a scoping review. There is no single accepted definition of a scoping review (or scoping study). Levac et al (2010) suggest that they generally involve 'mapping' or summarising the evidence. Arksey and O'Malley (2005) note that whilst mapping implies breadth of coverage, the depth or amount of information extracted will vary depending on the purpose of the scoping review. I chose this form of review because it enabled me to: identify the nature and extent of the research evidence about the Thalidomide-related health problems experienced by Thalidomide survivors as they age; summarise these research findings (to inform my thesis and for dissemination); and highlight the gaps in the literature. In addition, compared to systematic reviews, scoping reviews: lend themselves to broader research questions; can more easily accommodate a range of study designs and published and grey literature (Levac et al 2010); and are consistent with the use of grounded theory methods. Furthermore they are more feasible where time and resource constraints are an issue, which applied in my case.

4.3. Literature Searches and Study Selection

Although my review was not a systematic review, I developed a review protocol based on widely accepted guidance produced by the Centre for Reviews and Dissemination (CRD 2009). I used this to guide the search and selection process, and to demonstrate transparency. In the sections below, I describe in more detail my search strategy, and my study selection and data extraction processes.

4.3.1 Search strategy

I carried out an initial exploratory search of MEDLINE to gain a better understanding of the nature of the literature and to inform the development of the search terms to be used in the electronic searches. I then searched the following seven electronic databases for eligible studies:

- MEDLINE (1946 Onwards) (OvidSP)
- EMBASE (OvidSP)
- CINAHL Plus (EBSCO)
- PsychINFO (OvidSP)
- ASSIA (ProQuest)
- Social Policy and Practice
- Index to Theses (www.theses.com/)

The search strategies for each database used both subject headings and key words in the title and abstract. The search strategy used for MEDLINE is shown below in Table 7 as an example.

Table 7 Search strategy used for MEDLINE

	Search Terms
#1	thalidomide OR distaval OR tensival OR asmaval OR valgis OR valgraine OR sedoval OR celgene OR contergan
#2	Pregnan\$ OR during adj3 pregnancy or in adj3 pregnancy
#3	#1 AND #2
#4	Impair\$ OR damage\$ OR disable\$ OR disabilit\$ OR handicap\$ OR deformit\$ OR deform\$ OR affect\$ or consequen\$ of
#5	#3 AND #4
#6	health OR health problem\$ OR physical health OR mental health OR illness\$
#7	#5 AND #6

I began in search #1 by simply using the name of the drug, Thalidomide, and the most common names under which it was marketed in the 1950's and 1960s. As expected, this produced a huge number of records. Most were either concerned with the more recent use of Thalidomide to treat a range of conditions (e.g. multiple myeloma), or with the wider topic of pharmaceutical regulation. I used search #2 to focus on the use of the drug during pregnancy. Whilst this reduced the number of records substantially, it left in a large number that were primarily concerned with the teratogenic action of the drug and/or the clinical or ethical issues around drug administration during pregnancy. I combined these searches (search #3) with search #4, to narrow the results down further to the impairments or damage caused by exposure to the drug in the womb (search 5#). I then combined searches 5# and #6 to try and capture records that were specifically concerned with health problems.

The searches were run in May 2015 and again in November 2016. Ageing with TE is a specialist area with a very limited number of peer reviewed papers each year. The researchers working in the field keep in regular contact and normally notify each other of newly published papers. For this reason I did not re-run the electronic searches but continually tracked the literature through liaison with colleagues and experts in the field. I up-dated the results in December 2019.

The focus of this thesis is UK Thalidomide survivors and so I was primarily interested in studies involving the 'first wave' of Thalidomide survivors (i.e. people born in the late 1950's and early 1960's), and in studies focusing on their health and quality of life in middle to late life. However, at the search and screening stage I decided not to use any date restrictions. I thought that some earlier studies might identify authors who had conducted more recent, relevant research and/or provide useful background information for the historical context sections of my thesis. I also decided not to exclude the small number of studies which include Thalidomide survivors born in South America between the 1970s and the 2000s, as I felt they may contain useful contextual information and/or relevant citations. I did restrict the review to English language sources, as I did not have the resources to pay for translations. However, I was fortunate in that the Trust had paid for three very relevant publications (two from Germany and one from Japan) to be translated into English and I was able to obtain copies of the English language versions.

Whilst searching the electronic databases listed above was essential, the exploratory search suggested that the records found through this route were likely to be limited in number and nature (e.g. a bias toward clinical studies). Furthermore, from my own previous work and discussions with others working in the field, I was aware of several relevant studies that were in the public domain in the form of reports but did not appear in

peer-reviewed journals. If I had restricted my searches to published academic literature, I would have missed a number of important studies and lost data that ultimately proved very valuable. For this reason, it was necessary to search via a number of other sources, and I chose four:

Websites of Thalidomide Organisations - In most of the countries where significant numbers of people were born with Thalidomide damage, there are societies and associations that represent them. Whilst they vary in size and purpose, a number have commissioned or carried out work that was relevant to the review. I began by looking for potentially useful websites and identified two that had links to relevant studies:

- The Swedish Thalidomide Society (FfDN) website is available in an English language version and lists a number of reports and publications from several different countries
- Thalidomide Victims Association of Canada have made their own reports freely available via their website

The Federal Association of Congenital Victims in Germany also has a website that was potentially useful but there was no English translation. However, I was aware of relevant research taking place in Germany and was able to obtain English language versions of the reports from these studies via the Trust.

Contacting experts in the field - Internationally there is a small, informal network of clinicians and researchers with an interest in TE. Through my previous work with the Trust I was in contact with clinicians/researchers in Germany, Japan, Sweden and Australia and obtained copies of their reports and/or was directed to their publications (most but not all of which had been identified through searching the electronic databases). Contacting experts in a field to increase the likelihood of identifying all or most of the studies relevant to a review is now accepted practice (McManus et al 1998). It can be particularly helpful where the lack of sensitivity of electronic databases is a problem. From my exploratory search, I felt this was likely to be an issue in relation to my searches. I maintained these contacts throughout my doctoral studies and through them identified six papers published after the main searches.

'Hand' searching reference lists and journals – the reference lists did yield a few records that I had not identified through other sources but searches of three key journals – Disability and Society, Disability Studies Quarterly, and Journal of Disability Policy Studies only produced one potentially relevant paper.

Google Searches – because much of what has been written about Thalidomide in recent years has not appeared in peer-reviewed journals, I also made several Google searches, using a number of different words and phrases (e.g. Thalidomide survivor, Thalidomide

Embryopathy, Thalidomide damage). Whilst much of the material I found took the form of newspaper articles, website content and blogs, I did find two relevant reports via this route.

4.3.2 Criteria for screening the records

Given that the focus of my thesis is on the health of Thalidomide survivors (i.e. people with TE), not the health of people who have taken Thalidomide or its derivatives for other conditions, I wanted a clear way of screening out studies that looked at more recent uses of the drug. I developed two broad criteria for the initial screening of the records found in the searches:

- Type of exposure – only studies which are concerned with exposure to the drug Thalidomide (at any dosage and over any period) whilst in the womb were included
- Types of participants – only studies that focus on people born with physical and/or mental impairments that resulted from their mothers taking the drug Thalidomide during pregnancy were included.

For reasons I explain in 4.3.1 above, at the search and screening stage I did not impose any date restriction. In relation to the types of studies, the searches revealed that there was considerable variation in the size of the studies, study designs, contexts and the quality of the studies. In addition to the studies reporting primary research, there were a number of case series and reports from organisation representing Thalidomide survivors, which contained potentially relevant material. For this reason, I did not place any restriction on the type of study to be included.

4.3.3 Study selection

I assessed the titles and abstracts of the identified records to evaluate their potential eligibility and those that were clearly irrelevant were discarded at this stage. Where possible, I retrieved the full text of all the potentially relevant papers and assessed them using four questions:

- Is the study population Thalidomide survivors born in the late 1950 or early 1960's?
- Does the study report on the health and/or impairment of Thalidomide survivors?
- Does the study report on the quality of life of Thalidomide survivors?
- Does the study focus on the health/quality of life of Thalidomide survivors in middle age?

If the answer to the first question and at least one of the following questions was 'yes' I included the study. I developed a study selection form (shown in Appendix 11) to document my decisions. The study selection forms for the final list of included papers were audited by my main supervisor.

4.4 Data Extraction

In scoping reviews, the data extraction stage is often referred to as 'charting the data' (Arksey and O'Malley 2005). To ensure consistency in the type and depth of data extracted from the included studies, I used a data extraction form. An example of a completed form is shown in Appendix 12). I looked at a number of forms and templates (see for example Egan et al 2003; Noyes and Lewin 2011) and drawing on these developed my own form. This approach worked well for the journal articles and created helpful overviews for the longer reports. However, four key reports – one from the UK, one from Canada and two from Germany – were too long and detailed to summarise meaningfully in this way and so I annotated the reports, to make it easier to revisit key themes and findings later. My approach was relatively simple. I began by reading the reports in full and marking (with sticky bookmarks), the main topics or themes covered. As the headings for my descriptive analysis emerged (from all the literature), I re-read the reports and re-named my bookmarks to align them with these headings. At this stage, I also made additional notes on the hard copies or electronically, which flagged specific topics or data which I intended to include in the write up of the descriptive analysis.

4.4.1 Quality appraisal

Typically, scoping reviews, unlike systematic reviews, do not include any quality assessment of the included studies (Grant and Booth 2009). However, at the data extraction stage I felt it would be valuable to undertake a limited appraisal of the quality of the studies. The issue of how to assess and document the quality of the studies presented some difficulties: there were several different types of studies; some were highly clinical in nature; and the records included publicly available but unpublished literature. Due to the very diverse character of the studies, I did not use any standard quality assessment tools (e.g. Cochrane Risk of Bias or COREQ) but I did make notes on the quality of the studies and recorded these on the data extraction form. These notes did influence the weight I placed on the findings from some studies, especially where they were not supported by data from other studies. In this way, they informed the thematic analysis presented in 4.8.

4.5 Collating and Summarising the Evidence

Unlike a systematic review, which seeks to 'synthesise' the evidence, a scoping review simply collates and summarises the evidence (Arksey and O'Malley 2005). Nevertheless, in my review I wanted to use an approach that could deal with the heterogeneous nature of the literature I had found and if possible, allow some synthesis of the evidence. As my reading progressed, it struck me that drawing on some of the methods used in grounded theory might offer an interesting approach, which could both 'handle' the very mixed group

of studies found, and would 'fit' methodologically with the mixed methods grounded theory approach to my study.

In their review of possible methods for analysing qualitative and quantitative evidence, Dixon-Woods et al (2005) note that there are very few examples of the use of grounded theory but suggest that:

In principle, grounded theory offers a potentially suitable approach to the synthesis of primary studies. The constant comparative method, the most widely used element of grounded theory, has the most obvious potential for application, in part (especially in later formulations) because it offers a set of procedures by which data may be analysed. (p47)

Many methods for the qualitative analysis of evidence draw on the analytical methods described by Glaser and Strauss (1967), although the connection may not always be explicit (Pope et al 2007; Barnett-Page and Thomas 2009). The paper most often cited in relation to the use of grounded theory is Margaret Kearney's (2001) analysis of women's experiences of domestic violence, which included 15 studies. Importantly, a prerequisite for inclusion in Kearney's analysis was that the studies should have some affinity with grounded theory methods, notably that they should have used constant comparative techniques for data analysis and that the theories developed should be 'grounded' in the data. Kearney used constant comparative analysis to analyse the data descriptively and theoretically. She then used substantive (or initial) coding to identify and cluster concepts that were identified across studies into new categories. Axial (or intermediate) coding was used to examine the nature of the categories in more depth and to explore the relationships between them. Finally, she used selective (or theoretical) coding to develop and test her emergent theory.

All the studies included in Kearney's synthesis were qualitative in nature, and as noted above had some affinity with grounded theory methods. By contrast, the literature in my review was methodologically diverse and only a handful of the studies had any affinity with grounded theory methods. Nevertheless, I still felt that grounded theory offered a heuristic approach, and indeed Dixon-Woods et al (2005) note that:

The generation of higher order themes [using GT], as a means of synthesis encourages reflexivity on the part of the reviewer while preserving the interpretive properties of the underlying data.....The approach could potentially deal with quantitative data by converting quantitative data to qualitative form, for example through a narrative descriptive process, though there are currently no examples of this. (p48)

My approach to using grounded theory methods to collate and summarise the evidence had three main elements. I used the data extraction process as a form of initial coding and constant comparative analysis to analyse the data thematically. The thematic analysis was relatively straightforward but it allowed me to identify categories that cut across the studies. Constant comparative analysis also worked well and felt quite a 'natural' approach. It enabled me to: compare data from different types of studies (e.g. surveys and focused biomedical studies); move between and bring together findings from studies that were very different in scale and scope (e.g. major multifaceted studies involving large numbers of participants and small case studies); and to 'convert' quantitative data from the studies in to narrative description. I then developed intermediate codes that spanned a number of studies. However, unlike Kearney, I did not move on to subject the data to theoretical coding. To explain my reasons for this it is necessary to go back a step and reflect on the place of the literature review in grounded theory, and the purpose of this review in my study.

The debate about the use of literature in grounded theory is long standing (Birks and Mills 2015) and much of this debate centres on *when* a formal review of the literature should be conducted. In particular, in *The discovery of grounded theory*, Glaser and Strauss (1967) argued that a formal review of the literature should be delayed until data analysis has been completed, to avoid the researcher's thinking being unduly shaped by existing knowledge and theories. However, later writers (Urquhart 2007) regard reviewing the literature as a way of the researcher orientating themselves to the field of study, and Birks and Mills (2015) suggest that the literature can be used at various stages in a grounded theory study, including as data during analysis. For me the review did serve these two purposes – it developed my understanding of my research topic and provided an important source of data. Charmaz (2014) also considers the place of the literature but in broader terms, and importantly draws a distinction between the literature review and theoretical frameworks. She suggests that the boundary between the two is often blurred and that the sharpness of the distinction will depend on the purpose of the study.

The literature on the health of Thalidomide survivors as they age is almost completely devoid of theoretical frameworks and so it was possible and appropriate to draw a clear distinction between the literature review and the exploration of relevant theoretical frameworks, discussed in Chapter 8. The absence of theoretical frameworks also meant that in examining this literature prior to completing my data analysis there was little danger of my own theory being unduly influenced by it. I therefore decided to treat the studies found in the literature review as another source of data, and use intermediate coding to synthesise the evidence. The review provided me with a very valuable picture of the types

of health problems being reported (in the UK and internationally), which I used to shape the content analysis of the semi-structured telephone interviews, and to inform and contextualise the health and wellbeing survey discussed in Chapter 6.

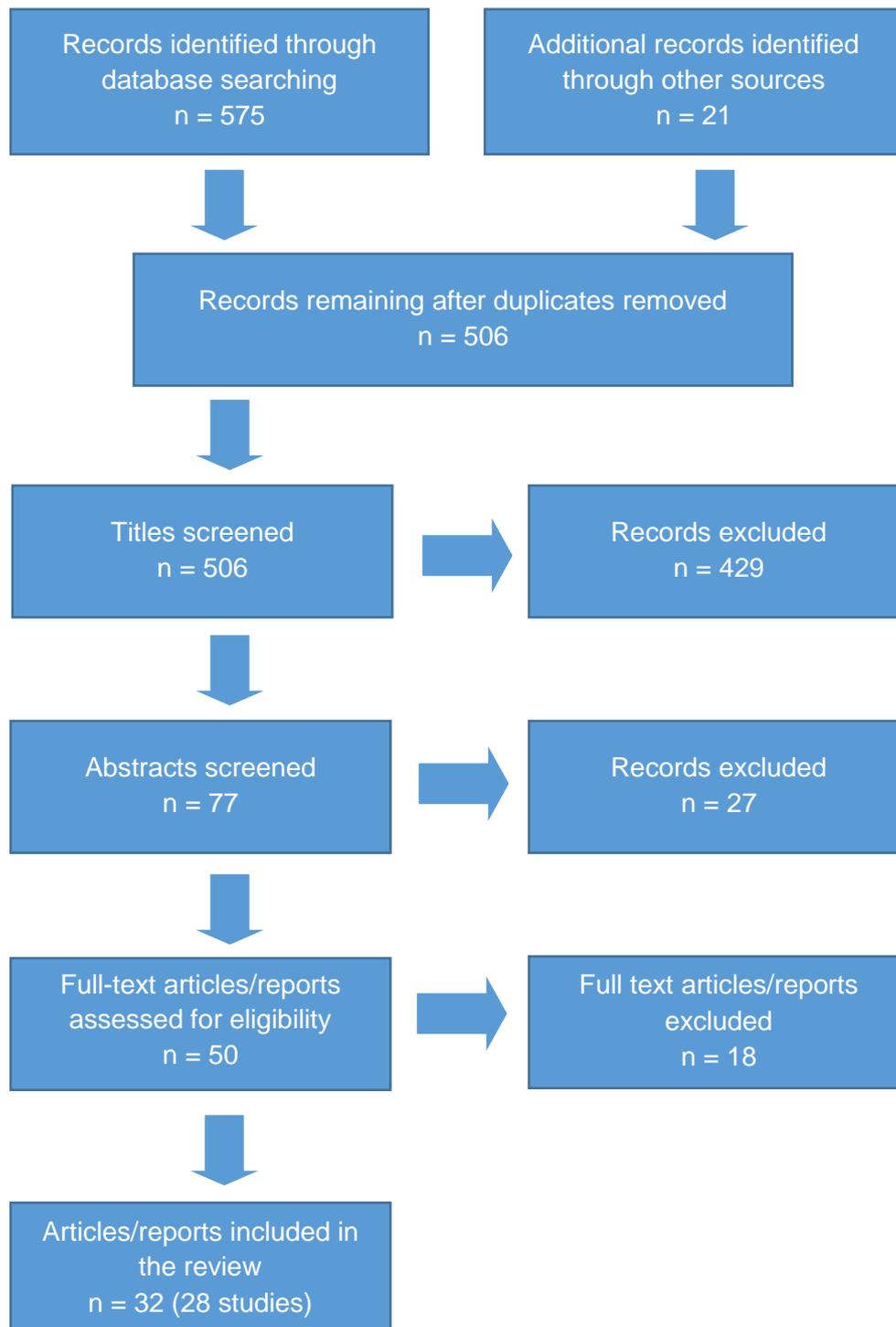
At this point, it is appropriate to reflect briefly on the use of GT methods for my evidence analysis and synthesis. I carried out most of the work on my literature review early in my doctoral research. At that stage, the overall 'shape' of my study was still evolving and I was new to Grounded Theory. As my research progressed, (especially since completing the secondary Grounded Theory analysis of the semi-structured telephone interviews), so did my understanding of grounded theory methods. When I came to update my literature review in December 2019, I was able to reflect on how I describe my methods. In particular, when I first wrote up my review, I described the codes presented in Table 10 as 'initial codes'. On reflection, I think these are more appropriately described as 'intermediate codes', with the data extraction process being akin to the initial coding. However - and given how my study has evolved - I feel that drawing on Grounded Theory methods for the evidence analysis and synthesis was appropriate and helpful. It provided an explanatory account, which outlined the scope of the literature along with its content.

Finally, it is helpful to note that in scoping reviews the analysis of the evidence is generally presented in two ways: a numerical summary, describing the characteristics of the included studies (e.g. year of publication, country, study design, research methods); and descriptive thematic analysis (Arksey and O'Malley 2005; Levac et al 2010). The numerical summary is presented in tabular form in 4.7 and the thematic analysis is presented as a narrative in 4.8.

4.6 Results

The literature searches (conducted in May 2015 and November 2016 and updated in December 2019) confirmed that there was very little published research about the health and quality of life of Thalidomide survivors, as they grow older. They yielded 575 records from electronic databases and 21 from other sources, which once duplicates had been removed, left 506 records. I first screened the titles to remove studies that were not concerned with exposure to Thalidomide whilst in the womb (a large number of studies focused on either the action of the drug or its contemporary uses). I then screened the abstracts using the inclusion criteria described in section 4.3.2. Figure 9 below shows the number of studies at each stage in the search and selection process. It includes all 32 of the records (which came from 28 studies) included in this review, regardless of when they were identified.

Figure 9 Literature review flow chart



4.7 Summary of the Evidence

As noted in the introduction to this chapter, it was only in the 2000's, when Thalidomide approached its 50th 'anniversary' and Thalidomide survivors entered middle age, that reports and papers specifically about the health and quality of life of Thalidomide survivors as adults began to appear. My review focuses on this body of literature. Although I have

used the phrase 'body of literature', it is in fact quite limited and disparate. It is also largely descriptive and rarely engaged with broader theoretical debates about ageing, health and disability. Despite the fact that Thalidomide was distributed in 46 countries, the 32 records (from 28 studies) come from just eight countries – Australia, Brazil, Canada, Germany, Ireland, Japan, Sweden, and the UK. For this reason, in Table 8 I have structured the evidence summary by country and then by year. In some countries, more than one paper or report has been produced from the same study, with the same group of participants. Specifically, all six of the records from Sweden come from one large multi-disciplinary study. However, they address different aspects of the health of Thalidomide survivors and use both cross-sectional and case control designs, and so in this summary I have treated them as separate 'studies'.

In terms of the types of study, 20 had a cross sectional design, five were case control studies, and three were case series. Of the 25 primary research studies, 21 used quantitative methods, one used qualitative methods and three multi-methods. The majority of the quantitative and multi-methods studies used validated questionnaires and/or clinical measures. The number of participants in these studies ranged from 15 to 870 and all except Nippert et al (2002), included men and women. All the studies except one (Kowalski et al 2015) focused solely on adult Thalidomide survivors who had been born in the 1950s or 1960s. The mean age of participants at the time of the studies ranged from 35 to 55 (excluding Kowalski et al (2015) where participants were aged 19 to 55).

My assessment of the quality of the studies was very limited (see 4.4.1), consisting of notes recorded on the data extraction form. However, it worth noting here that of the 25 primary research studies, I identified significant quality issues with six studies. A few of the studies were well conducted but there were wider issues such as the age of the data being used or (in prevalence studies), the lack of comparisons to set findings in context. In my thematic analysis of the evidence (4.8), I refer to any specific quality concern as part of my discussion of individual studies.

Table 8 Numerical summary of the evidence from the literature review

Authors and Year (grouped by country)	Type of Study and Study Sample	Overview of Methods / Measures Used
Australia (2 records)		
Chorlton M 2013	Cross-sectional survey of health-related quality of life 15 Thalidomide survivors across Australia and New Zealand	Self-completion SF36 health questionnaire distributed by post

Authors and Year (grouped by country)	Type of Study and Study Sample	Overview of Methods / Measures Used
Jankelowitz et al 2013	Cross-sectional study into late onset neurological symptoms 16 Thalidomide survivor with limb difference	Detailed medical history Clinical neurological examination Neurophysiological testing
Brazil (1 record)		
Kowalski et al 2015	Cross-sectional study of health and social circumstances 23 adult Thalidomide survivors Note: The study included Thalidomide survivors aged 19 to 55	Face to face administration of a questionnaire Clinical examinations
Canada (1 record)		
Vermette and Benegabi 2013	Cross-sectional survey of health and social circumstances 65 Thalidomide survivors	Self-completion questionnaire distributed by post
Ireland (1 record)		
O'Carroll et al 2011	Cross-sectional study of health and social circumstances 26 Thalidomide survivors	Self-completion questionnaire distributed by post
Japan (6 records)		
Oshima et al 2006	Case series Three Thalidomide survivor with radial dysplasia who were experiencing Carpal Tunnel Syndrome	<ul style="list-style-type: none"> • Examination, diagnostic tests and surgical procedures including: • Clinical examination • Electrophysiological tests • Carpal canal pressure measurement (pre/post operatively) • Treatment was the Okutsu endoscopic carpal tunnel release
Kayamori 2013	Cross-sectional survey 201 Thalidomide survivors	Methods section implies that the researchers went to peoples' home and completed the survey with them but this is not clear, partly due to poor translation.
Imai et al 2014	Case-control study into the presence/absence of mental health problems and the existence of epilepsy and autism.	Individual interview followed by: Measurement of electrical brain activity

Authors and Year (grouped by country)	Type of Study and Study Sample	Overview of Methods / Measures Used
	22 Thalidomide survivors who were admitted to a hospital for medical examination during the period from September 2011 to February 2012 Results compared to 'healthy controls' but details unclear	Wechsler Adult Intelligence Scale-III (WAIS-III; Japanese Version) intelligence test Autism-Spectrum Quotient General Health Questionnaire-28 MINI short structured psychiatric diagnostic interview instrument
Shiga et al 2015	Cross-sectional study investigating the development of lifestyle-related diseases and identify risk factors for visceral disorders 76 Thalidomide survivors	Medical examination, including a wide range of tests and investigations, were conducted at two centres between 2011 and 2014.
Tajima et al 2016	Cross-sectional study examining the prevalence of internal anomalies 22 Thalidomide survivors	Whole-body image screening using unenhanced whole-body computed tomography (CT) and head magnetic resonance imaging (MRI)
Hinoshita et al 2019	Cross-sectional survey about gathering information about health and living circumstances 173 Thalidomide survivors	Self-completion questionnaire distributed by post
Sweden (6 records all of which are from one large multi-disciplinary study)		
EKFeldt and Carlsson 2008	Cross-sectional study into the dental conditions and functional aspects of the masticatory system, with a special focus on tooth wear 31 Thalidomide survivors	Face to face administration of a questionnaire Clinical examination – WHO criteria for DMFT; tooth wear recorded; periodontal examination Radiographic examination
Sjogreen and Kiliaridis 2012	Case-control study of the frequency and characteristics of facial palsy in Thalidomide survivors. 25 Thalidomide survivors without recognized facial impairments and 25 healthy adults of a similar age.	Clinical examinations of: voluntary facial movements using Sunnybrook Facial Grading System; lip mobility (calculated mouth width, mouth width change and asymmetry); and lip force
Ghassemi Jahani et al 2014	Cross-sectional study into the long-term effect of limb malformations on the function of	Orthopaedic and neurological examination CT Scans

Authors and Year (grouped by country)	Type of Study and Study Sample	Overview of Methods / Measures Used
	<p>the extremities and the development of degenerative osteoarthritis (OA) in the lower extremities</p> <p>31 Thalidomide survivors</p>	<p>Functional assessment using Rheumatoid and Arthritis Outcome Score and Disabilities of the Arm, Shoulder and Hand Outcome Measure</p>
Ghassemi Jahani et al 2016a	<p>Case-control study examining degenerative changes in the cervical spine</p> <p>27 Thalidomide survivor and 27 age matched controls</p>	<p>Clinical examination by an orthopaedic surgeon MRI examination of the cervical spine</p>
Ghassemi Jahani et al 2016b	<p>Cross-sectional study investigating the effect of limb malformations on health-related quality of life and function of the extremities</p> <p>31 Thalidomide survivors</p>	<p>Clinical examination A questionnaire including Short Form 36 Health Survey and EuroQ Five Dimensions was completed in a face to face interview Upper limb function was assessed using Rheumatoid and Arthritis Outcome Score and Disabilities of the Arm, Shoulder and Hand Outcome Measure</p>
Ghassemi Jahani et al 2017	<p>Cross-sectional study investigating the need for orthopaedic surgery and limb orthosis in relation to function and physical independence</p> <p>31 Thalidomide survivors</p>	<p>Self-administered questionnaire about: limb surgery; use of orthotic devices; work; accommodation; disability adjustments; personal assistants; and time needed for activities of daily living Physical function measured by a modified General Function Score</p>
Germany (6 records, two from the same study)		
Nippert et al 2002	<p>Case-control study of 104 female Thalidomide survivors in North Rheine Westphalia and an age matched control group of 104 women from the same region</p>	<p>Self-completion questionnaire distributed by post. WHO QOL-BREF was incorporated into a larger questionnaire which gathered data about socioeconomic status</p>
Kruse et al 2013	<p>Cross-sectional study investigating the health, social care and living circumstances.</p> <p>870 Thalidomide survivors</p>	<p>Self-completion questionnaire distributed by post and returned by 870 23 Focus Groups involving 112 participants 285 Face to face interviews</p>

Authors and Year (grouped by country)	Type of Study and Study Sample	Overview of Methods / Measures Used
		NOTE: It is not clear whether the focus group and interview participants also completed the questionnaire.
Peters et al 2015	Cross-sectional study examining: socio-economic circumstances; physical and mental health; experience of pain; use of health services; and quality of life. 202 Thalidomide survivors living in North Rheine Westphalia	Face to face structured questioning of each participant using a questionnaire with a number of validated instruments (e.g. painDETECT, SF-36, EQ-5D, SKID-1 & 11 psychological disorders questionnaire), personal examination by two specialist doctors, and structured recording of psychological disorder characteristics. Depending on individual symptoms, x-ray and/or ultrasound were also carried out.
Niecke et al 2017	Journal paper presenting the mental health findings from Peters et al 2015 above	
Merkle et al 2016	Case series Four Thalidomide survivors and one other patient with Dysmelia	Patients were treated with shoulder arthroplasty and assessed clinically and radiographically before and after surgery.
Weinrich et al 2018	Cross-sectional study assessing the prevalence of congenital vascular and organ anomalies 78 Thalidomide survivors	Clinical examination using non-contrast Magnetic Resonance Angiography
UK (8 records, three from same study)		
Newman 1999	Case series of shoulder joint replacement surgery in one upper limb affected Thalidomide survivor	Description of patients condition before and after joint replacement
Kennelly et al 2002	Cross-sectional study 11 Thalidomide survivors participated in Focus Groups; 34 took part in interviews; and 209 responded to the telephone survey. 421 people from the general population of a similar age	Focus groups In depth interviews Structured telephone survey of Thalidomide survivors Structured telephone survey of a sample of the general population of a similar age

Authors and Year (grouped by country)	Type of Study and Study Sample	Overview of Methods / Measures Used
	responded to the telephone survey	
Bent et al 2007	Cross-sectional mixed methods study exploring health status, impairment, activity limitation; participation and quality of life quality of life 28 Thalidomide survivors took part in interviews and 41 responded to the survey.	Qualitative face to face unstructured interviews Postal Questionnaire using standardized measures (Rosenberg Self-Esteem Scale; Perceived Stress Scale; General Perceived Self-Efficacy Scale; Bodily Pain and Vitality and Physical Function Scale of the SF36; Barthel Index and; London Handicap Scale; EuroQoL General Well-Being Index
Newbronner et al 2011, 2012 and 2013	Cross-sectional evaluation of the pilot Health Grant A representative sample of Thalidomide survivors - 53 took part in 2011, reducing to 49 in 2012 and 41 in 2013	Semi-structure telephone interviews conducted annually over three years.
Newbronner 2015	Cross-sectional study about employment and health-related quality of life 245 Thalidomide survivors	Self-completion questionnaire distributed by post SF12 used to assess health-related quality of life
Nicotra et al 2016	Case-control study investigating peripheral nerve dysfunction 17 Thalidomide survivors with upper limb anomalies and neuropathic symptoms and 17 healthy controls	Clinical examination and standard neurophysiological testing

4.8 Thematic Analysis

In this section, I draw together the thematic analysis of the data from the literature. I have grouped the analysis under eight main headings, which are somewhat biomedical in nature. This structure may seem at odds with the contemporary theoretical understanding of disability. It is important to explain that the headings do not imply support for the medical model of disability but rather reflect the predominantly biomedical, a-theoretical and/or quantitative nature of most of the studies. Using a grounded theory approach enabled me to move beyond these descriptive themes and develop intermediate codes,

which begin to draw out the implications and meaning of these biomedical groupings for Thalidomide survivors.

4.8.1 Musculoskeletal problems

Thirteen studies discussed the musculoskeletal problems that Thalidomide survivors are experiencing, as they grow older. However, these discussions range from accounts of the problems being reported by Thalidomide survivors in qualitative interviews and broad health surveys to biomedical studies focusing on very specific musculoskeletal problems. In this section therefore, I begin by describing the findings from the qualitative studies and bringing together the relevant material from the survey-based studies. I then consider the findings from the biomedical papers.

In the focus group discussions and qualitative interviews conducted by Kennelly et al in their 2002 study, when Thalidomide survivors were entering their 40s, they were already beginning to report musculoskeletal problems, including arthritis, joint pain, muscular pain, and stiffness. The results of the survey conducted as part of the same study also reported on the musculoskeletal problems respondents described, but because of the construction of the survey questions it is difficult to extract robust figures for different 'types' of problems. Nevertheless, some broad findings are evident. Around 20% of the survey respondents said they had 'arthritis' and similar proportion reported '*increased joint pain*'. Roughly a quarter said they were experiencing '*increased muscular pain*', and a few reported specific issues such as scoliosis and back problems.

Almost a decade later, the evaluation of the Government Health Grant made to UK Thalidomide survivors found that over three quarters of the study participants were experiencing deterioration in one or more joints, and joint, back and/or neck pain (Newbronner et al 2011). Some participants described this pain as 'arthritic' but they did not necessarily have a formal diagnosis. In the second year of the evaluation, around a fifth of participants (Newbronner et al 2012), reported problems with muscle strain, especially in the back and neck, and/or muscle weakness, particularly in their arms and hands. For many participants, the musculoskeletal problems they were experiencing were associated with over-use of 'good' limbs or more generally the way they had to use their bodies to compensate for their impairments. In Kennelly et al's 2002 study, some UK Thalidomide survivors were already beginning to feel that their health and particularly their musculoskeletal health, was not as good as their peers in the general population. However, this theme emerged much more clearly in the later Health Grant evaluation (Newbronner 2011), with some participants explicitly stating that they felt older than their chronological age - "*I feel like I have the body of a 70 year old*" (p21).

Six studies reporting on surveys of the health and quality of life of Thalidomide survivors also present some findings about musculoskeletal problems. The study by Nippert et al (2002) of the health-related quality of life of 104 female Thalidomide survivors (described in more depth in section 4.8.7) found that 41.6% of the survey respondents had experienced deterioration in their health in the preceding twelve months, and of this group 83% reported increased musculoskeletal problems. Bent et al (2007) found that almost half the 41 survey respondents reported having arthritis in their shoulders and just over a third reported hip pain. Thalidomide survivors with more severe impairments reported significantly more musculoskeletal problems. O'Carroll et al (2011) also note that respondents in their survey reported deterioration in their '*original condition*'...*due to hand arm overuse, injuries and musculoskeletal problems affecting the feet, knees and back*' (p476). Lastly, the TVAC survey of Canadian Thalidomide survivors (Vermette and Benegabi 2013) found that 80% reported increasing muscular pain and 71% reported increasing joint pain.

A Japanese study of the health of 201 Thalidomide survivors (Kayamori 2013), described the musculoskeletal problems they were experiencing as 'overuse syndrome'. Based on this self-report survey, the author then identified five main problems: hip joint deterioration; shoulder pain (with a number of causes); poor posture, leading to scoliosis and thoracic kyphosis (dorsal hump); tendonitis, especially in the arms and hands; and back pain, sometimes caused by over-use, and/or lumbarization⁸ and other congenital deformities of the spine. The paper also includes some limited data about prevalence. Around a third of participants reported joint pain, and a similar proportion reported shoulder stiffness. In a more recent survey (Hinoshita et al 2019), Japanese Thalidomide survivors reported a range of musculoskeletal problems, the most common being "*stiff shoulder (22.5%), followed by lumbago or low back pain (21.4%)...arthropathy⁹ (15.0%)*" (p3).

In the first of the two large German studies Kruse et al (2013) describe the 'secondary damages' reported by the 870 Thalidomide survivors who responded to their survey. They define 'secondary damages' as: "*physical impairments that develop in thalidomide victims during the course of their lives in areas of the body not damaged prenatally*" (p14), and suggest that they are caused by "*some movement patterns practiced early on to compensate for missing functions*". They distinguish these 'secondary damages' from

⁸ Lumbarization is a congenital anomaly, in which the first and second segments of the sacrum do not fuse, and consequently the lumbar spine appears to have six vertebrae or segments, not five, while the sacrum appears to have only four.

⁹ Arthropathy is a disease of a joint.

'long term sequelae', which they describe as damage that "*occurred prenatally but were only detected at a later point in time*" (p14).

The survey questionnaire asked respondents to indicate the severity of four musculoskeletal problems – pain, osteoarthritis, muscle weakness and muscle tension – using a simple four point scale, where 1=slight, 2=moderate, 3=considerable and 4=extreme. The mean values for each problem or 'item' were then calculated for three areas of the body – 'upper extremities', 'lower extremities' and 'vertebral column/pelvis'. The results from this survey are compared to data from five years ago. Unfortunately, no information about where this earlier data comes from is provided in the report. The study found that musculoskeletal problems in the 'upper extremities' were significantly worse than five years ago with the mean value for each problem shifting from between 1.4 and 1.9, to between 2.3 and 3. There was also deterioration in the 'lower extremities' and 'vertebral column/pelvis'. Severity of pain, osteoarthritis, muscle weakness and muscle tension in the 'upper extremities' was clearly associated with the severity of original Thalidomide damage but for the 'lower extremities' and 'vertebral column/pelvis', the picture was less clear. The linked survey of participants' physicians found that 90% of the problems presented during consultations "*related to the musculoskeletal system*" (p42).

Kruse et al (2013) also discuss the pain associated with musculoskeletal problems. They found that 84.3% of their survey respondents experienced pain. Of this group, 50% experienced pain '*every day*' and 39% had '*persistent*' pain. The proportion of respondents reporting pain increased with the number of '*damage areas*' they had. The authors suggest that:

The reason for pain is both wear and tear or destruction of damaged joints, as well as tension in muscle attachments and tendon insertions. Pain is also the result of secondary damages that have developed in area not affected prenatally. In practice, it is quite difficult to separate the two causes of pain and functional impairment. The current situation defines the everyday life of the victims and represents the situation that has shaped itself in the amalgamation and development of prenatal damages and secondary damages over the course of 50 years. (p16)

In the second German study (Peters et al 2015), two doctors examined each participant and then completed a questionnaire, which recorded both 'primary impairment' (i.e. original Thalidomide damage) and 'subsequent impairment' or 'consequential damage' (both terms are used). In relation to consequential damage, data was collected about loss of movement and musculoskeletal pain in joints/areas of the body (the study also included

a more in-depth assessment of the nature and severity of participants' pain, and this is described in section 4.8.2). Pain was most frequently reported in the neck, back and shoulders, closely followed by knees and hips. Movement restrictions were most common in the hand, shoulder and elbow, and around two thirds of participants had painful, hypertonic¹⁰ muscles in one or more area of the body. In addition, the self-completion questionnaire asked about *“accompanying illnesses diagnosed by a doctor”* and 27.7% of respondents listed diseases of the musculoskeletal system and connective tissue.

A Brazilian study (Kowalski et al 2015), which involved 28 Thalidomide survivors aged from 3 to 53 years (21 born between 1959 and 1964), aimed to assess the extent to which their current health problems were a direct result of in utero exposure to Thalidomide or consequential damage associate with posture and lifestyles. They found a high frequency of musculoskeletal disease (30%) amongst the study participants, with arthrosis being the most commonly reported condition. However, as in the two major German studies, they conclude that these problems were *“probably caused by compensatory postures and difficulties in executing normal daily tasks due to limb anomalies”* (p801).

Five studies examined specific musculoskeletal problems. An early case study by Newman (1999) describe a shoulder joint replacement procedure for a then 35-year-old Thalidomide survivor with end-stage osteoarthritis. Although this is a single case study, the author speculates on three important issues: the likelihood of Thalidomide survivors developing degenerative joint disease, which will compound existing impairments; the need to recognise ‘overuse symptoms’; and the potential benefits of shoulder replacement. A more recent paper by Merkle et al (2016) presents a case series describing five shoulder replacements in four patients with Dysmelia, including three Thalidomide survivors. The mean age of the patients at the time of surgery was 50.4. All had been experiencing increasing shoulder pain and restricted range of movement due to osteoarthritis for a number of years and conservative therapy options had been exhausted. The authors suggest that overuse of upper limbs in patients with Thalidomide induced phocomelia results in premature wear and tear of the shoulder joint. Following resurfacing arthroplasty, all the patients in this study had almost complete remission of pain and significant improved range of movement. The authors argue that, for the type of shoulder dysplasia often seen in Thalidomide survivors with Dysmelia (i.e. glenohumeral joint dysplasia), resurfacing arthroplasty is preferable to arthroplasty with stemmed or reverse shoulder prosthesis because: it is less invasive; has shorter operation time;

¹⁰ Abnormally high muscle tone.

carries lower risk of fracture; and so does not involve loss of humerus length, all issues which are likely to be of significant concern to Thalidomide survivors.

A Swedish study (Ghassemi Jahani et al 2014), examined the development of osteoarthritis in the 'lower extremities' of 26 Thalidomide survivors using computed tomography (CT) scans and the Rheumatoid and Arthritis Outcome Score (RAOS). Five participants with major deformities of the lower limbs were excluded from this part of the study as the nature of their impairments might affect the development of osteoarthritis. The authors found that nearly 40% of the participants had osteoarthritis in the hip and 60% in the knee. They note that comparisons of prevalence rates of osteoarthritis of these joints in the general population of a similar age are problematic because estimates vary but they do cite estimates for both knee and hip osteoarthritis of 10% in Australian study and 15% in a Swedish study. They conclude that the rates found in Thalidomide survivors are much higher but suggest that these degenerative changes "*were mostly mild and had little clinical significance*".

A second paper by the same lead author (Ghassemi Jahani et al 2016a) examined degenerative changes in the cervical spine in a group of 27 Swedish Thalidomide survivors, and compared them to 27 age and gender matched controls. They found that Thalidomide survivors had a significantly higher degree of disc degeneration, alongside other changes, notably foraminal narrowing¹¹ - the passageway through which all spinal nerve roots pass. They concluded that Thalidomide survivors have a higher frequency of degenerative changes in the cervical spine and suggest that this may be caused by an altered load on the cervical spine. A third paper (Ghassemi Jahani et al 2017) based on research with the same group of participants, examined the number of surgical procedures they had undergone. The participants had undergone relatively few surgical procedures on their limbs until middle age, with carpal tunnel release being the most frequent procedure. The authors raise the question of whether carpal tunnel syndrome "*is caused by the limb malformations and the resulting overuse or changed use of the wrists, or is a consequence of the embryonic damage caused by the drug or a combination of these is however unclear*". It is worth noting that whilst these three papers led by Ghassemi Jahani (and the 2017 paper discussed in 4.8.7 below) were published relatively recently and are from a well conducted study, the data was collected some years previously, when the mean age of participants was 46 years. They are also based on data from the same group of 31 Thalidomide survivors.

¹¹ The foramen is the bony archway created by the pedicles of the adjacent vertebrae that provides the passageway through which the spinal nerve roots pass.

4.8.2 Pain and neuropathic symptoms

As the previous section shows, muscle and joint pain associated with musculoskeletal problems is common amongst Thalidomide survivors. However, one of the qualitative studies (Newbronner et al 2012) and two of those drawing on qualitative and/or survey data (Vermette and Benegabi 2013; Kruse et al 2013) also found that some Thalidomide survivors report generalised, possibly neuropathic¹², pain and neuropathic symptoms such as numbness, tingling, loss of sensitivity/dexterity and partial paralysis. None of these studies makes comparisons with pain prevalence in the general population of a similar age but Peters et al (2015) do and their findings are discussed below.

Only one study (Peters et al 2015) has specifically examined the issue of neuropathic pain. They used the painDETECT questionnaire – a standardised instrument that was completed by participants (171 out of 202 provided usable questionnaires). The questionnaire asks about the characteristic clinical symptoms of neuropathic pain and a score of 19 or more (maximum 38) indicates that a participant is likely to have a neuropathic component to their pain. The results showed that around 20% of participants probably had a neuropathic component to their pain, which the authors note compared to an estimate of 8% in the general population in Germany aged 45-54. Interestingly, participants without Dysmelia were most likely to have a neuropathic pain component, followed by those with quadruple damage and finally those with double damage.

Two studies have looked at late-onset neurological symptoms in Thalidomide survivors. The first study (Jankelowitz et al 2012) involved 16 Thalidomide survivors from Australia and New Zealand who had all presented with new neurological symptoms. The aim of the study was to “*determine whether there was ongoing nerve damage/loss in this population as a ‘late effect’ of thalidomide exposure or whether the effects were due to exacerbation of the normal ageing process as a result of lack of the normal ‘redundancy’ within the nervous system*” (p509). The study involved taking detailed medical histories, clinical neurological examinations and neurophysiological testing. The study found no evidence of clinically or neuro-physiologically of late-onset generalized neuropathy and concluded that the neurological symptoms experienced by their participants were largely due to compressive neuropathies. Lower limb musculoskeletal symptoms were more common

¹² The website Patient states: “*Neuropathic pain is defined by the International Association for the Study of Pain (IASP) as pain arising as a direct consequence of a lesion or disease affecting the somatosensory system*”. It notes that the pain is usually chronic in nature and has a number of possible features such as: patients experiencing a burning sensation, or sharp, shooting pain; allodynia - seemingly harmless stimuli, such as light touch, provoking pain; hyperpathia - a short episode of discomfort causing prolonged severe pain; and hyperalgesia - discomfort, which would otherwise be mild, being felt as severe pain.
<http://patient.info/doctor/neuropathic-pain-and-its-management> - accessed 20 March 2016.

amongst participants with more severe impairments, and the authors suggest that these may be due to postural abnormality.

The second study (Nicotra 2016 et al) was funded by the UK Thalidomide Trust in response to anecdotal reports of an increase in the number of UK Thalidomide survivors experiencing neurological symptoms, and/or the growing severity of these neurological symptoms. This small pilot study aimed to determine whether Thalidomide survivors have problems (e.g. numbness, tingling pain or weakness) with their peripheral nerves, i.e. the nerves that connect the skin and muscles to the spinal cord. The 17 Thalidomide survivors involved all reported sensory symptoms in their upper limbs and a few in their feet. They took part in a range of motor and sensory examinations and their results were compared to 17 healthy volunteers. The authors found that the majority of the Thalidomide survivors in the study (15 out of 17) had nerve compression, most commonly around the wrist but also of the nerve roots in the lower back and of the spinal cord in the neck. The findings for generalised neuropathy were less clear. They suggest that some symptoms could be due to abnormal peripheral nerve development or (in the lower limbs) early peripheral nerve dysfunction but that more research is needed.

Jankelowitz et al (2012) also noted that the chance of developing median nerve compression at the wrist is probably greater in Thalidomide survivors because overuse of the hand to compensate for other limb deformities coupled with musculoskeletal deformities may lead to narrowing of the carpal tunnel. A small study (Oshima et al 2006) of three Japanese Thalidomide survivors with Carpal Tunnel Syndrome and radial dysplasia¹³ supports this finding, as do the findings from Kayamori's 2013 study.

4.8.3 Dental problems/facial damage

Just one study looked specifically at the dental health of Thalidomide survivors (although five other studies do touch in the topic). Ekfeldt and Carlsson (2008) examined the dental status and oral function of 31 Swedish Thalidomide survivors. They found that dental caries was similar to general population but the number of decayed, missing or filled teeth (DMFT) was slightly higher. They suggest that this might be explained by fact that Thalidomide survivors find tooth brushing more difficult. They also found that tooth wear was on average more extensive than the comparable age group in the general population. The authors think this is due to dental erosion associated with high prevalence of regurgitation (although it is not clear if regurgitation is caused by Thalidomide damage) and to a lesser extent by using teeth as tools.

¹³ Radial dysplasia a condition where the radius bone of the forearm is underdeveloped or absent. It is often associated with hand deformities such as small or missing thumb and is common amongst Thalidomide survivors.

Kowalski et al (2015) report that 17% of their study participants had loose or weak teeth, which is very similar to Hinoshita et al 2019 who found that 17.9% of their survey respondents had dental problems. These findings, together with those from Newbronner et al (2012) qualitative study, and those of Kruse et al (2013), support Ekfeldt and Carlsson's (2008) findings. Upper limb affected participants frequently used their teeth to help them with everyday tasks such as getting dressed, opening bottles, holding keys etc. and some felt that this was causing damage to their teeth. These participants also described having difficulty cleaning their teeth properly, which could lead to higher rates of tooth decay. Peters et al (2015) also found that a third of their participants reported tooth wear, and this was significantly more common amongst participants with Dysmelia.

A connected study to Ekfeldt and Carlsson (2008), which involved 25 of the same participants, surveyed the frequency and characteristics of facial palsy in Thalidomide survivors (Sjogreen and Kiliaridis 2012). They used a range of approaches to test voluntary facial movements, lip mobility and lip force and compared the results for the Thalidomide survivors with those for 25 'healthy' adults of a similar age. They found that three Thalidomide survivors (10%) had acquired facial palsy - more than would occur by chance, and suggest this may indicate that the facial nerve in Thalidomide survivors is more vulnerable. They also noted that Thalidomide survivors in the study without recognized facial impairments had poorer lip force and mobility, suggesting mild facial muscle weakness that had not been previously clinically identified.

4.8.4 Deteriorating sight and/or hearing

In the UK around a quarter of Thalidomide survivors were born with damage to their eyes and almost a third have a hearing impairment (data provided by the Thalidomide Trust). The first study to highlight concerns about further deterioration was Nippert's (2002) study of the health-related quality of life of 104 female Thalidomide survivors found that 13% of survey respondents reported ear and eye problems. However, no further details were reported. In 2011 Newbronner et al noted that the Thalidomide survivors in their study group who were partially sighted and/or partially deaf were reporting deterioration in their sight and/or hearing, and a small number of other participants reported more recently acquired sight or hearing problems. Again no further details are given. The Thalidomide Victims Association of Canada survey (Vermette and Benegabi 2013) found that around 22% of respondents reported '*deterioration in eyesight*' and around 15% '*deterioration in hearing*'. However, it is not clear what proportion of these respondents are Thalidomide survivors who had original damage to their sight or hearing, and no comparison with the general population of a similar age in Canada is made. Similarly Hinoshita et al (2019) report that 19.1% of their survey respondents had "*ocular diseases*". Neither of the two

large German studies (Kruse et al 2013; Peters et al 2015), discuss the deteriorating sight or hearing among Thalidomide survivors.

4.8.5 General health and ‘lifestyle diseases’

Three studies, two from Japan and one from Brazil, gathered information about general health and ‘lifestyle diseases’. The first Japanese study (Shiga et al 2015) looked specifically at lifestyle-related disease and found the most common disease was hypertension, which affected nearly half the 76 participants, followed by (central) obesity, which affected nearly a quarter of participants. The paper makes few direct comparisons with the general population of a similar age but it does highlight gender differences, noting that male Thalidomide survivors were at higher risk of developing lifestyle related diseases. Perhaps the most interesting aspect of this paper for me was the authors’ reflections on the problem of accurately measuring blood pressure and body mass index, when people have missing or short limbs. These are two of the most commonly used indicators of risk of lifestyle diseases, and yet Thalidomide survivors may be less able to benefit from them because of the unreliability of the measurements produced. The most recent survey of Japanese Thalidomide survivors (Hinoshita et al 2019) also asked about general ‘health conditions’. The three most commonly reported problems were hypertension (15.6%), dyslipidaemia (13.9%) and diabetes mellitus (12.7%).

The Brazilian study (Kowalski et al 2015) found that 40% of their sample (aged over 40) had hypertension, which they reported is only marginally higher (with no statistical difference) than the general prevalence of the disease in Brazil (35%). For heart disease, they found that prevalence for study participants aged 50 was very similar to that of the general population of a similar age. However, the rate was much higher than the population norm for younger participants (14.2% compared to 3.7%). They conclude that there is a tendency for early onset of cardiovascular disease amongst Thalidomide survivors. Importantly, Kowalski et al (2015) also found that 65% (n=15) of their sample had at least one chronic disease (including long-term mental health problems), compared to 31.8% of the general population aged 15 to 59.

Three other studies looked very broadly at general health but the data presented in them is of limited use. Kennelly et al (2002) report that approaching half the Thalidomide survivors in their study felt their health was worse than people of the same age unaffected by Thalidomide. They also state (very imprecisely) that - *“participants have experienced an increase in diagnosed medical conditions or health problems over the last 5-10 years”* (page 34). The TVAC survey (Vermette and Benegabi 2013) also asked about *“general health status and wellbeing”*. Over three quarters of their respondents said their overall health and wellbeing had worsened in the past 5 years and a similar proportion said they

had “*a persistent health problem*” (often a musculoskeletal problem). However, the report does not discuss the prevalence of lifestyle related diseases or risk factors such as weight gain. The second report from the evaluation of the Health Grant (Newbronner et al 2012) does briefly describe the concerns of some participants about weight gain, difficulties exercising and the complications of managing lifestyle related conditions such as diabetes and hypertension.

Finally, two recent studies have looked at the extent and implications of the damage to internal organs and systems caused by Thalidomide. A Japanese study (Tajima 2016) examined the prevalence of “*internal anomalies in Thalidomide embryopathy*”, using MRI and CT imaging. Twenty-two Thalidomide survivors were “*selected*” to take part in the study. They each underwent a medical examination and then had both a whole body CT scan and an MRI of the head. The study found a high prevalence of abnormalities of the auditory organ, the vascular system and the gallbladder, and block vertebrae were seen in around a quarter of the group. The paper concludes by noting the value of using MRI and CT imaging to identify internal abnormalities but says nothing about the implications of these abnormalities for the health of Thalidomide survivors.

A team of researchers in Germany (Weinrich et al 2018) used non-contrast magnetic resonance angiography to determine the type and frequency of congenital vascular and organ anomalies, and to assess the effect of observed malformations on renal function in Thalidomide survivors. The study had 78 participants (50 female and 28 male) with a mean age of 55. Participants were split into three groups based on the extent of their upper limb Dysmelia. Information about ear, eye and face anomalies was retrieved from medical records. The main findings from the study were that nearly three quarters (74%) of participants had vascular anomalies, with two thirds of these related to arteries and one-third to veins. Most of the vascular anomalies were within reported frequencies for the general population. However, the study did find that “*supernumerary renal arteries, left vertebral artery originating from aortic arch and a retroaortic left renal vein occurred more often in subjects with TE than previously reported*” (p2369). The most common abdominal organ anomalies involved the renal system (i.e. missing or duplicated kidneys, and malpositioned and/or malrotated kidneys).

Although there was no evidence that the vascular or organ anomalies observed were affecting renal function, the authors point out that “*knowledge about possible malformations is important for subjects with TE in case of future abdominal surgical or vascular treatment*” (p2369). Importantly, the authors recommend that for Thalidomide survivors requiring abdominal surgery, preoperative imaging (preferably non-contrast MRA) of the abdominal organs and vessels should be conducted and used to inform a

plan for the operation. Lastly, they note that this study only included Thalidomide survivors with upper limb damage, and it is possible that vascular and organ abnormalities are more common and more severe in Thalidomide survivors with lower limb damage.

4.8.6 Mental health

Seven studies have explored the mental health or mental wellbeing of Thalidomide survivors. Of these, just two have specifically set out to assess the prevalence of mental disorders. Imai et al (2014) examined the psychological and mental health problems of 22 Japanese Thalidomide survivors and compared them to a 'healthy' control group. He also considered the prevalence of autism and epilepsy, as previous studies (Strömmland et al 1994; Kanno 1987) had suggested that these conditions are more common in people with TE. I have not included the findings from this part of the study here as they concern the prevalence of original impairments caused by Thalidomide rather than the implications of living with these impairments in later life. The participants in this study (nine men and thirteen women) had all been admitted to hospital for general medical examinations. Whilst their original Thalidomide impairment are briefly described, no information is provided about how representative they are of the population of Thalidomide survivors in Japan as a whole.

The General Health Questionnaire-28 (GHQ-28), a self-administered screening instrument, was used to measure psychological distress and minor psychiatric disorders. The maximum score for an individual is 12. No formal threshold exists for identifying probable mental ill health, but based on a cut-off point of 5 and above, the authors suggest that 59% (13 out of 22) of the group had some kind of mental health problem. The average GHQ score for the Thalidomide survivors was 7.36 (SD 5.34) which was significantly higher than the 'healthy' subjects group (2.76; SD2.31; P 0.01). Imai et al (2014) also found that participants who were single or divorced had higher depression scores, and higher scores for impaired social activity than married participants. However, the study does not comment on how this compares to the 'healthy' subjects. MINI, a short structured psychiatric diagnostic interview instrument, was used to make diagnoses of psychiatric disorders. The study found that 40.9% of participants had one or more psychiatric disorders. The author states that *"This is a percentage that it comparatively high"* but no comparison with the general population in Japan is made.

Niecke et al (2017) examined the nature and prevalence of mental disorders (according to the International Classification of Diseases) amongst 193 Thalidomide survivors participating in the wider study reported by Peters et al (2015). To do this they used a structured clinical interview for DSM-IV disorders (SCID-I and SCID-II). Their results showed that:

- Ninety-one participants (47.7%) had at least one mental disorder in the four weeks preceding the examination, compared to a 12 month prevalence in the German general population aged 50 to 64 of 27.1%
- Male Thalidomide survivors were more likely to experience mental disorder (based on 4-week and lifetime prevalence) than their female peers, which is in contrast to the general German population where 12 month prevalence is higher for women by a factor of 1.5
- Unipolar depression was the most common mental health diagnosis and it affected men and women equally. The lifetime prevalence of 33.2% was much higher than the general population of a similar age (18% lifetime prevalence). The prevalence for Thalidomide survivors rose to 39.4% when dysthymic or persistent depressive disorder and minor depressive syndromes were included

The full report from this study (Peters et al 2015) also reported that:

- For the two most frequently diagnosed disorders (depressive and somatoform¹⁴), prevalence was higher amongst participants with no Dysmelia compared to the two groups with Dysmelia – for depressive disorders 38.1% compared to just over 22% for the double and quadruple damage groups, and for somatoform disorders 23.8% compared to 17.5% and 16.7% respectively. However, it is important to note that almost two thirds of the no Dysmelia group were deaf or had a severe hearing impairment and many also had facial damage
- Of those participants with a mental disorder, 51.1% had two or more disorders compared to 44.4% for the general German population

Interestingly, Nieke et al (2017) found a high degree of mental comorbidity amongst the Thalidomide survivors in their study but a low use of “*psychosocial treatment services*”. They identified 73 participants who were in need of immediate mental health treatment and yet by contrast, just 32 participants (16.6%) had accessed some form of professional help in the preceding 12 months. Finally the authors speculate that the high prevalence of mental disorders in Thalidomide survivors: “*may be explained by biological factors (i.e. neurotoxicity) as well as by psychological factors (i.e. stress arising from restrictions of physical function and restricted social participation), social mortification and the specific historic context (i.e. stigmatization, ‘thalidomide scandal’)*” (p173).

¹⁴ The somatoform disorders are a group of psychological disorders in which a patient experiences physical symptoms that are inconsistent with or cannot be fully explained by any underlying general medical or neurologic condition.

In their survey of 870 German Thalidomide survivors, Kruse et al (2013) looked specifically at the prevalence of depressive disorders. In the publicly available report, the methods used to do this are not described in detail but the authors appear to have used the Major Depression Inventory (MDI), a self-report mood questionnaire developed by the World Health Organisation¹⁵. They estimate that 11.7% of their survey respondents were suffering from a depressive disorder, compared to 8.1% of the general German population aged 50 to 65. Like Peters et al (2015) they also found that in contrast to the general population, there was no substantial difference in prevalence between male and female Thalidomide survivors. They did however, identify a number of factors that appeared to increase the risk of Thalidomide survivors experiencing depression. These included:

- A poor social network – those respondents who said that they did not have anyone to help them when they were in difficulties were more likely to have experienced depression
- Unemployment – participants who were unemployed were three times more likely to report symptoms of depression than those in full time work (12.9% compared to 3.7%)
- Recent experience of severe pain – 18.4% of participants who reported ‘*severe to extremely severe pain in the last 2 weeks*’ reported symptoms of depression
- The need for long term care and assistance – those participants who required on-going care were almost twice as likely to report symptoms of depression than those who did not, and the proportion was even higher for those who said they did not have adequate insurance to cover their needs
- The severity or extent of Thalidomide-impairments – the more areas of ‘*Thalidomide-induced damage*’ (i.e. the number of limbs affected; sensory impairments; internal organs damaged etc.) participants had, the higher the risk of them developing symptoms of depression. The authors also suggest that depression is more common, and/or more severe, amongst deaf Thalidomide survivors but the data presented is unclear

Kowalski et al (2015) found that 52% of their participants aged 18 or over had some kind of “*chronic psychological disturbance*” which compares to 25-30% in the adult population in Brazil. Anxiety and depression were the most commonly reported problems (26% and 17% respectively). However, the authors note that participants also reported sporadic episodes of anxiety and depression, which are not included in their analysis.

¹⁵ The MDI is able to generate an ICD-10 or DSM-IV diagnosis of clinical depression in addition to an estimate of symptom severity.

In addition to the three studies described above, the TVAC survey (Vermette and Benegabi 2013) asked Thalidomide survivors about the '*recurrent or persistent health problems*' they had experienced in the past five years, and 23% (15 out of 65 respondents) said that they had had depression. No further analysis appears to have been undertaken and the authors do not provide any information about the prevalence of other mental health problems. In Hinoshita et al (2019) 9.8% of respondents reported having 'depression and/or other mental disease'.

Two studies explored mental wellbeing using qualitative approaches. In their 2002 mixed methods study of the quality of life of UK Thalidomide survivors, Kennelly et al state that - "*A number of participants have become more aware of the mental health effects of their physical impairments, reporting increasing experiences of depression...*" (p34). They found that one in ten participants had consulted either a psychologist or counsellor at least once in the last five years and "*a number*" of participants reported being depressed or having experienced periods of depression. However, in response to the survey question - '*What medical conditions or health problems do you have now that you didn't have or weren't aware of 5 or 10 years ago?*' just 7 participants (3%) reported having 'depression/mental health problems'. A further 5 (2%) reported depression when asked '*Do you have any other health problems not already mentioned, including any long standing problems?*'.

As part of the evaluation of the Health Grant to UK Thalidomide survivors (Newbronner et al 2012), 49 Thalidomide survivors were asked, through telephone interviews, about their current or recent health problems, including their mental wellbeing. A minority of the group reported experiencing depression or anxiety but many more described feeling 'down' or experiencing a decline in their emotional wellbeing in recent years. They often linked this to physical problems related to their Thalidomide impairments, such as pain or loss of function.

4.8.7 Health-related quality of life/quality of life

Although several studies included in this review make general reference to 'quality of life' or 'health and quality of life', in fact just six studies actually assessed quality of life or health-related quality of life using standardised instruments. Only these studies are considered in this section. The first study (Nippert et al 2002) looked specifically at the health-related quality of life of female Thalidomide survivors in North Rhine Westphalia, Germany, and compared them to a control group matched for age (mean age 38), gender and area of residence. The study used the WHO QOL-BREF, a self-completion instrument designed to assess quality of life in health and health care. It has 26 items grouped in to four domains (physical health, psychological wellbeing, social relationships and

environment), and produces a global quality of life score, with 100 being the highest possible score. The WHO QOL-BREF was incorporated in to a larger postal questionnaire, which included questions about socio-economic status, personal circumstances and, for the Thalidomide survivors only, their Thalidomide impairments. The survey was sent to all the female Thalidomide survivors know to the Contergan interest group in North Rhine Westphalia, and 104 (63%) returned completed questionnaires.

The study found that quality of life in health and health care was significantly poorer for women Thalidomide survivors than women of the same age from the general population. They had significantly lower global WHO QOL scores (63.0) and physical health scores (67.9) than the control group (global score 70.7 and physical health score 77.8). However, they had slightly higher psychological scores compared to the control group (71.7 vs. 68.5), and were more likely to be satisfied with four important areas of their lives: safety in daily life; their physical environment; their living conditions; and the support they get from their friends.

Bent et al (2007) gathered data on the quality of life of 41 Thalidomide survivors via a postal questionnaire, which used a mix of instruments to explore health status and quality of life. Overall health status was measured using the EuroQoL (EQ5D), and subjective quality of life was assessed by the General Well-Being Index (GWBI). The authors also used five of the eight components from the SF36 Health-Related Quality of Life survey – Physical Function, Role Limitation Physical, Pain, Vitality and Role Limitation Emotional. However, they report these individually rather than as overall scores for physical or mental health domains. All the results (except Physical Function) are presented as median rather than mean scores and so no comparison with the findings from other more recent studies is possible.

The authors state that: *“the median EuroQol score of 0.59 suggests poor health status but despite this...59% reported their health to be good and 70% reported their QoL was good or better than good”* (p154). The results of all instruments used are tabulated in the paper, and show that the mean GWBI score was 80, but there is no explanation of this score or its implications in the discussion. In relation to the SF36 Physical Function scale, participants in this study had a mean score of 69.7, which the authors suggest is *“well below the population norms for this age”* (p154), but no comparative data is presented. They go on to suggest that despite a significant relationship between SF36 Physical Function score and severity of impairment (based the Trust’s impairment bands) there are ‘outliers’ or individuals that have poorer physical health-related quality of life than expected for their impairment band.

The study evaluating the Health Grant made to UK Thalidomide survivors (Newbronner et al 2012), used the SF12 survey (a 12 question form of SF36) to examine the health-related quality of life of 49 Thalidomide survivors. Overall the study found that in the physical domain the Thalidomide survivors had lower average aggregate scores than people of a similar age (45-54) in the general population, indicating that their physical health-related quality of life is significantly poorer than their peers. Furthermore, 70% of the Thalidomide survivors had a physical domain score of below 30 i.e. the same or worse than the 2% of the general population with the poorest physical health-related quality of life. Only two Thalidomide survivors had a score above the average for the general population. In the mental health domain, the Thalidomide survivors' average aggregate scores were only marginally worse than the general population of a similar age. However, a small group of Thalidomide survivors (n=7/14%) had a score below 30 i.e. the same or worse than the 2% of the general population with the poorest mental health-related quality of life.

A slightly later study (Newbronner 2015), also conducted for the Thalidomide Trust, focused on employment and health-related quality of life. It used SF12 as part of a larger survey exploring changes in employment. SF12 data was available for 234 respondents and the results were broadly similar to those reported by Newbronner et al in 2012. It also found that in the physical domain the Thalidomide survivors had lower average aggregate scores than people of a similar age (45-54) in the general population (23.7 compared to 50), indicating that their physical health-related quality of life is significantly poorer than their peers. Furthermore, 68.4% of the Thalidomide survivors had a physical domain score of below 30 i.e. the same or worse than the 2% of the general population with the poorest physical health-related quality of life. Fifteen Thalidomide survivors had a score above the average for the general population. In the mental health domain, the Thalidomide survivors' average aggregate scores were only marginally worse than the general population of a similar age (43.2 compared to 50). However, a small group of Thalidomide survivors (n=38/16%) had a score below 30 i.e. the same or worse than the 2% of the general population with the poorest mental health-related quality of life. Detailed results for this study and Newbronner et al (2012) are shown in Table 9.

In 2013, Dr Mark Chorlton conducted a small, unpublished¹⁶ study of the health-related quality of life of 15 Thalidomide survivors from Australia and New Zealand using SF36. Again, detailed results are shown in Table 9. Although the number of participants was small, and other than gender (8 women and 7 men) there is no information about the

¹⁶ The short report from this study was given to me by Mark Chorlton following personal correspondence.

representativeness of the group, it does provide useful comparative data. Like their contemporaries in the UK, Australian and New Zealand Thalidomide survivors had significantly lower physical health-related quality of life than Australians in the general population of a similar age (55-64). However, their mental health-related quality of life was much closer to the general population. Further statistical analysis showed that these differences were statistically significant.

The Swedish researchers who undertook the orthopaedic studies described in section 4.8.1 also examined the health-related quality of life of their 31 study participants (Ghassemi Jahani et al 2016b). They used four validated questionnaires. Function of the limbs was evaluated using DASH (Disorder in Arm Shoulder and Hand) and RAOS (Rheumatoid Arthritis Outcome Score). Health-related quality of life was measured using SF-36 and EQ5D. Comparisons were made with the general population in the same age group and they examined differences between four sub-groups: those with and without '*major malformations of the extremities*' and those with and without PFFD¹⁷ (proximal focal femoral deficiency). They found that the physical health-related quality of life of Thalidomide survivors was significantly lower than the national reference population but mental health-related quality of life was similar (SF-36 mean physical composite score was 40.6, 95% CI 35.4-45.8 / MH composite score was 51.5, 95% CI 47.1-56.0). Poorer physical health-related quality of life correlated with severity of limb malformations, and participants with PFFD had lowest scores.

For EQ5D all dimensions involving physical activities revealed a lower level of health-related quality of life for Thalidomide survivors compared to general population, while the mental aspect (anxiety/depression) was unaffected i.e. similar to the results found for the SF-36. The authors speculate that mental health-related quality of life may not be affected by TE either because "*children who are born with congenital malformations do not know anything but the situation they have and have therefore adapted to it*" (p12). However, they also acknowledge that it could be in part because Thalidomide survivors in Sweden receive a good level of financial compensation and/or because the sample was unrepresentative, i.e. those who volunteered for the study had better mental health-related quality of life. Although this is a good quality study, the data presented is quite old. The authors do not state when the questionnaires were administered but the mean age of the participants was 46 suggesting that the data was gathered around 2007 i.e. ten years before publication. The literature described earlier in this chapter suggests that there has

¹⁷ There are different grades of PFFD ranging from a slightly shorter femur to the complete absence of the femur and associated deformity of the hip.

been a marked change in the health and possibly health-related quality of life of Thalidomide survivors as they reached their mid-50s.

The final study in this group (Peters et al) also used SF36 and as Table 9 shows, their results are very similar to the other three studies which used SF36/SF12. The physical health-related quality of life score for the 186 German Thalidomide survivors who complete the survey was significantly lower ($p = .000$) than the German population in the same age group – 29.6 compared to 49.2. Their mental health sum score was also significantly lower ($p = .014$) but the difference was much less marked – 47.8 compared to 50.2. Peters also examined the SF36 results for their three sub-groups – no Dysmelia, dual limb damage and quadruple limb damage. For all three sub-groups, physical health-related quality of life was significantly worse than the general population. However, whilst the mental health-related quality of life of participants without Dysmelia and with dual limb damage was also worse than the general population, the group with quadruple limb damage showed no significant difference. However, the authors note that statistical significance could be affected by the small number in the group ($n=20$).

Table 9 Comparison of SF36/SF12 results from the five health related quality of life studies

Component	Study				
	Newbronner et al 2012 (n=49)	Chorlton M 2013 (n=15)	Peter et al 2015 (n=186)	Newbronner et al 2015 (n=234)	Ghassemi Jahani et al 2016 (n=31)
Physical: Overall Score	24.6	30.52	29.6	23.7	40.6
Physical Function	19	40.56	50	15.40	65.3
Role Limitation Physical	33.5	12.50	38	33.90	54.6
Pain	28.6	35.97	39	31.20	59.2
General health	33.4	33.00	42	31.80	60.9
Mental Health: Overall Score	43.8	49.72	47.8	43.20	51.5
Vitality	41	42.22	46	38.00	59.2
Role Limitation Emotional	41.3	44.44	64	41.00	80.2
Social Function	29.5	44.44	63	29.9	90.2
Mental Health	36.9	67.78	64	36.20	29.5

The sum scores for physical and mental health quality of life are similar for all five studies. Looking across the studies at the individual component scores, there are some marked differences. Role Limitation Physical is markedly lower in the Australian study, and in the UK studies Physical Function is much lower than the other studies. However, comparing the studies is difficult because data collection methods varied, there are significant differences in the number of participants, and the findings from the smaller studies may be less robust.

4.9 Intermediate Coding and Conclusions

The descriptive analysis of the literature was inevitably quite 'factual', as many (but not all) of the studies contained little contextual information. At first I found it quite difficult to conceptualise how the 'intermediate codes' might move beyond this towards synthesis. I looked at examples of initial coding from a number of other grounded theory studies (see Sbaraini et al 2011), and whilst the majority of these were coding qualitative data, it was helpful in clarifying my thinking. I decided to group my intermediate codes alongside the themes from the descriptive analysis, so that the 'link' with the data from the primary studies was maintained. I present this in tabular form below. My aim in doing this was to facilitate the integration of the findings from the literature review, with those emerging from the analysis of my other primary data, notably the semi-structured interviews and the health and wellbeing survey.

Table 10 Intermediate codes from the literature review

Thematic Analysis Heading	Intermediate Coding
Musculoskeletal Problems	<ul style="list-style-type: none"> • Musculoskeletal problems are the most common health issue amongst Thalidomide survivors as they age • The prevalence and severity of musculoskeletal problems appears to increase with the severity of Thalidomide survivors impairments but this relationship is not simple or linear • Secondary damage to joints and muscles is primarily caused by 'overuse' and postural adaptations • The pain and movement restriction caused by secondary damage is compounding existing impairments
Pain and Neuropathic Symptoms	<ul style="list-style-type: none"> • Neuropathic pain and symptoms are more common amongst Thalidomide survivors (including those with no Dysmelia) than the general population • The causes of neuropathic pain and symptoms are disputed and often unclear • Thalidomide survivors are more vulnerable to compressive neuropathies but these are hard to diagnose and treat
Dental Problems/Facial Damage	<ul style="list-style-type: none"> • Thalidomide survivors have higher levels of decayed, missing and filled teeth, and tooth wear than the general population

Thematic Analysis Heading	Intermediate Coding
	<ul style="list-style-type: none"> • The causes of poorer dental health are multiple, including difficulties with dental hygiene, using teeth as tools and regurgitation • The dental and facial health of Thalidomide survivors is vulnerable
Deteriorating Sight and/or Hearing	<ul style="list-style-type: none"> • Thalidomide survivors are reporting deteriorating sight and hearing • It is unclear whether this deteriorating in sight and hearing is Thalidomide related or due to general aging • There is very little evidence about the extent and nature of deteriorating sight and hearing, and the impact on Thalidomide survivors quality of life
General Health	<ul style="list-style-type: none"> • It is difficult to accurately measure blood pressure and body mass index when people have missing or short limbs and this can make affective treatment/prevention difficult • Some Thalidomide survivors are aware that they are at risk of lifestyle related diseases but find their Thalidomide impairment make it difficult manage their weight or exercise • Hypertension may be more common amongst Thalidomide survivors but more evidence is needed
Mental Health	<ul style="list-style-type: none"> • Mental health problems are significantly more prevalent amongst Thalidomide survivors than the general population • Depressive disorders are the most frequently diagnosed or reported mental health problem, • The relationship between mental health and severity of impairment is unclear but Thalidomide survivors with severe hearing impairment and facial damage appeared to be at greater risk of developing depression • The consequences of physical impairment (i.e. stress of daily functioning, restricted social participation and stigmatization), appear to be contributing to poor mental health • Other risk factors for poor mental health are similar to the general population and include poor social networks; living alone; unemployment; the need for on-going assistance; and recent experience of pain
Health-related Quality of Life	<ul style="list-style-type: none"> • Thalidomide survivors have a much poorer physical health-related quality of life than their peers in the general population • The mental health-related quality of life of Thalidomide survivors is also lower than the general population of a similar age but the difference is less marked • Poor physical health-related quality of life is clearly related to severity of impairment but mental health-related quality of life is not • The mean scores for both physical and mental related quality of life mask 'outliers' i.e. people with very poor quality of life

In developing the codes I have tried to 'get underneath' the descriptive analysis and draw out what the literature tells us not only about the health problems of Thalidomide survivors

but how these differ from people in the general population at similar points in their lives, and the implications they have for quality of life. I also wanted to reflect on what the causes of these health problems might be and how they might relate to or interact with original Thalidomide damage. Importantly, intermediate coding provided a means to identify and cluster concepts that spanned a number of studies.

4.10 Summary

I began this chapter by explaining the rationale for undertaking a scoping review. I then described the literature searches, screening, study selection and results. After the numerical summary of included studies shown in Table 9, I present the descriptive thematic analysis, in which I drew on Grounded Theory methods. Table 10 links the themes from the descriptive analysis to the GT intermediate codes.

The review has shown that the literature about the health and quality of life of Thalidomide survivors as they grow older comes from just eight countries. It is limited in scope and disparate in nature. As the descriptive analysis highlights, most of the quantitative biomedical studies, perhaps by their nature, tend to address quite narrow clinical topics. The focus is mostly on diagnosing and examining the clinical problem being experienced, although some studies do make comparisons with prevalence in the general population and occasionally with other groups with early on-set disability. However, there is relatively little discussion of the functional and practical implications of these problems for Thalidomide survivors' daily lives, and none of these studies discuss early onset health problems in the context of the life course.

A small number of studies looked more broadly at the health and quality of life of Thalidomide survivors. This group of studies mostly use mixed methods, and some include clinical assessments. They all, in some way, discuss the implications of early onset health problems for Thalidomide survivors quality of life and future health and functioning, and a number reflect the experiences of Thalidomide survivors themselves, through quotations and case studies. However, because of the different topics covered, the range of methods adopted, and the different measures of quality of life and/or health-related quality of life used, they do not provide a coherent body of evidence. Furthermore, none of them discuss theoretical perspectives in relation to disability and ageing.

In the subsequent chapters of this thesis I aim to address this 'gap' in the knowledge base. In the next chapter, I begin by exploring the type and range of health problems UK Thalidomide survivors are experiencing.

Chapter 5 Changing Health: Content Analysis of the Interviews

This short chapter brings together the findings from the content analysis of the semi-structured telephone interviews. In doing so sets the scene for the health and wellbeing survey reported in Chapter 6 and the secondary grounded theory analysis of the interviews (Chapter 7). As I explain in Chapter 3, the main purpose of the content analysis was to inform the development of the Health and Wellbeing survey, although I also used it to prepare a short report for the Trust as part of the Health Grant Monitoring. To address this aim, I began the analysis with an initial interpretive phase which enabled me to identify the main health problems participants were experiencing, and begin to understand: the language people used to describe their health problems; how they linked different problems; and any connections they made to their original Thalidomide damage. To gauge the relative importance or 'prevalence' of these health problems, I counted the number of participants who reported experiencing different health problems. The findings from my literature review helped me think about how to group them but I was primarily guided by the data.

I begin this chapter by describing the type and range of health problems discussed in the interviews. I then present a simple 'count' of the number of participants who discussed them and the number of times they were referred to. In 5.2 I go on to discuss three overarching findings to emerge from the interpretive phase of the content analysis, which were important for the design of the survey. The first relates to language, the second to the connection between health problems and treatments, and the third to perceived causes. Throughout the chapter I use quotations from participants to illustrate or bring to life the points being made. The names shown are pseudonyms.

Before moving to the substance of the chapter it is perhaps helpful to reintroduce the interview participants. Of the 38 interviewees, 26 were women and 12 were men. As I note in Chapter 3, I did not collect data about age, as the overwhelming majority of UK Thalidomide survivors were born between 1959 and 1962 (i.e. aged 52 to 55 at the time of the interviews). The interview group came from across the UK and included Thalidomide survivors in all five impairment bands, although those with more severe impairments were slightly over-represented. At the time of the interviews, 26 participants were not working, 10 were working part-time and two were working full-time. Of those who were not working, sixteen said they were unable to work because of their health problems/disability, eight had given up work for a combination of health and personal reasons (e.g. family commitments, lifestyle), and two said they had decided not to work entirely for personal

seasons. In the group working part-time, half said they no longer felt able to work full time because of their health problems/disability, and half said they had reduced their working hours for a mix of health and personal reasons. In terms of home circumstances, seven lived alone, 26 lived with their partner (or their partner and children), and five lived with their children. Appendix 13 lists the interview participants' characteristics and their pseudonyms.

5.1 Type and Range of Health Problems

Initially, I had eight main themes or groups of health problems with just one for musculoskeletal (MSK) problems. However, it soon became apparent that the coding of these types of problems needed to be more fine-grained if I was to establish a sufficiently detailed picture of this group of problems. I therefore decided to cluster MSK problems by the areas of the body affected. There were three main reasons for this. First, because so many of the participants were reporting MSK problems, having all the references under one heading became unwieldy. By splitting them into several themes the data became more manageable. Secondly, MSK problems appeared to be in part related to the nature and severity of participants' limb difference, and this was potentially an important connection to be explored further in the Health and Wellbeing survey. Thirdly, the Trust was in the process of establishing a network of orthopaedic specialists who could diagnose and treat Thalidomide survivors, and so it was helpful for them to know what participants said about MSK problems in different areas of the body. I eventually settled on four main themes for MSK problems and a separate theme of 'pain'. Although pain was often closely associated with MSK problems, the interviews suggested that some Thalidomide survivors experience more generalised pain, which may not have a clear cause.

The table below shows all the eleven descriptive themes that emerged, the number of people who discussed them and the number of times they were referred to. There is some overlap between the themes, especially between '*MSK problems – joints*' and the other MSK themes, and between MSK themes and '*Pain*' as often people described a range of problems and the pain they were experiencing as a result of them, together, in one segment of the interview.

Table 11 Health problems/themes identified in the content analysis

Health Problem/Theme	Number of Participants	Number of References
MSK problems – Joints	28	40
MSK problems - Shoulders, arms and hands	16	21
MSK problems - Hips, knees and feet	14	20
MSK problems - Back and neck	11	15
Pain	14	20
Neuropathy symptoms	14	15
Mental and emotional health	11	16
Long term conditions/other health problems	9	13
Weight management	9	11
Sight and hearing problems	7	10
Dental health	5	9

Table 11 provides a useful overview but it is also important to understand what is encompassed by each of the themes. By this I mean both descriptively, in terms of the types of the health problems included and how participants themselves described them, but also experientially i.e. how participants perceived and made sense of their health problems. Delineating these themes was very helpful for the Trust and for the development of the survey but in some ways the neatness of them belies the interconnected nature of the health problems people were experiencing. Not only did people talk about more than one problem in the same segment of the interview, there was often a physical connection between them e.g. MSK problems were frequently accompanied by pain; pain and loss function led to depression or low mood; and loss of function and depression sometime contributed to reduced activity and weight gain. Below I describe the eleven themes in more depth and use quotations to illustrate these two dimensions.

5.1.1 Musculoskeletal problems

Many Thalidomide survivors were born with deformed, misaligned or dislocated hip, shoulder and knee joints, and so it was not surprising the ‘MSK problems – joints’ emerged as a theme. People ‘grouped’ their MSK problems in different ways. These groupings appeared to be related to either the parts of their body where they were experiencing pain or loss of movement, and/or their original Thalidomide damage. For

example Rowena who has one short arm explained that she gets pain in her shoulder: *“It is because I’ve got one short arm – my forearm’s shorter on the more affected side. I’m always compensating with the arm that’s full length and I think that’s probably why I get a lot of these shoulder pains”*. The information gained from the interviews helped me think about the best way to categorise or group MSK problems in the survey. There were eventually ten MSK options included in the multiple choice questions about health problems in the survey.

The problems people were experiencing in their shoulders, arms and hands appeared to be strongly related to either overuse of a ‘good’ hand or arm, or progressive deterioration in already damaged limbs and digits. These problems seemed to be equally significant for participants with mild and more severe upper limb damage. The quotation below is from a Thalidomide survivor with less severe impairments:

“About 10 years ago, my hand just seized up...the biggest deformity is in my right hand but actually now, I suffer most – because I put so much pressure on my left hand, not realising that that was also deformed, and that’s where I get the most pain...I thought it was just a strained ligament or something and I left it for several months. Actually then it didn’t go away, so I went to the doctor, he sent me for an X-ray and I was called in when it showed all the deterioration”. Jenny

However, some participants who had no upper limb damage also reported problems with their shoulders or arms. One person who covered several miles a day in a manual wheelchair explained – *“I’ve carpal tunnel – not last year the year before – from the wheelchair because I’m very active”*. Carol

The pain or loss of function people were experiencing in their lower limbs fell into two distinct categories. Participants with no arms or very short arms, who used their feet for everyday tasks, appeared most likely to report problems with their hips and feet, as the quotation below illustrates:

“Now we’re in our 50s, the rheumatism, arthritis etc. have started to kick in because we’re using our legs for things they weren’t designed for...[the pain] is worse in my feet because everything you would do with your hands, I do with my feet basically. Over the years what I can do has dwindled”. Fiona

Those who were lower or four limb affected described different and more varied problems, including dealing with the long term consequences of amputations and prosthetic limbs. One participant who uses a below the knee prosthetic on his left leg, described the problems he was now having in his right leg:

"I had a sudden, I suppose you'd call it a malfunction in my right leg. I got up one morning and I couldn't actually put my foot down...Basically, what it is - my ankle is twisted and it's twisted so that it bends inwards. So the outer bone through my knee and my foot is out of line with my femur and my patella. That causes the problem within the knee joint...but also the bones in my foot are completely flat on the ground – I've got no arch – so that's going to cause problems. They did say there's a possibility of completely reconstructing the bones within it – but I think that's too risky because if that goes wrong, it could bugger me up completely. I'd rather live with what I've got at the moment". Ben

Carol, the participant who had carpal tunnel syndrome, explained that she had both legs amputated below the knee as a child. She talked about the pain and infections she had experienced in recent years:

"I used artificial legs up to 10 years ago and then I had to give them up because they were causing me so much pain. Getting infections in my stump ends – cellulitis – which was quite bad. I'm now in a wheelchair all the time...Then I had a knee infection this year. February, my knee got infected because I was moving around on my stump ends and stuff and getting infections and that". Carol

Lastly, a participant who is four limb affected explained that compensating for an imbalance in the length of her legs had led to problems in her 'good' leg:

"I've had a couple of bouts - I think one was in the last year – of bursitis in my left hip. That is probably caused by my disability because from what I understand about bursitis you get it in one joint that's used more than the other and I have one leg longer than the other, so that's in my longer leg". Meg

The final MSK theme was back and neck problems. These were reported by over a quarter of the participants but this one theme included a wide range of conditions and causes, which were not necessarily related to the severity of peoples' original impairment. One participant, who described herself as *"one of the luckier ones"*, explained that she has one short arm. She has been very active and sporty all her life but feels that constant over-bending and overstretching has led to premature wear and tear in her spine:

"About 10-15 years ago I started having trouble with my back and I went to the clinic up in [town], which is where I used to live, and had an X-ray and they said my spine was wearing away. The actual spine was becoming serrated and wearing away but at that time, all the discs and everything were OK. Then about 2½ years ago I started having trouble walking and pain in my left leg and not being able to stand on my foot...They sent me for an MRI scan and they found then that

I had a trapped nerve at the 4th and 5th vertebrae and 3rd vertebrae, where the discs had totally collapsed and where the actual spine is virtually sitting on bone and there are no spongy discs between. So that is my problem at the moment”.

Ann

Several other participants talked about deterioration in their spines, ranging from disc problems and arthritis to curvature. Often this ‘structural’ deterioration was accompanied by muscular spasms and muscular pain. Upper limb affected participants generally felt that their problems were caused by over-using one side of their body and/or using their teeth (and hence their neck) for tasks that other people would do with their hand. One participant who talked about pain in her neck explained – *“I use my neck a lot cos I take clothes on and off with my mouth and things like that, so my neck is constantly in use”* (Tessa). However, some lower limb affected people also had back problems as the quotation below illustrates:

“I have arthritis in the spine and damage to the soft tissue coming from the spine and obviously that’s creating a lot more pain and the physiotherapist has tentatively suggested that it’s the way I am pushing myself in the wheelchair”. Alan

Whilst deterioration was a common theme, the interviews also suggested that as people aged, previously unknown damage had come to light or joint problems that they had coped with all their lives were now causing difficulties:

“I think it’s the shin bone is completely missing, so I’ve got a slightly twisted leg and I know when I saw the surgeon years ago he said the knee wasn’t great and probably I would get arthritis in my knee”. Nicola

“I hurt my left shoulder quite badly. I couldn’t bear weight on my arm – it was my good arm that I do my transferring with – and it took about 8 months to repair. I tore the rotating cuff in my shoulder blade and had some X-rays, and they said my shoulder socket wasn’t normal. I am able to bear weight on it...but I lost the strength in it, which is what I need to lift myself”. Alison

Often participants were experiencing more than one MSK problem, and this was reflected in the way they spoke about them. People ‘listed’ several problems and explained or speculated on how they felt they were interrelated. The quotation below illustrates this point:

“I’ve got problems in my neck, part of my back and down might right side. I’ve also got numbness in my right arm. I’ve got arthritis in my neck due to an injury sustained by using my head incorrectly. My teeth are chipping so I’m trying not to use them any more [for holding things etc.]. My right side [problem] is due to

overuse, standing on my right leg and doing things with my left leg and using my feet to do stuff. The left arm....I'm not quite sure what that is. I think it's coming from my neck". Amanda

5.1.2 Pain and neuropathic symptoms

As the quotations above about MSK problems show, many participants were living with pain to some degree, and again the connection with people's original thalidomide damage was evident. Most people described chronic pain, which had almost become part of everyday life - *"it just means sort of a constant nagging pain in my neck that I suppose in some ways I'm just used to"* (Meg). However, sometimes the pain was related to an acute problem. Karen, who has very short arms and relies heavily on her abdominal core muscles for movement, developed an acute condition that normally affects young sportsmen. The treatment involved several weeks of bed rest and strong painkillers:

"It started in January and lasted three months – I hate talking about it really! I had this horrendous pain in my rib cage and obviously my torso is what I move with, I do everything from my stomach. Whatever I do comes from there, the abdomen and I couldn't do anything. I thought what the hell is this? Anyway, I went to the doctor and he diagnosed something which is quite rare...It's something called Tietzes and it's like all you muscles in your rib cage are in spasm". Karen

When people talked about the pain they experienced, their descriptions were often intertwined with explanations of the dilemmas they felt about the use of pain medication or pain treatments. Ann explained her situation in some detail and the extract from her interview below vividly illustrates the difficulties they faced:

"I've had a cortisone injection. I've had a nerve epidural...I'm having acupuncture. I'm having massage. I'm on massive painkillers... I'm on an anti-inflammatory...I'm on high doses of codeine and paracetamol four times a day. Then I've got this other drug, duloxetine...It's like a nerve relaxant and also an anti-depressant, so I've been taking all sorts. I hate taking pills...After the injection, the nerve injection, it seems to do something and after the acupuncture, that seems to do something. So I started to try to reduce the medication to see what I could get away with but I'm at the point now where the pain is coming back, so I'm having to up it again. I was at a point where I thought 'Oh, I can walk, oh, I can stand, oh, I can do things'. I'd cut down on the medication but now I'm having to put it back up again...[the injection] only works up to about 6 months. I had it in March, so at some stage it'll wear off and they won't give it to you until you're at the point of excruciating pain again". Ann

The interviews also revealed clear interconnections between MSK problems, pain and neuropathic symptoms. Furthermore, although people used lay language, their descriptions reflected the mixed evidence from existing literature about the causes of these symptoms (i.e. compressive neuropathies resulting from Thalidomide survivors' unusual impairments and/or generalised neuropathy due to peripheral nerve damage caused by the drug). Either way, within the Thalidomide community there is a perception that neuropathic symptoms are a common feature of ageing with Thalidomide damage and more than a quarter of the participants spoke about them. Some had received a diagnosis and treatment (e.g. to relieve trapped nerves) but others were simply living with or trying to manage the symptoms. As I described above, Rowena had shoulder pain, probably linked to overuse of her 'good' arm. However, she was also experiencing tingling in her arms and hands and she speculated on the causes:

“Of course, you do things you probably shouldn't do. You should wait to get help but you carry on and I really notice it, more than I would have done, and the tingling's always there – in my fingers, my arms, my hands...I think a lot of the tingling is from trapped nerves and things like that and they [physiotherapist] could never release them, like they could in somebody else. But that probably suggests that there's a degenerative thing going on as well”. Rowena

Tingling or 'pins and needles' appeared to be most commonly reported in peoples' upper limbs but some participants experienced strange sensations, including numbness and extreme heat or cold, in their lower limbs. Jo described what happened to her – *“I got up one morning and the front of my left leg was numb and I've never experienced it before”*, whilst Gwen also suggested possible causes for what was happening to her:

“I have pins and needles all the time in my feet. My feet burn. They feel like they're really hot and again it's all to do with just the way things are worn out really and it's probably nerve damage and stuff just from the way I've used them”. Gwen

5.1.3 Sight, hearing and other physical health problems

Gwen's situation starkly illustrates how many Thalidomide survivors are coping with multiple impairments and health problems. She has no arms and uses her feet for everyday tasks. Alongside the neuropathy symptoms described above, she has spondylosis (wear and tear of the spinal column) and arthritis in her hips. However, the most dramatic change in recent years was the decision to have her eyes removed. She had lost her sight some years ago but because her eyes had not formed properly she had repeated cysts and infections in them which made her feel very ill. Having her eyes

removed made her feel better physically but it brought with it practical and emotional issues. She explained:

“I now have two artificial eyes. It’s made me have to depend on....because I have no arms, I can’t clean the eyes and I have to get my PA to do that, so for me that’s the first thing I’ve got that I can’t actually deal with [myself]... For me, it was something I never wanted to have to do. One of my eyes never formed properly and never worked, and it was always on the cards that it would have to come out. It was something I always held out against because I didn’t want to. I actually believed for quite a long time about them being the window to your soul. It was quite an emotional thing and even though I couldn’t see, I wondered if it was going to plunge me into a different blackness to what I already had. It was a very difficult period of time”. Gwen

Other participants reported changes to their vision or hearing that are associated with ‘normal’ ageing but might be complicated by their Thalidomide damage. Jenny who only had damage to her hands described the changes in her sight – *“Up to my 40th, I had 20:20 vision and then my short-sightedness started to deteriorate quite rapidly... it takes rather an adjustment”*. Her optician was so concerned about how quickly her sight was deteriorating, (especially as there was no family history), that she sent her for further tests. When these came back negative she speculated on whether there might be a link to Thalidomide.

With hearing impairment there is a known, and sometimes very obvious connection to Thalidomide damage. Around a third of UK Thalidomide survivors have damage to their inner and/or outer ear and many of this group are deaf or severely hearing impaired. However, the interviews suggest that some Thalidomide survivors have more minor damage which can exacerbate the normal decline in hearing associated with ageing:

“I have narrow ear canals and I suffer with having my ears cleaned... But I know that’s probably part of my disability as well... You know when somebody’s speaking, I have to make sure I’m looking at them so I can see what they’re saying, as well as hearing”. Tessa

Just five participants spoke about dental health but their descriptions of the problems they were experiencing were consistent with the research evidence about the higher rate of decayed, missing or filled teeth amongst Thalidomide survivors. For some it had led to the need for major dental work:

“I’ve been under treatment at the Dental Hospital for the last four years and that’s coming to a climax again because I’m having implants because my teeth are worn

out. I'm not even thinking about that as my health but that it absolutely related to my disability. I use my teeth for picking things up and all sorts. It's another hand, another gripping thing. I've got 5 dental implants...[its] not so much wearing down as fallen out. Because also I've had problems with my gums which is related to how well I can and can't clean my teeth". Martin

Like many people in their 50's, several participants reported struggling to manage their weight, although some noted that this was a long standing issue for them, in part related to the nature of their impairments and the associated barriers to maintaining a healthy lifestyle:

"I think it's like weight loss is something that I've struggled with since I was 9 and it's been a massive realisation that I can't eat the same calories as my peers because I don't move as much and my body is not as big". Meg

A number of people felt that weight gain was making their MSK problems more difficult to cope with, reducing their flexibility/mobility and linked to this, contributing to increased levels of pain. A few had specific health problems, which were exacerbated by being overweight. Gwen, who as we saw earlier is already dealing with a number of health problems explained:

"I have a battle like quite a lot of us do with the weight...Also I've got high blood pressure so to put on the weight is quite an important issue and obviously because, taking blood pressure on me, you can't get an accurate reading, that makes life a little bit hard". Gwen

Amongst those participants with long term conditions such as high blood pressure and diabetes, a common theme was the complication of managing these conditions with a physical impairment. The quotation from Gwen (above) illustrates this.

5.1.4 Mental health problems

I have left mental health to the end of this section, not because it is any less important than physical health, but rather because the physical health problems people were experiencing, were in many instances directly contributing to poor mental health. My literature review suggested that common mental health problems, such as depression and anxiety, are significantly more prevalent amongst Thalidomide survivors than in the general population, with some studies estimating that around half of all Thalidomide survivors have experienced mental health difficulties. In relation to mental health, the interview participants in my study may not be fully representative of the UK Thalidomide community, as those Thalidomide survivors with mental health problems may be less likely to volunteer to take part in research. Nevertheless around a quarter of the

participants described periods of low mood, depression and anxiety. Importantly, a number discussed what they perceived might have led to these problems. Their reflections shed light on how Thalidomide survivors themselves made sense of these difficulties.

Some participants felt that their mental health problems were linked to the experience of living with disability and particularly rare impairments. They described a sense of being 'different' and the effort it had taken to 'fit in'. However, loss of function was at the heart of many participants' emotional and mental health problems. Often this loss was progressive but sometimes it was related to an injury. Nevertheless the impact was similar, as the two extracts below illustrate:

"It makes me cross. I'm more irritable than I was. I become frustrated, so yes. I mean it does affect you psychologically. You know I find myself being more irritable. I always think of myself as being of a sunny disposition but I've become a miserable git! It's like everything's going swimmingly well and everything in the garden is rosy and then suddenly it turns and you think fuck! It's like it completely takes your day away because there's something you can't do. Especially if it's something you used to be able to do that you can't do. That kind of really does frustrate me". Martin

"I broke my arm a few years ago and it was my right arm which I do everything with, so I was completely dependent. I couldn't do anything because I do most things with my right arm, so I was back to using my feet again which I did when I was a child, and that was fine, but I was still very dependent on my husband for getting me dressed and washed and all sorts of things, and it was really scary that something that wouldn't affect you so much – if you broke one of your arms, you'd still manage. But I couldn't even feed myself cos I couldn't use my fork in my other arm cos I have no strength or control in that arm. So it was that really that made me feel very low – to be so dependent – and to be told 'Well, we don't know how your arm was meant to be before you broke it, so we're not sure how it's going to heal or if you'll ever get the same use back'...and I'm a really optimistic person, so it really shocked me that I was feeling quite so low about it". Amy

A few people felt that their mental health problems were linked to life events, such as bereavement, that could affect anyone but that perhaps their disability had made their mental wellbeing more fragile. Nicola explained that the death of her mother, who had been a huge support throughout her life, had precipitated a period of what she described as "mental strain" but also said – "I do wonder if that is a bit linked to my disability –

feeling less able to cope sometimes than other people – I don't know". Other participants talked about how financial worries or relationship breakdowns had contributed to their problems and several of the women participants noted that the menopause had been a complicating factor.

5.2 Language, Links to Treatments and Perceived Causes

The content analysis not only enabled me to describe the type and range of health problems discussed in the interviews, it also allowed me to identify three overarching findings which were important for the design of the survey. The first relates to language, the second to the connection between health problems and treatments, and the third to perceived causes.

When participants talked about their health problems, most described them using broad 'lay' terms. However, a few, especially those who had had a diagnosis and/or treatment, did use medical terms. The short quotations below illustrate this:

"I get pains in my fingers and my arms – in my neck, lower back, hip area – I've got one dislocated hip [and] a dodgy knee. In that respect, in that way, yes – a lot of aches and pains basically". Tessa

"I got a diagnosis last year, possibly related to thalidomide damage, I have lot of pain in my coccyx and I had a MRI scan and the orthopaedic consultant found coccydynia" [an unstable coccyx, which causes chronic inflammation]. Simon

This was an important observation because it had implications for the phrasing of questions about health problems used in the survey. So for example in the survey, within a multiple choice question about health problems, the theme 'neuropathy symptoms' translated in to three options – *'Tingling/pins and needles'*; *'Numbness/loss of feeling'*; and *'Sensations of extreme heat or cold'*.

The second overarching issue was the connection between health problems and treatments or treatment options. For example a few people talked about how a procedure or treatment had helped them (e.g. by reducing pain) but often treatments brought both benefits and difficulties, as the quotations below show:

"Things are quite a lot better since I had the hip replacement. I can feel pain gathering in my other leg – I had the hip replacement in my right hip – and I can actually feel... I think eventually there'll be a need for a hip replacement in the left leg". Isobel

“My arms - they’re short and they’re deformed and stuff. But they’re not as short as some of the others. But I was feeling – a lot of arthritis was setting in about 10 years ago, and it really was getting – it was painful. Since then, I’ve had about, altogether, I think about 8 operations on my arms...It has taken the pain away but there’s things now that I can’t do – a lot of things I can’t do now with my arms”. Jim

Again this influenced the survey, leading me to include both a detailed multiple choice question about the health treatments people had had but also a free text box in which people could describe treatments not listed or add comments about outcomes and experiences.

Finally the other important overarching finding to emerge from this initial analysis was that people perceived three (often interconnected) root causes of their Thalidomide related health problems. The first was that some problems were directly linked to peoples’ original Thalidomide damage. For example, one participant who has been blind in her left eye since birth, explained that her right eye was now deteriorating, due to a cataract. However, the eye is small and deformed, and so her Ophthalmologist had advised that it was too dangerous to operate. Another had developed breathing difficulties related to her original impairments:

“I’ve got something called bronchiectasis which I developed about 6 years ago which is a chronic lung condition, or breathing condition...My breathing capacity is pretty small. It’s 30%, reduced for somebody my age. The consultant said that it’s not asthma or anything like that. It’s to do with constriction...particularly on the left side, my heart is over to the left, and my ribcage, with my disability.... everything’s a bit more constricted”. Penny

The second and perhaps the most common root cause discussed in the interviews was what people perceived as premature wear and tear caused by the ways in which they have had to use their bodies to compensate for their impairments (often referred to in the literature as ‘postural adaptations’). For example, one participant described what he felt were the long term consequences of being a foot user:

“Basically, I don’t have any arms at all so I use my legs to do everything. So therefore the lower back – the hip area and the lower back – cos you’re constantly lifting your knees up – up to a table, whatever it is really, some sort of working surface. So that takes its toll over the years maybe, I don’t know”. Alex

Secondary damage was frequently highlighted in relation to MSK problems but was also touched on when people talked about pain and neuropathy symptoms. It was most commonly raised by those people with limb difference and to some extent, as many of the

quotations in this section show, it is a thread running through peoples' lived experience of their impairments.

The third root cause was accidents and injuries. Some participants talked about accidents and injuries, which they felt had occurred as a result of their impairments e.g. falls linked to mobility, balance or sight problems. Beth described how mobility and balance problems had contributed to her falling and breaking her arm – *"...because of the way I walk (I have no knee joint), I sort of swing from side to side. So I'm conscious now that my balance is not the same"*. Another, who only has sight in one eye, explained that deterioration in her sight had contributed to a series of falls, one of which has resulted in a cracked kneecap – *"I had three pretty nasty falls, all in the space of about a month. You start to worry don't you? My eye sight had got really bad and I'd gone into varifocals"* (Karen).

5.3 Summary

This chapter explains that the primary purpose of the content analysis of the semi-structured telephone interviews was to inform the development of the Health and Wellbeing survey. I describe how the initial interpretive phase of the content analysis enabled me to identify the main health problems participants were experiencing. By counting the number of participants who reported experiencing different health problems, I was then able to gauge the relative importance of them. The chapter shows how the content analysis began to shed light on the language people used to describe their health problems; how they linked different problems; and what they perceived to be the three root causes of their Thalidomide related health problems. Whilst it was not possible to directly explore these links in the survey, the findings did reinforce the need to gather information in the survey about respondents' original Thalidomide damage, and I describe this in the next chapter. They also highlighted the importance of examining these issues in more depth in the secondary grounded theory analysis of the interview data, and in particular, exploring the relationship between these perceived root causes and Thalidomide survivors experience of ageing. This is discussed in Chapter 7.

Chapter 6 Health and Wellbeing Survey

This chapter presents the findings from the health and wellbeing survey of UK Thalidomide survivors. Wherever possible I discuss the findings in relation to other people with early acquired disabilities and/or the general population of a similar age. The survey was conducted in 2015, as part of the Health Grant Monitoring project I was undertaking for the Thalidomide Trust. However, as I explain in Chapter 3, it also enabled me to address the objectives of my doctoral research by generating a huge amount of valuable data about the health and wellbeing of Thalidomide survivors, and providing an understanding of the prevalence of specific health problems. Importantly, the high response rate and the representativeness of the respondents, in terms of gender and level of impairment, mean that the results can be treated with a high degree of confidence.

The chapter begins by examining how representative the survey respondents are of the whole population of UK Thalidomide survivors, in terms of the severity and nature of their Thalidomide impairments, and their country of residence. I then describe their socio-economic circumstances in some detail, including living circumstances, educational qualifications and work situation. I have purposefully presented the information in these two sections at the start of the chapter, as it contextualises and informs the analysis presented later in the chapter. These sections are followed by a detailed examination of respondents self-reported health problems, and their self-reported use of health and social care services. The survey also explored Thalidomide survivors' health-related quality of life, and mental wellbeing. The overall findings in relation to these topics are discussed, followed by further analysis of the relationship between quality of life, mental wellbeing and the characteristics of respondents. This is followed by a brief discussion of 'concerns for the future' that respondents highlighted in a final narrative question at the end of the survey. I have presented them here as they bring to life how health problems are affecting Thalidomide survivors' daily lives.

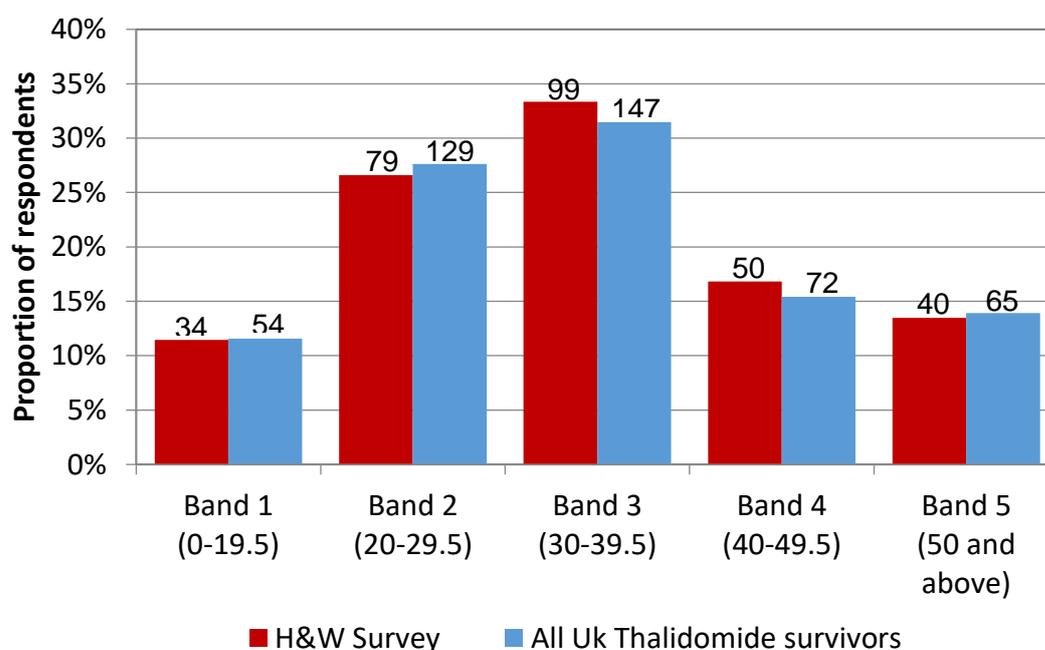
6.1 Representativeness of the Survey Respondents

Limb difference, and in particular missing or short arms, is the most commonly recognised feature of Thalidomide damage in the public discourse. However, Thalidomide damage took many forms and varied considerably in severity. The drug was also no respecter of class or culture, and so survivors are in fact a heterogeneous group. It was therefore important to assess how representative the survey respondents were of all 467 UK Thalidomide survivors. Representativeness is important in quantitative research because it allows wider inferences to be made from the sample being studied (Silverman 2013). In this case, it had implications for my analysis and the strength of conclusions I could draw

from the results. However, in order to establish representativeness, the characteristics of the study sample (i.e. the respondents to the survey) needed to be checked against the characteristics of the population (i.e. the all UK Thalidomide survivors). The Trust does hold some core information about the ‘characteristics’ of its beneficiaries, notably gender, severity of impairment and type of impairments. The Trust also knows where people live but it does not routinely hold information about socio-economic characteristics (e.g. educational qualifications or marital status) or ethnicity. I could therefore only check the representativeness of the survey respondents in relation to four characteristics – gender, severity and type of impairment, and country of residence. Each of these are examined below.

In terms of gender, 174 respondents were female and 174 were male. This matches the gender split of all UK Thalidomide survivors. Three respondents did not give their gender. As explained in Chapter 2, as part of the legal settlement all Thalidomide survivors were assessed and given ‘points’ according to the severity of their impairment. The total number of points is referred to as their 6(iv) b figure. For analysis and reference purposes, the Trust also groups its beneficiaries into five ‘impairment bands’. The spread of 6(iv) b impairment figures/Bands for the survey respondents almost exactly matched that of all UK Thalidomide survivors. There were only minor differences, which can be seen in Figure 10.

Figure 10 Survey respondents and all UK Thalidomide survivors by impairment band



NB: The total number of survey respondents in Figure 10 is 302. This is because I was only able to identify impairment band for those beneficiaries who provided their names

The survey asked respondents to describe their original Thalidomide impairments. There were 25 categories covering limb damage, sensory impairments and damage to internal organs, plus a free text box where respondents could add other damage. As I discuss in Chapter 3, there are inevitable limitations and issues of accuracy when self-classification is used. However, the aim of gathering this information was not to compile a comprehensive clinical classification but rather to help assess the representativeness of the respondents and enable me to look at any variations between groups of Thalidomide survivors with different types of impairments (e.g. upper limb damage; hearing impaired).

For analysis purposes, the 25 categories were collapsed into fourteen groupings. To check how representative the survey respondents were in terms of their original Thalidomide impairments, I compared the self-reported information from the survey with data held by the Trust on the number of its beneficiaries with different impairments. This data is based on the clinical information captured at the time they were accepted as beneficiaries by the Trust, which could be any time from the early 1970s to the present. As was noted in section 3.5.3, there are some differences between the survey categories and the categories used by the Thalidomide Trust, and so it was not possible to make direct comparisons for all categories.

Tables 12 and 13 show the self-reported information about impairments from the survey compared with information held by the Trust. It is important to note that many Thalidomide survivors have multiple impairments and so will appear in both tables. For example:

- 73 respondents had both upper limb damage and were deaf or partially deaf
- 27 respondents said they had both sight and hearing impairment
- All except one of the respondents who had damage to their internal organs also had another impairment/s

Table 12 Comparison of survey respondents' self-reported limb damage with Trust information

Impairment	Survey Number	Survey % (351)	Trust Number	Trust % (467)
Upper & Lower limb mild/moderate	39	11%		
Upper & Lower limb severe	50	14%		
Upper and Lower limb total	89	25%	157	34%
Upper limb mild	23	7%	55	12%
Upper limb moderate	69	20%	40	9%
Upper limb severe	61	17%	85	18%
Upper limb very severe	52	15%	73	16%
Upper limb only total	205	58%	253	54%
Lower limb only	14	4%	7	1.5%
No limb damage	43	12%	50	11%
Total respondents/beneficiaries	351		467	

Table 13 Comparison of survey respondents' self-reported non-limb damage with Trust information

Impairment	Survey Number	Survey % (351)	Trust Number	Trust % (467)
Scoliosis	77	22%		
Spinal damage			151	32%
Totally Deaf	28	8%	147	31%
Partially deaf	96	27%		
Blind/Partially sighted	40	11%	117	25%
Damage to face and/or outer ear	65	19%	218	47%
Damage to internal organs	110	31%	102	22%
Damage to nervous system	52	15%		
Learning needs			27	6%
Epilepsy			17	4%

There are a number of points to note in comparing the self-reported survey information and the clinical information held by the Trust. The proportions of respondents/beneficiaries

who have no limb damage and those who have upper limb damage only, are broadly similar. Amongst those with limb damage, there is a big difference between the proportion of Thalidomide survivors in the survey group who have both upper and lower limb damage, and the proportion found in the Trust's records (25% compared to 34%). The number of Thalidomide survivors who have lower limb damage only is small but there is also a marked difference between the proportion in the survey and the Trust's information. However, it may be that there are a number of Thalidomide survivors that the Trust's records show as having both upper and lower limb damage, who have not recorded the damage to their upper limbs in the survey, possibly because they regard this damage as minimal, compared to their peers (e.g. minor damage to hands).

Whilst the proportion of Thalidomide survivors who are hearing impaired is similar in the survey and the Trust's records, substantially fewer respondents reported that they were blind or partially sighted, suggesting that Thalidomide survivors with a visual impairment may be under represented in the survey. The number of respondents who self-reported damage to their face and/or outer ear was also significantly lower than the Trust's records suggest. This may be because those with ear damage felt they had reported this by identifying as partially or completely deaf in the survey, which reflects a weakness in the phrasing of the questions used to illicit this information. Lastly, a far greater proportion of survey respondents reported that they had damage to their internal organs than the Trust's information would suggest. However, some of this damage may not have been apparent at the time of their original assessment and so may not be documented in the Trust's records.

Table 14 compares the country of residence of the survey respondents with that of all UK beneficiaries, and shows that the pattern is broadly the same. The information was important for the Trust, as the funding for the Health Grant comes from the four UK Departments of Health (rather than central government) and the Trust reports to each of them on the use of the Grant. However, it was also useful for my analysis, as there is increasing divergence in health and social care policy across the four nations of the UK, and this may have implications for the health and wellbeing of Thalidomide survivors (e.g. arising from access to services and support).

Table 14 Country of residence for survey respondents and all UK Thalidomide survivors

Country of Residence	UK Thalidomide Survivors	Survey Respondents
England	325 (69%)	214 (71%)
Wales	37 (8%)	16 (5%)
Scotland	55 (12%)	38 (13%)
Northern Ireland	19 (4%)	14 (5%)
Non-UK resident	31 (7%)	20 (7%)

NB: The total number of survey respondents in Table 15 is 302. This is because I was only able to identify country of residence for those beneficiaries who provided their names.

6.2 Socio-economic Characteristics of the Respondents

In this section, I describe and discuss the socio-economic characteristics of the survey respondents, including their home circumstances and housing situation, educational qualifications and work situation. This information is interesting in its own right, as it is the first time that such a full picture of the socio-economic circumstances of UK Thalidomide survivors has been obtained. However, it also provided a basis for comparisons with the general population of a similar age, and enabled me to undertake sub-group analysis. In particular, some of the information in this section is cross-tabulated with data presented later in the chapter.

6.2.1 Home circumstances and housing situation

In the general population, people in their fifties often experience changing family circumstances e.g. adult children leaving home, but they may also take on new family responsibilities, such as supporting older parents. A briefing note by Carers UK (2014) suggests that the peak age for caring is 50-64, with one in five people in that age group being carers. Recent NICE guidance (2015) highlights 'mid-life' (defined as 40 to 64) as a key period of age related changes in health and functioning, which can be made worse by social circumstances, like caring responsibilities or reduced income. Just like their peers, Thalidomide survivors are experiencing these changes but the implications for them can be more profound, especially where they rely on day-to-day help from family members. They can also have an emotional impact, with Thalidomide survivors feeling more vulnerable or socially isolated, or simply frustrated that they are unable to do more for older parents who have supported them all their lives and now need help (Newbronner 2015). As part of the survey it was therefore important to gather information about home circumstances. I also asked respondents about their housing situation, as the health grant

evaluation had revealed that housing adaptations and/or the need to move to more suitable accommodation was a growing concern for many Thalidomide survivors.

Almost two thirds of respondents lived with their partner/spouse or with their partner/spouse and their children/another family member. Nearly a quarter (76/22%) lived alone. As a comparison, 17% of the general UK population aged 50-64 live alone (ONS 2014). Just over 10% of respondents lived with another family member/s (e.g. parents or a sibling). Nine respondents said they lived at home with full-time paid carers or lived in residential care. The majority of respondents (304/87%) owned their own house or flat, which is a higher proportion than the general UK population aged 50 to 64 (75%) (ONS 2013). Twenty-one (6%) lived in a private rented house or flat; 15 (4%) in a housing association/local authority house or flat; and just six lived in a residential care home or supported housing. Five did not answer this question. Of the 36 respondents who lived in rented accommodation, a significantly higher proportion lived alone (43% compared to 22% for all respondents) and they were also more likely to be unable to work due to their disability or health problems. Respondents in band 2 were over-represented in this group (31% compared to 23% for all respondents).

6.2.2 Education

Table 15 provides a profile of respondents' educational qualifications. The pattern is broadly similar to that of the general population of a similar age (ONS 2011), although Thalidomide survivors are less likely to have a degree (20% compared to 27%) and less likely to have no formal qualifications (23% compared to 25%). Comparisons with the educational profile of people with physical disabilities, of a similar age, are hard to find but the ONS Labour Force Survey 2012 (ONS 2012) estimates that 19.2% of people with disabilities of working age do not hold any formal qualifications, whilst 14.9% hold a degree level qualification. However, these figures encompass people with learning disabilities and describe the situation for *all* working age adults. It is likely that the profile for people with physical disabilities and those in the same age group as Thalidomide survivors will be different.

Table 15 Educational qualifications by impairment band

Impairment Band	Number in band	Degree or higher degree (e.g. MA)	Dip or prof. qual. (e.g. Nurse)	A Levels or Highers	O Level or GCSE equivalent (Grade A-C)	O Level or GCSE equivalent (Grade D-G)	Vocational Plus (e.g. HND)	Vocational (e.g. OND)	No formal qual.
Band 1	34	10 [29%]	2 [6%]	4 [12%]	6 [18%]	2 [6%]	5 [15%]	0	5 [15%]
Band 2	79	13 [16%]	13 [16%]	6 [8%]	15 [19%]	6 [8%]	9 [11%]	3 [4%]	13 [16%]
Band 3	99	20 [20%]	3 [3%]	9 [9%]	18 [18%]	10 [10%]	13 [13%]	1 [1%]	24 [24%]
Band 4	50	8 [16%]	3 [6%]	6 [12%]	15 [30%]	1 [2%]	4 [8%]	0	13 [26%]
Band 5	40	8 [20%]	5 [13%]	5 [13%]	4 [10%]	1 [3%]	2 [5%]	1 [3%]	13 [33%]
Not known	49	11 [22%]	4 [8%]	7 [14%]	7 [14%]	1 [2%]	2 [4%]	1 [2%]	12 [24%]
Overall	351	70 [20%]	30 [9%]	37 [11%]	65 [19%]	21 [6%]	35 [10%]	6 [2%]	80 [23%]

NB Percentages are of the band. Seven respondents did not answer this question.

These results suggests that, as a group, UK Thalidomide survivors are not substantially educationally disadvantaged compared to their peers. Peters et al (2015) also found that overall, German Thalidomide survivors had a similar, if not slightly higher educational profile that their peers in the general population. However, this masked differences between groups of Thalidomide survivors with different impairments. In particular, those with a hearing impairment had fewer qualifications. I also compared the education qualifications of respondents with different severity and types of impairment. It revealed that, as in the German study, respondents with a sensory impairment (with or without limb damage), were least likely to have a degree or higher degree and most likely to have no formal qualification. In terms of severity of impairment, respondents in band 1 one were most likely to have a degree. The proportion without any formal qualifications rose steadily with severity of impairment, rising from 15% for respondents in band 1 to 33% for respondents in band 5. I also examined whether educational level had any influence on employment status and the results of that analysis are presented in section 6.2.3 below.

6.2.3 Work situation

The survey asked respondents to describe their current work situation by ticking one of ten statements. Table 16 provides an overview for all respondents and Figure 11 show the breakdown of responses for men and women. Overall, 15.4% (54) of respondents were working full time. Seventeen percent of all respondents (59) were working part time either because of their disability/health problems or because they had chosen to do so to preserve their health/functioning, and a few (17/4.9%) had chosen to work part time for family or personal reasons. A small number (15/4%) said they were not working at the moment but would like to. By far the biggest group were those who were unable to work because of their disability or health problems (145/41%).

Table 16 Work situation – all survey participants

Work Situation – all respondents	Number	%
I'm unable to work because of my disability or health problems	145	41.4%
I work full-time	54	15.4%
I have chosen not to work in order to preserve my health/functioning	45	12.9%
I work part-time because of my disability or health problems	30	8.6%
I work part time in order to preserve my health/functioning	29	8.3%
I work part-time for family or personal reasons	17	4.9%
I'm not working at the moment but would like to	15	4.3%
I've chosen not to work for family or personal reasons	8	2.3%
Other (e.g. education)	7	2.0%

Figure 11 shows that there were some important differences between men and women. Men were nearly three times more likely to be working full-time and women were nearly twice as likely to work part-time. Unlike the general population where women are less likely to be working (DWP 2015), the proportion of men and women not working was approximately equal.

Figure 11 Work situation of men and women

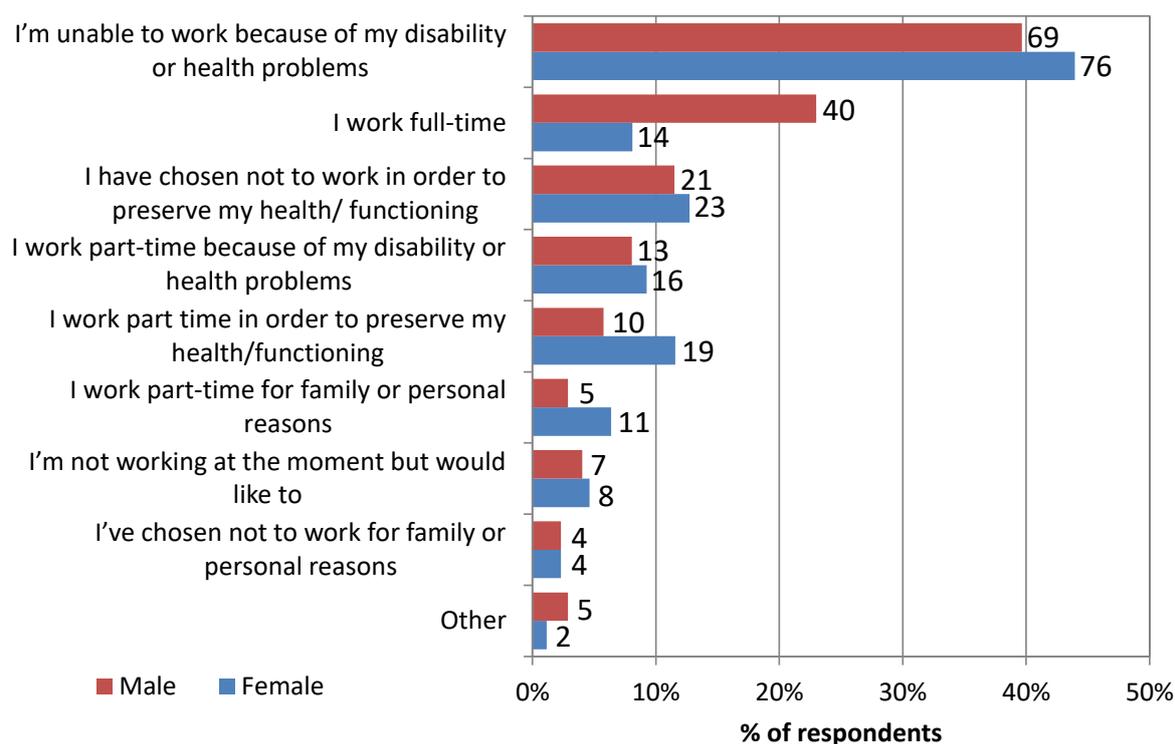


Table 17 shows the work situation of respondents by impairment band. The proportion of respondents who are unable to work increased with severity of impairment, from 35% of those in band 1 to 75% for those in band 5. The proportion in full-time employment goes in the opposite direction reducing from 32% to 8%, but the pattern for those respondents working part-time is less clear. However, although respondents in the lower impairment bands (1 and 2) were more likely to be in full time work, around a third of them said they were unable to work because of their disability or health problems.

Table 17 Work situation by impairment band

Impairment Band	N° in group	I work full-time	I work part-time	I have chosen not to work	I am unable to work
Band 1	34	11 [32%]	6 [18%]	5 [15%]	12 [35%]
Band 2	79	15 [19%]	22 [28%]	17 [22%]	25 [32%]
Band 3	99	13 [13%]	24 [24%]	15 [15%]	45 [45%]
Band 4	50	4 [8%]	8 [16%]	9 [18%]	28 [56%]
Band 5	40	3 [8%]	5 [13%]	2 [5%]	30 [75%]
Band not known	49	8 [16%]	12 [24%]	8 [16%]	20 [41%]
Overall	351	54 [15%]	77 [22%]	56 [16%]	160 [46%]

NB: Percentages are of the band

Comparisons with the general population, and/or with people with disabilities as a whole are difficult, as different sources use different terminology, definitions and age groupings. Furthermore, Thalidomide survivors themselves are a diverse group in terms of the severity of their impairments. The comparisons I present here should therefore be treated with some caution. Data from the Department of Work and Pensions show that in 2015, the employment rate for people aged 50 to 54 in the general population was 82% (78% for women and 86% for men) (DWP 2015). This suggests that 18% of this age group were 'economically inactive', compared to 63% of the survey respondents. However, data collated by the Papworth Trust suggest that disabled people are four times as likely as their peers without disabling impairments to be unemployed or involuntarily out of work (Papworth Trust 2014).

As in the general population, there was an association between the level of educational qualifications and the proportion who were in work, either full or part-time. Table 18 shows that nearly 70% of those with degrees or higher degrees are working, whilst only 12% of those with no formal qualifications are working. However, within the qualification groups there was a spread of impairment bands and types of impairment (e.g. the 19 respondents with degrees working full time are in all five bands and all impairment types except lower limb only). This suggests that whilst respondents' ability to work is strongly linked to the severity of their impairment, educational qualifications also have an important influence.

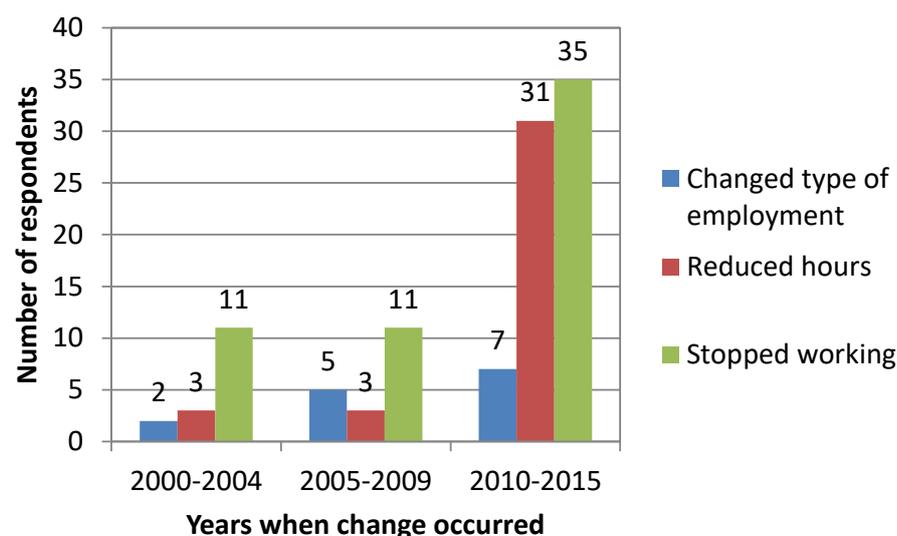
Table 18 Work situation by educational qualifications

	N° in group	I work full-time	I work part-time	I have chosen not to work	I am unable to work
Degree or higher degree [e.g. MA, PhD]	70	19 [28%]	28 [41%]	6 [9%]	16 [23%]
Diploma or professional qualification [e.g. Reg. Nurse]	30	5 [17%]	8 [27%]	3 [10%]	14 [47%]
A Levels or Highers	37	4 [11%]	10 [28%]	5 [14%]	17 [47%]
O Level or GCSE equivalent [Grade A-C]	65	6 [9%]	13 [20%]	13 [20%]	33 [51%]
O Level or GCSE equivalent [Grade D-G]	21	6 [29%]	3 [14%]	3 [14%]	9 [43%]
Vocational Plus [e.g. HND]	35	10 [29%]	6 [17%]	7 [20%]	12 [34%]
Vocational [e.g. OND]	6	1 [17%]	0 [0%]	1 [17%]	4 [67%]
No formal qualifications	80	2 [3%]	7 [9%]	17 [22%]	52 [67%]

NB: Percentages are of those in the qualification group

There is evidence that the work situation of Thalidomide survivors has changed over the last 10 to 15 years (Newbronner 2015; Vermette and Benegabi 2013; Kruse et al 2013). In the UK context, this trend may be partly related to important changes to Thalidomide survivors' financial support, in particular Annual Grants being exempt from taxation from 2000, an uplift in the Annual Grants in 2001, and in 2010 the introduction of the Health Grant (see section 2.7.7 and 2.7.8). I was therefore interested in exploring how many respondents had changed their work situation since 2000. In all, 207 participants had made changes since 2000: 128 had stopped working, 62 had reduced their working hours and 35 had changed the type of work they did. Fifteen respondents had made more than one change (so may appear in more than one category in the table and figure below). Of this group, all had reduced their working hours and all bar one had changed the type of work they did. Figure 12 clearly illustrates that since 2000 there have been some major changes in the work situation of respondents, with the biggest changes taking place in the five years from 2010 to 2015, when Thalidomide survivors were entering their 50s.

Figure 12 Changes in work situation since 2000



Tables 19 and Figure 13 examine whether there is any association between recent employment changes and impairment band. Overall, almost two thirds of respondents had changed their work situation. Respondents in bands 1, 2 and 3 were more likely to have reduced their working hours or changed the type of work they do. Whilst a greater proportion of those in bands 4 and 5 had stopped working, this change was occurring across all the bands. Figure 13 compares the proportion of beneficiaries in each band who were working before 2000 and the proportion working at the time of the survey. It shows that over three quarters of respondents in bands 1 to 4 were working prior to 2000. By

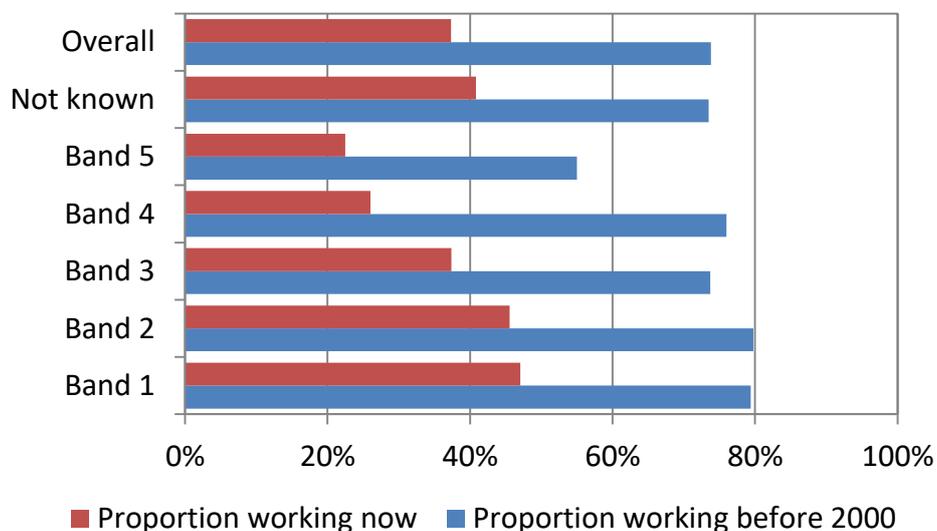
2015, less than half of all respondents were working and, moving from band 1 to band 5, there is a gradual fall in the proportion working.

Table 19 Changes in work situation since 2000 by impairment band

Impairment Band	N° in Band working in 2000	I have reduced my working hours	I have changed the type of work I do	Those who have stopped working
Band 1	27	8 [30%]	6 [22%]	11 [41%]
Band 2	63	19 [30%]	10 [16%]	27 [43%]
Band 3	73	18 [25%]	11 [15%]	36 [49%]
Band 4	38	5 [13%]	2 [5%]	25 [66%]
Band 5	22	4 [18%]	2 [9%]	13 [59%]
Not known	36	9 [25%]	5 [14%]	16 [44%]
Overall	259	63 [24%]	36 [14%]	128 [49%]

NB: Percentages are of those in the Band who were working in 2000

Figure 13 Proportion of respondents working pre and post 2000 by impairment band



Furthermore, over three quarters (118) of the respondents who were working full or part-time thought that their Thalidomide-related disability/health problems would require them to change their work situation in the next five years, and of these, 51 thought that they might have to stop working.

Of the respondents whose work situation had changed since 2000, 91 volunteered additional comments (in response to the open question at the end of the work and

pensions section of the survey). Their comments provided a personal perspective on the changes reflected in the data, and helped me to understand more fully the nature and impact of these work changes on peoples' wellbeing. I briefly discuss this below, using a number of quotations taken from the responses to the open question, to illustrate key points. At the end of the section, I bring together the quantitative data about work changes and the issues highlighted by the narrative comments.

The comments showed that for many respondents the change in their work situation was incremental, often moving from full to part time employment, or reducing working hours or changing jobs, and then giving up work completely.

"Increasingly from 2002 onwards, at which time I was a Director of a limited company working in excess of 50 hours per week. I now struggle to manage 18 hours per week. I have now reached the point where stopping work altogether is imminent." Survey ID2

Whilst a few respondents noted that the improvements in the financial support for Thalidomide survivors since 2000 had enabled them to change their work situation, others still felt under financial pressure to continue working, despite health problems:

"Injury to hand, equivalent of RSI – my physio told me I needed to retire, cannot afford to, but cut down." Survey ID89

"I left work for a bit due to ill health but could not survive on benefit money and had to go back to full time work." Survey ID166

Others had reluctantly given up work, sometimes because their employer could not accommodate their needs:

"2011 I was forced to make a difficult decision to stop working due to continued failing health." Survey ID183

"In 2009 I had to reduce my hours in line with medical advice. In 2010 I had further problems... and in 2011 I was medically retired (not at my request) as my employer had no role for me." Survey ID276

Together, the data from all the questions about work show that since 2000, but particularly since 2010, many Thalidomide survivors have changed their working situation, often (eventually) giving up work altogether. Proportionately, Thalidomide survivors with the most severe impairments (i.e. in bands 4 and 5) were the most likely to have stopped working since 2000 but from 2013 onwards, a growing number of Thalidomide survivors in bands 1, 2 and 3 also ceased working. It was clear from the semi-structured interviews discussed in Chapter 5, that the Health Grant provided many Thalidomide survivors with

the financial means to reduce their working hours or stop working. However, the comments respondents added to the survey suggest that often several interrelated factors underpinned this difficult decision.

For some respondents, changing their work situation was an important means of preserving their health. In effect they were self-managing their declining health or functioning by taking greater control over how, and how much, they had to use their bodies. However, other respondents clearly felt 'forced' to stop working. Certainly, compared to their peers in the general population, health problems appear more likely to affect Thalidomide survivors' ability to work or to work full time. I was unable to find data about employment patterns over the life course, for people with early acquired physical disabilities in the UK, and so it is difficult to know whether the changing work pattern of Thalidomide survivors is unusual when compared to people with similar impairments. However, a report by the Office for National Statistics on disability and employment in the UK (ONS 2019) found that in the 55-59 age group just under half (49.9%) of disabled people were in employment compared with 83.7% of their peers in the general population.

There are several reasons why people with disabilities have lower employment rates, including lower educational attainment, poor health, employment discrimination or a lack of suitable employment (Fevre et al 2016). In certain respects, Thalidomide survivors are atypical in that as a group, they appear to have a similar level of educational qualifications to the general population in the same age group. The annual (compensation) payments and the Health Grant they receive may also mean that economically they are more secure than is the case for many people with disabilities, and so they may have more choice about whether to work or not. However, as they reach their pre-retirement years, poor health, a lack of suitable employment and employment discrimination appear to be growing issues for Thalidomide survivors too.

6.3 Self-Reported Health Problems

The content analysis of the semi-structured interviews indicated that it is sometimes hard for Thalidomide survivors to make a clear distinction between their original Thalidomide damage and secondary health problems associated with that damage. This is particularly the case in relation to damage/health problems associated with internal organs (e.g. bowel and digestive problems). Thalidomide survivors with limb damage (e.g. musculoskeletal problem), are often able to chart more recent health problems related to this damage through changes such as reduced flexibility and/or mobility and increasing pain, although they may not know the 'medical' cause of these problems. However, even for this group the line between original damage and secondary problems can be a little

blurred, for example with damage such as misshapen joints only coming to light when secondary problems are investigated. To help respondents make the distinction between their original damage and secondary health problems, I used the order in which the questions appeared in the survey, purposefully asking them about their original Thalidomide damage *before* asking them about the health problems they had recently experienced or were currently experiencing.

Asking respondents to identify their health problems inevitably created potential for tension between social and medical models of disability. It is important to note, therefore that the question had a very specific purpose i.e. to enable the Trust to gather information about their beneficiaries' health problems so that they could better plan services to support them. For me the data provided a means of examining links between the self-reported health problems of Thalidomide survivors as they aged and other factors such as severity of impairment, and from this to explore how original impairments, secondary health problems, and socio-economic circumstance might be intersecting as Thalidomide survivors grow older.

For the purposes of analysis, I grouped the data into a number of categories. This made cross tabulation more manageable and the presentation of results clearer. I also took the decision to use categories that are somewhat biomedical in nature, as it facilitated comparisons with both the general population and the clinical studies in my literature review. The findings are presented below under five main headings: musculoskeletal problems; generalised pain, neuropathy, fatigue and balance; mental health; hearing, sight and dental problems; and other health problems (including 'lifestyle' related conditions). At the end of the section, I consider the important issue of comorbidity and the implications the impairments caused by Thalidomide have for managing long-term conditions.

6.3.1 Musculoskeletal problems

A study by Manchester University (Parsons et al 2011) noted that the term 'musculoskeletal conditions' includes over 200 disorders affecting joints, bones, muscles and soft tissues. The survey results suggest that overall, 93% of respondents were experiencing musculoskeletal problems (defined in the survey as pain and/or loss of movement in one or more joint, including their neck and/or back). As Table 20 shows, back problems were the most commonly reported musculoskeletal problem, closely followed by shoulder pain/loss of movement and problems with hands.

Whilst comparisons with general population are not straightforward, the General Household Survey of 2007 (ONS 2007) does provide some context. It found that 19.5% of

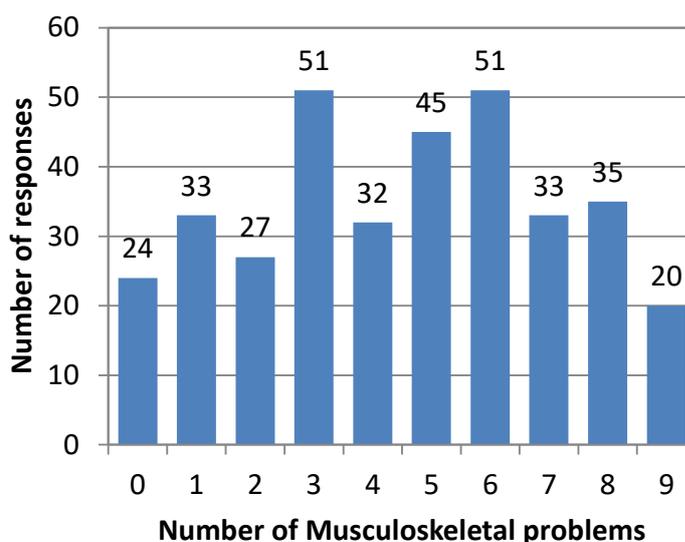
adults aged 45-64 reported having a chronic musculoskeletal condition. More specifically, a global study of the burden of low back pain (Hoy et al 2014) estimates that in Western Europe around 15% of the population is suffering back pain, with slightly more men suffering the condition than women, and prevalence increasing with age. The prevalence of musculoskeletal problems, and back problems in particular, is therefore much higher amongst UK Thalidomide survivors than in the general population. These findings are supported by other studies with Thalidomide survivors. A recent Swedish study (Ghassemi Jahani et al 2016a) found that degenerative changes in the cervical spine were more common and more extensive in Thalidomide survivors than in an age-matched control group. The categories/groupings used by Peters et al (2015) in their study of the health problems of German Thalidomide survivors are slightly different to those used in this survey and so full comparison is not possible. However, the proportion of beneficiaries reporting back, shoulder and hip problems was very similar, whilst in the German study hand problems were less common and neck problems were more common.

Table 20 Musculoskeletal problems reported

Musculoskeletal Problem	Number	%
Back problems – prolapsed disc; damage to vertebrae; scoliosis and/or muscular pain	254	72%
Shoulder – pain, loss of movement or deterioration of the joint	211	60%
Hands – pain, loss of grip and/or dexterity	210	59%
Arms and wrists – pain, loss of strength and/or movement	197	56%
Neck pain and/or loss of movement	195	55%
Knee – pain or deterioration of the joint	168	48%
Hip – pain, loss of movement or deterioration of the joint	164	46%
Ankles, feet and toes – pain and/or loss of movement	100	28%

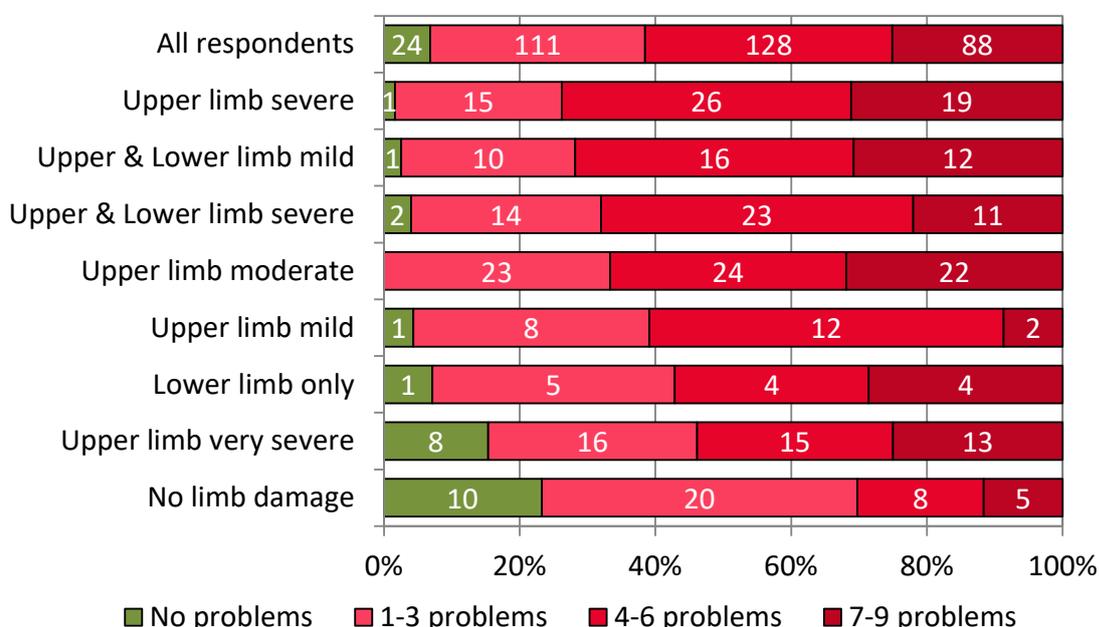
Importantly, many survey respondents reported multiple musculoskeletal problems, with the mean number of problems being 4.5 and over half of all respondents reporting five or more problems (see Figure 14 below).

Figure 14 Number of musculoskeletal problems reported



I looked at whether there were any differences between respondents with different types/severity of impairment. My analysis suggests that Thalidomide survivors with severe or moderate upper limb damage and those with upper and lower limb damage reported marginally more problems. Figure 15 below gives a breakdown of the number of problems reported by each impairment group.

Figure 15 Number of musculoskeletal problems by impairment group



6.3.2 Generalised Pain, Neuropathy, Fatigue and Balance

Thalidomide has long been known to cause peripheral neuropathy in adult patients (Fullerton and Kremer 1961) and it is one of the known side effects of its current use for

conditions such as multiple myeloma (Nicotra et al 2016). Many Thalidomide survivors report experiencing symptoms of neuropathy and/or generalised pain (i.e. pain affecting many parts of the body) but the causes are unclear and disputed. Through the survey, it was possible to explore the extent of this issue.

In addition to the very high proportion of respondents reporting joint pain, 49% said they had generalised pain; 92 (26%) respondents said this was severe and/or continuous and a further 81 (23%) described it as moderate and/or intermittent. As Table 21 shows, respondents in bands 5 were the most likely to report experiencing generalised pain and those in band 2 least likely to do so.

Table 21 Experience of generalised pain by impairment band

	Band 1	Band 2	Band 3	Band 4	Band 5
Generalised pain - severe	8 (24%)	12 (15%)	30 (30%)	13 (26%)	15 (38%)
Generalised pain - moderate	9 (26%)	19 (24%)	21 (21%)	13 (26%)	10 (25%)
Generalised pain - either	17 (50%)	31 (39%)	51 (51%)	26 (52%)	25 (63%)

NB: Percentages apply to the proportion in the impairment Band

The open comments added by respondents provided some valuable background information, in particular suggesting that for some, the cause of their pain was unclear and therefore treatment choices were limited or difficult.

“Chronic neuropathic pain in peroneal nerves - both legs, below knee. 5 years. No cause found. Does not respond to treatment/pain management medication.”

Survey ID298

“I have been suffering with regular bouts of pain in my side. I have had several tests done but I am told there is no conclusive reason for the pain.” Survey ID104

Overall, 66% (231) of respondents reported experiencing symptoms of neuropathy, with tingling/pins and needles being the most common symptom (see Table 22). My review of the literature suggests that from a clinical perspective, there are differing views about the causes of these symptoms (Jankelowitz et al 2012; Nicotra et al 2016). However, Thalidomide survivors report that the impact on their general wellbeing can be significant, especially where sleep is affected (Newbronner 2015).

Table 22 Symptoms of neuropathy reported

Symptoms of Neuropathy	Number	%
Tingling/pins and needles	182	52
Numbness/Loss of feeling	130	37
Sensations of extreme heat or cold	127	36

A significant proportion of respondents also said that they experienced severe tiredness/fatigue (139/40%) and nearly a third of all respondents said they had problems with balance/falls. However, as Table 23 shows, whilst the proportion of respondents reporting symptoms of neuropathy was consistent across all five impairment bands, fatigue was more commonly reported by those in bands 1 and 2. This may be partly because respondents in these bands were more likely to be working and therefore less able to rest when needed. The survey also suggests that respondents in bands 3 and 4 were more likely to experience balance problems but these could have many different and/or multiple causes, including deteriorating sight and musculoskeletal problems.

Table 23 Symptoms of neuropathy, fatigue and problems with balance/falls by impairment band

	Band 1	Band 2	Band 3	Band 4	Band 5	Band not known
Neuropathy	22 (65%)	50 (63%)	66 (67%)	34 (68%)	28 (70%)	31 (63%)
Fatigue	15 (44%)	34 (43%)	36 (36%)	21 (30%)	15 (38%)	18 (37%)
Balance/Falls	5 (15%)	15 (19%)	37 (37%)	24 (48%)	10 (25%)	18 (37%)

NB: Percentages apply to the proportion in the impairment Band

6.3.3 Mental health

Overall, 50% of respondents said that they were currently experiencing or had recently experienced depression and/or anxiety, and a further 19% said they had generally poor emotional health. Table 24 provides a more detailed breakdown of the problems reported.

Table 24 Mental health problems reported

Mental Health Problems	Number	%
Anxiety	145	41%
Depression	118	34%
Alcohol or drug misuse	26	7%
Other mental health problems	25	7%

The Mental Health Foundation (2007) estimates that in the UK, 20% of adults aged between 50 and 54 experience a common mental health problem (i.e. depression, anxiety or panic) and between 8% and 12% of the population (all ages) experience depression in any year. I was unable to find specific data about the prevalence of common mental health problems amongst working age adults with physical impairments. However, a study by Meltzer et al (2012), which looked at (self-reported) physical ill health, disability, dependence and depression in a sample of nearly 7500 adults (including older adults) across the UK, found a prevalence rate for depression and mixed depression/anxiety of 19.5% for people with disabilities compared to 7.2% for people disabling impairments. The self-reported prevalence of mental health problems amongst Thalidomide survivors is therefore significantly higher than in the same age group in the general population and higher than adults (all ages), with physical disabilities. It is however, very similar to the prevalence of mental health problems found in the recent German study (Peters et al 2015). Using face-to-face psychiatric assessment (rather than self-reporting), that study found that 47.7% of Thalidomide survivors had experienced a mental health problem in the preceding four weeks or were currently experiencing mental health problems.

6.3.4 Hearing, sight and dental problems

Deteriorating sight/eye problems were a concern for nearly half of respondents and 38% (133) said that they had deteriorating hearing/other ear problems (see Table 25). These figures will almost certainly encompass both deterioration in sight/hearing due to general ageing and more severe problems directly related to respondents' Thalidomide damage e.g. just 40 respondents reported being blind or partially sighted from birth, compared to the 151 who are now reporting deteriorating sight/eye problems. However, it is important to note that even 'normal' deterioration in sight due to aging can cause additional problems for Thalidomide survivors. For example, having very short arms can make putting glasses on and off difficult and the use of contact lenses impossible, and for those Thalidomide survivors with facial damage (e.g. a missing ear) simply wearing glasses can be a challenge.

Over a third (120/34%) of respondents reported dental health problems. The unusual and varied nature of the original damage to Thalidomide survivors' hearing, sight and teeth/jaws makes comparisons with the general population difficult. However, a Swedish study (Ekfeldt and Carlsson 2008) of the dental health of Thalidomide survivors found that they had higher levels of tooth wear and decayed, missing or filled teeth than the general population of a similar age. The study suggests that these differences may be due to a combination of factors including difficulties with tooth brushing, using teeth as tools and regurgitation/acid reflux.

Table 25 Sight, hearing and dental problems reported

Hearing, Sight and Dental Problems	Number	%
Deteriorating sight/eye problems	151	43%
Deteriorating hearing/other ear problems	133	38%
Dental Health Problems	120	34%

6.3.5 Other health problems

The content analysis of the interviews suggested that weight management is a concern for many Thalidomide survivors, and the survey confirmed this with 40% (141) identifying this as a health problem. The survey did not provide data on the number of Thalidomide survivors who are overweight but there is evidence that people with disabilities are more likely to be overweight or obese. Public Health England's (2013) report on obesity and disability concluded that adults with disabilities have higher rates of obesity than adults without disabilities. It went on to say:

The association between obesity and disability varies by age and sex, and by level or type of disability. Physical inactivity and muscle atrophy, as well as secondary conditions (such as depression, chronic pain, mobility problems and arthritis) have all been found to contribute to the development of obesity among people with physical disabilities. (p6)

Thalidomide survivors are reporting all the secondary health problems highlighted in this quotation, which suggests that they may be at greater risk of becoming overweight and/or find it harder to lose weight.

Respondents also reported a range of other health problems and a breakdown of these is shown in Table 26 below. In addition, eight people noted in the free text box that they had high blood pressure, or were being treated for hypertension.

Table 26 Other health problems reported

Health Problem	Number	%
Bowel or digestive problems	98	28%
Bladder or continence problems	72	20%
Asthma or breathing problems	54	15%
Diabetes	32	9%
Kidney problems	30	9%
Heart problems	28	8%
Cancer	17	5%
Stroke/TIA	5	1.4%

All of these health problems are experienced by people in the general population. For some conditions the prevalence rates reported by respondents appeared to be similar or lower e.g.:

- Information collated by Diabetes UK (2015) suggests that in the UK around 19% of people aged 50-59 have diabetes (Types 1 and 2) whereas 9% of the respondents in the survey reported having diabetes.
- Five (1.5%) respondents (all men) reported that they had had a stroke/TIA. This compares to a prevalence rate of between 0.8 to 2% in the UK population aged 45 to 54 (with prevalence rates being higher for men) (Townsend et al 2012).

However, some problems may be more prevalent amongst Thalidomide survivors e.g.:

- In 2011, the national outcomes strategy for COPD and asthma (DH 2011) estimated that 13% of the population aged over 35 had COPD (both diagnosed and undiagnosed) and around 6% of the adult population had asthma. This compares to 15% of survey respondents reporting asthma/breathing problems.
- NICE (NICE 2014) defines chronic kidney disease as '*abnormal kidney function and/or structure*' and Kerr (2017), suggests that the prevalence of doctor diagnosed chronic kidney disease is between 4.3% and 6.5% (all ages). This compares to 9% of respondents reporting kidney problems.

These comparisons need to be treated with caution, as there are differences in definitions, prevalence periods and age groups etc. What is clear, however, is that all these health problems may be made more difficult to manage, or be exacerbated by Thalidomide damage. For example, a Japanese study (Shiga et al 2015) of 'lifestyle' diseases

amongst Thalidomide survivors suggested that hypertension is a particular area of concern because of the problems many Thalidomide survivors have in exercising and controlling their weight and the potential inaccuracy of blood pressure measurement in people with limb difference.

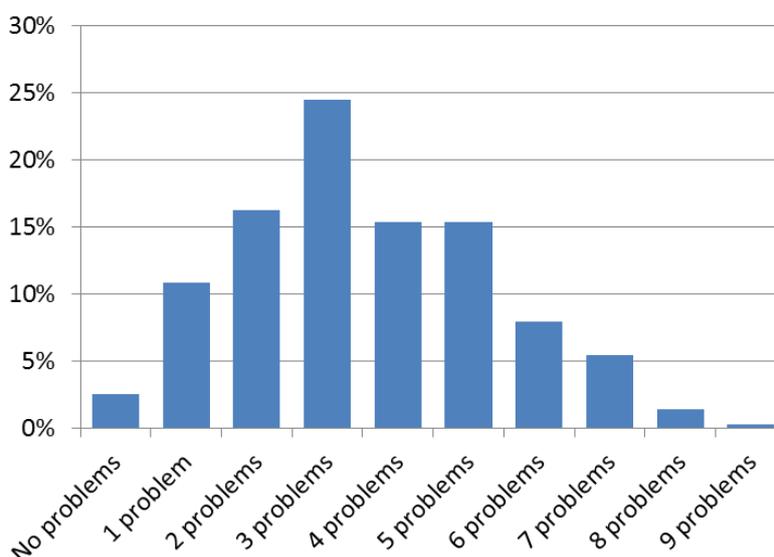
6.3.6 Multimorbidity

The rise in the number of people living with multiple long-term conditions is a growing concern in the UK (Barnett et al. 2012). The NICE guidelines on the clinical assessment and management of multimorbidity (NICE 2016) define it as - *the presence of 2 or more long-term health conditions, which can include:*

- *defined physical and mental health conditions such as diabetes or schizophrenia*
- *ongoing conditions such as learning disability*
- *symptom complexes such as frailty or chronic pain*
- *sensory impairment such as sight or hearing loss*
- *alcohol and substance misuse.*

The survey showed that a high proportion of Thalidomide survivors were experiencing multiple physical and mental health problems (i.e. multimorbidity). I examined the survey data to identify how many respondents reported that they were currently or had recently experienced two or more of the following health problems – a musculoskeletal problem, generalised pain, neuropathic symptoms, a mental health problem, bowel or digestive problems, bladder or continence problems, asthma or breathing problems, diabetes, kidney problems, heart problems, cancer and stroke/TIA. Figure 16 shows that just 9 respondents (3%) had no health problems, 85% had two or more health problems, and almost three quarters (73%) reported between three and nine health problems.

Figure 16 Proportion of respondents reporting multiple health problems



6.4 Use of Health and Social Care Services

In research in the UK (Newbronner et al 2012) and Germany (Peters et al 2015), Thalidomide survivors report problems getting access to healthcare practitioners who understand Thalidomide damage and have the knowledge and skill to diagnose and treat them effectively. The semi-structured interviews suggested that even where they can access the right services, they may face difficult decisions about treatments. For example joint replacement surgery may reduce the pain a person is experiencing but it may also reduce their flexibility. This has led to many Thalidomide survivors to pursue, where possible, self-management strategies, including the use of complementary therapies, such as osteopathy and remedial massage. However, access to appropriate preventative, diagnostic and treatment services is vital if Thalidomide survivors are to maintain their health. The survey provided an opportunity to gather information about the health treatments Thalidomide survivors had used over the past ten years, and to understand more about the problems they may have experienced in getting access to appropriate services.

The Trust was also interested in their beneficiaries' use of local authority social care services. Anecdotal evidence suggested that a relatively low proportion of Thalidomide survivors receive support from their local authority, and the Trust felt their beneficiaries might need more advice and information around this issue. Again, access to social care services could have implications for the wellbeing of Thalidomide survivors and so I have included a brief analysis of these data in this chapter. Below I discuss the findings from my analysis under three headings – use of health services, access to health services and use of social care services.

6.4.1 Use of health services

The data collected in the survey about the health treatments Thalidomide survivors have used, both NHS treatments and those purchased privately was very useful for my research. It shed light on some important issues, including approaches to self-management, treatment options, and the difficult choices that are sometimes associated with them.

Physiotherapy and Complementary Therapies

The most commonly used treatments were physiotherapy (NHS or private) and/or complementary therapies (especially therapeutic massage), with over two thirds of respondents ticking these categories. Table 27 provides a more detailed breakdown.

Table 27 Use of physiotherapy and complementary therapies

Treatment	Number	%
Physiotherapy – NHS	105	30%
Physiotherapy – private	88	25%
Therapeutic massage	89	25%
Chiropractic	61	17%
Acupuncture	53	15%
Osteopathy	34	10%

Joint and Back Surgery

Overall, 17% (60) of respondents said they had had joint or back surgery. As Table 28 shows, hip replacement/hip surgery was the most common procedure. Six percent of respondents reported that they had had a hip replacement/hip surgery in the last ten years, compared to 1% of the general population aged 50 to 54 (Age UK 2012). Similarly, 4% of respondents had had knee surgery, compared to just under 1% of the general population aged 50 to 54 (Age UK 2012). Similar comparisons with the general population for wrist/arm, shoulder and back surgery are less straightforward as these grouping cover a wider range of procedures. Furthermore, national data collection is less developed for these areas. However, data collected by the National Joint Registry (2012) suggests that there are only about 2000-3000 shoulder and elbow procedures performed each year (compared to around 85,000 hip replacements), so the proportion of Thalidomide survivors who have had these procedures appears high.

Table 28 Joint and back surgery in the past ten years

Type of joint/back surgery	Number	%
Hip replacement/hip surgery	21	6%
Wrist/arm surgery	18	5%
Knee replacement/surgery	14	4%
Shoulder replacement/surgery	12	3%
Back surgery	6	2%

The open comments respondents added to their questionnaires revealed that some respondents were facing difficult decisions about if, and when, to have surgery. The quotations below illustrate this:

“Need a shoulder replacement but surgery is not an option as it can only be done once and will wear out within 4-5 years potentially leaving me in a worse situation. Managing related pain using meds and will get surgery if/when the issue is no longer bearable”. Survey ID43

“Both knees are in need of replacement. Surgeon reluctant to do this due to flexibility after surgery.” Survey ID257

The figures presented here may not be surprising given the number of respondents identifying hip, knee and/or shoulder damage as one of their original Thalidomide impairments (158/45%), and the high proportion reporting pain and/or loss of movement in one or more of their joints. However, coupled with evidence from the literature on aging with TE, they suggest that the management and treatment of MSK problems is a major issue for Thalidomide survivors, and an area in which treatment decisions can be difficult.

Pain Medication and Treatment

Half of the respondents (174/50%) said that they had either taken prescription pain medication and/or had pain-relieving treatment such as injections in the past ten years. Nearly half (168/48%) had used prescription pain medication and nearly a quarter (79/23%) had had other treatments to relieve pain. The comments respondents added to their questionnaires bring to life the issues they are facing, as this quotation illustrates:

“Recently diagnosed with congenital fusion of two coccygeal segments for which I undergo an annual steroid injection into the joint. This is effective for three to four months but can only be repeated annually”. Survey ID3

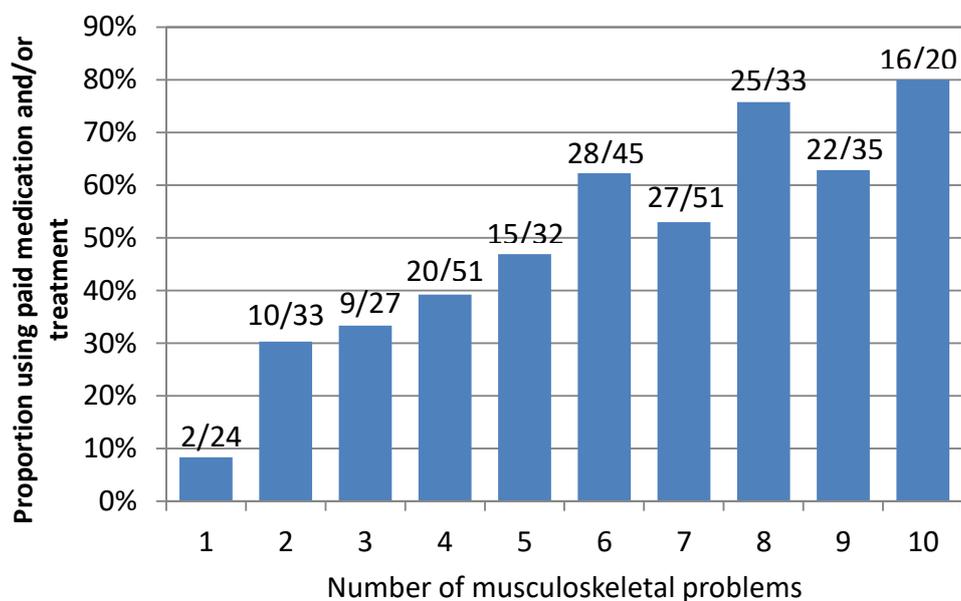
Interestingly, the use of pain medication/treatment was marginally more common amongst respondents in bands 1 and 2, as Table 29 shows. A higher proportion of respondents in these bands were still working (full or part time), which raises the questions of whether they are more reliant on pain medication/treatment because they are less able to self-manage their pain through rest and ‘pacing’ activity.

Table 29 Use of pain medication/treatment by band

Band	Number	%
Band 1	21	62%
Band 2	46	58%
Band 3	42	42%
Band 4	27	54%
Band 5	18	45%

Not surprisingly, the more MSK problems respondents reported, the more likely they were to report that they had had prescription pain medication/treatment (e.g. of the 33 respondents reporting eight MSK problems, n=25/76% were using pain medication and/or treatment). Figure 17 provides a more detailed picture.

Figure 17 Pain medication/treatment and number of MSK problems



Given that 93% (327) of respondents reported pain or loss of movement in one or more joints, these figures suggest that a significant proportion of them were self-managing their pain through the use of other treatments, non-prescription medication and/or changes to their lifestyle, living or working situations. One respondent described the changes they had made in order to manage their pain:

"[Some] years ago I had real health issues and things got so bad I had to take dramatic action...sell [my] business and change lifestyle. So I had to learn to be less independent - to actually be dependent...I refused all help but I had to change my mind-set. I've gone from excessive painkillers every single day to rarely touching one now." Survey ID94

Mental Health Care

With regard to mental health, a quarter of respondents (87) had received treatment for anxiety and/or depression and 10% (35) had had counselling for emotional issues (22 respondents had both). Given that 50% of beneficiaries reported anxiety and/or depression, it is likely that a significant proportion of Thalidomide survivors who have experienced mental health problems have not had any professional treatment.

6.4.2 Access to health services

In the Health Grant evaluation (Newbronner et al 2012), a number of Thalidomide survivors talked about the problems they had experienced with either obtaining access to appropriate health services or the perceived quality of care they received. Specifically, many of them reported that healthcare professionals often had a poor understanding of their particular impairments and/or Thalidomide damage in general. Clearly, access to knowledgeable care and appropriate treatment is important for Thalidomide survivors' health and wellbeing. I was able to use the data gathered in the survey to explore this issue further, both for health services in general and general practitioner (GP) care in particular.

The survey question listed nine problems with health care services that had emerged from the Health Grant evaluation and respondents could tick all that applied to them. There was also a 'no problems' option and a box where respondents could describe problems not listed or add comments. Table 30 shows all the responses. Overall, nearly two-thirds (215/61%) of respondents said that (in the last five years) they had experienced one or more problems with the quality of and/or access to health services. The main areas of concern were a perceived lack of knowledge/understanding of Thalidomide damage in general amongst health professionals (170/48%), and a perceived lack of knowledge/understanding of respondents' impairments amongst health professionals (127/36%). However, difficulties/delays in seeing a suitably experienced health professional/specialist (81/23%) and general delays in getting treatment (82/23%) were also a concern.

Table 30 Problems reported with healthcare services in the last five years

Question	Number	%
Lack of knowledge/understanding of Thalidomide damage in general amongst health professionals	169	48%
Lack of knowledge/understanding of my impairments amongst health professionals	127	36%
Not experienced any problems with healthcare services	132	38%
Difficulties/delays in seeing a suitably experienced health professional/specialist	82	23%
Delays in getting treatment	81	23%
Inflexible care or treatment	62	18%
Lack of involvement/choice in decisions made about my care and treatment	51	15%

Question	Number	%
Problems with the quality or choice of equipment	50	14%
Misdiagnosis or delayed diagnosis	48	14%
Incorrect or inappropriate treatment	47	13%

A number of respondents added open comments about their experiences of healthcare services. The quotations below highlight the difficulties two respondents had in getting the knowledgeable, skilled care they needed (the most frequently highlighted issue in the comments) and the knock-on consequences that poor care can have for mental wellbeing:

“I have not enjoyed my usual robust general health for three years now. I have recently struggled with depression/isolation. I am awaiting the results of blood tests as I complete this form. I delayed the tests because of the difficulty in getting a needle into me to take blood. An angiogram ordered by a specialist had to be abandoned after s/he had tried unsuccessfully three times to insert a drip.” Survey ID265

“Could not get bloods done as nurses could not do it – took 2 years to get doctors to do it. Having a nervous breakdown due to stress and worry. It is hard to admit all about your illnesses, when it is your bowels and bladder. You feel ashamed when it is not your fault. The last thing you want is strangers knowing.” Survey ID212

Importantly, a small number had experienced misdiagnoses or delayed diagnoses (48/14%) and a similar number reported being given incorrect or inappropriate treatment (47/13%). From the survey data I was unable to determine whether these experiences concerned respondents’ Thalidomide related health problems or general health problems. However, as the following quotation illustrates, some beneficiaries perceived that the misdiagnosis of their problems was related to being a Thalidomide survivor:

“There is a lack of understanding of depression/psychological issues and Thalidomide amongst general health professionals. Living a life of being stared at and fighting against barriers and perceptions has taken its toll. My depression was misdiagnosed by general health professionals originally. Thanks to the Trust's assistance I was able to access a specialist.” Survey ID345

The survey also asked respondents - *“How well does your GP/GP surgery understand how your Thalidomide damage affects you?”*. Over half said that their GP fully understood

or partly understood how their Thalidomide damage affected them. Just 20% said their GP did not understand and the remainder were not sure (see Table 31). Given the 'gatekeeping' role of GP in relation to referral to specialist services and their role in offering coordinated, continuity of care, this is an important issue.

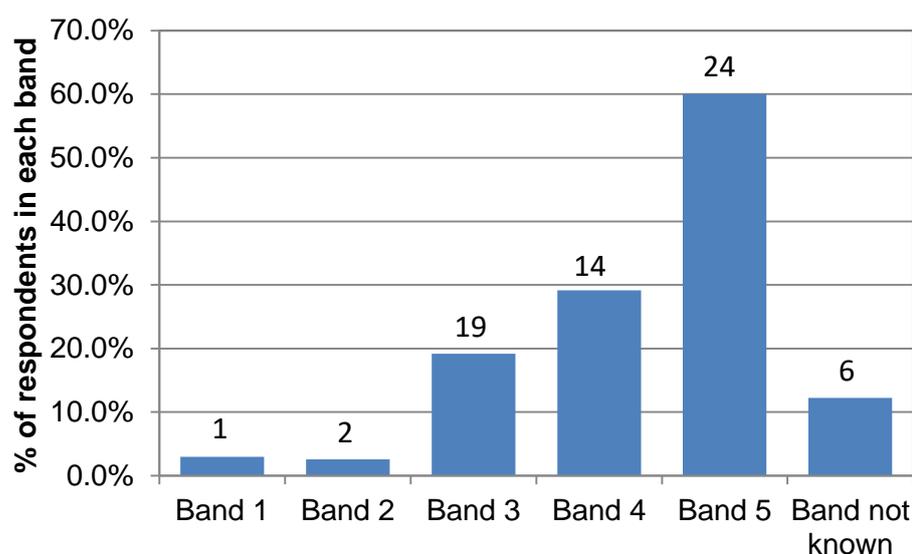
Table 31 GP/GP surgery level of understanding of Thalidomide damage

Response	Number	%
Fully understands	57	16%
Partly understands	136	39%
Doesn't understand	72	21%
Not sure/don't know	81	23%

6.4.3 Use of social care services

Sixty-six respondents (19%) were receiving local authority funded social care at the time of the survey. I looked at this group in more depth and found that respondents who lived alone, and therefore may have had less day-to-day help from family members, were more likely to be getting social care (25%) than those who lived with a partner or other family member (16%). As might be expected, the proportion of respondents receiving local authority social care increase with the severity of their impairment (see Figure 18).

Figure 18 Use of local authority social care by impairment band



Of those respondents receiving local authority funded social care, just over half (34/52%) said that the level of support they were getting was enough to meet their needs. However, 20 respondents (30%) said their care package had been reduced in the last five years and

of these 14 felt that their package was not enough to meet their needs. In addition, almost two thirds of respondents (40/60%) who received local authority funded social care were also paying for additional time or services from their own income, and three quarters (49/74%) thought they would need more support in the next five years.

Whilst the majority of respondents (282/81%) were not receiving local authority funded social care, almost two thirds of this group (181/64%) were buying support privately (e.g. personal assistance, help in the home, gardening, DIY). Nearly 20% (54) thought that they would need to apply for local authority funded social care in the next five years.

6.5 Health-Related Quality of Life

In the earlier sections of this chapter, I have looked at the socio-economic circumstances of Thalidomide survivors, the health problems they are experiencing and their use of health and social care services. I now go on to examine in some depth, their health-related quality of life, and reflect on how socio-economic factors, and secondary health problems might affect this. This includes a comparative analysis, in which the experience of Thalidomide survivors is contextualised in relation to broader population norms.

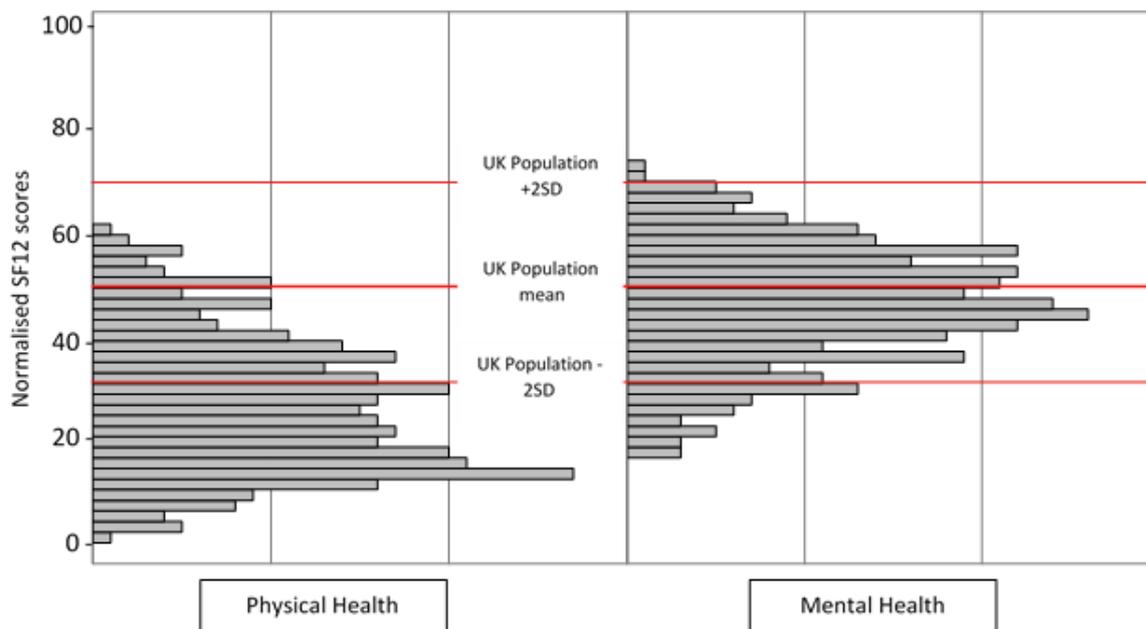
As I explain in Chapter 3, the SF12 Health Survey is a tool for measuring generic health status which is widely used in health research in the UK and internationally. SF12 consists of eight scaled sections (General Health; Pain; Physical Functioning; Role Limitation Physical; Mental Health; Role Limitation Emotional; Social Functioning; Vitality) which can be 'aggregated' into two domains – physical health-related quality of life and mental health-related quality of life. Here I present the findings for both the physical health and mental health domains. Of the 351 survey respondents, 335 returned SF12 questionnaires that were useable for the analysis¹⁸. Of these 285 gave their name and so I was able to link their SF12 scores to their 6(iv) b figures (level of impairment).

The results for the physical and mental health domains are presented in 'normalised form' i.e. the scores for the general population group are adjusted such that the mean is 50 and the standard deviation (i.e. the spread) is 10. This means that 96% of the population in the normalised general population group will have SF12 scores between 30 and 70 (+/- 2 standard deviations). This is simply a device to facilitate easy comparison between specific sub-groups and the general population. I decided to present the results in this way because in many respects the SF12 scores for Thalidomide survivors only become meaningful when they are set alongside the score for the general population of a similar age (45 to 54 years). Figure 19 shows the results for the survey respondents compared to

¹⁸ Questionnaires which were not been completed in full could not be used in the analysis.

the general population aged 45-54, based on responses to the Central England Healthy Life Survey (Jenkinson et al 1993).

Figure 19 Normalised SF-12 physical and mental health scores for survey respondents compared to UK population



In the physical health domain respondents had a markedly lower average aggregate score than the general population (i.e. a mean of 26.7 compared to 50) indicating that their physical health-related quality of life is much poorer. 59.7% (n = 200) of the respondents had a score below 30 i.e. the same as or worse than the 2% of the general population group with the poorest physical health-related quality of life, and only 7.5% (n = 25) of the respondents had a score above the average for the general population group. In the mental health domain the average aggregate score for respondents was 46.5, slightly lower than the general population (score 50). This suggests that on average Thalidomide survivors' mental health-related quality of life is only marginally poorer than their peers in the general population; indeed 40.9% of respondents (n = 137) had a score above the average for the general population. However, 10.7% (n = 36) had a score below 30 i.e. the same as or worse than the 2% of the general population with the poorest mental health-related quality of life.

Table 32 shows the component scores that make up the two domains. In the four components for the physical domain, perhaps not surprisingly, respondents had the lowest scores for Physical Functioning (20.9). Of the four sections that make up the mental health domain, respondents had the lowest score for Social Functioning (34.6).

Table 32 SF12 component scores for physical and mental health domains

Component	Mean	Min	Max
Physical Health Domain			
Physical Functioning (PF)	20.9	1.7	57.6
Role Limitation Physical (RP)	36.4	21.9	55
Pain (BP)	33.6	14.2	59.2
General Health (GH)	33.7	13.7	63.7
Mental Health Domain			
Vitality (VT)	40.4	21.3	68.2
Role Limitation Emotional (RE)	43.5	23.7	55.3
Social Functioning (SF)	34.6	2.0	55.5
Mental Health (MH)	40.7	7.4	64.5

These findings suggest that Thalidomide survivors experience significantly poorer physical health-related quality of life compared to the general population but their mental health-related quality of life was only marginally poorer than their peers in the general population. The findings are also consistent with a German study of 186 Thalidomide survivors in North Rhine Westphalia, which used SF36. Peters et al (2015) reported that Thalidomide survivors had a mean aggregate physical score of 29.6 and a mean aggregate mental health score of 47.8. A Swedish study of 31 Thalidomide survivors (Ghassemi Jahani et al 2016b) also found that their physical health-related quality of life was significantly lower than the general population, although their mental health-related quality of life was similar.

As well as comparing health-related quality of life with the general population norms, I also used the SF12 results to examine what might explain the variance in health-related quality of life among Thalidomide survivors. First I examined whether there was any relationship between health-related quality of life and gender, and then between health-related quality of life and level of impairment. Overall men had a higher mean score for physical health than women (28.6 compared to 24.7) and this difference was statistically significant ($t(327) = 2.567, p = 0.01$). Although women had a higher mental health score than men (47.8 compared to 45.1), this difference was not significant ($t(327) = -1.981, p = 0.05$).

For level of impairment, I found that there was a negative correlation ($r = -.276; p = .000$) between lower SF12 physical health scores and severity of impairment i.e. the more severe a respondent's Thalidomide damage, the poorer their physical health-related quality of life was likely to be. In contrast, when I examined the same relationship for

mental health-related quality of life, I found that the less severe a respondent's Thalidomide damage, the poorer their mental health-related quality of life was likely to be i.e. there was a positive (but weaker) correlation between lower SF12 mental health scores and less severe impairment ($r = .148$; $p = .012$).

The content analysis of the semi-structured interviews and the responses to the narrative questions in the survey, suggested that other factors, in particular being unable to work because of secondary health problems and living alone, could be important in explaining variance in both physical and mental health-related quality of life. To examine if this was the case I used hierarchical regression, using three sets of variables: original impairment level (as indicated by the number of impairment points) (step 1); being unable/ able to work and qualifications (step 2); and gender and living alone/living with others (step 3). Tables 33 and 34 show the results for SF12 physical and mental health scores.

The model predicting physical health-related quality of life was significant at: step 1— $F(1, 273) = 24.526$, $p < .001$; step 2— $F(3, 271) = 30.337$, $p < .001$; and step 3— $F(5, 269) = 19.396$, $p < .001$ (Table 33). These results show that together the five variables explained 25% of the variance in physical health-related quality of life. However, only three variables make a unique statistically significant contribution (i.e. $p = .05$ or less) to the model – a higher level of original impairment, being unable to work, and gender (being male), predicted poorer physical health-related quality of life, with being unable to work accounting for most of the variance.

Table 33 Hierarchical regression results for SF12 physical health related quality of life

Variable	B	SE B	B (95% CI)	Sig.
Impairment Level	- 0.194	0.063	-0.31, -0.07	0.002
Unable to Work	11.556	1.572	8.46, 14.65	0.000
Qualifications	- 0.184	0.290	-0.75, 0.38	0.526
Gender	- 3.207	1.471	-6.10, -0.31	0.030
Live Alone	- 0.343	1.755	-3.79, 3.11	0.845

NB: Step 1 Adj $R^2 = 0.079$; Step 2 Adj $R^2 = 0.243$, $\Delta R^2 = 0.169$; Step 3 Adj $R^2 = 0.251$, $\Delta R^2 = 0.014$

The model predicting mental health-related quality of life was significant at: step 1— $F(1, 273) = 5.348$, $p = .021$; step 2— $F(3, 271) = 7.514$, $p < .001$; and step 3— $F(5, 269) = 5.080$, $p < .001$ (Table 34). For mental health-related quality of life, the five variables explained just 7% of the variance, with only two variables – lower level of original impairment and being unable to work, making a unique statistically significant contribution to predicting poorer mental health-related quality of life.

Table 34 Hierarchical regression results for SF12 mental health related quality of life

Variable	B	SE B	B (95% CI)	Sig.
Impairment Level	0.190	0.060	0.07, 0.30	0.002
Unable to Work	5.026	1.497	2.07, 7.97	0.001
Qualifications	- 0.355	0.276	-0.89, 0.18	0.200
Gender	2.077	1.401	-0.68, 4.83	0.140
Live Alone	0.974	1.671	-2.31, 4.26	0.561

NB: Step 1 Adj $R^2 = 0.016$; Step 2 Adj $R^2 = 0.067$, $\Delta R^2 = 0.058$; Step 3 Adj $R^2 = 0.069$, $\Delta R^2 = 0.009$

Whilst the more severe a respondent's original Thalidomide damage, the poorer their physical health-related quality of life was likely to be, being unable to work accounted for most of the variance in SF12 scores. This suggests that secondary health problems and associated loss of function may be a far more important influence on physical health-related quality of life than original impairment alone. In relation to mental health-related quality of life, the narrative responses to the survey suggest that for Thalidomide survivors with lower levels of impairment, who have probably been actively employed for most of their lives, having to give up work (as opposed to choosing not to work) is having a detrimental effect on their mental wellbeing. However, the quantitative analysis showed that being unable to work accounted for just under 7% of the variance in SF12 scores, which implies that psychosocial factors, not explored in the survey, may be of more importance.

6.6 Mental Wellbeing

The content analysis of the semi-structured interviews, and anecdotal reports from the Thalidomide community suggested that some Thalidomide survivors were experiencing declining mental wellbeing. As part of the survey, I wanted to gauge the mental wellbeing of Thalidomide survivors, compared to the general population, and explore any relationship to severity of impairments and/or personal circumstances. To do this I used the Warwick Edinburgh Mental Wellbeing Scale (WEMWBS). WEMWBS was developed to capture the broad concept of positive mental wellbeing. It has a long form with 14 questions and a short form with seven (SWEMWBS), which is the one used in the survey. The reasons for choosing this instrument are discussed in Chapter 3. Respondents were asked to rate each of seven statements against a five-point scale – 'None of the time', 'Rarely', 'Some of the time', 'Often', 'All of the time' – where 'None of the time' = 1 and 'All of the time' = 5. So, for SWEMWBS the minimum score is seven and the maximum score is 35. The seven statements are:

- I've been feeling optimistic about the future
- I've been feeling useful
- I've been feeling relaxed
- I've been dealing with problems well
- I've been thinking clearly
- I've been feeling close to other people
- I've been able to make up my own mind about things.

To compare SWEMWBS results with WEMWBS data from the Health Survey for England 2016, the scores have to be 'transformed' (i.e. weighted and then doubled). It is these weighted scores I use here. The comparison (for those aged 45 to 54) shows that for both men and women Thalidomide survivors have a lower mean scores (43.2 and 44 respectively) than the national means for England of 49.5 and 48.6 respectively (NHS Digital 2016). There was no obvious relationship between mean mental wellbeing score and impairment band. There are no hard and fast rules for interpreting WEMWBS, but guidance provided by Warwick Medical School (2018) suggests that a score of 40 and below corresponded to probable depression and they note that NHS Direct have adopted this cut of as indicating low mental wellbeing. Overall, 41.3% (n=140) of the survey respondents fell in the low mental wellbeing group. The Health Survey for England 2016 also showed that in the 45 to 54 age group, 10% of the population (i.e. the 10th centile) had a score of 38 or below (NHS Digital 2016). For Thalidomide survivors, 35% had a score of 38 or below. Moreover, for those respondents who said that they were unable to work, 51% had a score of 38 or below.

As I note in Chapter 3, the main purpose in using this tool was to provide a baseline for future Thalidomide Trust surveys. However, the results, which show some marked differences, also help to set the mental wellbeing of Thalidomide survivors in the context of the general population.

6.7 Concerns for the Future

At the end of the survey, there was a free text box where respondents could make comments, or provide more information on any topic. Ninety-eight respondents added comments and many of these reflected their concerns for the future. I undertook a very simple thematic analysis of these comments. They need to be treated with some caution, as in the context of a quantitative survey narrative comments may not be representative of respondents as a whole. Nevertheless, I briefly present the results here because they vividly illustrate how health problems are affecting both Thalidomide survivors' daily lives

now and their outlook for the future. They also provide an early indication of a number of important issues, which I explore much more fully in Chapter 7.

It is clear that physical health was the major area of concern for the vast majority of respondents. This was reflected in the comments, which ranged from concerns about deterioration in general health, either now or in the future, to specific health problems:

“Health-wise, I feel at the moment I am in between feeling quite well and potentially deteriorating quite quickly. I could stay at this level of health for the next 20 years or so but equally all it would take is for a few physical problems to occur and my health and way of life both domestically and socially would change forever.” Survey ID70

“As a result of doing everything with my only arm I have multiple RSIs, trapped nerves in my neck and shoulder and have lost some dexterity and experience numbness in my hand. I have been told that this won't improve and have had to stop doing a lot of everyday general activities about the house. There is the possibility that I will completely lose the use of my arm but there's no way to predict when.” Survey ID276

Many of the health problems beneficiaries mentioned were causing progressive loss of function and it was the implications of this for independence and family relationships that caused concern:

“My only normal hand is deteriorating badly. I've had 3 operations on it, they can't do anything more. I'm in pain with it nearly all the time. I can't do hardly anything for myself now. I'm terrified. I'm only 55 – how much worse is it going to get? Having one hand I was never disabled but I am now. Luckily I have fantastic children who all automatically do everything for me that's needed. They cut my food up, do up my buttons, zips, and laces, and are amazing but I don't want to be a burden to them. Losing your independence is soul destroying.” (Survey ID307)

A number of beneficiaries described wider fears about coping and loss of identity or self-esteem, if their health declined further:

“This past few years my health has declined, my anxiety is more and I worry about coping. I physically struggle more with daily life. I don't like talking about not being able to cope or asking for help. Hate having to rely on people. Simple things I used to do I can no longer do. It makes me feel a burden and useless at times.” Survey ID126

“From being a fully employed, independent active and optimistic person, I am becoming isolated and cut off from work and family. I may have to consider moving back to the UK in 5-10 years’ time, which would negatively affect my marriage and wider life. Any serious health concerns – diabetes, cancers etc. – will be both difficult and painful to manage. Perhaps more than anything I dread the prospect of going blind. While I am endeavouring to remain active and positive and have received huge support from family, friends and Thalidomiders (social media is invaluable) at times, I feel my sense of myself as a person is under siege.” Survey ID265

Deterioration in physical health and loss of independence were, for many respondents, intertwined with their emotional health, and their comments highlighted this. For some, worries about emotional health resulted from a lifetime of dealing with physical impairment, whilst for others it arose from recent problems or events:

“Everything in life is and always has been a compromise from the type of property I live in to what I may prefer in clothes, social activities, holidays, or helping with grandchildren. All aspects of life are a compromise between what I would like and what my disability allows. Emotionally, psychologically, physically this is impacting far more as I age. A combination of deteriorating health/ability and [the] realisation of the freedom of choice my peers have.” Survey ID132

“In the last few years I have noticed a huge deterioration in my everyday needs and emotional wellbeing. This has made me suffer with deep anxiety and panic attacks. I do feel safe and secure when in my own home [but] cannot cope with busy environments at all these days... [since] I had a serious fall...which left me with very little confidence and scared of falling again.” Survey ID80

A number of respondents highlighted their growing need for personal assistance and help in the home. Some beneficiaries found it hard to come to terms with this in relation to their independence and personal privacy.

“I am very independent...but I find it harder to manage. The big dilemma is how to maintain independence or how to manage help or minimize it because I don't mind one-off visits e.g. for garden or handyman jobs but regular cleaning etc. I don't like. It feels like an interference and I like my space.” Survey ID192

Respondents’ comments about personal assistance and help in the home often overlapped with comments about support from family members and fears about this changing in the future.

“Because I live with my partner, I feel relatively secure. This year he had a cancer scare and though his results were negative I came face to face with the precariousness of my living arrangement. I would be in a disastrous situation if anything happened to him. I rely on him 100%.” Survey ID85

“What happens to me when my parents are no longer alive?” Survey ID133

Running through many of these comments is a common thread, namely that some Thalidomide survivors feel their current way of life was vulnerable, even precarious.

6.8 Summary

Given the substantial range and depth of the material presented in this chapter, it is perhaps helpful to briefly summarise the main findings. The survey respondents were highly representative of all UK Thalidomide survivors in terms of gender, country of residence and level of impairment, although there were some differences in relation to the nature of respondents' impairment. In particular, Thalidomide survivors with visual impairment were under-represented. The educational qualifications of respondents was broadly similar to that of the general population of a similar age, but their work situation was radically different with almost half reporting that they were unable to work or had to work part-time, because of their disability or health problems.

Musculoskeletal conditions and mental health problems were the two most frequently self-reported health problems, but generalised pain and multimorbidity were also common. Compared to the general population of a similar age, a higher proportion of respondents had undergone joint surgery. Only half of those reporting mental health problems had received treatment for these problems. In relation to health-related quality of life (as measured by the SF12 Health Survey), respondents had much poorer physical health-related quality of life than the general population of a similar age but their mental health-related quality of life was only marginally poorer. Further statistical analysis, which showed that poor physical health-related quality of life was associated with severity of original impairment and being unable to work, led me to conclude that secondary health problems and associated loss of function may be a far more important influence on physical health-related quality of life than original impairment alone. Those respondents who reported being unable to work were also likely to have poorer mental health-related quality of life and low mental wellbeing (as measured by SWEMWBS).

Lastly, the comments that respondents added in the free text box at the end of the survey, remind us that the health problems Thalidomide survivors are experiencing are being layered onto a lifetime of living with disability and this has profound and complex implications. I explore these issues in greater depth in the next chapter.

Chapter 7 Changing Lives: Secondary Analysis of the Interviews

In Chapter 5 *Changing Health*, I began to scope the type and nature of the health problems that Thalidomide survivors are experiencing as they grow older. Descriptive analysis enabled me to identify the main 'groups' of health problems, whilst content analysis helped me gauge the relative importance of the health problems discussed in the interviews. This initial analysis informed the development of the health and wellbeing survey, which has determined the prevalence of these health problems and provided insights into how deteriorating health is affecting the quality of life of Thalidomide survivors. This final results chapter presents the findings of the secondary analysis of interview data, which were much richer than originally anticipated, with participants talking in some depth about the impact that secondary health problems were having on them, physically and mentally. This enabled me to understand how their lives were changing in response to deteriorating health, and develop conceptual constructs consistent with the principles of grounded theory.

As I describe in Chapter 3, I set the initial content analysis aside, and reanalysed the interview transcripts using a grounded theory approach. From the initial and focused codes, seven conceptual categories emerged. In this chapter I describe what is encompassed by each of these conceptual categories and the relationships between the categories. I present them in the order that seemed most logical and informative but in reality the categories overlap and intersect. Some categories influence or provide context for others and occasionally they throw up contradictions but collectively they show how, in their own different ways, Thalidomide survivors are adapting and changing their lives as they age. As in Chapter 5, I use quotations from participants to bring the conceptual categories to life and illustrate themes within them. The names shown are pseudonyms.

7.1 Shifting Impairment

The initial analysis of the interviews highlighted the health problems Thalidomide survivors are experiencing as they grow older. The Health and Wellbeing Survey (Chapter 6) provided further evidence about the prevalence of these health problems. Together they show that whilst TE is non-progressive, the impairments it caused are not static.

Thalidomide survivors are experiencing *shifting impairment*. This makes them especially conscious of managing future uncertainty, which in turn makes them more aware of the importance of independence

In the initial analysis of my interviews, I identified three perceived root causes of peoples' Thalidomide related health problems. The first was that some problems were directly linked to peoples' original Thalidomide damage. This encompassed both deterioration of known damage (e.g. in eye sight or a heart condition) but also the emergence of newly recognised damage (e.g. a missing kidney) or an increased understanding of the extent of known damage (e.g. the nature of malformed joints). The second and perhaps the most common root cause was secondary damage or premature wear and tear caused by the ways in which people have had to use their bodies to compensate for their impairments. The third root cause was accidents and injuries, where these had occurred as a result of existing impairments (e.g. falls linked to mobility, balance or sight problems). All three of these root causes, but particularly the first two, are central to this shifting impairment. Below I explore Thalidomide survivors experiences of shifting impairment, including how they talked about this change, the implications for their functioning and mobility and, for some, the heightened sense of 'being disabled' that it engendered.

A number of people described how deterioration in known damage was affecting their health and functioning. Fiona explained that she was born with a hole in her heart and had operations as a child to repair a valve. However, in recent years she had required further treatment: *"In the last 3 years it needed replacing altogether and I had a new valve fitted in 2011. That was major surgery again"*. More commonly people talked about deteriorating eyesight or hearing resulting from the original damage to their eyes or ears, whilst a few people touched on other issues such as long standing bladder and bowel problems becoming worse. For example, in talking about his reluctance to take pain medication, Gary mentioned that this was linked to concerns about his bowel problems: *"Such medication will only serve to irritate or exacerbate my existing stomach and intestinal abnormalities which are already beginning to cause related bowel issues"*. Others described how the process of seeking diagnosis and treatment for health problems revealed the extent of their Thalidomide damage. Linda, who described herself as *"one of the least disabled out of all of us"* developed severe pain and a lump on her wrist from pushing wheelchairs as part of her work. She explained:

"...they said they thought it was carpal tunnel but they'd never seen anybody's hands like mine, and could they do X-rays. When it came back, I did find a lot of things out and one of the things I found out was there was only one blood supply into my hand and everybody has two". Linda

Several participants had sought treatment because deterioration in existing impairments was causing severe pain and/or loss of function but were often unsure about whether to proceed. There was a real fear that addressing one problem might create new and

different problems. Amy explained that she has one leg slightly longer than the other, so her foot turns over to compensate and she suspects that her hips “aren’t made properly either”. In recent years her limp has become more pronounced and she is getting pain in her knee and hip.

“I think I need to go and have some things put into my shoes to stop my left foot turning because I think that would help. I think the difficulty is that I’m quite worried that if I redress that balance, and skew everything back, it’s going to put everything else out. Because I’ve been walking like this for so long, because that’s the way I reach for things and that’s the way I do things.... but the worry is then that if I skew everything back and make it all straight, it’s going to cause more problems”. Amy

The choice was even starker for those being offered surgical treatments. This issue is discussed more fully in Section 7.5 Taking Control of Own Health. However, it is useful to note here that whilst for some, surgical treatments had relieved the symptoms they were experiencing with no permanent loss of function, for others it led to a significant shift in their impairment. Jim had been experiencing severe pain in his shoulders and arms for about ten years. Diagnostic scans showed major deterioration in his shoulder joints and so he decided to have both shoulder joints replaced. However, whilst the operations had taken away the pain, his movement had become much more restricted, and the procedures also had unexpected and major ‘knock on’ consequences for his health and level of impairment, as the extract from his interview reveals:

“When I had my shoulders and that done, something happened to my back. What it was, I’d been stooping because my shoulders were broke. I was stooping a little bit and of course I’d got a humped back. The thing is, what happened to my back – the spine straightened itself and - it took over 2 years – [I was] getting taller and taller...But something bad happened. I was having all these headaches and that and I went to the hospital – neurology hospital – in London and they gave me an angiogram and they found out that the blood was coming up the spine but it wasn’t going to the places it should be going to...they had to do it [an operation] straight away and I was on the verge of a haemorrhage....I mean I was lucky...they explained to me that, because of the complications, I could die and I could never walk again. But it had to be done to get the blood going to the right places. And it was all good but the only thing that happened was I had a stroke under the anaesthetic – yes – my left leg is completely numb. This is the worst thing that’s come out of it. My left leg is completely numb and I’m walking on it but it’s not getting any better and it’s dragging a bit, if you see what I mean. So it’ll get better

one day, the nerves might come back but I can't see it myself. But I was lucky – I was so lucky really if you think about it. But I mean that's what happens - there are other sides to things – but this is all to do with the Thalidomide anyway. It was my fault. I mean, I wanted to do things in my shoulders and I didn't think that would happen to my back and it did, so it was all down to me, and I'll never blame anybody at all....My own health is all right, it's my arms – I just can't use them, and my legs". Jim

For a few participants the emergence of newly recognised damage, coupled with deterioration, was leading to significant changes in the nature of their impairment. Carol described how she only discovered that she had a hole in her pelvis, when she broke it about 15 years ago. She then went on to talk about her decision to stop using her artificial legs:

"I used artificial legs up to 10 years ago and then I had to give them up because they were causing me so much pain. Getting infections in my stump ends – cellulitis – which was quite bad. I'm now in a wheelchair all the time." Carol

Helen, another lower limb affected Thalidomide survivor had taken a similar decision because of the back pain and fatigue caused by using her artificial legs. The change from walking with artificial legs to becoming a wheelchair user is a very visible manifestation of shifting impairment. It might also be seen as 'worsening impairment'. However, ultimately both Carol and Helen saw this change as positive because they felt better physically and were in many ways more mobile:

"When I was younger, a child, I walked around with nothing – no sticks or crutches or anything. Probably in the early 1990s, I started using crutches because of my back, and over a period of time I used the chair more and more, so it would be 1999 when I completely gave up my limbs and I found I was more mobile without them on – without using them. I just said 'It's easier to get round in a wheelchair'."

Helen

The overwhelming majority of Thalidomide survivors perceived their shifting impairment as being directly linked to the ways in which they have use their bodies to cope with or compensate, for their original impairments. However, they made sense of this change in different ways and their response to it also varied. Some people appeared relatively sanguine about the problems they were experiencing, and described them in quite matter of fact terms:

"Because I've had problems with me right leg, me left leg's done all the donkey work and it's now basically saying 'I've had enough' and I've had problems with me

left knee, left hip. I've always had problems with basically me spine, just general wear and tear." Tom

For those with more severe damage in particular, there was a sense that the deterioration was inevitable, given the nature of their original impairments. Fiona simply talked about *"using our legs for things they weren't designed for"*, whilst Alex explained that he has no arms and uses his legs to do everything, leading to problems in his lower back and hips. Similarly, Alan, a lower limb affected Thalidomide survivor was told that the arthritis in his spine was probably the result of the way he was pushing himself in his wheelchair. He commented: *"There's no other way I can push myself, other than not pushing myself at all, which isn't really an option"*.

Many participants described in some detail the unusual ways in which they had to use their bodies and speculated on the secondary damage this may have caused. Often they illustrated this by talking about everyday activities:

"I would have to say it's the pain in my joints, especially now I'm finding it in my feet as well because I would use my feet for turning on and off plugs instead of bending down, and then of course my fingers with typing and you know getting dressed...and then my teeth. Obviously you use hands for pegging out clothes, well I use my teeth to hold clothes to the pegs. Things like that, or opening a bottle or water or juice or something like that because you wouldn't have the power in your hands to do that anymore. So your teeth have taken wear and tear which I think people forget about". Joyce

"My right foot is my useful foot where I have a lot of dexterity in the toes. It's the one for picking up things, picking things up off the floor and putting them onto surfaces, in reach of my hands, and things like that. I use that foot for filling the washing machine, and taking the clothes out of the washing machine and things like that, so it's actually now having quite a big effect on me. And because that leg is going bad, it's affecting my balance and walking is not so good". Moira

When participants talked about the everyday activities they could no longer manage, or could only manage with aids or support, they were, in effect, talking about how their impairment had shifted. As such, everyday activities had become the barometer by which they measured the changes in their impairment, often comparing what they could do when they were younger and what they could do now:

"I have experienced deterioration in my arms and hands over the last ten fifteen years. My fingers are not as flexible and my arms haven't got as much movement, so things that I could have done ten fifteen years ago I can't do now. I mean from a

personal care point of view, like being able to wipe ones bottom and that type of thing, I can't bend anymore. I can't do that for myself. I have to rely on my Clos-o-mat toilet or I have a disability aid which is like a tissue holder that I can use.

Whereas before, I was flexible enough that I could have managed that sort of thing myself but I definitely can't do that now". Tracy

For some participants, the 'unpicking' of how they used their bodies was perhaps a way of understanding or even reconciling themselves to shifting impairment. In trying to make sense of the loss of strength in his arms, Malcolm reflected: *"I'm trying to over-reach – trying to...adapt to the problem. I think my arm, because it's not wanting to do that, I think my shoulders are trying to compensate for it, so therefore it's hurting my shoulders and my neck"*. For others it also appeared to be about developing strategies or taking steps to reduce further loss of function (these efforts to preserve function are discussed in greater depth in Section 7.2). This latter group were more likely to use quasi medical words and phrases such as 'overuse', or 'over compensate' and 'right/left side dominance'. For example Moira, who in the quotation above described the loss of function in her 'useful' right foot, went on to say:

"It is all part of the overuse syndrome, and I think in my case, and I would imagine other Thalidomiders like this, I'm very right side dominant in terms of my right arm and right leg being the ones I've always used to do things. They are wearing out quicker than the left side. So I'm having to try and adapt, to train my left foot to start doing the kind of work my right foot used to do". Moira

Amongst participants whose original impairments were less severe, deterioration in their function or mobility often engendered a new or heightened sense of 'being disabled'.

Participants like Linda talked about the emotional reaction:

"I was really worried because I've always tried to be the same as everybody else. That's emotionally how it's affected me because even when you were at school when you were younger and things like that, I never wanted to be different, so try to over-compensate. So when something started to go wrong, and you start to think 'Oh, no – I'm not going to be able to do this anymore"'. Linda

Others talked about the practical implications. For some, relatively minor shifts in impairment had led to them feeling more 'disabled' by their environment. For example Amy explained that she was finding it increasingly difficult to manage things like door handles, keys and ticket machine: *"I often go places and think actually, I can't go to the toilet here cos its round door handles and if I go in, I'm not going to be able to get out again"*. Others talked about accepting bureaucratic indicators of 'disability'. Ann described

how loss of earnings (due to sickness absence from work) and mobility problems had led her to apply for Disability Living Allowance and a Blue Badge.

“I finally got a blue badge about a couple of years ago...I never needed it before but now with the bad back....Well, a couple of years, I wasn't able to walk – I needed to park near things...so the Blue Badge has been helpful and the Disability [Living Allowance] thingy I've never had that before”. Ann

In concluding this section, it is perhaps helpful to touch on two other aspects of shifting impairment which had a strong relationship to other conceptual categories. The first is that alongside participants actual deterioration in their function or mobility, was a fear of further deterioration. This inevitably led participants to think about ways of preserving their function, which was in turn linked to attitudes to independence and access to financial resources. The other is the 'life course' aspect to shifting impairment, which was clearly linked to Thalidomide survivors' broader experience of ageing. A few participants didn't really perceive that their impairments had shifted but rather their ability to cope with them had changed, as they aged. More commonly people struggled to disentangle the deterioration they were experiencing from 'normal' age related changes. This reflects the fact that shifting impairment really assumes meaning when set in the context of the life course and normative assumptions about ageing.

7.2 Preserving Function

Coming to terms with the loss of function caused by shifting impairment was often hard and involved both psychological and physical adjustments. Not surprisingly, it had a major impact on some participants' mental wellbeing and I discuss this further in Section 7.5. However, many participants also talked about the practical steps they were taking to try and preserve the function they still had. For some this process began with a change in their mindset, which was in part driven by the fear of what further deterioration would mean for their daily lives:

“When you've always done it, and you suddenly can't do it, it's very frustrating. I'll be honest, it's one of the things – it took me a while to be able to say 'Well, you can't do it, so you'd better just stop messing around and just get on and let somebody else do it. You cannot do this'. It did take a while to let that sink in...it's stupid because you're just going to deteriorate. If you don't do something about it now, what are you going to be like in 10 years' time?” Linda

Like Linda, many participants acknowledged that it had taken time for them to recognise that they needed to change aspects of their lives, both big and small, in order to preserve their bodies. A few, especially those with lower levels of damage who tended to be less

connected to the Thalidomide community, almost had to begin by acknowledging their disability, so that they could then seek advice about what to do.

“I just need to know where to go – obvious I think for the future...I think adaptations is what I need to do, but I really don’t know what would be appropriate, or what would help, or where to go...I really need information and also to try things out. I don’t move in the world of disability – I know that sounds really weird but I don’t move in that world. I don’t know much about it, so I try and function just the same as everybody else and probably need to step into a new way of thinking really.” Jenny

A few participants were particularly proactive in their efforts to preserve their function, perhaps in a more explicit attempt to gain some control over what was happening to them. Interestingly they were sometimes critical of other Thalidomide survivors who they felt were not making the effort to help themselves – a view that perhaps mirrors some of the argument in public health around the role of the individual in promoting or preserving their own health: *“We really need to keep our bodies functioning...but some people are just not interested. They’ll lie on their couch and stuff themselves with cream cakes and worry about tomorrow when they can’t get off the couch”* (Amanda. However, the majority of participants were trying to preserve their functioning in a variety of ways. The approach they chose was in part determined by the nature of their impairments and associated physical needs but family circumstances, the acceptability of different strategies (e.g. aids and adaptations versus personal assistance) and resources also played a part.

Although many Thalidomide survivors, especially those with severe damage, have always had help with daily living, often some or all of this help was provided by family members. Changing family circumstances sometimes meant that in order to preserve their function (and maintain their independence) a number were now having to buy in help, as Beth explained: *“I’ve had to give in and get a gardener in, because we have a garden, and I can’t cope with it. It’s not fair asking my sister and brother-in-law to do it. Their health’s not 100% either.”* Others were putting more support in place in anticipation of adult children leaving home or ageing parents no longer being able to help them:

“I’m paying for a lot more help, an awful lot more help. I do not do things that are going to put a strain on me...when you’ve been in so much pain and you can have a quality of life ...it’s a bitter pill but I’m very fortunate that my eldest daughter is still at home at nearly thirty. She will have to go. I’m almost going to have to push her away. But of course she’s my main help in the house but things will change.”
Karen

Many simply saw accepting more help from family and friends or buying in help with domestic tasks as one of the most practical ways of reducing the strain on their bodies. Rowena, who described herself as *"fiercely independent"* when she was young, reflected that she was now accepting more help around the house from her husband and son in an effort to avoid further deterioration in her arms and hands. As the quotation from Karen above implies, preserving function was also intertwined with avoiding or reducing pain, in part because pain was often seen as a 'marker' of deterioration. For example Alan, who is a wheelchair user explained that because of arthritis in his spine and pain in his hands, he has accepted his PA pushing his wheelchair when he is away from home for long periods. Tom put it very clearly:

"Truthfully, I think there's a lot of us who are, are starting to turn round and have the attitude it's easier if somebody helps, it's easier if somebody does it; to a certain extent, it could possibly make you look a bit lazy, but being a bit lazy and pain free is, is a lot easier than being in pain." Tom

However, others were reluctant to accept help, or at least help from outside the family. Carol, who has grown up children nearby said that she has always been happy to ask them for help but she is now reluctantly contemplating getting help with cleaning:

"Yes, I'll probably hire a cleaner, once a week or twice a week...When I Hoover I Hoover on my knees. I balance where my stump is and just Hoover, you know what I mean. At some point I'll have to stop doing that because it's how my knee got damaged in the first place." Carol

A few were finding having help in the home from strangers very difficult. Jenny described her feelings about privacy and dependence: *"I've had cleaners and I've found that really difficult. I really don't like having people in my house. It's all very personal – I just hate it"*. She went on to say: *"I really don't want to be dependent on people. You know, when I stopped the cleaner, I felt – I know there's a cost to it in time and the stress on my hands but gosh – I felt so good"*.

As the Health and Wellbeing survey results showed, a significant proportion of Thalidomide survivors saw giving up work or reducing their working hours as one of the most beneficial things they could do to preserve their function. Rick was experiencing back and neck problems and an assessment from his employer's occupational health doctor showed that these problems were being exacerbated by office tasks such as using a computer and answering the phone. Rick said: *"Since I gave up work, the day-to-day issues, a lot of them have gone away because, as I say, there was a lot of keyboard use and stuff like that, in an office environment"*. The extract from Alex's interview below,

reveals that peoples reasons for giving up work were often mixed but at the core was a desire to preserve their functioning:

“It was a bit about family – I’ve got quite a young family, who actually quite like to do family things really – it’s quite nice. And because I’m in a position where I can – my wife works and she’s got a reasonable job – so from the finance point of view, it was doable. But there was also the issue of ‘It’s actually getting quite hard, this’ – having to carry lots of things – finding that quite hard work. I mean, the employer was as..... they do their best, don’t they? They say ‘OK, how can we fit this in?’ They got the Access to Work people involved, got me a motorised desk and this, that and the other. But at the end of the day, you’re still having to put the effort in, you’re still having to do things with your feet and legs. The job I had was in was in Adult Care – an Adult Social Services role. I was going out, giving people advice about various things. I was seeing people with disabilities myself who had left it too late. These were people who were maybe in their 60s and 70s [who had said] ‘Oh, I’ll do it when I retire...When I retire, I’m going to do that’. Something happened – their health deteriorates, a road traffic accident, or whatever it is, and now they can’t do it. That was in my mind as well. I was thinking, ‘Well, if I keep going like this, by the time I’m 60, I could just...I might be worse’. At the time, it felt that it was actually quite a big possibility – that’s not just a random, nonsense type of thing people say. It could happen. So I made that decision – quit while I’m ahead.” Alex

Several participants explained that for them, it wasn’t just the strain their actual job placed on them, it was everything surrounding working, from getting up and dressed, to travelling to work, to unsympathetic employers. Ben, who has a prosthetic leg, described how commuting to work by train (e.g. lifts not working, walking long distances, crowds etc.) had become increasingly difficult after major problems with his ‘good’ leg: *“I thought to myself, well, I don’t want to put any more strain on my right leg, so I made the decision to give up on that basis because I just didn’t want to damage myself any more”*. Ben’s and Alex’s comments suggest that some participants were not just trying to preserve function within the current framework of their lives, they were actually prioritizing function and in so doing changing aspects of their lives quite significantly.

Conversely, a few participants were keen to continue working, albeit usually part time. Sometimes the motivation was financial but often it was because people enjoyed their work and/or valued the social contact it provided. Although some participants had bad experiences with employers, several said that their employer (and work colleagues) had made changes to their working environment so that they could continue working without

putting a strain on their bodies. Others were buying in more help at home or from workplace personal assistants so that they could keep working: *“I’ve worked hard at my job and yes it’s a very important part of my life. It’s financial too. I’m a single parent with two children – I’ve got to work”* (Penny).

It was clear that the introduction of the Health Grant had been a factor in some participants deciding to give up work or reduce their working hours, in effect using their Health Grant to offset loss of income. As such, it gave them the choice or at least the perception of choice about whether to work or not. However, the Health Grant also made it more possible for people to use home adaptations and equipment to help preserve their function. For most participants, especially those with upper limb damage, the adaptations to their homes that made the most difference were kitchens and bathrooms, as the quotations below illustrate:

“Currently my husband is putting in a kitchen, which is a thing I’ve wanted for absolutely years and finally we just said that’s what we need to do for myself so that I can access the cupboards...It’s going to be my own space with a work surface at a level that I can lean on and I’m having everything made so that I don’t have to stretch”. Joyce

“We decided to put in a shower – a wet room – that’s the word I’m looking for. But basically, it’s a shower.... it’s a bit like when you go into a swimming pool, the shower rooms that you go in, and everything’s tiled, so there’s more space for me to move about. I can sit on the floor. I can wash myself as best I can. For the areas where I’m not able to wash myself, my wife will come in and help out, so there’s room for two of us”. Alex

Many participants were also making more minor adaptations to their homes and these often made a significant difference to their daily lives. The most common minor adaptations were things like changing taps, door handles and locks to make them easier to use but also fitting new windows. The quotation below vividly illustrates this point:

“I have done another door with the automatic blipper. We live in an old house and all the handles are quite low and I’d been going down on my knees to try and turn the key. Now I’ve got this blipper...my wrist doesn’t work like your wrist. I can’t do Yale locks. We had the Chubb ones and I can just about do those at a push. So this is amazing – you just have this little blipper that you take with you. It cost a lot of money but I use it every day of my life”. Karen

Alongside physical adaptations to their homes, most participants were making a range of small changes in their daily lives, all with the aim of making life easier and so preserving

function. Often they were things that anyone might do such as online supermarket shopping or using taxis more frequently but sometime they were more unusual e.g. electric curtains or bespoke pieces of equipment such as dressing stations. Participants also talked about changing their routines or ‘pacing’ themselves or just being more careful about what and when they did things. Several participants, like Tessa, explained that they tried to do tasks in the morning or when they had more energy: *“I’m quite all right first thing in the morning, and I whizz through everything, but as the day goes on, I get tired quicker obviously, so I do try and do what I can when I can”*. For others it was about generally slowing the pace of life or interspersing busy or working days with ‘rest’ days. Importantly many participants saw all these adaptations and changes as a progressive – something that they would continually have to revisit as their impairments shifted and they aged. Alison described her thoughts about this:

“As you’re getting older, you’re thinking ‘Oh, that used to work but this doesn’t work anymore’. So as time goes on you’re constantly adapting. I mean before we know it, the 10 years [of the Health Grant] will be up and we’ll probably be at a completely different stage again... it’s kind of like a rolling programme because something that worked 5 years ago, or 10 years ago, may need further change”.

Alison

Whilst preserving function was a distinct conceptual category, the approaches participants were using to achieve this often overlapped with efforts to maintain their independence or rethink what independence looked like for them at this point in their lives. Money also played an important part in creating choice and facilitating what people did. I discuss how money mattered in section 7.4.

7.3 Rethinking Independence

For Thalidomide survivors, like all of us, independence is a relative concept but how they thought about their independence was complex and nuanced. They judged it relative to both their peers in the general population and in the Thalidomide community but also to their younger selves – perhaps something that few people in their 50’s would do. Their feelings about it were influenced not only by the extent to which they had used help throughout their lives but also by the type of help they needed and who (or what) provided that help. Furthermore, as they age and their impairments shift, many Thalidomide survivors are having to rethink what independence means for them, which often brought with it a sense of uncertainty about what the future might hold. However, the start point for them rethinking independence is slightly unusual. Thalidomide survivors have a strong group identity, which was revealed by participants’ use of ‘we’ and ‘us’ rather than ‘I’ when

talking about their attitudes towards independence, even seeing certain personally traits as common to the group:

“We’re quite stubborn. I don’t think we mean to be. But sometimes if I’m speaking to people and you do a sort of self-appraisal of yourself, and you think ‘yes, I am quite stubborn actually’. But it’s because you want to show the world that ‘yes, I’ve got quite a disability, but I’m as independent as I can be”. Alex

For many participants, independence appeared to be intimately linked to both their individual identity and that of the group, and they feared that accepting more help (and so in their eyes becoming less independent), would somehow change who they were.

“I think it’s something that’s just coming upon us now because I think so many of us have been so independent. So you know, we met our husbands, we were completely independent, the same as everyone else, we’ve had our children, we’ve brought our children up – we’ve been very independent – and for us now to start finding we can’t do things, it’s changing the person we are...if you start becoming somebody who needs help all the time, then you’re different to who you have been. Does that make sense?” Amy

Some participants felt this group identity, perhaps reinforced by public perceptions, had a negative side, making it harder for people accept that they may need to change how they lived. As Carol put it:

“I think people have always been made to do stuff or to feel that they should do certain stuff and if they don’t they’re a bit of a looser or have given up but they haven’t, it’s just that you have to make lifestyle choices”. Carol

In section 7.1 *Shifting Impairment* I explained that participants often used their ability to carry out everyday activities as a measure of how their impairment had shifted. Similarly, in relation to independence, people compared what they could do now (unaided) with what they could do when they were younger. Over the years people had developed ‘work arounds’ to enable them to do tasks themselves but increasingly they were finding that these no longer worked.

“There are certain things I can’t do now that I used to be able to do, like I used to be able to unload the dishwasher but I can’t do that...Lifting heavy stuff – I can’t do that...things like washing my hair. I do do that but I find it a bit harder, and washing the top of my head a bit harder still but I find things to use to compensate in that respect. It doesn’t always work very well but at least it does it”. Tessa

As a result many participants were making greater use of aids and equipment (e.g. wash and dry toilets) or were modifying aids they already had (e.g. dressing stations), and/or making adaptations to their homes, in particular kitchens and bathrooms. This was partly to preserve their function (see section 7.2 above) but also so that in their own environment they were as independent as possible. It was often when people were away from home that their independence felt most fragile.

“It’s more when we go away or out anywhere else because I think you mould your own environment round yourself, don’t you? So you can manage where you are but when you’re away in a different environment, then that’s a bit tricky”. Isobel

Even in these situations people were rethinking independence and finding new strategies. For example, Robbie travels to London regularly and so he found a London based personal assistant (PA) who assists him when he is there. Simon takes a portable bidet with him when he travels and Martin has his trousers altered:

“I like smart trousers and now I’ve found a guy who will elasticate them and put little hoops on them so that I can pull them on and off myself. It’s all right getting my wife to help but if I’m out at a meeting somewhere and I need the loo I’ve got to be able to do it myself”. Martin

However, even with aids and adaptations, as I discussed in *Preserving Function*, for many people there was a continuing tension between doing things for themselves and knowing that if they did they would be in pain or excessively tired or even cause further damage i.e. there was a ‘physical price’ for independence. Participants talked about how gradually they were having to accept they needed more help. Clearly some, like Kathleen, still found it hard: *“It was having to admit that I needed more help than I realised and I can’t do everything I think I can, as my daughter keeps pointing out. Just using the term ‘I can’t’ sticks in my throat”.* Others like Karen, were more philosophical: *“We’ve all gone through the ‘I cans’. We’ve proved it to ourselves that we can and now its hang on, what can I do to make life easy”.*

The majority of participants had always had some help from family members and many were conscious that they were needing more help. However, peoples’ perceptions of what this meant for their independence and what was acceptable to them varied. Most participants accepted help, albeit sometimes reluctantly, with practical tasks around the home but for some there was a sense that needing help with personal care from their partner marked a decline in their independence. Others struggled with the more intimate aspects of personal care that:

“I’ve had these shoulders done and now I cannot leave the house unless [wife] dresses me. I mean, I really don’t like it. So she really does do quite a bit for me, you know. But there are things I won’t let her do, if you see what I mean, which is very personal things”. Jim

Interestingly, some participants were comfortable with help and even personal care from family members but clearly saw needing help from outside the family as a step change in their independence. Despite having help around the home from personal assistants Karen remarked: *“it’s the personal care...but I haven’t crossed that line yet because the family help me personally”*.

Many Thalidomide survivors with more severe damage have had help from carers or personal assistants for much of their adult lives. Interestingly, the participants in this group actually saw PAs as a means of maintaining their independence, not reducing it. Gwen said: *“It means that I can do things I wouldn’t be able to do without a PA, like when you’re away you can go out and do activities and stuff – it all helps”*. However, for her and several other participants having a Direct Payment which gave them the freedom to choose their PAs, decide what hours they worked, and what they did, was crucial to their sense of independence. For others, accepting more help from their PAs or applying for a Direct Payment so that they could employ PAs, was part of the process of rethinking independence. For example, in the past when her PA was off sick or on holiday, Alison would have tried to cope on her own. Now she employs a relief PA: *“Whereas at one time, I would have managed and just got on with it, I’m teaching myself not to do that anymore. So I call in this other young lady on a casual basis...I’m making myself delegate and not struggle”*. Others had decided to apply for help from social services for the first time, in part to help them maintain their independence:

“I am losing a lot of function and also the amount of effort I’m putting into doing basic functional tasks is having a massive impact on energy levels – I’m using up all my energy doing basic tasks. So yes, I’ve been referred to social work and they have been out and done an initial assessment and they’ve written a report for the Direct Payment services...So I’ll hopefully be employing somebody, hopefully in the next few months”. Moira

Conversely, a few participants saw accepting help from social services as diminishing their independence. Carol said: *“I’m not severe enough to actually apply for money for personal help. I suppose I could but then I’d lose part of my independence, part of who I am, my identity”*.

Compared to disabled people in general, Thalidomide survivors have perhaps had more freedom to decide whether to seek state help to maintain their independence because they have resources from their Annual (compensation) Grants and more recently the Government Health Grant. However, as I discuss in the next section, money was important for much more than independence.

7.4 Money Matters

In Chapter 2, I describe how the legal settlement in 1974 led to the establishment of the Thalidomide Trust and the payment of Annual (compensation) Grants to all UK Thalidomide survivors. For many years these payments were not substantial. They were also subject to income tax, with Thalidomide survivors (and previously their families) having to submit receipts if they wished to claim tax relief on items that were related to their disability: a system they found bureaucratic and patronising. It is only in the past two decades that Thalidomide survivors' financial situation has improved: in 2000 compensation payments became tax exempt; in 2005, Diageo agreed a new multi-year financial settlement, which doubled beneficiaries Annual Grants; in 2010 the Government made a pilot Health Grant of £26 million over three years; and this was then renewed for ten years from 2013. These changes have not only given Thalidomide survivors much needed resources (in 2018 the average Annual Grant was £37,000 and the average Health Grant was £24,000), they have also empowered them to use those resources in the ways that they judge will have most benefit to them and their families.

It is perhaps important to begin by saying that because the interviews were conducted as part of the Health Grant monitoring process, they specifically explored how participants had used their grants, the impact (if any) of the grant on their health and wellbeing, and whether the resources they had felt adequate in relation to their needs. Inevitably this did shape participants' responses, in that they perhaps focused more on the changes brought about by the Health Grant, than on their financial resources generally, and so some caution in interpretation was needed. Nevertheless a number of clear intermediate codes emerged. They suggested that money mattered, not only because of what it could buy but also because of how it made people feel. Having money gave participants a sense of security, including the ability to cope with unforeseen events. It gave them choice about how best to maintain their independence or preserve their function, and the resources to do this through equipment, adaptations and support. However, the extent to which money made a difference was tempered by the high cost of living with disability, for many, the loss of income from paid work, and a sense that often participants were still having to make trade-offs.

Participants frequently prefaced their thoughts on the Health Grant and their financial situation by reflecting on how things had been for them and their families before the introduction of the grant. Jim talked about the difference it had made to him: *“It’s changed our life so much, it’s been incredible. It has been smashing, to tell you the truth...We have struggled in the past and now we don’t have to”*. The quotation from Linda below also reveals how some participants with less severe of damage even felt ‘lucky’:

“I feel myself really, really lucky to be honest with you, and even with the Trust money [Annual Grant] as well, because, as I said, I’m at the bottom end of the spectrum where I’ve just got no thumbs and slightly shorter arms – and I just feel really, really lucky because what I am getting is making my life a lot easier. If I wasn’t getting that, then we would be struggling”. Linda

A few compared their situation to other people with disabilities, who did not have the same support, and again stressed how ‘lucky’ they were to have the additional resources provided by the Health Grant:

“To be honest, I feel incredibly lucky to have it. It feels like an enormous gift and, like you say, it’s enabled me to carry on working...I think I’d really feel I was struggling without it. I think that’s partly because of the job that I do. I’ve got a decent wage. I do earn a decent amount of money but the Health Grant has meant that splitting up from my partner hasn’t made me feel too panicky and powerless and out of control and that I can still keep working. I don’t feel that it’s not enough but that’s partly because I work with lots of disabled people who are struggling and don’t get anything. So I feel very, very lucky in many ways”. Penny

In many respects these comparisons set the context for participants’ reflections on the sense of security that having money gave them. Many talked about practical and current concerns like having the money to pay for their vehicle or wheelchair to be repaired if they broke down or being able to have the heating on more during cold weather. Others spoke more broadly about how reassuring it was to have the certainty of the money they received via the Trust, enabling them to save for the future or cope with unexpected events or changing circumstances. As Nicola put it: *“It has given me a safety net really – peace of mind”*. Interestingly Nicola also commented that she didn’t have an employers’ pension and so she was now trying to save some money from her Health Grant and Annual Grant in anticipation of having to give up work early.

The Health and Wellbeing survey results suggested that only a fifth of Thalidomide survivors have social care support funded by their Local Authority (although the proportion increased with the severity of impairment). For some, their Annual and Health Grants

meant they could choose not to seek help from social services or the benefits system. The reasons for this varied but appeared to be largely about bad experiences in the past and the dislike of the 'bureaucracy of disability'. Penny explained that she had had some local authority support in the past but *"found them really very difficult to deal with, very intrusive, unpleasant – I really didn't have a good experience at all"*. However, for participants with more severe damage, the prospect of being able to use their combined income from the Trust to help meet their care needs, if support or funding from their local authority was reduced, was important for their sense of security:

"Having the grant makes you feel safe so if there was an eventuality we'd be able to cope with it. I'm very careful with it and you know I eek it out until the next one is due if I can but it is peace of mind, it helps you sleep at night. I don't think there is anything more on offer from the local authority because as you know there are cutbacks everywhere". Karen

These reflections suggest that 'security' has a number of dimensions for Thalidomide survivors: the comfort of being able to afford things in the here and now; the reassurance of having 'insurance' to cover unexpected events; and the confidence that if necessary, the resources are there to meet changing needs.

Several participants described how money brought wider benefits for their family, many of which were the same as anyone might wish for, such as family holidays or helping their children out financially. For some this was also around taking the load off a partner who provided care:

"I have used part of my grant to buy a cleaner, a lady to clean 5 hours a week, just to take some of the edge off it for my wife. Otherwise it all falls to her. I think that's one of the advantages of the Health Grant – it knocks on and give her a bit of respite. You know, she's forever helping". Martin

However, many participants explained that simply having the funds to do pleasurable things, helped them by improving their emotional or mental wellbeing (I discuss this further in section 7.6) and helped their family. Tracy explained that she was unable to work and her husband did not have a well-paid job. Prior to the Health Grant, they had struggled financially, rarely being able to afford nights out or holidays, and she had experienced bouts of depression:

"Up until we got the Health Grant and the extra money to do things, depression was a big problem as well. I can say definitely since having the Health Grant the depression has been the one thing that has not completely disappeared but has 99% disappeared. The money has given me the opportunity to be able to do other

things and not rely on household income. To be able to go out and do various activities to keep me occupied and interested in living a life...a worthwhile and purposeful life". Tracy

Others also commented on how money mattered for their emotional wellbeing. Jenny echoed Tracy. She explained that because of her disability, simply doing routine household activities like shopping, cooking, cleaning and gardening took up a huge amount of time. Having the money to buy in help gave her time for a social life: *"That extra money allows you the time to have a life...to have a social life, and not to feel so cut off"*. Amy described her feelings about the Health Grant: *"It's really made us feel like we can use it to do things that physically help us, but also emotionally help us"*. She had used some of her money to pay for personal care task such as cutting her toenails and doing her hair, that she found difficult but as she put it *"make you feel better – and normal"*. She went on to say:

"And it's nice that it's something that we've been trusted to spend the way we feel that we can best spend it for our bodies because obviously we're all really different. What I'd spend mine on, somebody else might not spend theirs on". Amy

Interestingly, a number of participants drew a distinction between their Annual Grant and general household income, and the Health Grant. They clearly saw the Health Grant money as being specifically for their health and wellbeing and used it accordingly. For some there was a sense that this almost gave them permission to spend it in certain ways

"It's nice having it kind of separate as well because you can 'think this is for my well-being so its fine to use it in this way'. It's like a wheelchair costing £6000 or £7000. It's a huge amount of money and you have to think about the other things this money is to be used for. I've spoken to other beneficiaries who've said 'this is what this money is for. Don't feel guilty that you've bought two wheelchairs...the money is there to make your life easier and better'." Meg

More broadly, having money gave people options and choices, particularly in relation to how best to maintain their independence or preserve their function. This affected many areas of life from work and health care, to home adaptations and personal care. As I discussed in section 7.2 *Preserving Function*, having money (to replace lost income) meant people could choose not to work, or work fewer hours or change the type of work they did, or even buy in help to enable them to continue working.

Money also mattered in relation to how people looked after their health and wellbeing. The guidance agreed with the Departments of Health stated that the Health Grant was not to be used to meet needs already being met by the NHS. However, as I discuss more fully in

section 7.5, for many participants the NHS was not meeting their needs and so they were finding ways to self-manage their health problems. Often this involved buying treatments such as physiotherapy, osteopathy and massage privately. Even amongst those who needed surgical treatments, there was a strong view that having money gave them greater choice over when and where they had that treatment:

"I've also got the reassurance that...in the future I'm going to need me, me left knee sorting and I'm going to need me right hip replaced for a third time. I can have it done private, I don't have to wait on the waiting list, I don't have to suffer pain for eighteen months to two years waiting on the waiting list, I can go for it".

Tom

Simply being able to afford adaptations and equipment was very important to participants. As Martin put it *"I do something every year that makes my life easier"*. However, it was also about having more choice over what those adaptations and equipment were. Some participants explained that they could now afford 'standard' but better quality equipment (e.g. domestic appliances with buttons instead of knobs, or cars with features such as electronic seating adjustment), whilst others were paying for bespoke equipment. In addition to the obvious practical benefits, having choice could also be quite liberating:

"I think it's important to understand the freedom that having the knowledge that you can afford to spend a bit more gives you. It means you don't have to accept second best and you can look with hope really. You think 'oh I can do that' or you can find someone. Given enough money you can work it out". Amanda

However, there was also a clear sense that people were having to make difficult decisions about what adaptations were most important for their independence or function, when they could afford to replace vehicles, wheelchairs and specialist equipment, and/or whether they should buy in more help. Whilst such decisions might be regarded as part of most peoples' lives, they are brought into sharp focus when set in the context of the cost of living with disability, and especially rare impairments. Participants talked frequently about the additional expenses they incurred in all aspects of life. This included everyday expenses such as: higher shopping bills because they had to buy ready chopped vegetable or smaller more manageable packets; the higher cost of routine home maintenance (e.g. paying an electrician to change a lightbulb or a fuse); and higher heating bills because of needing to keep warm.

The costs associated with home adaptation, adapted vehicles, and specialist equipment were even more significant. Despite the Health Grant, many participants were unable to

do all the things they felt were needed to preserve their function or maintain their independence, and like Jo, were having to phase expenditure:

“Because it’s like, even though we’re getting the funding now, we still have to budget because we can’t, you know.... you’re talking about your kitchen which is like 40k odd or whatever and it doesn’t stop there because there’ll be appliances to buy and everything on top of that. And then I need a new car. I can’t buy that new car until next year now because by the time we’ve paid for what we’re doing this year, there’s no money left...But I’d like to do it now because my car’s 11 years old now”. Jo

It was also apparent from the way participants talked about their decisions in relation to adaptations and equipment, that they felt their needs were continuing to change – equipment that helped in the past was no longer adequate or further adaptations would be needed. For example, some participants had used normal toilets all their lives, perhaps with the help of a toilet stick but were now struggling to do so without help. They were now installing specialist ‘wash and dry’ toilets, which cost around £3000. Other participants were experiencing similar changing needs in relation to wheelchairs and vehicles. For example Moira has always driven an adapted car but now needs one with foot steering rather than conventionally steering. *“A new vehicle with all the adaptations I need, is looking like it’s going to be about £48k in total, which is actually about two years’ worth of my health grant”.*

It was clear that having money gave people choice and options, and this in turn gave them a sense of control and empowerment. Participants chose to use their resources, particularly the Health Grant, in very different ways but there appeared to be an acknowledgement within the Thalidomide community that this was as it should be, given the range of impairments and personal circumstances.

7.5 Taking Control of Own Health

A key aim of the interviews was to gather information about the types of health problems people were experiencing. In particular I was interested in problems which were in some way related to peoples’ original Thalidomide damage, and in any health care treatment or self-management strategies they had use to address them. However, it is important to understand that the context in which Thalidomide survivors made these treatment decisions and self-management choices was strongly influenced by their experiences of doctors and healthcare both as ‘Thalidomide children’ and adults (see Chapters 2 and 6).

A broad but common theme to emerge from the interviews was a wariness or even distrust of health care professionals, especially doctors. For some participants this was

rooted in theirs, and their mothers' experiences of doctors when they were children. Jo said: *"I think we've had the medical things shoved down our throats all our lives and a lot of people shy away from that"*. Martin was equally forthright: *"I don't do GPs! They're all right if you want an antibiotic but my faith in them stops after antibiotics. I think it comes from my mother's bad experience"*. However, many participants had more recent experiences of healthcare professionals' lack of understanding of how Thalidomide had affected their bodies and their failure to listen and respect what Thalidomide survivors told them about it. They (and their families) often had to be very assertive to stop inappropriate or unnecessarily invasive treatment. Beth's experience when she broke her arm vividly illustrates this.

"When originally I broke my arm, we were talking about operating. The day I did break the arm...I went to the hospital, the chap said 'We need to take blood' and I said 'You're going to have trouble getting blood'...I had the 'Don't you worry sweetheart, we know what we're doing'. So I'm like 'No – you do not know what you're doing about blood' and he never got blood. Then they kept me sitting for – I went down on the Thursday and they kept me sitting until the following Monday, when they were going to come and do the surgery. In the meantime, my sister had spoken to the [Thalidomide] Trust and they had told them under no circumstances to let them do the operation without an MRI scan because they know that the nerves do not run the same in our bodies as in others". Beth

Beth went on to say that when she had a gynaecological operation a few years previously her consultant had really listened to her and had found a specialist maxillofacial anaesthetist. She explained this to the doctors treating her arm but they ignored her. She said: *"As soon as the anaesthetist came, he took one look at me and wouldn't do the surgery – and I was more than glad – and he didn't do the surgery – and the arm's been fine"*. Karen also talked about having to be very assertive to stop inappropriate treatment:

"I had a flair up with my shoulder and I ended up in A&E and they tried to give me gas and air to put my shoulder joint back in and I haven't got one. They wanted to operate but I said no. They showed me the x-rays and said 'there it is you've dislocated your shoulder' and I had to get Martin involved at the [Thalidomide] Trust. I said look they are threatening to take my driving licence away because I won't have this operation and he rang me back and said 'Karen, you haven't got a ball and socket anyway'. You learn to speak up". Karen

Participants gave numerous examples of similar situations and it was often these experiences that led to people feeling that where possible they had to take more control of

their own health. Alison, who is in the most severe impairment group (band 5) and uses a wheelchair, described this very clearly:

“I think back in October, when I’d hurt my shoulder in the May, and I didn’t feel like it was getting any better, even though I’d been attending physio...they simply gave up on me. They didn’t know what else to do and I think by September, I thought enough is enough – I’ve got to take control of the situation myself. So I booked the holiday and found myself an osteopath...I did go back to the GP and said ‘Look, I’m in so much pain’ but the GP was really horrible, really horrible – very sharp, very unsympathetic. He didn’t seem to appreciate that having an injured shoulder had a massive knock-on effect to my ability. That things were difficult anyway, so that hurting myself made life even more difficult. I didn’t feel he appreciated that at all but he was the one that gave me the Tramadol, which did help a lot with the pain. So I then decided to book the holiday and just try and take control of the situation myself really”. Alison

Taking control of their health meant different things to different people. For some participants it began with their relationship with their GP. Like Alison, a few participants had had bad experiences but others simply felt that their GP didn’t really understand how Thalidomide had affected them. Several participants described how they worked with their GP to improve their understanding. Some made a point of trying to see the same GP, a few arranged for their GP to get information from the Thalidomide Trust or even talk to the Medical Adviser at the Trust, and one agreed to talk to medical students in the practice.

For those who needed conventional healthcare treatments, particularly surgery, taking control was more about finding the right specialist – one who had treated other Thalidomide survivors and had developed some knowledge of how their bodies might be different. The Thalidomide Trust has been working to identify specialists in different fields and several participants had sought their advice about who to be referred to. Some had paid to be seen privately because of problems getting an NHS referral. Moira decided to pay privately to see a hand specialist after spending months trying to get appropriate treatment through the NHS:

“I think that has been much more helpful than the struggle through the NHS system. It can take a hell of a long time and it’s very reliant on finding an individual who is willing and able to help, because my experience is that some of the staff in NHS services are brilliant, others really couldn’t care at all or lack information or are scared of treating me or just didn’t have the knowledge needed or the confidence to do it. It was pot luck!...I got to a general surgeon who was more

used to doing hip replacements. This was for my right hand and right knee. My right hand has a very, very unconventional structure so of course a general orthopaedic surgeon who mostly does hip replacements, which I don't need – I don't need a hip replacement – it was kind of inevitable that he was going to say 'oh well, there is nothing I can do for you, go away' but that process I think took 18 months. It was a huge learning point for me. I vowed that I would never get stuck that way again and be much more...take more charge of... or be more mindful of what's going on rather than just letting myself be taken along by the system. It's like throwing yourself into a river and then being surprised when you get dumped somewhere". Moira

Private healthcare, particularly for surgical procedures, also gave people choice about when they had their treatment. This was important for some people as they needed to arrange for extra help at home when they came out of hospital. However, several participants described very good care in the NHS. Jo initially paid privately to see a pain specialist but he then referred her to a pain specialist at her local hospital who had trained with him, and she was happy with the change: *"She's going to do exactly the same as he did and also it's more convenient because we're less than 10 miles away"*.

A number of participants faced dilemmas about when to have treatment or whether to proceed with treatment at all, especially where the outcome was uncertain. Often they were weighing up reducing pain against loss of function. Tom's and Ann's situations illustrate this. Tom, who is a foot user, was advised that he needed a knee replacement but he was concerned that the prosthetic knee would not function as well and so he was putting off the surgery: *"I'm better coping and suffering with the pain at the moment, possibly sticking with it for another five to ten years"*. Ann, who has relatively minor Thalidomide damage, has severe back problems. The extract from her interview not only illustrates the treatment dilemma she faced, it also reflects a common concern that doctors do not fully understand the consequences of 'routine' treatments for Thalidomide survivors:

"The consultant wanted to fuse 5 of the vertebrae but I said 'no, you're not because I'm not like a normal person, and if you fuse all my spine...I won't be able to bend. I'll lose my flexibility and if I lose my flexibility, I won't be able to be independent.' I'm going through all the different things to try to prevent that but I won't have that operation – I won't have it...[It's] not guaranteed to work. He said after you've fused the five discs, the top and the bottom ones become unstable, so you have to do that. You've got lots of metal and you've got lots of problems with infections, so at the moment I'm putting up with the pain – a lot of pain". Ann

A very common aspect of taking control of health was finding ways to manage pain. Participants were using a range of approaches. As I discuss in section 7.2, *Preserving Function*, some participants had made lifestyle changes or used adaptations and equipment or bought in more help to reduce the strain on their bodies. For many these changes were also about managing pain or avoiding more pain in the future. The simplest approaches to pain management involved ‘pacing’ or avoiding certain activities. Some participants focused on fitness, flexibility and weight management, partly as a way of reducing or avoiding pain medication:

“I don’t believe in drugs. I don’t really believe in doctors or drugs. I save them for when I really need them. I think pain should really be managed but not with drugs. I do use them very rarely but I find they upset me so I either have a treatment, you know physical therapy treatment or I do exercises and stuff or I rest”. Amanda

Many participants said they tried to avoid taking pain medication or they wanted to reduce the amount they were currently taking. There were a variety of reasons for this: a dislike of all drugs; a recognition of general advice about the use of pain killers; a feeling that in the future they would need more pain medication so they needed to limit it now; and a dislike of the effect that strong pain killers had on their mood. Rowena said: *“I try not to take painkillers, cos I don’t want to start taking them now if in the future I’m going to need them more”.* As she mentions in the quotation above, Alison was taking prescription pain medication but was very concerned about over using it: *“They are on prescription and they’re quite worrying actually because they’re very strong – Tramadol – and although I’m aware that they can be quite addictive, I’m trying really hard to be cautious of how I use them”.* The effect of prescription pain medication on peoples’ mood or ability to function was a common concern. Robbie said: *“The other thing with me is the medication suppresses mood”* whilst Tessa explained:

“I do take a painkiller at night and if it’s really bad, I up it but I try and keep to the minimum of what I do use. There is one I use every so often if it gets really bad but I can’t take that if I’m driving, cos it tends to make you a bit zonk-i-fied the next morning, so I only take that when needs must, basically”. Tessa

A small number of participants had sought more specialist pain treatments such as injections or patches but the majority had chosen to use physiotherapy and/or complementary therapies to help manage pain and to maintain flexibility/movement. Where participants were using physiotherapy, they were generally paying for this privately. Sometimes this was so that they could see a specialist physiotherapist (e.g. one

specialising in upper limbs), but it was mainly so that they could have on-going treatment from the same person.

“I have been privately seeing a very experience physio and she has me on an exercise routine...she is fantastic. I gave her a copy of the MRI scan and said she thought she could help me and I see her once every 4 to 6 weeks”. Colin

Similarly, those using osteopathy and other complementary therapies had often been seeing the same person for several years – they had established a relationship with them and felt that they had built up knowledge of their bodies. Kathleen had been seeing the same Osteopath for 20 years, and Alison said of her Osteopath: *“I’ve built up quite a big trust in her – I say she’s got magic hands – and considering my disability, I think she’s wonderful. She’s sort of been learning about me”.* Many participants were using massage to manage pain and muscle tension, sometimes combining it with physiotherapy, as the quotation below illustrates:

“I do receive regular sort of fortnightly massage to help keep on top of that. The place I go for the massage which is a sports injury clinic and if the pain isn’t sorted out with the massage I ask to be referred over to see one of the physios there, so paying privately, and that works really well because they liaise with one another”.

Meg

For some participants, ‘taking control’ was also about coping and coming to terms with comorbidity. A number of people were experiencing both secondary physical health problems and depression and/or anxiety and I discuss this in more depth in section 7.6 below. A few had other health problems such as diabetes, bladder and/or bowel problems (e.g. irritable bowel), and more rarely, chest or heart problems. Colin described the difficulties he was now encountering in managing his diabetes:

“I’ve got diabetes as well which is thalidomide related and had for 40 years but I’m in the danger years for related things but I don’t have those at the moment. An example is I can’t manage a pen – click on it and hold it at the same time. So what I do is use pen cartridges but I use syringes with them and I just draw up the insulin in the syringe with that and it works fine for me...One of the issues which I suspect is going to become a more significant one is that the areas of my body which I easily reach, my stomach area, when you have been jabbing in them for multiple years you can over jab in some areas and then you can reach a point where the insulin doesn’t get absorbed as well and I’m beginning to find that I’m jabbing but when I check later its almost as if I haven’t jabbed...that may be a sign

that I am over jabbing in certain areas and the issue that I am going to have is that in terms of reach I'm going to struggle to go to too many other places easily". Colin

Robbie has a gastric band to help him control his weight but he had started to have problems with a low iron count. He had the band loosened and took iron tablets but his weight increased and so he eventually decided to have the band tightened again. Robbie's experience also highlights the place of broader lifestyle issues (in particular weight management) and how participants used lifestyle changes as one way to take more control of their health. Gwen has always struggled with her weight and since losing her sight has found it even harder to stay active:

"I've been doing dieting on and off for years but my problem is because of my disability, I have to rely on people cooking for me, so it's very hard sometimes to get the meals worked out for me... I wouldn't say I'm an excessive eater. I like stuff but I think because as the years have gone on, I'm not able to do as much as I used to, I sit about much more and therefore weight just seems to pile on". Gwen

Simon also talked about how he had struggled with his weight and was now trying to stick to a very strict regime:

"Weight management is something that's ongoing and I'm firmly in control of and something I can't afford to let go of. I went through a substantial weight loss program a couple of years ago and I soon discovered that the difficulty is maintaining that lower level of weight and that has a knock on effect for various things: my general physical fitness, for reach and range of motion available, for various muscular skeletal pain issues. Keeping that going is a tough one, its something you have to be constantly on your guard about – you can't just lose your weight and then go back to the way you were. So that's an ongoing battle, a battle I'm winning but one I have to be constantly aware of". Simon

Often people wanted to do more exercise but were put off using facilities such as public swimming pools or gyms because of people staring at them. However, they did find solutions. Beth and her sister were hiring a private pool each week, whilst others had bought exercise equipment they could use in their own homes. A number of participants had personal trainers who came to their homes. Carol said: *"I've also got a personal trainer as well and we do a lot of core work and manipulation to stretch the muscles, you know to try and counteract the effects of using a wheelchair really".*

In describing how participants tried to take more control of their own health, I have focused on physical health. However, mental wellbeing is a growing health concern within

the Thalidomide community, and one which participants found far harder to 'take control' of.

7.6 Vulnerable Mental Wellbeing

The Health and Wellbeing survey began to quantify mental wellbeing problems, with the results suggesting that around half of UK Thalidomide survivors have experienced low mood, depression and/or anxiety. However, the interviews revealed why the mental health of Thalidomide survivors is becoming more vulnerable. Two primary factors emerged: the cumulative impact of living with a rare disability, and in particular the sense of 'being different' which that engendered; and the emotional impact of further loss of function, and the implications this had for independence. How much these experiences affected people and how they made sense of them, was influenced by both individual circumstances (e.g. family attitudes or life events) and the wider societal context.

Participants talked either directly or obliquely about what they saw as the cumulative impact of living with disability, especially rare impairments. Some people focused on the mental effort involved in coping with daily life, constantly having to adapt and think ahead or plan how to manage in different situations. The extract from Malcolm's interview below is interesting not only because of his analysis of this but also because he uses 'they' rather than 'we', perhaps as a way of distancing himself from the experience:

"I have had some counselling for anxiety and depression. I think that was about 6 or 7 years ago. That was because I was drinking a lot previously – about 13 years ago, drinking – and I had to sort of come back into the human race, as I call it, and I found it very difficult and I was going through a very big stress-y period of my life. I thought it was just drinking and stuff like that but my counsellor took one look at me and said 'It's possibly related to your disability a little bit'. You've probably heard most of us almost try and dismiss it as 'This is what we've got – we've just got to face the fact of it' but I think a lot of Thalidomiders don't realise that they've been deeply affected by it, a lot more than they really realise...Now it's starting to hit hard...It's becoming a new challenge because they're having to adapt, whereas when they were younger, they probably just didn't think about it and adapted naturally – and obviously people who saw them thought 'Oh, what marvelous children these are' but they didn't realise the mental strain they had to go through to adapt and the frustration". Malcolm

For many, especially those with upper limb damage and/or facial disfigurement, it was the psychological impact of 'being different' that touched their mental wellbeing. Often the situations they described were mundane, such as people looking at them in restaurants if

they needed help with cutting up their food or being stared at in the gym or swimming pool or just in the street. Moreover, they stressed that they had never come to terms with unwanted attention this brought: *“People say they get used to it. I’m not used to it and I never will be”* (Jim). However, a number of people described more disturbing events: Joyce had been stopped in her home city by a small group of tourists who tried to take photographs of her; Colin had to seek help from the police after being targeted by vandals in his community; and Nicola felt her disability had been a factor in bullying at work.

Family attitudes and childhood experiences also clearly influenced participants’ mental wellbeing, both positively and negatively, but the extent to which these were directly linked to their Thalidomide damage varied. Diane explained that her mother had her when she was 45 and her siblings were in their late teens. She feels that they never accepted her and this has had a long term emotional impact on her:

“I mean the, you know, the fact that I’ve got no legs is nothing to me cos I don’t know any different but it’s them [siblings] that are the problem, and that is why...my biggest thing is the this psychological abuse which went on from, my earliest memory is from the age of five up to like last year”. Diane

Jenny had grown up in a very sporty family where her Thalidomide damage was rarely discussed. She felt her mum struggled to come to terms with having a disabled child and carried a lot of guilt about taking Thalidomide. She explained:

“So there was a lot going on in the family and the Thalidomide really didn’t help and I think that really affected me. So I know that a lot of the counselling I’ve had has always come back to that sense of being a freak and not being as good as other people really. Somehow, just, you have that underlying feeling that you’re different from other people – and actually my disabilities are not noticeable at all”.
Jenny

Conversely, many participants described how supportive their family had been and how their parents had helped them develop a resilient attitude to life. A few said that the improved financial situation of Thalidomide survivors had caused tensions with siblings but others were still close to their siblings and really valued their support.

As I discussed in section 7.1, shifting impairment was leading to loss of function for many participants. This was reflected in a changing ability to carry out everyday tasks and activities. They often used words like *“frustrated”* or *“irritated”* to describe their feelings about this change but for some the impact had been more profound:

“I didn’t think about it. I went with the flow and got on with my life and it was only really when my own personal health started failing and I had to sort of pull right

back from doing the same old things the same old way, and old coping strategies didn't work anymore, that I went on to a different journey. I had to open myself out to what was happening to my body, all the background to the Thalidomide story, the injustice and allowed it all in. It's been quite tough and I have had a period of being quite stuck and not necessarily being very kind to myself". Moira

The emotional impact of loss of function appeared to be more significant when it led to peoples' lives becoming more limited or resulted in them giving up activities they enjoyed, and when it had a knock on consequences on their family. Joyce described how many everyday activities had become more difficult for her and thinking back to what she was able to do previously made her feel quite low:

"It depresses you because you realise what you can't do now. I wouldn't go out shopping on my own because of the simple fact that I can't lift and I'd be scared of falling because of my leg, when carrying things". Joyce

Amy, whose children were still relatively young, reflected on how her declining mobility had affected both her and her family:

"I think sometimes I feel like I would love to go on a really, really long ramble, like I used to, and I can't do that because it hurts my knees and my back too much to go on very uneven ground for too long and so I suppose it does stop you going on the sorts of activities or family holidays that you would otherwise have chosen to do. I think that can be very frustrating and get you down a bit". Amy

However, several participants talked about finding new activities to replace the ones they could no longer do. Amanda explained that she didn't feel safe in her sailing dingy anymore but she was determined to keep active:

"Your world might get smaller because you're less able but there is still a lot you can do with it. I've never been able to do team sports until recently but now I cox for a rowing team and I've won my first ever team event which I've done through making them work hard and steering the boat and thinking but I'm involved in a normal event and a normal rowing team. I have to keep fit and I have to keep skinny or they won't want me otherwise. But there are a lot of things you can do".

Amanda

Others were buying in help or making adaptations so that they keep doing valued activities. For example Rick had his bike adapted and Ann was hoping to keep diving by finding holiday companies that had equipment to help her get in and out of the water. Beth reflected on her situation:

“I still have a good life. I go to the theatre a lot and I have to now pay for somebody to go with me because I sit in the wheelchair, because I can’t walk from the car park to the theatre, which I used to be able to do”. Beth

Alongside the impact of current changes in peoples’ lives, several participants speculated about the implication of further change in their circumstances. There was a clear sense from some that their current way of life was fragile and this made them feel vulnerable. In particular they worried about losing their partner or their partner’s health declining such that they were no longer able to support them. Karen, whose husband had recently had a “cancer scare” said: *“Obviously it’s brought to the fore what happens if [husband] ever gets sick – we have nobody. This is it – I don’t have any sisters”.*

For a few people their feelings of vulnerability were related to the wider environment. Jenny, who lives alone with her two dogs explained they provide company and exercise but also make her feel less vulnerable. Others talked about seemingly trivial but real concerns such as not being able to open doors in toilet cubicles or use cutlery in restaurants, whilst Joyce felt physically vulnerable in public places:

“I’m scared of getting mugged. You have that fear because you’re vulnerable. I keep my mobile phone in the pocket of my coat or trousers or whatever and then if anything happened and they do take my bag, at least I’ve got my mobile phone. I would never use my mobile phone in the street as it would be so easy for someone to just snatch it and run. You know anybody can get mugged or have things taken but I would never walk with my purse in my hand because it would be so easy to take. It’s just those we things we have to think about as well”. Joyce

It seemed that what was important was not each separate ‘vulnerability’ but the fact that together and over time they had a corrosive effect on peoples’ mental wellbeing.

In section 7.3 I discuss the positive and negative aspects of the group identity of Thalidomide survivors for their perceptions of independence. Similarly, in relation to mental wellbeing it created both benefits and difficulties. Several participants said that their contact with other Thalidomide survivors had increased in recent years, partly facilitated by email and social media, but mainly because as they developed more physical and emotional difficulties they had felt a greater need to connect with their peers. Tracy said that a long period of depression had led to her seeking friendships within the Thalidomide community:

“I didn’t have any peers around me that I could talk to on a regular basis. I used to go to the meetings, the Thalidomide Society meetings once a year but since that

time I've developed my own friendships within that circle and there are people there that I can ring up and we see each other". Tracy

Others had set-up informal local groups or connected via social media, whilst many used Thalidomide Trust and Thalidomide Society events as an opportunity for mutual support: *"A lot of people get together at the NAC meeting, stay the night, because they actually enjoy talking to other Thalidomiders"* (Carol). However, those participants who had become a beneficiary much later in life or who had minor damage sometimes felt they were *'on the outside'*.

Although vulnerable mental wellbeing stands alone as a conceptual category, it is intimately intertwined with and influenced by the other categories. It is also an important part of the disabling experience. Shifting impairment, coupled with loss of function and the need to rethink independence, did have a detrimental impact on many participants mental wellbeing. Conversely, having money, both for the support it could buy but also for the choice and security it provided, was having a positive effect on many participants' mental wellbeing.

7.7 Ageing Differently

The preceding conceptual categories reveal that Thalidomide survivors' experiences of ageing (in late middle age), are different to those of their peers in the general population, but perhaps similar in some respects to other people with early acquired disabilities. For many there was a sense that their bodies, and particularly their limbs, were *'wearing out'*. Most commonly participants associate this with the way they have used their bodies to compensate for their impairments. Rick, like many Thalidomide survivors with relatively limited upper limb damage, has one arm which is longer and stronger than the other. He explained:

"I'm conscious that with both arms, but particularly the left one, it's going to become more and more of an issue. As I get older, I'm using my left side for 95% of the day, compared to the right side, it's a lot of wear and tear on that part of my body." Rick

However, others talked about their bodies in some way becoming weaker and less resilient as they aged. Malcolm, who has two very short arms, talked about how the strain that everyday living had placed on his and other Thalidomide survivors' limbs was now being exacerbated by normal ageing processes:

"I know what it is. Its age – it's just muscles and bones deteriorating and unfortunately, because of the way our arms are – the size them – they're probably

equivalent to the size of maybe a 2 or 3-year-old's and that is the strength they have. If you ask a 2-year-old to take a bin bag out, they'd just look at you and say 'I can't'. I think that's the problem. It's that we like to think that we can do heavy stuff or we've grown up to be able to do it, and then as we've got older we've started to become weaker." Malcolm

Alongside this notion of bodies becoming weaker or 'wearing out', Thalidomide survivors had a strong perception that they are ageing prematurely. Again some people associated this with the way they had used their bodies, and to a lack of advice when they were younger, about how to preserve function.

"I'm going to be 53 in a few months so the way I look at it, any 53 year old is going to start and have pains and aches. Yes our bodies are say about 20 years older they reckon because of what we're doing, and maybe if they had been more vigilant about how we used our limbs years ago maybe we wouldn't be having the problems now so much. You know I think maybe they've closed the stable door and the horse has already away. So I think there was a lack of medical advice say in your late teens, twenties." Joyce

They felt their bodies were older than their chronological age or they talked more broadly about 'feeling old before their time'. Like Joyce (above) and Jenny (below) they acknowledge that most people would expect to slow down to some degree in their 50s, but they felt that for them, this change was happening more rapidly: *"I know you're slowing down in your 50s anyway but...I think as probably a lot of people say, you feel it's coming a bit too early. I feel more than my age"* Jenny.

This sense of premature ageing had implications for both physical and emotional wellbeing. Ann had been a very active person all her life, taking part in sports such as skiing and scuba diving but recent back problems related to her Thalidomide damage had had a profound effect on her physically and emotionally:

"I never even thought about it. Never even thought about it. I've been much more angry and frustrated over the last 2 years...it's really curtailed what I've been able to do. When I was younger, I was fine. I was fit, I could do everything, I didn't need any help...even just thinking into the future, and thinking, well maybe in 10 years' time, when I'm 63, I'll be like a bloomin' 80-year-old and I will need help, and that makes me angry. You know, I want to not have it and be able to do everything I've always been able to do without any help." Ann

Inevitably people compared their experience of late middle age with that of their friends, siblings and peers of a similar age. The sense of being out of step with others at the same

stage in their life course seemed to prevail regardless of the severity of people impairments as the three short quotations below (from participants in bands 1, 3 and 5 respectively) illustrate:

“I’ve got 3 sisters...and they are able to do far more than I am. I think that’s the best comparison because obviously we were brought up in the same household, the same genetics, and they are much more able.” Jenny

“I know it’s the same for everybody as you get older but usually, when you’re in your 50s, you can still do what you did in your 20s can’t you?” Fiona

“I think when you get to 50, normal people tire but I find that I tire even quicker maybe than somebody the same age as me, just because everything’s so much more effort.” Gwen

By contrast a few participants felt less out of step as they got older because their contemporaries were also experiencing aches and pains or finding it harder to do things they had done with ease when they were younger. Having felt ‘different’ for much of their lives this was perhaps a way for some people to normalise their experiences.

Importantly, not only are Thalidomide survivors ageing prematurely, they also ageing differently. The combination of a rare condition and the fact that Thalidomide survivors are ageing as a cohort means that they do not have an older generation to look to and learn from. People often felt uncertain about whether the problems they were experiencing were caused by the normal process of ageing or by the long term consequences of their Thalidomide damage. Jo reflected on this issue: *“What’s happening to your body now is it, because obviously now we’re all over 50, all age-related or is it because of the drug? It’s a difficult one to call, isn’t it?”* Others talked about ageing being layered on to their existing impairments. For those with less severe impairments it appeared to remind them of their disability:

“Only very recently [there was] something where I thought I haven’t done as well – and then I thought, hang on a minute – I have got a disability and I am getting older...I think we’ve all got normal ageing things coming in on top of how we are now.” Nicola

However, some like Simon who has severe Thalidomide damage and has used both equipment and personal assistance much of his life, highlighted both the practical and emotional implications of ageing compounding existing impairments:

“I do worry about the aging process, I almost have to tell myself not to dwell on it. I’m kind of thinking ‘in our old age who is going to make the specialist walking

sticks'? These are all the things that older people use to maintain their mobility. We are going to need a whole lot of other stuff aren't we? The average walking frame is not going to work for us. I think our care needs are going to increase exponentially. Already we know that the sum of more than one impairment is greater...aging is just another impairment to add on top of the other impairments we've already got – the impact will be profound and I don't like the idea but that's the reality isn't it. I don't want to be a very old man.” Simon

Just as Simon's closing comment implies, others (men in particular), expressed concerns about the implications of ageing with Thalidomide for both the quality and length of their lives. The quotations below from Rick and Martin highlight this:

“I think we're all conscious – well, none of us knows how long we're going to live but we're all conscious that, in terms of our own bodies, in real terms, your life is a bit less than the norm, I suppose.” Rick

“I mean older people can't do things that they used to do and I think that's nagging in the back of my mind. Ok 52 and I'm thinking fast forward, 62 then what. I live in dread. I don't fancy getting old at all. I think when the quality of my life's gone I'll want out.” Martin

The perception of ageing prematurely and ageing differently left Thalidomide survivors feeling increasingly out of step with their peers in the general population at the same stage in the life course. Moreover, because they do not have an older generation to look to and learn from, and the long term effects of the drug are poorly understood, they are ageing with heightened sense of uncertainty.

7.8 Summary

This chapter describes the seven conceptual categories to emerge from the secondary grounded theory analysis of the semi-structured telephone interviews, exploring how they overlap and intersect. I have shown how *Shifting Impairment* is about both increasing impairment and the interconnection between original impairment, secondary conditions and ageing, and how it led participants to think about *Preserving Function*. The approaches they used to achieve this often involved them in *Rethinking Independence*. This process was complex and nuanced, and influenced by Thalidomide survivors' beliefs and attitudes, as well as their health, social and economic circumstances. In particular, *Money Matters*, not only because of what it can buy but also because of the sense of security and empowerment it gave people. It also influenced the fifth conceptual category, *Taking Control of Own Health*, although this was strongly shaped by Thalidomide survivors' often negative experiences of healthcare professionals over the course of their

lives. *Vulnerable Mental Wellbeing* stands alone as a conceptual category but it is intimately intertwined with and influenced by the other categories. It is also an important part of the disabling experience but one, which is sometime under explored. Together the conceptual categories suggest that Thalidomide survivors are *Ageing Differently* when compared to their peers in the general population, and in some respects to other people with early acquired disabilities.

In the next and final chapter I discuss how the conceptual categories described in this chapter, together with the findings from the literature review and the health and wellbeing survey, led to Ageing Differently emerging as my core category, or as I have termed it, my 'emergent theory'.

Chapter 8 Discussion and Conclusion

I began this thesis by stating that Thalidomide cannot be dismissed as a historical tragedy. It is a contemporary disability issue. Across the world, Thalidomide survivors and their families are still living with the consequences of the drug. In the UK, Thalidomide survivors are now approaching later life, and as they do so they are experiencing new Thalidomide-related health problems. My study captures their experiences at this particular stage in their lives, where impairment, disability and ageing are beginning to intersect. It also sheds light on the cumulative experience of disability over their life course. In particular, how the historical, social and economic context of their lives, their unique group identity, and their efforts to negotiate and re-negotiate their independence, have shaped their navigation of the life course.

I open this discussion in section 8.1 with a brief descriptive summary of the main findings. I then go on to discuss my findings in more depth under three integrative explanatory categories: shifting impairment; preserving function/rethinking independence; and vulnerable mental wellbeing. Under each of these categories I bring together the findings from the literature review, the health and wellbeing survey and the conceptual categories which emerged from the secondary grounded theory analysis of the interviews. Where appropriate I make links to the wider literature (both empirical and theoretical) about ageing with early acquired disability. These integrative categories provide the framework or grounded theory 'storyline' for my emergent theory - Ageing Differently - which explores the extent to which Thalidomide survivors' experiences of ageing at this point in the life course is different or similar to their peers in the general population and to other people with early acquired disabilities. This is presented in the final part of the chapter.

I go on to consider what this study has contributed to the body of knowledge about the long term consequences of TE and ageing with early acquired disability more broadly, along with the implications of my findings for policy and practice. I discuss where further research is needed, both in relation to the health of Thalidomide survivors as they age and the growing population of people ageing with early acquired disability. Finally, I reflect on the strengths and limitations of the study, before presenting my overall conclusions.

8.1 Main Findings

The findings from this thesis clearly show that whilst TE is regarded as a non-progressive condition, its consequences are not static. Thalidomide survivors are now experiencing a range of secondary health problems which are connected to and interacting with, their original impairments. This is causing further loss of function, which in turn has disabling

consequences. The literature about the health of Thalidomide survivors as they age revealed that they are increasingly experiencing secondary and associated conditions, which are linked either directly or indirectly to their Thalidomide damage. Of course ageing is an inevitable process, which involves a decline in physical function over time. For Thalidomide survivors, and other people with early acquired disabilities, this 'normal' ageing process is layered on to their original impairments (Treischmann 1987). Furthermore it is often complicated by secondary conditions (e.g. osteoarthritis in the case of Thalidomide survivors), which are a direct result of the original impairments (Kemp and Mosqueda 2004).

The literature review showed that internationally, musculoskeletal problems are the most commonly reported health issue. This conclusion is supported by the findings from the health and wellbeing survey which suggests that the majority of UK Thalidomide survivors were experiencing some kind of musculoskeletal problems. For many these problems were associated with restricted movement and further loss of function, which people perceived to be beyond the gradual loss of function associated with ageing.

Shifting impairment was leading to many Thalidomide survivors needing more help in their daily lives, more equipment and home adaptations, and to them giving up paid work prematurely. These changes were in part about Thalidomide survivors trying to preserve their function and gain some control over what was happening to them. However, accepting more help or using more aids and equipment involved many Thalidomide survivors rethinking what independence means to them. Despite the majority having lived relatively independent lives, many are having to adjust to growing disability.

For Thalidomide survivors, as for all of us, physical and mental health were intimately intertwined, and so loss of function and the need to rethink independence had profound implications for their mental wellbeing and mental health-related quality of life. In both the international literature and the health and wellbeing survey, common mental health problems were the second most frequently reported health issue. Almost half the Thalidomide survivors who responded to the survey reported that they were currently, or had recently, experienced depression and/or anxiety. The interviews revealed why the mental health of Thalidomide survivors was becoming more vulnerable. Two primary factors emerged: the cumulative impact of living with disability, particularly a rare disability, and the sense of 'being different' which that engendered; and the emotional impact of further loss of independence, associated with secondary health problems. How much these experiences affected people and how they made sense of them was influenced by both individual circumstances (e.g. financial resources, family attitudes or life events) and the wider societal context.

However, Thalidomide survivors (as a group) are in some respects atypical of people with disabilities. They have, for example, a similar level of education to their peers in the general population. For many, any employment disadvantages (as indicated by lower rates of labour market participation) are relatively recent and at least in the last decade or so, they have been more financially secure because of the Health Grant. My research suggests that having money matters, not only because of what it can buy but also because of the material and psychological reassurance it provides in the context of a somewhat uncertain future. Having money creates a sense of security, and for Thalidomide survivors this has a number of dimensions: the comfort of being able to afford things that help them in the here and now; the reassurance of having 'insurance' to cover unexpected events; and the confidence that the resources are there to meet changing future needs. It also creates options and choices, particularly in relation to how best to maintain independence.

Nevertheless, at this relatively late stage in life Thalidomide survivors are experiencing greater exposure to the environmental and other disadvantages common to many disabled people and appear to be increasingly out of step with their peers in the general population at the same stage in the life course. In essence, they are *ageing differently*.

8.1.1 Shifting Impairment

Thalidomide is now known to be a very powerful human teratogen which can cause a wide range of birth defects. However, Dismelia (missing, short and/or deformed limbs) and associated damage to joints, are the most common and characteristic features of TE. It is perhaps not surprising then, that in the international literature musculoskeletal problems were the most commonly reported health issue. This conclusion was supported by the findings from the health and wellbeing survey which showed that over 90% of UK Thalidomide survivors were experiencing some kind of musculoskeletal problem, with half reporting multiple problems (five or more). Back problems, ranging from degenerative changes in the spine to muscular pain, were the most common (72%) but a high proportion of Thalidomide survivors were also experiencing restricted movement, pain and muscle weakness/tension in their necks, shoulders, arms/hands, hips and/or knees. The prevalence and severity of musculoskeletal problems appeared to increase with the severity of impairment but this relationship was not simple or linear.

Alongside the pain and loss of function associated with musculoskeletal problems, two thirds of the Thalidomide survivors in the survey said they experienced neuropathic symptoms and almost half reported generalised pain (which may be neuropathic in nature). These findings were broadly supported by the literature review. Clinically the causes are unclear and disputed, although most authors agree that Thalidomide survivors

are more vulnerable to compressive neuropathies. However, regardless of the clinical cause, it was clear that for some Thalidomide survivors, pain and neuropathy were having a significant impact on their general wellbeing and function. Changes in other areas of original damage, such as eye sight, hearing and internal organs, were also a concern for many survey respondents. However, in the literature there is very limited evidence about the extent and nature of these problems, and it is unclear whether this deterioration is Thalidomide related or due to general aging.

All the international studies which discuss deterioration in original musculoskeletal impairments and secondary conditions, conclude they are caused by the way in which people have had to use their bodies to compensate for missing, short or damaged limbs and joints. Kruse et al (2013) talk about the patterns of movement people adopted at an early age to compensate for missing functions; Kowalski et al (2015) refer to 'compensatory postures'; and several authors use terms such as 'overuse syndrome' or 'symptoms of overuse'. However, none of these studies have really explored what Thalidomide survivors themselves perceive to be the causes of these problems or how they made sense of this shifting impairment. The interviews with Thalidomide survivors suggested that they felt there were three root causes.

The first was deterioration of known damage (e.g. in eye sight) and/or the emergence of newly recognised damage (e.g. a missing kidney) or an increased understanding of the extent of known damage (e.g. the nature of malformed joints). The second was accidents and injuries where these had occurred as a result of existing impairments (e.g. falls linked to mobility, balance or sight problems). The third and most commonly described root cause was premature wear and tear caused by the ways in which people have had to use their bodies to compensate for their impairments, which clearly accords with the literature.

However, people made sense of these changes in different ways and their response to them also varied. For those with more severe damage, there was sometimes a sense that the deterioration was inevitable, given the nature of their original impairments i.e. they attributed the decline they were experiencing to their original damage, not to the ageing process. Amongst participants whose original impairments were less severe, there was more uncertainty about what could be attributed to 'normal' ageing and what to their original impairments. Regardless of this, deterioration in their function or mobility often engendered a new or heightened sense of 'being disabled'. Participants often talked about the everyday activities they could no longer manage or could only manage with aids or support. As such, these activities had become the barometer or benchmark by which they measured their shifting impairment. For some participants, the 'unpicking' of how they used their bodies was perhaps a way of understanding or even reconciling

themselves to shifting impairment. For others it also appeared to be about finding ways to take control of their health and develop strategies to reduce further loss of function.

In many respects, Thalidomide survivors are reluctant pioneers because the long term consequences of their condition are emerging at the same as they experience them (Lowton and Higgs 2010). This is perhaps different to many other disabling conditions. Nevertheless, there are similarities between Thalidomide survivors' experiences of shifting impairment and those of other people with early acquired 'non-progressive' disabling conditions. Molton and Yorkston (2017) note that: "...functional limitations are often not stable across the life span. Rather there is now mounting evidence that the cumulative effects of living with a disability condition for many years contribute to premature declines in health" (p291). They go on to suggest that this might include the early onset of musculoskeletal conditions, medical comorbidities and "*the development of secondary conditions, like pain and fatigue*". Studies into ageing with specific conditions such as Cerebral Palsy (Haak et al 2009), spinal cord injury (Groah et al 2012) and Spinal Bifida (Klingbeil et al 2004) have drawn similar conclusions. Not only are people with these types of disabling conditions dealing with the normal physiologic issues of aging, they are also coping with secondary complications of their disability, and the inter-relationship between the two (Klingbeil et al 2004), all of which can have a significant impact on their functional ability as they age. Unfortunately, as a number of commentators have observed (Iezzoni 2014; LaPlante 2014) health care services, and rehabilitation medicine in particular, have tended to focus on supporting people with newly acquired disabilities, and so knowledge and services to support people with early acquired disabilities as they age have been slow to develop.

Interestingly, a broad but common theme to emerge from my interviews was a wariness or even distrust of health care professionals, especially doctors. For some this was rooted in their experiences as children. However, many participants had more recent experiences of healthcare professionals' lack of understanding of how Thalidomide had affected their bodies and the secondary problems they were now experiencing. This often set the context for how people tried to take control of their own health. The survey showed that many Thalidomide survivors (70% of survey respondents) are self-managing their musculoskeletal problems by paying privately for physiotherapy and complementary therapies. The interviews suggested that this was partly about being able to establish a relationship with the person treating them so that they understood their Thalidomide damage but it was also about trying to defer or finding alternatives to more invasive treatments, in particular joint replacement surgery.

Overall, 17% (60) of the Thalidomide survivors who responded to the survey had had joint or back surgery (in the last ten years). The rate of hip and knee surgery was far higher than the general population of a similar age and the rate for shoulder and elbow surgery also appeared to be higher, although comparative data was limited. The interviews revealed that Thalidomide survivors often face difficult decisions about whether (or when) to have surgical treatments, especially where the outcome was uncertain. In particular, joint replacement surgery can remove or substantially reduce pain but it can also leave people with restricted movement. However, as a recent study about shoulder replacement (Merkle et al 2016) suggests, knowledge and treatments for Thalidomide survivors are advancing, albeit slowly. For those who needed conventional healthcare treatments, particularly surgery, taking control was often about finding the right specialist – one who had treated other Thalidomide survivors and had developed some knowledge of how their bodies might be different.

In terms of 'lifestyle' diseases or diseases of ageing, there is some evidence from the literature that Thalidomide survivors are marginally more likely to have hypertension and heart disease (i.e. it may be 'associated' with TE). The results from my survey were inconclusive but this may be partly because of problems with the phrasing of questions and the resulting difficulty in making comparisons. However, both in the literature and in my own work the issue of risk factors for lifestyle diseases emerges. Thalidomide survivors often experience problems with weight management and for some there are physical, social and practical barriers to taking regular exercise. Moreover, obtaining accurate measurements for two of the most commonly used indicators of risk factors for lifestyle diseases – blood pressure and body mass index – is difficult when people have missing or short limbs. Again there are parallels with people with disabilities more generally. An American study (Altman and Bernstein 2008) drawing on the National Health Interview Survey found that people with disabilities had higher rates of risk factors (i.e. obesity, smoking and physical inactivity) for lifestyle diseases than their peers. Moreover, some authors (Iezzoni 2011) have speculated that health care professionals may be less likely to address risky health behaviours in people with disabilities. There is also a small but growing body of literature which contends that commonly used models of successful ageing have been developed with little consideration of early acquired disability (LaPlante 2014; Molton and Yorston 2017). As a consequence, insufficient attention has been paid to health promotion and prevention for this group of people, and more appropriate indicators and goals for healthy living are needed. I return to the issue of successful ageing in 8.1.4.

What was clear from both the survey and the interviews is that multimorbidity (including lifestyle diseases and mental as well as physical health) is a growing issue for Thalidomide survivors, with almost half of the survey respondents reporting between four and nine separate health problems. None of the studies in the literature review (and few in the wider literature about ageing with disability) explicitly discuss multimorbidity but some record the number of chronic health conditions participants reported or talk more generally about the number of diagnosed medical conditions. Whilst multimorbidity is increasing in the UK population as a whole (Barnett et al 2012), my findings suggest that a higher proportion of Thalidomide survivors are experiencing multimorbidity than would be expected at this point in their life course, when compared to their peers who do not have impairments with disabling consequences.

Conceptually, shifting impairment was not just about *increased* impairment, it was about the somewhat unpredictable interconnection between original impairment, secondary conditions and ageing, and as such it carried with it inherent uncertainty about the disabling consequences. Although we have no comparative data from when Thalidomide survivors were young or middle aged adults, my contention is that the shifting nature of their impairments is one of the main factors contributing to their poor physical health-related quality of life, as indicated by the SF12 results. They perceive that their 'health' in its very broadest sense (i.e. as reflected in the SF12 component scores of physical functioning, role limitation, pain and general health) is declining and they are increasingly experiencing the disabling consequences of this decline, such as having to give up paid work and finding it harder to maintain independent mobility. Shifting impairment was therefore intertwined with efforts to preserve function, and for some, the necessity to rethink or renegotiate independence.

8.1.2 Preserving Function/Rethinking Independence

Coping with the loss of function associated with shifting impairment involved both physical and psychological adjustments. Over the course of their lives Thalidomide survivors have developed 'work arounds' to enable them to do tasks themselves but increasingly they were finding that these no longer worked. Within the literature, a few studies discuss Thalidomide survivors' efforts to preserve function and maintain their independence, by making greater use of aids, equipment, adaptations and/or personal assistance. The health and wellbeing survey and interviews confirmed this. For example, the survey found that whilst only a minority of Thalidomide survivors were receiving local authority funded social care, almost two thirds of survey respondents were buying support privately (e.g. help in the home). The interview findings suggested that this had increased significantly following the introduction of the Health Grant. The survey also showed that many

participants were making other changes in their lives such as giving up paid work or reducing the hours they worked.

For many participants, these practical changes were driven by a desire to reduce strain on their bodies, and so avoid or reduce pain and preserve the function they still had. As such they were implicitly assessing the likely risks to their independence and making an active choice to try and protect it. There are links here to the wider literature about disability and rehabilitation. In the past decade or so, this philosophy of *“conserve it and preserve it”* has also appeared in the literature about ageing with early acquired disability. Kemp and Mosqueda (2004) suggest that after the Second World War, the emphasis in rehabilitation was on maximising function. This philosophy prevailed when Thalidomide survivors were children and young adults. However, there is now recognition that it can cause problems for people ageing with disability, in particular premature degeneration in limbs and joints. Indeed some interview participants reflected that when they were younger they had been given little or no advice about preserving function and were now dealing with the consequences. In that sense Thalidomide survivors face similar issues to other people ageing with disability but, as I discuss below, they are also dis-similar in terms of group identity and public perceptions.

My findings suggest that decisions about how much and what type of help and support to accept were influenced by peoples' idea of independence (and the resources available to them). We know from previous research that independence is a contested concept (Barnes 2006; Rabiee 2013). In her longitudinal study with disabled adults and older people about choice and control, Rabiee (2013) found that it: *“is not a fixed and ‘given’ concept, but is highly relative, conditional and multidimensional”*. Thalidomide survivors' perceptions of independence often appeared to be shaped by the extent to which they had used help throughout their lives. Those who had always had personal assistance and/or relied on aids and adaptations, saw independence as less about being self-reliant and performing tasks without assistance, and more about being able to make decisions about one's life and having control over the help provided (Oliver 1989). Conversely those who had largely lived their lives without assistance or equipment or with minimal help from family, associated reduced self-reliance with reduced independence. For these participants, the process of 'rethinking independence' had more in common with people who acquire a disability condition later in life (Groomes and Leahy 2002; Uppal 2006). More generally what emerged was a sense of how much Thalidomide survivors valued their independence, which was perhaps because many had struggled to achieve and maintain it throughout their lives.

For many participants there was a continuing tension between doing things for themselves and knowing that if they did they would be in pain or excessively tired or even cause further damage i.e. there was a 'physical price' for independence when seen as self-reliance. There was also a temporal element. Some participants saw accepting more help and a modest reduction in some dimensions of independence now as a way to preserve function and so maintain their overall independence in the longer term. Importantly many Thalidomide survivors viewed the changes in how they lived as progressive – something that they would continually have to revisit as their impairments shifted and they aged. Trieschmann (1987) described this as an adaptive model of ageing with disability in which peoples' health and functional skills evolve over the life course. However, LaPlante (2014) suggests that this is a "*balancing act... [that] becomes more tenuous with age*" (pS46), and which is neither predictable nor orderly. Certainly for Thalidomide survivors there was an awareness that their independence was both hard won and precarious. Their sense of vulnerability mediated their current experience of ageing, while also creating uncertainty about the future. I discuss this further in 8.1.4.

Thalidomide survivors are unusual in that they are a clearly identifiable group who are ageing together. In relation to preserving function and perceptions of independence, the strong group identity within the Thalidomide community (reinforced by media coverage and public perceptions) has brought benefits but also created problems. It often motivated Thalidomide survivors to maximise their independence and lead active lives but, as I describe in 8.1.1 and 8.1.3, it has also contributed to secondary health problems, and difficulties adjusting to the need for assistance. It has also influenced how Thalidomide survivors judged their independence. Interestingly very few participants compared themselves to other people with disabilities.

My observation is that Thalidomide survivors with more severe damage often have strong connections with the Thalidomide community, e.g. through involvement with the Thalidomide Society and Thalidomide Trust or attending the same residential school, and so for them the natural comparison is with other Thalidomide survivors. Conversely, Thalidomide survivors with less severe damage often had less involvement with the Thalidomide community: some had only been recognised as a Thalidomide survivor later in life; others described themselves as 'the lucky ones' and they perceived that they weren't like Thalidomide survivors with severe damage; and a few implied that they had not wanted their lives to be defined by Thalidomide and so had purposefully had little contact with the Thalidomide community. Furthermore, for much of their lives many of these Thalidomide survivors had not thought of themselves as 'being disabled', and so were more likely to compare themselves to their peers in the general population. This

echoes thinking in the field of disability studies about narratively constructed self-identity. Carol Thomas (2007), drawing on the work of Margaret Somers explains that this:

Suggests that people with life-long or acquired impairments make sense of their experiences and who they are by continually weaving stories about themselves that draw upon the public and cultural narratives they are exposed to about 'people like them/us' (negative and positive). Individual's social circumstances (familial, educational, socio-economic and so forth) differentially expose them to these public and cultural narratives....this perspective can explain why many disabled people do not or will not identify as 'disabled'. (p80)

Importantly, participants also judged their independence relative to their younger selves. Whilst many people in their 50's might reflect on how easily or quickly they could do something compared to when they were younger, few would conceptualise this in terms of their independence or expect to make fundamental changes in how they live their daily lives. They are perhaps forced to look back because they do not have an older generation to compare themselves to.

The interviews suggested that decisions about the use of aids, equipment, adaptations, personal assistance and lifestyle changes, and associated perceptions of independence were also influenced by the financial resources people had access to. Having money gave them choice (or at least perceived choice) about the best way to preserve their function and maintain the aspects of independence that mattered to them. This in turn gave them a sense of control and empowerment. In relation to financial resources Thalidomide survivors are again unusual. Since the up-lift in the Annual (compensation) Grants and the introduction of the Health Grant, they are financially more secure than many disabled people. The sense of control this gave them was akin to that found in the research into disabled peoples' experiences of Direct Payments, (Priestley et al 2007; Glasby 2005) and confirms the link between independence, choice and control (Rabiee's 2013).

8.1.3 Vulnerable Mental Wellbeing

In both the international literature and the health and wellbeing survey, mental health problems emerged as the second most common health problem amongst Thalidomide survivors. Although estimates vary, based on the nature of the studies and the measures used, the evidence from Germany, Japan and Brazil suggests that between 40% and 50% of Thalidomide survivors are currently or have recently experienced mental health problems, a level far higher (the studies suggest) than found in the general population of a similar age in those countries. Depression was the most frequently reported mental health problem, which unlike in the general population, appeared to affect men and women

equally. The health and wellbeing survey found a very similar picture with half the respondents reporting recent or current experience of depression and/or anxiety. The survey results for the SWEMWBS also suggest that a far higher proportion of Thalidomide survivor (especially those who report being unable to work) have poor mental wellbeing, compared to their peers in the general population. There are no studies of the mental health of Thalidomide survivors in early adulthood or middle age and so it is hard to know whether their mental health has always been vulnerable, or has become so as they grow older. My observation is that there has always been vulnerability but as they age they are being exposed to a greater range of risk factors (i.e. increasing impairment, secondary health problems, changing social roles such as giving up paid work, and a sense that their independence is precarious), which for some have implications for mental wellbeing.

The relationship between physical disability and depression is complex and our understanding of this relationship in working-age adults remains limited (Turner and Noh 1988; Karahalios et al. 2019). In particular few studies have examined functional impairment (as measured by Activities of Daily Living/Instrumental Activities of Daily Living (ADL/IADL) and prevalence of depression. A UK study by Meltzer et al (2012) found a higher prevalence of depression and mixed depression/anxiety amongst people with disabilities compared to people who do not have impairments with disabling consequences, a finding supported by a more recent study of middle-aged and older Chinese adults (He et al 2019). However, Meltzer et al (2012) describe two other findings that are potentially highly relevant to Thalidomide survivors. The authors found that the number of ADL/IADL limitations people experience had an incremental effect on the likelihood of depression: *“each additional limitation appears to add to the psychological burden on the individual in an almost linear fashion”* (p108). Furthermore, whilst physical health problems were also associated with depression, disability seemed to be more strongly related to feelings of depression.

In the international literature, restricted physical function (especially decline in physical function) was one of the factors highlighted as contributing to higher levels of common mental health problems amongst Thalidomide survivors. Social isolation, pain, unemployment, and the need for care and personal assistance were also highlighted, although clearly these factors are likely to be linked to and influenced by physical function. In my research, loss of function, especially where it led to wider changes in peoples' lives such as giving up work or valued activities, or the need for personal assistance, also emerged as an important factor in Thalidomide survivors' mental wellbeing becoming more vulnerable. The results of the SF-12 Health Survey cast further light on this. Overall the mental health-related quality of life of Thalidomide survivors was only marginally

poorer than their peers in the general population. However, the results also showed that the less severe a respondents' Thalidomide damage, the poorer their mental health-related quality of life was likely to be. This suggests that it is not restricted physical function per se but rather the decline in physical function that was significant, especially where this results in ADL/IADL limitations.

However, my research also revealed another important influence on mental wellbeing which is rarely touched on in the international literature: the cumulative impact of living with disability (Karahalios et al 2019), and especially with rare impairments such as limb difference and facial disfigurement. Some participants described the mental effort involved in coping with daily life, constantly having to adapt and think ahead or plan how to manage in different situations. Those with upper limb damage and/or facial disfigurement, particularly highlighted the psychological impact of 'being different' and the unwanted attention that this sometimes brought. How these factors affected people and how they made sense of them, was influenced by both individual circumstances and characteristics (e.g. family attitudes, life events, personality traits) and the wider societal context (such as access to care and support, social networks, and financial resources). To understand this in more depth it is helpful to look again at the wider literature about ageing with disability.

Kemp and Mosqueda (2004) make the point that although rates of depression are higher amongst people with disabilities, depression does not appear to be caused by disability. Furthermore, they contend that there is very little connection between severity of impairment and rates of depression. They suggest that the reason for this conundrum: *"appears to relate to stress and the way people differ in their ability to cope with stressful circumstances such as having a disability"* (p57). To explain this they draw on the theory of stress and coping developed by Lazarus and Folkman (1984). The theory states that there are five factors which influence how much stress a person will experience in response to life challenges: 1) life events (or stressors) – number of life events, changes, or losses, in particular negative ones; 2) appraisal – the way the person views the events and their perception of the potential threat; 3) social support – how much people feel supported and understood by others when coping with life events; 4) coping method – the type of coping strategies the person uses to deal with events both emotionally and practically; and 5) personality – the person's long standing personality traits. The authors argue that people with disabilities are likely to experience more negative life events throughout their lives (e.g. discrimination, health problems, financial pressures) and that these increase with age. It is this that accounts for the higher rates of depression amongst disabled people. They go on to suggest that the differences in the rate of depression *within* groups of disabled people is determined by the other four factors (appraisal, social

support, coping method and personality) but that there is no evidence these factors should be significantly different in people with disabilities. They do not discuss the role of financial resources but it might be reasonable to assume that having financial resources influences the extent to which they see life events as a threat because people can use these resources to 'buffer' themselves. They may also facilitate better social support because people can afford to be more socially active.

Furthermore, the conclusion which Kemp and Mosqueda (2004) reached, fails to take account of a number of important factors. Individuals do cope differently with stressful events but this coping occurs in a social context and is conditions by what people have to cope with. People with disabilities often experience a wider range of negative life events or stressors (Groomes and Leahey 2002), and these stressors tend to be more complex. In addition, as Iwasaki and Mactavish (2005) point out, *"the stress they experience also tends to be chronic and magnified by factors related to their disability"* (p194). This certainly accords with the experiences of the Thalidomide survivors. Iwasaki and Mactavish (2005) group the causes of stress for disabled people into two 'theme clusters':

"Individual and systemic/environmental. The individual theme cluster contains four specific categories of stress: (a) disability (i.e., added demands in daily living and the complications of disability and aging), (b) health, (c) interpersonal relationships, and (d) the inability to meet expectations. The systemic/environmental cluster also incorporates four sources of stress: (a) exclusionary social systems and structures, (b) physical accessibility, (c) employment accessibility, and (d) economic marginality". (p199)

A number of these themes resonate with my findings and in particular the cumulative impact on mental wellbeing of a lifetime of disability. The participants in Iwasaki and Mactavish (2005) study highlighted the added demands that disability places on daily living, in particular *"the extra energy, effort, time, and care required to fulfil daily responsibilities"* (p199). My research suggests that this issue may be amplified for Thalidomide survivors with severe upper limb damage. Living with missing or short arms presents obvious practical challenges to daily living but these are often exacerbated by a wider systemic/environmental failure to understand and accommodate these rare impairments. For Thalidomide survivors the demands of living with their original impairments were being complicated by secondary health problems, decline in function and the associated impact on independence. Furthermore, fears that these problems would increase in the future led to some participants to feel their current way of life was fragile, which in turn had a corrosive effective on their mental wellbeing. Similarly, Iwasaki and Mactavish (2005) found that *"the stress evoking implications of disability were*

compounded with age related health problems, life changes and reduced independence” (p200). The authors also discuss the effect of social systems and structures which leads to disabled people feeling excluded. They note that feelings of exclusion were often associated with negative attitudes and behaviours toward disabled people. Thalidomide survivors, especially those with rare and visible impairments, report similar feelings of exclusion and ‘difference’.

Finally, a number of studies (Moll and Cott 2013; Kemp and Mosqueda 2004; Iwasaki and Mactavish 2005) clearly show that the assumption that people with early acquired disabilities are somehow better able to cope with the secondary health problems and decline in function associated with ageing, is questionable. Kemp and Mosqueda (2004) observe that people with early acquired disabilities may have had long periods where their physical function was stable, during which they were able to maximise their independence and quality of life. The experience of age-related changes, especially where these occur earlier than for people without disabling conditions, and are life limiting, can have a very significant impact on mental wellbeing. Furthermore, these changes *“may signify that the disability has finally ‘won’”* (p61). In many respects the experiences of Thalidomide survivors mirror these observations. However, my research suggests that the impact of these changes may be felt more keenly by those people with less severe impairment, who have needed little or no assistance for most of their lives. Importantly, for some of this group their perspective was less that *‘the disability has won’* and more that they are *‘now disabled’*.

8.1.4 Emergent Theory - Ageing Differently

My research has focused on Thalidomide survivors at a particular stage in their lives, where disability and ageing are beginning to intersect. The findings clearly show that physically Thalidomide survivors are ageing differently to their peers in the general population but they also reveal how their experience of ageing is both different and similar to other people with early acquired disabilities. Importantly, my emergent theory considers how what is happening to Thalidomide survivors now needs to be seen in the particular historical, social and economic context of their lives and how, throughout their lives, they have had to continually negotiate and re-negotiate their independence. I begin by briefly considering the notion of ‘normal’ ageing and how normative assumptions about ageing may not ‘fit’ for people with early acquired disability. I then describe how a life course perspective might inform our understanding of Thalidomide survivors’ particular experience of ageing with disability.

‘Normal biological’ ageing involves a range of predictable age related changes. It does not include changes that cause disease, although some health conditions may become more

common with age (e.g. a slower gait is a normal age related change but osteoarthritis is not) (Kemp and Mosqueda 2004). Psychological changes are also a normal part of ageing but again these need to be distinguished from mental health conditions which are more common in later life (e.g. changes in a person's in motivation and emotions are normal but depression is not). Similarly peoples' social roles and relationships will change as they move through phases of their life course, but these are often influenced by social and cultural norms (Balcombe and Sinclair 2001). All of these dimensions bring with them assumptions about what constitutes 'normal' ageing (e.g. level of health, mental functioning and social roles) at certain chronological ages or phases in the life course. For Thalidomide survivors and people with early acquired disability in general, these normative assumptions may be incorrect and even problematic. Indeed, Lowton et al (2017) suggest that the existence of these new ageing populations, '*challenge an understanding of the normal within discourses of ageing*' (p9).

A life course perspective encourages us to think about how disability may have affected a person throughout their life, not just how it is affecting them in middle and later life (Jeppsson Grassman et al 2012). It also reminds us that aspects of identity, like age and disability, overlap and intersect throughout the life course (Naidoo et al 2012). Traditional approaches to the life course are underpinned by the idea of a 'normal' life course, in which people move through a series of stages linked to chronological and biological ageing (Priestley 2003). However, many people with early acquired disabilities will have lived atypical lives where, for example impairment and age related changes may be overlapping sooner than expected, potentially leading to increased disability. Their experience of ageing needs to be seen in the light of this. Furthermore, the historical era and social context in which people live plays a role in shaping their life course (Elder et al 2003). This is particularly significant in relation to Thalidomide survivors because they are a generational cohort who, broadly speaking, have been exposed to the same social influences.

Thalidomide survivors' experiences of shifting impairment reinforce the point that whilst many disabling conditions are regarded as static, peoples function does change over their lives (Molton and Yorkston 2017). Concepts such as 'biographical disruption' (Bury 1982) developed in the field of sociology of chronic illness and disability, tend to take a short term perspective that does not capture the experience of disability over the life course (Jeppsson Grassman et al 2012). Certainly, Thalidomide survivors perceived that a lifetime of living with disability is leading to their bodies 'wearing out' or becoming less resilient. They have a sense of being older than their chronological age and often described themselves as being out of step (in terms of overall health) with their peers. My

research confirms that, as a group, their health and function is poorer than their peers in the general population: they are increasingly experiencing secondary conditions which are linked to and being layered on to their original Thalidomide damage; many are dealing with other health problems commonly associated with ageing; and multi-morbidity is a growing concern, all of which impacts on their experience of disability.

The rate at which the changes associated with normal ageing take place will vary from person to person, whether disabled or non-disabled, and is affected by a range of influences (e.g. genetics, lifestyle, environmental exposures, socio-economic status). Pre-existing disability creates a further complication (Trieschmann 1987). Most people reach their peak physical/functional capacity in their twenties, after which it slowly decreases. This decrease does not in itself cause illness but as Kemp and Mosqueda (2004) explain, it does reduce the “*buffer zone*” or physiologic reserve that enables our bodies to deal with or recover from stressors. People with early acquired disabilities are often unable to reach the same peak capacity in one or more body system (e.g. the peak bone density and peak lung capacity of a person who has never been able to walk is likely to be lower than someone who has always been able to walk). This means that whilst their physiologic reserve may decrease at the same rate as their peers who do not have impairments with disabling consequences, they are starting from a lower point i.e. they have a narrower buffer zone. As a result they may experience changes associated with ‘normal’ ageing at an earlier age, although for them this is the norm.

As such, the Thalidomide survivors’ perception that they are ageing prematurely (in relation to the normative assumptions in our society), suggests that their experiences are similar to other people ageing with early acquired disability. However, there are interesting differences too. Thalidomide survivors in the UK are the first (and only) generation of people living with TE, and so they do not have an older generation to look to and learn from. Furthermore, despite recent advances in research, we still know relatively little about the long term effects of the drug. For these reasons it can be particularly hard for Thalidomide survivors to distinguish between ‘normal’ age-related change and secondary conditions linked to their Thalidomide damage. This also creates uncertainty about the future. This sense of uncertainty is not unique to Thalidomide survivors. As they approach later life, many disabled people have concerns about the future (e.g. about further loss of function, the need for assistance, changing family circumstances etc.) but these are exacerbated by lack of knowledge about the long term consequences of TE.

The integrative category ‘Preserving Function/Rethinking Independence’ highlights the acute awareness that many Thalidomide survivors have of their bodies, and how they are changing. They recognised that their function was declining, or might do so in the future,

and many were taking steps to preserve their function. In part this was about retaining control over what was happening to their bodies, which sometimes involved rethinking long held notions of independence. They also saw this as an on-going process, something that they would continuously need to revisit as they grew older. These findings echo those of the Swedish *Disability, Life Course and Ageing* study (Jeppsson Grassman et al 2012), one of the few studies to examine what it means to live a long life with disability. The authors conclude that: *autonomy is a process and not a state. It, too, must be created and recreated frequently over time* (p107).

However, here again the experience of Thalidomide survivors is slightly different. In the last two decades there has been a significant improvement in their financial situation, with the up-lift in their annual compensation payments and the introduction of the Government Health Grant. Unlike many people with early acquired disabilities, they do have resources which they can use to help them preserve their function and re-negotiate their independence. Moreover, they have the freedom to use these resources in the way that makes most sense to them, whether that is changes to their home, changes in lifestyle (e.g. giving up paid work) or changes in the nature and type of assistance they used. To some degree these resources also buffer them from some of the uncertainties of ageing with disability described above. They not only enable them to pay for things here and now, they also provided a form of 'insurance' which could help them cope with as yet unspecified future needs. In this sense Thalidomide survivors are *ageing differently in relation to negotiating independence*. As disability and ageing begin to intersect, the independence they have established over the course of their lives is increasingly threatened, both now and in the future, and they are using their resources to reduce the associated uncertainty and risk.

Despite the benefits brought by this relative financial security, my research shows that depression and anxiety was far more prevalent amongst Thalidomide survivors than the general population of a similar age, and people with physical disabilities in general. In 8.1.3 I suggest that one reason for this is the decline in physical function and increase in secondary health problems that many Thalidomide survivors are experiencing. It might be assumed that over their lifetime, people with early acquired disabilities get used to living with disability and are in some way better able to cope with further loss of function and additional health problems but the experience of Thalidomide survivors and others shows this is not the case (Jeppsson Grassman et al 2012; He et al 2019). I would also argue that, whilst not unique to Thalidomide survivors, the cumulative impact of living with rare impairments such as limb difference and facial disfigurement has been particularly corrosive to their mental wellbeing. However, my observation is that this is less about the

ageing per se and more about exposure to negative social attitudes over nearly six decades.

In these final paragraphs I consider how Thalidomide survivors might be regarded as *ageing differently* not just as they approach later life but also when we look at the full arc of their lives. In particular I examine how their experiences reflect prevailing social and institutional attitudes to disability at different periods in their lives but also how they themselves have contributed to the change in some of these attitudes. Throughout the Thalidomide survivors' childhood and early adulthood, biomedical definitions of disability prevailed. It might even be said that Thalidomide survivors were 'victims' of this view of disability, which saw disability as primarily an individual 'problem' (Rembis et al 2018). It brought with it a desire to, where possible, 'correct' impairments. As I briefly describe in Chapter 2, as children many Thalidomide Survivors underwent multiple surgical procedures. Whilst some of these were necessary and beneficial (e.g. creating a thumb from a finger so that those born without thumbs had the ability to grip), others were cosmetic and detrimental (e.g. amputating malformed digits that were thought to be of no use). Some were also expected to use prosthetic limbs which were often uncomfortable and even dangerous (e.g. causing falls and injuries). These childhood experiences have left many Thalidomide survivors with a distrust of doctors and a reluctance to seek and accept medical advice and treatment.

In some ways the often atypical experiences of Thalidomide survivors serve to highlight the kinds of social and structural barriers to participation that all disabled people faced at that time. Perhaps partly because of the visibility of the 'Thalidomide children' and partly as a result of the tenacity of their parents, Thalidomide survivors as a group achieved similar educational attainment to their peers in the general population but this was not the case for most disabled people in the 1960s and 1970s. Indeed, those Thalidomide survivors who lacked family support often had difficult childhoods and inadequate education. As Thalidomide survivors reached adulthood, disability activists and academics were challenging bio-medical definition of disability and developing the ideas that would eventually underpin social models of disability. Thalidomide survivors were part of this wider dynamic, and their efforts to negotiate their independence as young adults helped to put some of this thinking into practice. For example when Thalidomide survivors reached their late teens and wanted to be able to drive, there was no nationwide system for obtaining adapted cars, especially not cars that a person with limb difference could drive. The Motability adapted car scheme was developed in large part in response to their desire for independent mobility.

In this way, in the public discourse, Thalidomide survivors began to move from being seen as passive tragic victims to heroic pioneers. However, it was in their 40s and 50's that Thalidomide survivors, as a group, with a collective shared experience, became truly active politically, in particular campaigning for reparation from the British Government for their failure to properly regulate the drug in the late 1950s and early 1960s. This led, in 2010, to the creation of the Health Grant, which whilst clearly being seen by many as social justice, was also an implicit acknowledgement that Thalidomide survivors needed substantially more resources if they were to have a good quality of life as they grew older i.e. if they were to flourish not just 'get by'. Furthermore, Thalidomide survivors are able to use their Health Grants in whatever way they feel will be most beneficial to their health. In effect, for this small group of high profile disabled people, the Government has conceded that disabled people need adequate resources and the freedom to use them if they are to age successfully, a philosophy that has not been evident in wider policy towards disabled people in the last decade of austerity. This final observation brings us full circle and once again highlights to contemporary relevance of the Thalidomide 'tragedy'.

8.2 Contribution of the Study to Existing Knowledge

This study makes three important contributions. First, it extends and deepens our understanding of the health and independence of Thalidomide survivors as they approach later life. Second, it adds to the body of knowledge about ageing with early acquired disability. Third, it provides further examples of two underused research approaches; the use of grounded theory in the context of mixed methods research; and a grounded theory analysis of secondary data. I discuss each of these contributions in more detail below.

The literature about ageing with TE is still relatively limited, despite an increase in research over the last decade. Much of this recent research focuses on the clinical aspects of ageing with TE, although a few studies have looked more broadly at aspects of health and independence. Mine is the first study to examine the experience of ageing with TE in depth, and to consider how this experience is different from or similar to Thalidomide survivors' peers with and without disabling conditions. It has also documented how the health and impairment of UK Thalidomide survivors is changing, and revealed how they are renegotiating their independence in the light of these changes. It shows the important role that financial compensation plays in these negotiations, but also how the strong group identity of Thalidomide survivors can both assist this process (e.g. through sharing information and peer support), and hinder it because people may be reluctant to acknowledge that they need assistance if this implies that they are not 'coping' as well as other members of the group. The insights gained have important implications

for the provision of healthcare and social support for Thalidomide survivors, particularly since health and social care agencies often struggle to offer such support.

The combination of impairments (particularly limb difference) caused by Thalidomide is rare, and the historical and social context of Thalidomide survivors lives is unique. Nevertheless, by focusing on such an identifiable group who are ageing together, and comparing their experiences to other people with early acquired disability, my study contributes to our overall understanding of ageing with disability. Specifically, it adds to our knowledge about two issues, the cumulative impact of disability over the life course, and the place of the 'impaired body' in peoples' experiences of ageing with disability. Relatively few authors have used a life course perspective to understand the nature of ageing with disability but those that have (Priestley 2003; Naidoo et al 2012; Jeppsson Grassman et al 2012) have made a valuable contribution. In particular they highlight '*the centrality of temporality*' (Jeppsson Grassman et al 2012, p107): the experience of growing older having already lived a long life with disability; the interaction between the historical time in which a person has lived their life and biographical time; the importance of seeing the maintenance of independence and autonomy as a process, which has to be revisited over time; and the implications of uncertainty about the future. My findings reinforce these themes and strengthen the case for more work of this kind.

Over the past five decades the lives of UK Thalidomide survivors have been documented in the media. Their 'impaired bodies' have been photographed and filmed and, in the medical press, X-rayed in order to illustrate the consequences of TE. Thalidomide survivors themselves have also made explicit use of images of their bodies in their campaign for compensation from Chemie Grünenthal. Given this coverage, it is perhaps not surprising that Thalidomide survivors are very aware of their 'impaired bodies', how they are changing as they age, and what they might need to do to preserve them. Jeppsson Grassman et al (2012) also found that their participants used awareness of their bodies as a strategy for retaining control of their everyday lives. These practical realities reflect a much bigger theoretical debate within disability studies and medical sociology about the place of the body, and the extent to which disability is caused by impairment and social exclusion or social disadvantage (Thomas 2004). I believe that my findings support Carol Thomas's argument for a sociology of disability that recognises both disablism and the impairment effects that arise from the lived experience of the impaired body (Thomas 2012).

Finally, my study provides new examples of two underused research approaches: the use grounded theory within mixed methods research and grounded theory analysis of secondary data. A systematic review of the application of MM-GT (Guetterman et al 2017)

in health sciences, social sciences and education, noted that despite the widespread use of both mixed methods research and grounded theory, combining the two is relatively new. The review identified just 61 articles that claimed to use both qualitative and quantitative empirical data (regardless of whether they were described as 'mixed methods' studies), and to use grounded theory (at least for the qualitative strand of the study). It found that researchers claiming to use grounded theory in mixed methods research rarely drew upon all or even most of the six grounded theory features identified by the authors (see Chapter 3, section 3.7.1). Whilst my decision to adopt a MM-GT approach emerged from a heuristic process, I believe my research represents an interesting and clearly documented example of a MM-GT study. Undertaking grounded theory analysis of secondary data is even less common. My attempt to find examples which I could draw on yielded only one paper (Whiteside et al 2012), although Birks and Mills (2015) do discuss this topic in their excellent practical guide to grounded theory. For me, the grounded theory secondary analysis of the interviews was a particularly valuable element of my study. It added significantly to the richness of my findings, because it helped me to look deeper in to the data to understand how people experienced and made sense of their health problems, and how these problems affected them physically, mentally and practically. It also facilitated my reflexivity as a researcher. The line by line coding pushed me to look at the data with fresh eyes and, in doing so, examine my preconceived ideas about how Thalidomide survivors were responding to changing health. This may be a valuable reflection for other researchers contemplating secondary analyses of their own data.

8.3 Strengths and Limitations of the Study

The study has a number of important strengths but also several limitations. Importantly, I had worked with people in the Thalidomide community for a number of years prior to starting my doctoral studies. I had come to know some individuals well and developed an understanding and empathy for the challenges many of them were facing. As such there was a risk of overfamiliarity and the possibility that I might find it difficult to question or shed preconceived ideas. Certainly I felt this was the case when I came to undertake the secondary analysis but as I note in 8.2 above, the line by line coding did push me to re-examine my assumptions. More generally, the overall structure of the study, sound methods and regular supervision in which I could discuss my thinking, enabled me to avoid this pitfall.

Looking at the study overall, the interconnection between my doctoral research and the Thalidomide Trust Health Grant Monitoring project helped to strengthen the study in two important respects: it ensured that all the main stages of data collection were strongly

informed by Thalidomide survivors; and it facilitated a very good response to the survey. The two methods of data collection and the overall timetable for conducting the data collection were determined by the Health Grant Monitoring project but in fact this encouraged me to think creatively about the sequencing of my research and how to make best use of my data. It also led me to adopt a MM-GT approach, which worked well as it: provided a coherent and practical 'structure' for the study; enabled me to use the most appropriate methods for addressing my research questions; facilitated integration of the different stages; and created greater explanatory potential.

Looking more closely at the different elements of the study, the choice of a scoping review (rather than a systematic review) felt appropriate to needs of the study. I did conduct it in a 'systematic' manner e.g. using a systematic approach to searches and so I am confident that I captured all the key literature about TE. The Grounded Theory approach to analysis/synthesis enabled me to generate themes relevant to the objectives of the study, and helped me develop my understanding of Grounded Theory methods at an early stage in my doctoral studies. The results of the scoping literature review have now been published in the Disability and Health Journal (see Appendix 10).

The qualitative study had a number of limitations, partly reflecting the need to balance feasibility with desirability. Recruitment for the study was led by the Trust and was a relatively informal process when compared to the approach a University would take. Specifically, participants were self-selected and so may not be fully representative of UK Thalidomide community as a whole. The group comprised of significantly more women than men, whereas the Thalidomide community is split equally. It is possible that people who felt more comfortable with research and/or had a higher level of education were more likely to volunteers to take part. Conversely, those less engaged with the Thalidomide community or those with low mood or depression might have been less likely to volunteer. Broadly, the severity of participants' impairments (as indicated by the Trust's impairment bands) was similar to that of all UK Thalidomide survivors but those with severe hearing impairment were under-represented and so my findings may not fully reflect their experiences. Having to structure the topic guide for the interviews around the issues the Trust wanted to explore created a tension, but the interviews nevertheless yielded a great deal of rich data. Using both initial content analysis and then secondary analysis of interview data meant that I was able to draw a great deal from it without placing a further burden on Thalidomide survivors, an important consideration given the concerns within the Thalidomide community about research. There was a danger of duplication/overlap or insufficient distinction between the two phases of analysis but the use of Grounded Theory for secondary analysis prevented this.

The Health and Wellbeing Survey worked particularly well. Offering Thalidomide survivors the option to complete the questionnaire online, by post, and over the telephone was well received and this together with the reminder and more informal encouragement from Trust staff and volunteers, produced a very good response rate (75%). Furthermore, the survey respondents were highly representative of all UK Thalidomide survivors in terms of gender, UK country of residence, and the nature/severity of their impairments. However, there were some issues with the phrasing of health questions and consequent difficulties with comparisons with general population. I also felt that the data generated by a few of the questions was not robust and so decided not to use it in my thesis. The statistical analysis was also relatively limited because my original plan had been to just use descriptive statistics. It was only after I had completed the initial analysis that I realised the quantity and quality of the data would allow for further statistical analysis. I did undertake additional analysis, particularly in relation to the results for health-related quality of life, but inevitably the data would allow for even more analysis. The main results from the survey have now been published in PLOS One (see Appendix 10).

It might be assumed that because Thalidomide survivors are such a unique group, the findings from this study may have limited transferability to other groups. However, as the study progressed it became apparent to me that there was much to learn from comparing their experiences to other people with early acquired disabilities. I believe that my emergent theory, *Ageing Differently* has the potential for wider application. This accords with grounded theory tradition. Birks and Mills (2015) explain that whilst early writers saw the emergent theory (or core category) as reflecting a basic social process, later writers have taken a more flexible approach. Charmaz (2014) focuses on 'usefulness', suggesting that: the categories within the emergent theory should suggest some generic processes; that the analysis could be applied in other settings; and that the emergent theory can be understood and applied in the real world. I begin to demonstrate these points in the next two sections.

8.4 Implications for Policy and Practice

My research provides further evidence that the health needs of Thalidomide survivors are often more complex than those of their peers in the general population. Knowledge of secondary conditions is increasing but the long term consequences of TE remain uncertain. It is vital therefore, that they have access to health and social care professionals who understand their original impairments and secondary conditions associated with TE, and the implications of age related conditions. In the UK the Thalidomide Trust has been working to identify doctors in key specialties, notably different branches of orthopaedic surgery (i.e. hip, shoulder, and arm/wrist), cardiology, and

neurology who have developed experience in diagnosing and treating Thalidomide survivors. Similar initiatives are going on in Germany, Japan, Sweden and Australia, and efforts are increasing to share specialist knowledge internationally. It is essential that these initiatives continue. However, it is also important that other non-specialist healthcare practitioners (e.g. GPs, physiotherapists, practice nurses and advanced practitioners) have some understanding of their needs or at least recognise their own lack of knowledge. They should work with the Thalidomide survivor they are treating to improve their understanding and get access to good advice and information. The Thalidomide Trust has recently produced information about key practical topics such as measuring blood pressure and taking blood samples from people with short or missing arms, and the potential musculoskeletal differences physiotherapists should be aware of when treating Thalidomide survivors.

The Thalidomide Trust is a unique organisation, which has both the remit and the resources to support its beneficiaries in this way. Many people with early acquired disability, including those with rare impairments, do not have this type of support. Whilst it would be unreasonable to expect all healthcare practitioners to have an in-depth knowledge of early acquired disability and ageing with disability, the NHS should ensure that there is greater awareness. Thalidomide survivors often describe how, across their life course they have had negative experiences of healthcare including: inappropriate or inadequate treatment; negative even discriminatory attitudes; a failure to comprehend the implications of impairments for treatment and recovery; an inability to distinguish between their disabling condition and conditions common in ageing; and importantly, a lack of understanding of the mental health consequences of lifelong disability. For some this has led to a general distrust of healthcare practitioners. Other groups with early acquired disabilities report similar experiences (Iezzoni 2011; Molton and Yorkston 2017). The number of people ageing with disability in population is growing and so healthcare practitioners will increasingly encounter them in their everyday practice. They should have the knowledge to support them appropriately.

More specifically, healthcare services need to recognise that whilst many disabling conditions are regarded as static, peoples function does change over their lives. For this reason, habilitation (i.e. attaining, keeping or improving skills and abilities) and rehabilitation (i.e. regaining skills or abilities that have been lost) should be seen as something that disabled people may need throughout their lives. This is particularly important for people ageing with disability, where a seemingly modest loss of function can have major consequences for a person's independence. However, there are conflicting views, especially about rehabilitation within disability studies with some seeing it as

emphasising 'normalisation', whilst others suggest that where disabled people themselves are actively involved in decisions about their rehabilitation, it can mitigate impairment (Shakespeare et al 2018). Perhaps the key is for healthcare practitioners to see rehabilitation as supporting disabled people to manage their bodies as they age, and as such a collaborative approach is essential. Healthcare practitioners also need to understand the implications for mental health, of loss of function and decline in physical health. They should not assume that people with early acquired disabilities get used to living with disability and are in some way better able to cope with additional health problems. Nor should they assume that depression is an inevitable consequence of disability (as I discuss in 8.1.3). It can be prevented and when it does occur it should be treated.

In recent years the concept of 'successful' or 'healthy' ageing has received increasing attention. Although there are social and psychological models of successful ageing, the medical model (i.e. that chronic illness and disability can be delayed or prevented so that people live more of their lives in a healthy state) predominates (Bowling and Dieppe 2005), especially in public discourse. Molton and Yorkston (2017) point out that this emphasis on preventing or delaying disability "*embodies ableism*" and implies that "*individuals ageing with disabling conditions cannot age successfully*" (p291). As the experiences of Thalidomide survivors and other people with early acquired disability show, this perspective fails to recognise the strategies that people use to preserve their function and age healthily on their own terms and not in accordance with an ideal and imagined norm. However, the experiences of Thalidomide survivors as a group also reveal the vital importance of financial resources in enabling people to adopt such strategies. The introduction of the Health Grant increased Thalidomide survivor annual 'income' from the Trust by about 75%. This gave them greater choice about how to preserve their function and renegotiate their independence as they age. It also enabled many of them to overcome some of the barriers that disabled people face, and so lead fuller lives i.e. to 'flourish' with disability (Berghs et al 2019). In essence, flourishing with disability is about respecting individual experience while challenging the context in which disability is generated. However, in later life it is also about challenging normative assumptions about successful ageing and recognising that people find fulfilment in different ways (Jeppsson Grassman et al 2012). This has important implications for the relevance to disabled people of current public health messages about healthy ageing, and for the level of disability benefits.

8.5 Further Research

A number of possible avenues for further research have emerged from my study. Some topics are specifically concerned with the health of Thalidomide survivors, whilst others are broader questions related to ageing with disability. I discuss these further below and link them where appropriate.

In relation to the specific health problems of Thalidomide survivors, some work is already taking place in the UK, Germany and Japan to identify the most effective interventions, particularly surgical interventions, for treating the musculoskeletal problems Thalidomide survivors are experiencing. However, there would be value in developing greater understanding of the non-invasive treatments and self-management strategies Thalidomide survivors use to manage pain and preserve their function. Not only would this benefit Thalidomide survivors, it may also help younger people with limb difference to *'conserve it and preserve it'*.

Many Thalidomide survivors report neuropathic pain and symptoms of neuropathy (e.g. pins and needles, numbness). Current research evidence suggest that for some people this may be caused by compressive neuropathy (e.g. carpal tunnel syndrome) but so many Thalidomide survivors describe these symptoms that it seems possible that they are related to the long term effects of the drug. Certainly developmental biologists researching the action of the drug believe this could be the case¹⁹. Research that sheds light on the possible causes of these symptoms (which can be debilitating), would assist clinicians in identifying appropriate treatments.

My research also suggests that multimorbidity is an increasing concern for Thalidomide survivors and as people with disabilities live longer, it will become an increasingly common issue in the population as a whole. Research is needed to understand how people with early acquired disabilities experience multimorbidity, and whether any adjustments are needed in the approach to their care and treatment.

There has been a good deal of research in recent years into the link between long term health conditions and depression and between ageing and depression but research into the relationship between ageing with early acquired disabilities and depression remains sparse, despite the prevalence of the condition. This gap in our knowledge needs to be addressed so that people are able to get timely diagnosis and treatment. However, we also need to develop a better understanding of the mental health consequences of living a long life with disability so that disabled people can be supported to maintain their mental

¹⁹ Personal correspondence with Prof Neil Vargesson, University of Aberdeen.

wellbeing, and the societal conditions which have a detrimental influence on their mental health can hopefully be addressed.

Finally, to my knowledge there have been no longitudinal cohort studies in the UK which have focused on people ageing with early acquired disabilities, especially those moving from late middle age to older age. Such a study could be used to explore a number of topics but here I highlight three which I feel are particularly important in terms of improving the health and quality of life of disabled people:

- Their experience of shifting impairment and changing health, and in particular how they respond, physically, emotionally and practically, to the onset of secondary conditions and/or conditions associated with ageing, after having navigated their life course with their primary disability condition
- Their access to health services that are able to meet their needs. There is a danger that disability services used to dealing with younger adults are not geared up to support people ageing with disabilities, whilst services for older adults may struggle to understand the impact of living a long life with disability. We need to understand what service models work best and what features of services people value most
- Their understanding of what it means to 'age healthily' with an early acquired disability and whether it is possible to develop a model of successful ageing with disability that can be used to inform public health messages.

8.6 Impact and Dissemination

At various points during my doctoral research I have taken opportunities to disseminate my findings. The results of the scoping review and the Health and Wellbeing survey have both been published in peer reviewed journals. In 2016 I organised two events. The first was the UK premiere of *50 Years of Shame*, a film about the situation of Thalidomide Survivors in Spain. The screening was held at the University of York, and was followed by a panel discussion involving the film's director, two Thalidomide survivors (one from Spain and one from the UK) and myself. The event was jointly funded by the Department of Health Sciences and the Centre for Global Health Histories at the University of York. The second was an interdisciplinary 'Legacy of Thalidomide' meeting, supported by the Wellcome Trust funded Centre for Chronic Diseases and Disorders, at the University of York. A report from the meeting was published in *Birth Defects Research*.

I made oral presentations at the first and second International Thalidomide Embryopathy Symposiums held in Tokyo, Japan in 2015 and 2019. In 2019 I also made a written submission to the Australia Senate Community Affairs Reference Committee inquiry into support for Australian Thalidomide survivors. I was subsequently invited to give oral

evidence (by teleconference) to the hearing held in Sidney. My evidence was quoted extensively in the interim report from the inquiry and as a result I was asked by the Royal Australasian College of Physicians to write (jointly with two colleagues) a continuing Professional Development module about Thalidomide. These and other dissemination and impact activities are summarised in Appendix 14.

8.7 Conclusion

The aim of this study was to explore the changing nature and perceptions of health and independence amongst UK Thalidomide survivors, at a stage in their lives where disability and ageing are beginning to intersect. The study contributes to our understanding of the interaction between original impairment, secondary health problems and the ageing process. Importantly, given the biomedical in focus of much of the existing literature, it gives Thalidomide survivors a voice and an opportunity to articulate how this interaction is affecting their daily lives. My hope is that this knowledge will inform how healthcare professionals, and health and care services, treat and support Thalidomide survivors and other people ageing with early acquired disabilities.

Appendix 1 Initial Consent Form



Monitoring the 10 Year Health Grant

Consent Form

Thank you for offering to be part of the Health Grant monitoring Study Group. Please complete this consent form and return it to Firefly Research.

Please tick the boxes.

	YES	NO
I agree to take part in the Health Grant monitoring project	<input type="checkbox"/>	<input type="checkbox"/>
I agree to be interviewed once a year	<input type="checkbox"/>	<input type="checkbox"/>
I agree that you can record the interview	<input type="checkbox"/>	<input type="checkbox"/>
I understand that the information I give in my interview will be treated in confidence	<input type="checkbox"/>	<input type="checkbox"/>
I agree to the Thalidomide Trust giving Firefly Research information about my impairment (6ivb) band and the value of my Annual Grant and Health Grant	<input type="checkbox"/>	<input type="checkbox"/>
I understand that no other information about me will be given to Firefly Research by the Thalidomide Trust	<input type="checkbox"/>	<input type="checkbox"/>

Signature:		Date:	
Name:			
Address:			
Tel. No.			
Email:			

Appendix 2 Revised Consent Form for Interviews

Monitoring the 10 Year Health Grant Consent Form for Interviews

Thank you for offering to be part of the Health Grant monitoring Study Group. Please complete this consent form and return it to Firefly Research.

Please tick the boxes.

	YES	NO
I agree to continue taking part in the Health Grant monitoring project	<input type="checkbox"/>	<input type="checkbox"/>
I agree to be interviewed in Spring 2015	<input type="checkbox"/>	<input type="checkbox"/>
I agree that you can record the interview	<input type="checkbox"/>	<input type="checkbox"/>
I understand that the information I give in my interview will be treated in confidence	<input type="checkbox"/>	<input type="checkbox"/>
I agree to the Thalidomide Trust giving Firefly Research information about my impairment (6ivb) band and the value of my Annual Grant and Health Grant	<input type="checkbox"/>	<input type="checkbox"/>
I understand that no other information about me will be given to Firefly Research by the Thalidomide Trust	<input type="checkbox"/>	<input type="checkbox"/>
I agree to anonymous information from my interview being used as part of a PhD study at the University of York	<input type="checkbox"/>	<input type="checkbox"/>

Signature:		Date:	
Name:			
Address:			
Tel. No.			
Email:			

Appendix 3 Ethical Approval Letter and Response

THE UNIVERSITY *of York*

DEPARTMENT OF
HEALTH SCIENCES

c/o Department of Philosophy
Heslington
York YO10 5DD

Telephone (01904) 433253
Fax (01904) 321383
E-mail smh12@york.ac.uk

23 May 2014

Dr Stephen Holland
www.york.ac.uk/healthsciences

Ms L Newbronner
University of York
Heslington
York
YO10 5DD

Dear Liz

Understanding the nature and implication of Thalidomide-related health problems being experienced by Thalidomide-impaired people as they age

Thank you for submitting the above research study to the Health Sciences Research Governance Committee for approval. Your application was considered by the committee at its meeting on Monday, 19 May 2014.

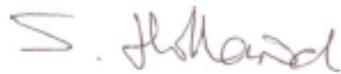
The committee has approved the study but asked me to feed back the following points:

1. The number of participants is ambiguous (52 in Section 12 of the Submission Form; 25 on the Information Sheet).
2. It is unclear as to where the interviews will take place. This raises concerns about researcher safety; in particular, whether the study is compliant with the Department's Lone Worker Policy.
3. It should be very clear on the Information Sheet and Consent Form that participants have the right to withdraw from an interview without giving reasons and without any repercussions.
4. The Information Sheet and Consent Form should have Date and Version Numbers as headers (so that they can be accurately referred to), and should carry the University logo.
5. The abbreviation, 'NAC' on the Information Sheet may not be familiar to all recruits so the name of the organisation should be spelt out.

6. It is unclear whether the consent form covers one interview or interviews that will take place in future years. The committee recommends that participants consent to each interview annually. But if consent covers more than one annual interview, it should be made very clear how many annual interviews are being consented to. Whichever option is chosen, the extent of the consent should be clearly stated on the Information Sheet and Consent Form.

The committee is happy for you to take up these issues with your supervisor and does not need to see the study again. However, please inform me if you make any substantial amendments to the study. If you have any questions regarding the committee's decision then please contact me.

Yours sincerely

A handwritten signature in cursive script that reads "S. Holland".

Stephen Holland (Dr)
Chair: HSRGC

30th June 2014

Dr Stephen Holland
Department of Philosophy
University of York
Heslington
York YO10 5DD

Dear Stephen

Understanding the nature and implication of Thalidomide-related health problems being experienced by Thalidomide-impaired people as they age

Many thanks for your letter regarding HSRGC approval for my PhD research study. I very much appreciate the Committee's feedback. I've now had an opportunity to discuss the points raised with Prof Atkin, my supervisor and have set out the actions I plan to take below (in italics).

7. The number of participants is ambiguous (52 in Section 12 of the Submission Form; 25 on the Information Sheet).
I should have made it clear that the original commission from the Thalidomide Trust specified 25 participants but 52 Beneficiaries volunteered and so the Trust and the National Advisory Council decided that all the volunteers should be included in the study group.
8. It is unclear as to where the interviews will take place. This raises concerns about researcher safety; in particular, whether the study is compliant with the Department's Lone Worker Policy.
The interviews are all being conducted by telephone, except possibly one where the participant (who is already known to me from a previous study) has a hearing impairment. However, my supervisor has made me aware of the Department's Lone Worker Policy.
9. It should be very clear on the Information Sheet and Consent Form that participants have the right to withdraw from an interview without giving reasons and without any repercussions.
Unfortunately the Information Sheet and the Consent Form have already been used for the original recruitment of participants but I am making this point clear at the start of each interview.
10. The Information Sheet and Consent Form should have Date and Version Numbers as headers (so that they can be accurately referred to), and should carry the University logo.
Apologies, I should have included a date and version number. With regard to using the University logo, that wouldn't really be appropriate as technically this isn't a University of York study – it is only the secondary data analysis that is part of my PhD – and it may confuse participants. However, when I seek participants re-consent next year I will ensure that the information sheet makes it clear that some of the data will be used as part of a doctoral study based at the University of York.
11. The abbreviation, 'NAC' on the Information Sheet may not be familiar to all recruits so the name of the organisation should be spelt out.

I will do this in future versions but the Thalidomide community is so small and they have so much contact with their National Advisory Council representatives that it is highly unlikely that participants aren't familiar with the abbreviation.

12. It is unclear whether the consent form covers one interview or interviews that will take place in future years. The committee recommends that participants consent to each interview annually. But if consent covers more than one annual interview, it should be made very clear how many annual interviews are being consented to. Whichever option is chosen, the extent of the consent should be clearly stated on the Information Sheet and Consent Form.

The consent form was intended to cover consent for the whole study (i.e. one interview a year for eight years) but I appreciate that I should have made it clearer. In effect people will consent every year, as each Spring I will contact them (by email or letter) and ask them to confirm that they are still happy to be part of the study group.

I hope this covers all the main points and thank you again for your help with my application.

Yours sincerely

E.V. Newbronner.

Liz Newbronner

Appendix 4 Substantial Amendment and Letter of Approval

Department of Health Sciences Research Governance Committee

Application for a Substantial Amendment

Name of Applicant: Liz Newbronner
Role: Part-time PhD Student
Project Title: Understanding the nature and implication of Thalidomide-related health problems being experienced by Thalidomide-impaired people as they age

Summary of the Amendment

My original application to HSRGC (May 2014) sought approval for the secondary analysis (for my PhD) of interview data being collected as part of a project I am conducting for the Thalidomide Trust in my capacity as an independent researcher.

The findings from the interviews were presented to the Thalidomide Trust at the end of last year. In the light of these findings, and to inform other work within the organisation (e.g. an internal review of priorities; plans to apply for Specialist Commissioning status for Thalidomide Embryopathy) the Trust decided to undertake a survey of all beneficiaries, in order to quantify the health problems they were experiencing and the impact these are having on peoples, physical functioning, mental well-being and personal/working lives. Working with colleagues from the Trust, including a group of ten beneficiaries, I have developed and piloted the survey, and will be undertaking the analysis of the results later this year. The survey process and content was approved by the Trust's Research Committee (formerly their Scientific Committee) which considers the ethical and governance issues associated with any research being conducted with the Trust beneficiaries or the use of data held by the Trust for research purposes.

The survey was sent by the Trust to all beneficiaries in August 2015 and will remain 'live' until mid-September. It can also be completed on-line and by telephone. Completion of the survey is entirely voluntary and whilst beneficiaries are asked to give their names to avoid unnecessary reminders, it is made very clear that they can complete it anonymously. To date c300 of the 460 UK beneficiaries have completed the survey and approximately 10% have chosen to complete it anonymously.

Whilst the survey was commissioned and is being conducted by the Trust, they have kindly agreed that I can have access to the data from it for my PhD. This will be the largest survey of Thalidomide-affected people in the world to date and as such will be a hugely valuable resource for my study. The analysis of the data for my PhD will be entirely anonymised. No names or data that would allow individual to be identified will be used in the presentation of results. Arrangements for storage and security of the data, and for ensuring data confidentiality will be the same as those set out in my original application.

This application for a substantial amendment seeks approval from the committee for the secondary analysis of the survey data.

Liz Newbronner
7 September 2015

24 September 2015

Dr Stephen Holland
www.york.ac.uk/healthsciences

Ms L Newbronner
University of York
Department of Health Sciences
Heslington
York
YO10 5DD

Dear Liz

Understanding the nature and implication of Thalidomide-related health problems being experienced by Thalidomide-impaired people as they age

Thank you for sending the Notice of Amendment for the above. The amendment was discussed at the meeting of the Health Sciences' Research Governance Committee (HSRGC) on Monday, 21 September 2015.

I am writing to confirm that the HSRGC have approved the amendments.

Yours sincerely



Stephen Holland
Chair: HSRGC

Appendix 5 Health and Wellbeing Survey



The Thalidomide Trust

Health and Wellbeing Survey 2015

About You

At the end of the survey we will ask you for your name. It would be extremely helpful to us if you could give your name but if you would prefer to complete the survey anonymously, that's fine.

Are you?	Male	Female
----------	------	--------

What is the highest level of education qualification you have obtained (please tick one box)?			
Degree or higher degree (e.g. MA, PhD)	<input type="checkbox"/>	ONC/BTEC or NVQ Level 3	<input type="checkbox"/>
Diploma or professional qualification (e.g. Registered Nurse)	<input type="checkbox"/>	O Level or GCSE equivalent (Grade A-C)	<input type="checkbox"/>
A Levels or Highers	<input type="checkbox"/>	O Level or GCSE equivalent (Grade D-G)	<input type="checkbox"/>
HNC/HND or NVQ Level 4	<input type="checkbox"/>	No formal qualifications	<input type="checkbox"/>
Other (please describe):			

Family and Housing

Q1 Which of the following best describes your home circumstances (please tick)?

I live alone	<input type="checkbox"/>
I live with my partner/spouse	<input type="checkbox"/>
I live with my partner/spouse and other family members (e.g. children)	<input type="checkbox"/>
I live with another family member (e.g. parent or sibling)	<input type="checkbox"/>
Other (please describe):	

Q2 Which of the following best describes your housing situation (please tick)?

I live in a house/flat which I (or my partner/family) own	<input type="checkbox"/>
I live in a private rented house/flat	<input type="checkbox"/>
I live in a housing association or local authority house/flat	<input type="checkbox"/>
I live in a residential care home	<input type="checkbox"/>
Other (please describe):	

Q3 How many years have you lived in your current home?

Q4 Are you planning any adaptations to your home *in the next year*?

Question is not applicable to me	<input type="checkbox"/>
No, I have done all the adaptations required to meet my current needs	<input type="checkbox"/>
No, I can't afford to do any adaptations in the next year	<input type="checkbox"/>
Yes, major adaptations e.g. new kitchen, an extension, other structural changes	<input type="checkbox"/>
Yes, minor adaptations e.g. new door handles, repositioning electrical sockets	<input type="checkbox"/>
Not sure/don't know	<input type="checkbox"/>
Is there anything else you would like to tell us about adaptations to your home?	

Q5 If you think you will need to move home *in the next 5 years* what are the main reasons for this (please select all that apply)?

Question is not applicable to me - I don't think I will need to move home	<input type="checkbox"/>
I need a home which is fully adapted for my disabilities/health problems	<input type="checkbox"/>
I need a smaller house/garden	<input type="checkbox"/>
I need a home with no stairs e.g. bungalow or flat	<input type="checkbox"/>
I need a larger house	<input type="checkbox"/>
I need a house with accommodation for a live-in personal assistant	<input type="checkbox"/>
I need to release some capital from the value of my home	<input type="checkbox"/>
I need to move nearer to a family member	<input type="checkbox"/>
I need to move nearer to shops and services	<input type="checkbox"/>
Other (please describe):	

Q6 Which, if any, of the following difficulties might affect your ability to move home (please tick all that apply)?

Question is not applicable to me - I don't think I will need to move home	
The cost of buying <i>and</i> adapting a new home	
Getting a mortgage/increasing your existing mortgage	
Finding the right property	
Selling your existing home	
Finding a suitable property to rent	
My local authority/housing association accepting that my needs are not being met in my current home	
Not sure/don't know	
Other (please describe):	

Work and Pensions

Q7 Which of the following best describes your work situation (please tick one)?

I work full-time	
I work part-time because of my disability or health problems	
I work part time in order to preserve my health/functioning	
I work part-time for family or personal reasons	
I'm not working at the moment but would like to	
I'm unable to work because of my disability or health problems	
I have chosen not to work in order to preserve my health/functioning	
I've chosen not to work for family or personal reasons	
I'm in full or part-time education	
Other (please describe):	

Q8 *Since the year 2000*, has your work situation changed in any of the following ways because of your Thalidomide-related disability and/or health problems?

My working situation has not changed	
I have reduced my working hours	
I have changed the type of work I do	
I have stopped working	

If your working situation has changed please tell us in what year(s) this occurred.

Q9 If you currently work full or part time, *in the next 5 years* do you think your Thalidomide-related disabilities and/or health problems will require you to change your work situation in any of the following ways?

Question does not apply to me as I am not currently working	
Reduce my working hours?	
Change the type of work I do?	
Stop working?	
I don't expect my work situation to change because of my Thalidomide-related disabilities and/or health problems	

Q10 If you have paid, or are currently paying into an employer/company or private pension (i.e. additional to the normal state pension) approximately how many years of contributions do you have?

Q11 Is there anything else you would like to tell us about your work or pension situation?

Original Thalidomide impairments

We would like to understand how the health and wellbeing of beneficiaries with different types of impairments is changing. The categories in the table below are just intended to provide us with a simple picture and are not comprehensive.

Q12 Original Thalidomide impairments - damage to limbs (please tick all the categories below that you feel apply to you):

	Left side of body	Right side of body
Minimal or no arm		
Arm shorter than elbow length		
Arm longer than elbow length		
Arm normal length		
Misshapen hand/missing digits		
Misshapen shoulder joint		
Minimal or no leg		
Leg shorter than knee length		
Leg longer than knee length		

Leg normal length		
Misshapen foot		
Misshapen hip		
Misshapen knee		

Q13 Original Thalidomide impairments - other damage (please tick all the categories below that you feel apply to you):

Scoliosis (curved spine)	
Damage to face and/or outer ear (including facial palsy)	
Totally deaf	
Partially deaf	
Totally blind	
Partially sighted	
Damage to heart	
Missing or damaged kidneys	
Damage to digestive system/bowels	
Damage to reproductive organs	
Damage to nervous system	
No 'other damage'	
Other impairments/damage (please describe if you wish):	

Mobility and Equipment

Q14 Do you use any of the following to help you with your mobility? (please tick)

	All of the time	Some of the time	None of the time
Manual wheelchair			
Electric wheelchair			
Mobility scooter			
Prosthetic limbs			

Q15 Do you use a hearing aid/s and/or have hearing implants?

Yes	No
-----	----

Q16 Do you have a car or van? (please tick all that apply)

I don't have a car or van	
I have a car/van with no adaptations	
I have a car/van with minor adaptations	
I have a car/van with major adaptations	

Q17 Is there anything else you would like to tell us about your mobility or the equipment/vehicles you use e.g. quality of wheelchairs, cost of adapting a car?

--

Health Problems

Q18 Are you currently experiencing, or have you recently had, any of the following health problems (please tick all that apply to you):

Back problems - prolapsed disc; damage to vertebrae; scoliosis	<input type="checkbox"/>	Anxiety	<input type="checkbox"/>
Back problems – muscular pain and/or spasms	<input type="checkbox"/>	Alcohol or drug misuse	<input type="checkbox"/>
Neck pain and/or loss of movement	<input type="checkbox"/>	Other mental health problems	<input type="checkbox"/>
Shoulder - pain, loss of movement or deterioration of the joint	<input type="checkbox"/>	Generally poor emotional health	<input type="checkbox"/>
Arms and wrists - pain, loss of strength and/or movement	<input type="checkbox"/>	Generalised pain – severe and/or continuous	<input type="checkbox"/>
Hands - pain, loss of grip and/or dexterity	<input type="checkbox"/>	Generalised pain – moderate and/or intermittent	<input type="checkbox"/>
Hip - pain, loss of movement or deterioration of the joint	<input type="checkbox"/>	Severe tiredness/fatigue	<input type="checkbox"/>
Knee - pain or deterioration of the joint	<input type="checkbox"/>	Tingling/pins and needles	<input type="checkbox"/>
Ankles, feet and toes - pain and/or loss of movement	<input type="checkbox"/>	Numbness/Loss of feeling	<input type="checkbox"/>
Problems with the fit or use of prosthetic limbs	<input type="checkbox"/>	Sensations of extreme heat or cold	<input type="checkbox"/>
Deteriorating sight/eye problems	<input type="checkbox"/>	Heart problems	<input type="checkbox"/>
Deteriorating hearing/other ear problems	<input type="checkbox"/>	Kidney problems	<input type="checkbox"/>
Problems with balance/falls	<input type="checkbox"/>	Bladder or continence problems	<input type="checkbox"/>
Dental health problems	<input type="checkbox"/>	Asthma or breathing problems	<input type="checkbox"/>
Weight management problems	<input type="checkbox"/>	Diabetes	<input type="checkbox"/>
Bowel or digestive problems	<input type="checkbox"/>	Stroke/TIA	<input type="checkbox"/>
Cancer	<input type="checkbox"/>	I have no health problems	<input type="checkbox"/>
Depression	<input type="checkbox"/>		<input type="checkbox"/>

Are there any other health problems you would like to tell us about?

Q19 If your health or wellbeing has improved recently what has made the difference e.g. weight loss, successful treatment.

--

Use of Health Services

Q20 Which, if any of the following health treatments have you had in the *past 10 years*:

Shoulder replacement/surgery	<input type="checkbox"/>	Physiotherapy - Private	<input type="checkbox"/>
Wrist/arm surgery	<input type="checkbox"/>	Acupuncture	<input type="checkbox"/>
Hip replacement/hip surgery	<input type="checkbox"/>	Osteopathy	<input type="checkbox"/>
Knee replacement/surgery	<input type="checkbox"/>	Chiropractic	<input type="checkbox"/>
Bariatric surgery for weight problems	<input type="checkbox"/>	Therapeutic Massage	<input type="checkbox"/>
Treatment to relieve pain e.g. injections	<input type="checkbox"/>	Treatment for depression and/or anxiety, including counselling	<input type="checkbox"/>
Prescription pain medication	<input type="checkbox"/>	Counselling for other emotional issues	<input type="checkbox"/>
Back surgery	<input type="checkbox"/>	Treatment for alcohol or drug dependence	<input type="checkbox"/>
Physiotherapy - NHS	<input type="checkbox"/>	No health treatments	<input type="checkbox"/>
Are there any other health treatments you would like to tell us about?			

Q21 How well does your GP/GP surgery understand your Thalidomide damage and how it affects you?

Fully understands	Partly understands	Doesn't understand	Not sure/don't know
-------------------	--------------------	--------------------	---------------------

Q22 If you had a Thalidomide-related health problem do you think your GP would be willing to seek advice from a specialist with knowledge of Thalidomide damage and/or from the Thalidomide Trust?

Yes	No	Not sure/don't know
-----	----	---------------------

Q23 *In the past 5 years* have you experienced any of the following problems with healthcare services (please select all that apply):

Lack of knowledge/understanding of Thalidomide damage in general amongst health professionals	
Lack of knowledge/understanding of my impairments amongst health professionals	
Lack of involvement/choice in decisions made about my care and treatment	
Difficulties/delays in seeing a suitably experienced health professional/specialist	
Misdiagnosis or delayed diagnosis	
Delays in getting treatment	
Incorrect or inappropriate treatment	
Inflexible care or treatment (e.g. blocks of physiotherapy treatments rather than on-going care)	
Problems with the quality or choice of equipment (e.g. wheelchairs, hearing aids, prosthetics) available through the NHS	
I have not experienced any problems with healthcare services	
Other (please describe)	

Social Care Support

Q24 Do you get local authority funded social care (i.e. personal budget, direct payment or home care services)? Yes | No

If you answered 'Yes' to Q24 please continue with Q25, if 'No' go to Q30:

Q25 Do you feel the level of local authority funded support you get is enough to meet your needs? Yes | No

Q26 Has your local authority funded care package or personal budget/direct payment been reduced in the last 5 years? Yes | No

Q27 Do you pay for additional time/services from your own income? Yes | No

Q28 Do you think you will need more support in the next 5 years? Yes | No

Q29 Is there anything you would like to tell us about the quality and/or availability of the social care services you get?

If you answered 'No' to Q24 continue with Q30, if 'Yes' go to Q32:

Q30 Do you buy support (e.g. personal assistance, help in the home, gardening/DIY) privately? Yes | No

Q31 Do you think you will need to apply for local authority funded social care in the next 5 years? Yes | No

Mental Well-being

We know that many beneficiaries feel they have to 'put a brave face on'. So, the next few questions are designed to help us get a better picture of how people are really feeling/coping emotionally.

Q32 For each of the following statements *please circle* the number that best reflects how you feel now:

Statements	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future	1	2	3	4	5
I've been feeling useful	1	2	3	4	5
I've been feeling relaxed	1	2	3	4	5
I've been dealing with problems well	1	2	3	4	5
I've been thinking clearly	1	2	3	4	5
I've been feeling close to other people	1	2	3	4	5
I've been able to make up my own mind about things	1	2	3	4	5
I've been able to be honest about how I am feeling/coping	1	2	3	4	5

Q33 Thinking about your emotional well-being, *compared to five years ago* how well do you feel you are coping now with the demands of everyday life (please tick)?

Much worse than 5 years ago	<input type="checkbox"/>
Worse than 5 years ago	<input type="checkbox"/>
About the same as 5 years ago	<input type="checkbox"/>
Better than 5 years ago	<input type="checkbox"/>
Much better than 5 years ago	<input type="checkbox"/>

Q34 Thinking about your social life, including social activities and relationships with family, friends and neighbours, which of the following statements best describes your current situation (please tick):

My social life is as good as it could be and I never feel lonely or isolated	<input type="checkbox"/>
My social life is good but I occasionally feel lonely or isolated	<input type="checkbox"/>
My social life is ok but I sometimes feel lonely or isolated	<input type="checkbox"/>
My social life is poor and I often feel lonely or isolated	<input type="checkbox"/>
My social life is very poor and I feel lonely or isolated most of the time	<input type="checkbox"/>

Health Related Quality of Life Questions

For each of the following questions, *please circle* the word or phrase (in the unshaded boxes) that best describes how your health is now or how you are feeling now. Please try to complete all the questions in this section even if some of the wording does not completely fit your situation, because they are standard questions used internationally to measure health related quality of life.

Q35 In general, would you say your health is:				
Excellent	Very good	Good	Fair	Poor
The following two questions are about activities you might do during a typical day. Does <i>your health now limit</i> you in these activities? If so, how much?				
Q36 <i>Moderate activities</i> , such as moving a table, pushing a vacuum cleaner or light gardening				
Yes, limited a lot		Yes, limited little		No, not limited at all
Q37 <i>More strenuous activity</i> such as briskly propelling your wheelchair, climbing several flights of stairs or mowing the lawn.				
Yes, limited a lot		Yes, limited little		No, not limited at all
During the <i>past 4 weeks</i> , how much of the time have you had any of the following problems with your work or other regular daily activities <i>as a result of your physical health</i> ?				
Q38 <i>Accomplished less</i> than you would like				
All of the time	Most of the time	Some of the time	A little of the time	None of the time
Q39 Were limited in the <i>kind</i> of work or other activities you are able to do				
All of the time	Most of the time	Some of the time	A little of the time	None of the time
During the <i>past 4 weeks</i> , how much of the time have you had any of the following problems with your work or other regular daily activities <i>as a result of any emotional problems</i> (such as feeling depressed or anxious)?				
Q40 <i>Accomplished less</i> than you would like				
All of the time	Most of the time	Some of the time	A little of the time	None of the time
Q41 Did work or activities <i>less carefully than usual</i>				
All of the time	Most of the time	Some of the time	A little of the time	None of the time
Q42 During the <i>past 4 weeks</i> , how much did <i>pain</i> interfere with your normal work (including both work outside the home and housework)?				
Not at all	A little bit	Moderately	Quite a bit	Extremely

These three questions are about how you feel and how things have been with you *during the past 4 weeks*. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the *past 4 weeks*:

Q43 Have you felt calm and peaceful?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
-----------------	------------------	------------------	----------------------	------------------

Q44 Did you have a lot of energy?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
-----------------	------------------	------------------	----------------------	------------------

Q45 Have you felt downhearted and depressed?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
-----------------	------------------	------------------	----------------------	------------------

Q46 During the *past 4 weeks*, how much of the time has your *physical health or emotional problems* interfered with your social activities (like meeting friends, visiting relatives etc.)?

All of the time	Most of the time	Some of the time	A little of the time	None of the time
-----------------	------------------	------------------	----------------------	------------------

Q47 When you think about your future which of the following areas of your life are of *most concern* to you?

	Most concern	Some concern	No concern
Housing and adaptations			
Long term living arrangements (e.g. residential care)			
Personal assistance and help in the home			
Family and personal relationships			
Social activities/social life			
Your working situation			
Pension provision			
Mobility			
Your physical health			
Your emotional health			
Other (please describe):			

Q51 Is there anything else you would like to tell us about your health and well-being or any issues/concerns you would like to highlight?

Q52 Would you be willing to answer a few more questions about the topics covered in this questionnaire, either on the telephone or in an informal discussion? Yes | No

It would be enormously helpful if you could give your name as it will make it easier for us to explore how the needs and experiences of beneficiaries vary and enable Firefly Research to get in touch with you to follow up this survey (if you said 'Yes' to Q52). It also means that we won't bother you with unnecessary reminders.

*If you do give your name your answers will still be **completely confidential** and will only be seen by Firefly Research.*

Name:	
-------	--

Thank you again for helping us with this survey.

Appendix 6 Interview Invitation Letter



Date

Address

Dear

Monitoring the 10 Year Health Grant – Can You Help?

I hope all is well with you. I am writing to you, as someone who kindly helped us with the evaluation of the three year Health Grant, to ask if you would like to be involved in the monitoring of the new 10 year Health Grant. Although there is no requirement to evaluate the new Health Grant the Thalidomide Trust and the NAC felt it would be valuable to put in place some 'light touch' monitoring to:

- Be able to present a case to the UK Departments of Health for the Health Grant to be renewed in 10 years-time
- Support negotiations with Diageo

The Thalidomide Trust Scientific Committee has asked Firefly Research to undertake the monitoring of the Health Grant over the next eight years. There will be two parts to the monitoring:

- A survey of the health-related quality of life of all beneficiaries in years 1, 3 and 8 of the Health Grant (i.e. 2013, 2015 and 2020).
- Annual interviews with a 'case study' group of around 25 beneficiaries

In late November/early December this year we will be sending out (via the Trust) a short questionnaire which will ask people about their health needs and health-

related quality of life. All beneficiaries will have the opportunity to take part in the survey.

However, we are also looking for around 25 beneficiaries (our 'case study' group) who would be willing to get more involved by being interviewed once each year. As someone who contributed to all three years of the Health Grant evaluation, we wondered if you might be willing to continue working with us on the monitoring project.

As before, the interviews can either be done by telephone or face to face and will take about an hour. They will probably take place in December and January. This time we won't be asking people to give us a full breakdown of their Health Grant expenditure but we would like to talk to people about broadly how they used their Health Grants, and the extent to which the Grant is enabling them to meet their health-related needs.

If you take part in the study group, it would be helpful if you would allow us to have access to some *very limited* information held by the Thalidomide Trust about you, notably the severity of your impairment (6ivb band), and the levels of both your Annual Grant and Health Grant. No other information will be given to us by the Trust.

All the information you provide for the monitoring project will be treated in confidence and will only be seen by the Firefly team. We will not give any individual information to the Trust without the person's consent, and the reports we prepare for the Trust will not name or identify any individual beneficiaries.

If you would like to be part of the study group, it would be really helpful if you could complete the enclosed consent form and return it to me in the Freepost envelope provided. If you would prefer to have a chat before deciding whether to get involved, please do give me a call, or email and we can arrange a time to talk.

Many thanks for taking the time to read this letter.

With best wishes

Liz Newbronner

Appendix 7 Interview Topic Guide

Long-Term Monitoring of the 10 Year Health Grant to Thalidomide-impaired People

Topic Guide for 2014 Study Group Interviews (Final)

Introductory Notes

- Explain the overall purpose and structure of the Health Grant Monitoring study
- Clarify that this is the first of three annual interviews
- Note that at the start I will collect some background information designed to help me understand their situation but explain that providing this information is optional
- Explain that the interview is likely to last approximately one hour and check that this is ok
- Reassure the interviewee that everything they say will be treated in confidence and explain that a) their interviews notes will only be seen by me; b) no information about individual beneficiaries will be passed to the Trust and; c) if I use personal stories in reports I will use pseudonyms and will ask their permission
- Explain that the Trust has given me permission to use material from the Health Grant Monitoring study for my doctoral research. Note that I am now seeking verbal consent from each participant for me to their interview transcript in my research. Explain that they are free to decline and this will not affect their involvement in the Health Grant Monitoring study
- Check circumstances (below)

Background Information

Background Information			
Home Circumstances			
Employment Situation			
Impairment Band			
Level of Annual Grant		Level of Health Grant	

Current or Recent Health Problems

1. What health problems (if any) have you experienced over the past few years that you believe are related to the Thalidomide damage you experienced?

Explore: description of the nature/impact of the problem/s; how long have they have been experiencing the problem/s; whether the problem is static or deteriorating

2. How have these health problems affected you?

Explore: Physical and emotionally affects as well as practical affects (e.g. lifestyle/quality of life; impact on family; impact on employment)

3. Have you sought and/or had any treatment for the health problems you are experiencing or support to deal with the effects of them?

If yes, explore: where this help has come from i.e. NHS; social services; Thalidomide Trust; paid for privately; other sources? How confident they felt in the advice/treatment given (specialist centre option)? What difference this treatment/help has made?

If no, explore: reasons why? Whether they have had problems getting (appropriate) treatment? Willingness to travel to a specialist centre if available? What are their main current unmet health needs/outstanding problems?

Social Care Support

4. Do you have any social care support?

Explore: any problems with access to and/or level and appropriateness of social care/support

Use of Health Grant

5. How have you used your (2013/14) Health Grant?

Explore: Main types/areas of expenditure and ask for very approximate breakdown, if appropriate/possible

6. What were the main reasons for using your health grant in these ways?

7. Has the level of health grant you received this year been adequate in terms of meeting your main health or health-related needs?

Explore: any trade offs/compromises made and any unmet needs

8. Do you think that the things (e.g. home adaptations, equipment, treatments) you have been able to fund through the Health Grant or the way you have used it (e.g. to replace lost income) have had any impact on your health and wellbeing?

If yes, explore in what ways (e.g. changes in a specific health problem; lifestyle change so less stress)? Any wider impact on partners/family?

If no, explore why not?

The Future

9. Looking ahead, what do you think your biggest health-related needs are likely to be over the next 5 to 10 years?
10. Do you have any plans/ideas for how you might use your Health Grant to help you deal with these longer term health or health-related needs?

Other information/concerns/questions?

Closing Notes

- Thank the Beneficiary for taking part in the interview
- Ask if they have any questions
- Explain what will happen next, timetable for the report etc.
- Remind them of where they can contact me if, at a later point there is anything they want to add or any questions they want to ask

Appendix 8 Survey Information Sheet



Health and Wellbeing Survey 2015

Dear Beneficiary

Many thanks for taking the time to complete this health and wellbeing questionnaire. Your contribution is really important as the findings from the survey will help guide the Trust's work over the next few years. They will also be used in negotiations with Diageo and to help the Trust make the case for continued funding of the Health Grant.

The survey is **completely confidential**. Your answers will only be seen by the team at Firefly Research and the report from the survey will not include any names or details which would enable individual beneficiaries to be identified.

The questionnaire should take about 20 minutes to complete. Most of the questions are either tick boxes or yes/no responses but there are a few places where you can add more information if you would like to. The questionnaire has 10 sections:

- About You
- Family and Housing
- Work and Pensions
- Original Thalidomide Impairments
- Mobility and Equipment
- Health Problems
- Use of health Services
- Social Care Support
- Mental Wellbeing
- Health-related Quality of Life

If you would like more information about the Health and Wellbeing Survey or would like help completing the questionnaire, please contact Liz Newbronner on 01751 798927 or email liz@firefly-research.co.uk

The survey can also be completed online by going to

<http://surveys.firefly-research.co.uk/s/HWSurvey15/>

Appendix 9 Survey Cover Letter from Thalidomide Trust

Dear [name of beneficiary]

We are writing to ask you to fill in the attached **Health and Wellbeing Survey 2015**. We are asking all beneficiaries to complete this survey. We would like to get as full a picture as we can of all beneficiaries' current situations and the challenges you are currently facing and think you'll have to deal with over the next few years. This information will be very important because:

- It will help the Trust develop its services so we can provide you with the information, help and support you will need
- It will enable us to demonstrate to the Departments of Health the sort of health-related issues that you are facing and help us to secure further funding when the current Health Grant comes to an end.
- It will also be extremely useful in our forthcoming negotiations with Diageo about future funding

The survey should only take 20 minutes to fill in. You can also fill in part of it, save your answers and come back to complete it later. Most of the questions can be answered very quickly (yes/no; tick boxes). There are a few places where you can add more information if you would like.

The Thalidomide Trust has commissioned the Health and Wellbeing Survey from Firefly Research. Your answers will go direct to Firefly Research and will be kept completely securely – **and no individual responses will be shared with the Trust**. The Survey does ask for your name and it would be enormously helpful if you could provide this as it will help us to identify trends (for example if certain health problems are more common amongst beneficiaries with particular patterns of thalidomide damage or if worries about the future are different for males and females) and enable us to get in touch with you to ask further questions on specific issues that emerge. It also means that we can check who has/has not replied and save bothering you with further reminders. Of course, if you don't wish to include your name, you can still complete the questionnaire anonymously and it will provide us with really helpful information.

For the last survey that Firefly carried out in 2013, on how you were using the Health Grant, over half (59%) of you responded. **We'd like to do even better this time!** So please do take a few minutes to fill in the survey.

If you'd prefer to complete the survey online, please go to: <http://surveys.firefly-research.co.uk/s/HWSurvey15/>. If you'd find it easier to answer the survey questions over

the phone, please contact Liz Newbronner at Firefly Research on 01751 798927 or email her at liz@firefly-research.co.uk, and she will be happy to go through the survey with you.

If you have any queries or concerns about the survey or how the information will be used, please don't hesitate to contact Liz or Michelle-Jane at the Trust on 01480 474074.

Thank you in advance for your help – and best wishes

Deborah Jack, Director

Simone Illger, Chair of NAC Health & Wellbeing Committee

Appendix 10 Published Papers



The changing health of Thalidomide survivors as they age: A scoping review

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ABSTRACT

Background: In the late 1950s and early 1960s the drug Thalidomide was given to thousands of pregnant women across the world to relieve morning sickness. The drug caused severe birth defects. Much has been written about the drug, its teratogenic effects, and the nature of the damage it caused. There is however, little literature exploring ageing with Thalidomide damage.

Objectives: The aim of the review was to bring together, for the first time, the evidence about the Thalidomide-related health problems Thalidomide survivors are experiencing, as they grow older.

Methods: A systematised review of published and grey literature, in which grounded theory provided a heuristic for the evidence synthesis.

Results: Twenty-five relevant papers were found. They included biomedical papers focusing on specific health problems, alongside surveys and mixed method accounts exploring the health of Thalidomide survivors. Most studies had physical health as their primary focus.

Conclusions: The two most frequently reported groups of health problems were musculoskeletal and mental health conditions. There was little discussion about the social consequences of secondary damage being layered onto lifelong impairments or of the implications of co-morbidities. Future research needs a stronger connection to more social models of disability and critical disability studies.

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Introduction

In the late 1950s and early 1960s the drug Thalidomide was given to thousands of pregnant women across the world to relieve morning sickness. The drug caused severe birth defects, which are referred to as Thalidomide Embryopathy or Thalidomide Syndrome. Thalidomide survivors were born with a range of impairments.¹ Most commonly they have missing or short and/or deformed limbs (Phocomelia). Some people have sight or hearing impairments and/or facial disfigurement. A few have brain damage. Thalidomide damage can also be unseen, affecting internal organs. Globally, thousands of Thalidomide survivors and their families continue to live with the medical and social consequences of Thalidomide. As they age, they are experiencing new Thalidomide-related health problems, as well as deterioration in their original impairments. This can lead to disabling and discriminatory

outcomes, of which we know relatively little.

Much was written in the 1960's and 1970's about the drug Thalidomide, its teratogenic effects, and the nature of the damage it caused.^{2,3} During the 1980 and 1990s there were a small number of studies involving younger adult Thalidomide survivors but these tended to focus on narrow topics (e.g. the ophthalmic consequences of Thalidomide⁴). Only in the 2000's, when Thalidomide approached its 50th anniversary and Thalidomide survivors entered middle age, did research about the health of Thalidomide survivors as adults begin to appear in academic journals. Since then several reports and papers have been published. Some focus on early on set health problems. Others look more broadly at health and quality of life. There are however, no published reviews about ageing with Thalidomide damage. A few studies briefly examine the literature but this is restricted to an area of clinical interest. Consequently, the current literature fails to reflect both the complexity of the health problems many Thalidomide survivors face, and the broader social context.

This paper presents the results of a conventional scoping review⁵ of published and grey literature (documents produced by

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governments, charities or businesses, which are not commercially published) about Thalidomide-related health problems survivors are experiencing, as they grow older. The review also encompassed the literature on health-related quality of life but this is the subject of a separate paper.

Methods

A protocol was developed⁶ to ensure that the review included as many elements of the systematic review process as possible. However, resource constraints (e.g. one reviewer), the heterogeneous nature of the literature, the high proportion of grey literature and the variation in the quality of the studies, meant that a fully systematic review was not possible. The review was part of a doctoral study which drew on grounded theory methods. These provided a heuristic for the evidence synthesis. To facilitate quality control, EN discussed decision making with KA.

Search strategy

An initial exploratory search of MEDLINE was undertaken to gain a better understanding of the nature of the literature and to inform the development of the search terms to be used in the electronic searches. Seven electronic databases were searched - MEDLINE (1946 Onwards) (OvidSP), EMBASE (OvidSP), CINAHL Plus (EBSCO), PsychINFO (OvidSP), ASSIA (ProQuest), Social Policy and Practice, and Index to Theses. The search strategies for each database used both subject headings and key words. The search was run in May 2015 and up-dated in November 2016. Four new papers were found. The search strategy used for MEDLINE is shown below in Table 1 as an example.

The exploratory search, suggested that there would be not more than 30 to 40 relevant studies published in peer reviewed journals. Furthermore, we were aware that several relevant studies took the form of reports, which were in the public domain but did not appear in the published academic literature. For this reason it was necessary to supplement the searches of electronic databases with four other approaches:

- Searching websites of Thalidomide organisations
- Contacting experts in the field through the UK Thalidomide Trust and the European Dysmelia Reference Information Centre
- 'Hand' searching reference lists and journals
- Google Searches using a number of different words and phrases

Screening, selection and quality appraisal

Two broad eligibility criteria were used for initial screening of the records - studies were only included if they were concerned with exposure to Thalidomide whilst in the womb; and focused on people born with physical and/or mental impairments that resulted from their mothers taking the drug during pregnancy. Given the considerable variation in the size of studies, study designs and

contexts, no restriction was placed on the type of study to be included. The full text of all potentially relevant papers was then assessed using four questions:

- Is the study population Thalidomide survivors born in the late 1950 or 1960's?
- Does the study report on the health and/or impairment of Thalidomide survivors?
- Does the study report on the health-related quality of life of Thalidomide survivors?
- Does the study focus on the health/quality of life of Thalidomide survivors in middle age?

If the answer to the first question and at least one of the following questions was 'yes' we included the study. We decided not to exclude studies which made no explicit reference to ageing as some biomedical studies, whilst being condition focused could include implicit references to ageing. A study selection form was developed to document decisions. Details of the literature flow are given in Fig. 1.

The issue of quality assessment created some challenges. The quality of the studies varied significantly but we decided not to exclude any studies at the study selection stage on the grounds of quality, as even studies of a lower quality might yield some useful insights (and this did prove to be the case). However, during the data extraction stage, we did make a basic assessment of the quality of the studies and our comments are included as part of our analysis. Due to the diverse nature of the studies, we did not use any standard quality appraisal tools. However, we drew on three sources^{5,7,8} to devise a simple appraisal framework which we used to note the quality of the: study design; analysis and findings; reporting; and contribution to knowledge and understanding. These notes influenced the weight placed on the findings from some studies, especially where they were not supported by data from other studies. In this way, they informed the literature synthesis.

Data extraction and synthesis

A data extraction form was completed for all the included papers, focusing on the aims of study; setting; theoretical background; sampling approach; participants characteristics; design (data collection & analysis); and findings. The data was extracted by the lead author (EN) and a sample of data extraction forms was reviewed by the second author (KA).

Grounded theory provided a heuristic for the evidence synthesis.⁹ Previous work by Kearney¹⁰ and Bailey et al.¹¹ informed our approach, which had two main elements. Constant comparative analysis enabled us to: analyse the data descriptively; identify categories that cut across the studies; compare data from different types of studies; move between and bring together findings from studies that were very different in scale and scope; and 'convert' quantitative data from the studies in to narrative description. We then used initial coding to identify key themes from across studies.

Table 1
Search Strategy use for MEDLINE.

#1	thalidomide OR distaval OR tensival OR asrnaval OR valgis OR valgraine OR sedoval OR celgene OR contergan
#2	Pregnan\$ OR during adj3 pregnancy OR in adj3 pregnancy
#3	#1 AND #2
#4	Impair\$ OR damage\$ OR disable\$ OR disability\$ OR handicap\$ OR deformit\$ OR deform\$ OR affect\$ OR consequen\$
#5	#3 AND #4
#6	health OR health problem\$ OR physical health OR mental health OR illness\$
#7	#5 AND #6
#8	#3 AND #4 AND #6

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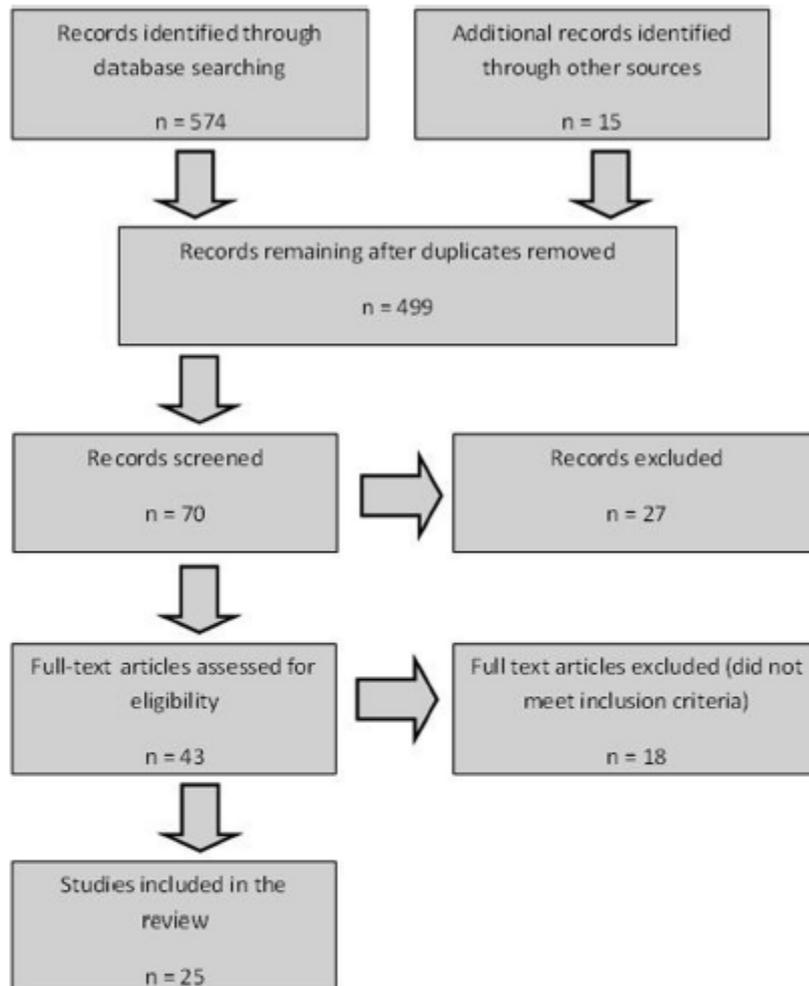


Fig. 1. Flow Diagram of the Literature Review Stages.

The codes were developed by EN and then refined through discussion with KA.

Results

The studies in the review included quantitative, qualitative and mixed methods studies, with a high proportion of grey literature. Appendix A presents an overview of the 25 included papers in relation to: focus and aims; population and sample size; and methodology, methods of data collection and analysis. Thalidomide was distributed in 47 countries but the studies came from just seven countries where there are significant numbers of Thalidomide survivors – Australia, Canada, Germany, Ireland, Japan, Sweden and the UK. They included biomedical papers focusing on

specific health problems, accounts of surveys exploring the health and health related quality of life of Thalidomide survivors, and multi-methods studies; most of which took the form of reports for government bodies or organisation representing Thalidomide survivors. Most studies focused on physical health, and in the biomedical papers, musculoskeletal problems were the most commonly researched topic.

Primarily the literature documented the on-set of health problems in middle age. Several studies discussed ageing with the lifelong impairments caused by Thalidomide. However, few explored the experience of living with lifelong impairments and the impact of secondary health problems. Few papers made a connection to disability theory and we consider the implications of this further in our discussion.

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Musculoskeletal problems

Fourteen studies discussed the musculoskeletal problems. These discussions ranged from accounts of the problems being reported by Thalidomide survivors in qualitative interviews and health surveys to biomedical studies focusing on specific conditions.

In Kennelly et al.'s 2002 study,¹² UK Thalidomide survivors who were entering their 40s, reported musculoskeletal problems. Around 20% of the respondents to their survey of all UK Thalidomide survivors said they had arthritis, with similar proportions reporting *increased joint pain* and *increased muscular pain*.¹²

A decade later, an evaluation of a government Health Grant to UK Thalidomide¹³ survivors (n = 60) found that over three quarters were experiencing deterioration in one or more joints, and joint, back and/or neck pain. For many participants, these musculoskeletal problems were associated with over-use of 'good' limbs or the ways in which they had to use their bodies to compensate for their impairments. A Japanese study of the health of 201 Thalidomide survivors¹⁴ describes musculoskeletal problems as 'overuse syndrome'. The paper also included some limited data about prevalence with around a third of participants reporting joint pain and a similar proportion shoulder stiffness.

In both the UK studies, Thalidomide survivors were beginning to feel that their health - and particularly their musculoskeletal health - was not as good as their non-disabled peers. However, this theme emerged with more clarity in the second report from the Health Grant evaluation,¹³ with some participants stating that they felt older than their chronological age - *"I feel like I have the body of a 70 year old"*.

Four studies reporting on the health and quality of life of Thalidomide survivors also presented findings about musculoskeletal problems. Nippert¹⁵ explored the health related quality of life of 104 female Thalidomide survivors in Germany found that 41.6% of the survey respondents described experiencing deterioration in their health in the preceding twelve months. Of this group, 83% reported increased musculoskeletal problems. Bent et al.¹⁷ found that almost half the 41 UK Thalidomide survivors who responded to their survey reported having arthritis in their shoulders and just over a third reported hip pain. Thalidomide survivors with more severe impairments reported significantly more musculoskeletal problems. O'Carroll et al.¹⁸ also note that the Thalidomide survivors in Ireland reported deterioration in their 'original condition' ... *due to hand and arm overuse, injuries and musculoskeletal problems affecting the feet, knees and back*. Finally, in the Thalidomide Victims Association of Canada (TVAC) survey¹⁹ 80% reported increasing muscular pain and 71% reported increasing joint pain.

There have been two large German studies into the health and socio-economic circumstances of Thalidomide survivors as they age. The Contergan Foundation for People with Disabilities commissioned the first²⁰ and asked the University of Heidelberg to *'identify the existing care deficiencies and future special needs of thalidomide victims'*. Material from 870 Thalidomide survivors from across Germany was collected via surveys, face-to-face interviews and focus groups. The study described 'secondary damages', which the authors defined as: *'physical impairments that develop in thalidomide victims during the course of their lives in areas of the body not damaged prenatally',* caused by *'some movement patterns practiced early on to compensate for missing functions'* (p14). The authors distinguish these 'secondary damages' from 'long term sequelae' (i.e. prenatal damage detected at a later point).

The survey questionnaire asked respondents to indicate the severity of four musculoskeletal problems - pain, osteoarthritis, muscle weakness and muscle tension - using a simple four point scale. The results were compared to a similar survey conducted by

the authors five years earlier. The study found that musculoskeletal problems in the 'upper extremities' were significantly worse than five years earlier. There was also deterioration in the 'lower extremities' and 'vertebral column/pelvis'. Severity of pain, osteoarthritis, muscle weakness and muscle tension in the 'upper extremities' were clearly associated with the severity of original Thalidomide damage; but for the 'lower extremities' and 'vertebral column/pelvis' the picture was less clear. A linked survey of participants' physicians found that 90% of the problems presented during consultations *'related to the musculoskeletal system'*.

The University of Heidelberg study²⁰ also discussed the pain associated with musculoskeletal problems. They found that 84.3% of their survey respondents experienced pain. Of this group, 50% experienced pain *'every day'* and 39% had *'persistent'* pain. The proportion of respondents reporting pain increased with the number of 'damage areas' they had. The authors suggested:

"The reason for pain is both wear and tear, or destruction of damaged joints, as well as tension in muscle attachments and tendon insertions. Pain is also the result of secondary damages that have developed in area not affected prenatally. In practice, it is quite difficult to separate the two causes of pain and functional impairment. The current situation defines the everyday life of the victims and represents the situation that has shaped itself in the amalgamation and development of prenatal damages and secondary damages over the course of 50 years." (p16).

The second German study,²¹ was a multi-methods study of the *'Damage to Health, Psychosocial Disorders and Care Requirements of Thalidomide Victims'* in North Rhine Westphalia. It involved face-to-face assessments, clinical examinations and diagnostic tests. A self-selected but representative sample of 202 Thalidomide survivors took part. Two doctors examined each participant and then completed a questionnaire, which recorded both 'primary impairment' (i.e. original Thalidomide damage) and 'consequential damage'. For consequential damage, data was collected about loss of movement and musculoskeletal pain in joints/areas of the body. Pain was most frequently reported in the neck, back and shoulders, closely followed by knees and hips. Movement restrictions were most common in the hand, shoulder and elbow, and around two thirds of participants had painful, hypertonic muscles in one or more area of the body. In the self-completion questionnaire 27.7% of respondents listed diseases of the musculoskeletal system and connective tissue.

Finally, three papers examined specific musculoskeletal problems. An early case study by Newman²² described a shoulder joint replacement procedure for a then 35-year-old Thalidomide survivor with end-stage osteoarthritis. Although a single case study, it highlighted three important issues: the likelihood of Thalidomide survivors developing degenerative joint disease, which compound existing impairments; the need to recognise 'overuse symptoms'; and the potential benefits of shoulder replacement. More recently, a Swedish study by Ghassemi Jahani et al.,²³ examined the development of osteoarthritis in the 'lower extremities' of 26 Thalidomide survivors using computed tomography scans and the Rheumatoid and Arthritis Outcome Score. The authors found that nearly 40% of the participants had osteoarthritis in the hip and 60% in the knee. They conclude that for these conditions, the prevalence rates found in Thalidomide survivors are higher than in the general population of a similar age but suggest that these degenerative changes *'were mostly mild and had little clinical significance'*.

A second paper by the same lead author²⁴ examined degenerative changes in the cervical spine in a group of 27 Swedish Thalidomide survivors; and compared them to 27 age and gender matched controls. They found that Thalidomide survivors had a significantly higher degree of disc degeneration alongside other changes, notably foraminal narrowing (i.e. narrowing of the

passageway through which all spinal nerve roots pass). They concluded that Thalidomide survivors have a higher frequency of degenerative changes in the cervical spine and suggest that this may be caused by an altered load on the cervical spine. In addition, a case study of one Canadian Thalidomide survivor²⁵ highlighted the impact of back and neck pain on daily life.

Pain and neuropathic symptoms

Whilst muscle and joint pain associated with musculoskeletal problems were common, three studies^{15,28,29} also found that some Thalidomide survivors reported generalised, possibly neuropathic pain and neuropathic symptoms such as numbness, tingling, loss of sensitivity/dexterity and partial paralysis. None of these studies, however, makes comparisons with pain prevalence in the general population of a similar age.

Only one study - Peters et al.²¹ specifically examined the issue of neuropathic pain. They used the painDETECT questionnaire and found that around 20% of participants probably had a neuropathic component to their pain, compared to an estimate of 8% in the general population in Germany aged 45–54.²⁶ Participants without Dysmelia were most likely to have a neuropathic pain component.

Two other studies looked at late-onset neurological symptoms. The first by Jankelowitz et al.²⁷ involved 16 Thalidomide survivors from Australia and New Zealand who had all presented with new neurological symptoms. The aim was to “determine whether there was ongoing nerve damage/loss in this population as a ‘late effect’ of thalidomide exposure or whether the effects were due to exacerbation of the normal ageing process as a result of lack of the normal ‘redundancy’ within the nervous system” (p509). The study involved taking detailed medical histories, clinical neurological examinations and neurophysiological testing. The authors found no evidence of clinically or neurophysiologically late-onset generalised neuropathy and concluded that the neurological symptoms experienced by their participants were largely due to compressive neuropathies.

The second paper²⁸ reported on a pilot study designed to determine whether UK Thalidomide survivors had problems with their peripheral nerves. The 17 Thalidomide survivors involved all reported sensory symptoms in their upper limbs and a few in their feet. They took part in a range of motor and sensory examinations and their results were compared to 17 healthy volunteers. The authors found that the majority of the Thalidomide survivors in the study (15 out of 17) had nerve compression, most commonly around the wrist but also of the nerve roots in the lower back and of the spinal cord in the neck. The findings for generalised neuropathy were less clear. They suggest that some symptoms could be due to abnormal peripheral nerve development or (in the lower limbs) early peripheral nerve dysfunction but that more research is needed.

Jankelowitz et al.²⁷ also noted that the chance of developing median nerve compression at the wrist was probably greater in Thalidomide survivors because overuse of the hand to compensate for other limb deformities coupled with musculoskeletal deformities may lead to narrowing of the carpal tunnel. A small study²⁹ of three Japanese Thalidomide survivors with Carpal Tunnel Syndrome and radial dysplasia (i.e. absent or underdeveloped radius bone in the forearm) supported this finding, as did Kayamori's 2013 study.³⁴

Dental problems/facial damage

Just one study looked specifically at the dental health of Thalidomide survivors. Ekfeldt and Carlsson³⁰ examined the dental status and oral function of 31 Swedish Thalidomide survivors. They

found that dental caries was similar to general population but the number of decayed, missing or filled teeth was slightly higher. They suggest that this might be because Thalidomide survivors find tooth brushing more difficult. They also found that tooth wear was on average more extensive than the comparable age group in the general population. The authors suggested this could be due to dental erosion associated with high prevalence of regurgitation amongst Thalidomide survivors and to a lesser extent by using teeth as tools.

The findings from Newbronner et al.¹⁵ and those of Kruse et al.,²⁰ support Ekfeldt and Carlsson's³⁰ findings. Upper limb affected participants frequently used their teeth to help them with everyday tasks such as getting dressed, opening bottles and holding keys. Participants also described having difficulty cleaning their teeth properly, which could lead to higher rates of tooth decay.

Peters et al.²¹ also found that a third of participants reported tooth wear and this was significantly more common amongst participants with Dysmelia. A study linked to Ekfeldt and Carlsson's,³⁰ which involved 25 of the same participants, surveyed the frequency and characteristics of facial palsy in Thalidomide survivors.³¹ They found that three (10%) had acquired facial palsy - more than would occur by chance - and suggest this may indicate that the facial nerve in Thalidomide survivors is more vulnerable.

Deteriorating sight and/or hearing

In the UK, around a quarter of Thalidomide survivors were born with damage to their eyes and almost a third have a hearing impairment. The first study to highlight concerns about deterioration in middle-age was Nippert's study³⁵ of female Thalidomide survivors, with 13% of survey respondents reporting ear and eye problems. In 2011 Newbronner et al.¹³ noted that the Thalidomide survivors in their study who were partially sighted and/or partially deaf were reporting further deterioration in their sight and/or hearing. The TVAC survey²⁹ found that around 22% of respondents reported ‘deterioration in eyesight’ and around 15% ‘deterioration in hearing’. However, it is not clear what proportion of these respondents are Thalidomide survivors who had original damage to their sight or hearing. Further, no comparisons with age matched population norms were made.

General health

One study, conducted in Japan, looked specifically at ‘lifestyle diseases’.³² The study found that the most common lifestyle-related disease amongst Thalidomide survivors was hypertension, which affected nearly half the 76 participants, followed by obesity, which affected nearly a quarter of participants. The paper made few direct comparisons with the general population of a similar age but it did highlight gender differences, noting that male Thalidomide survivors were at higher risk of developing lifestyle related diseases. Importantly, the authors’ reflected on the problem of accurately measuring blood pressure and body mass index when people have missing or short limbs. These are two of the most commonly used indicators of risk of lifestyle diseases, and yet Thalidomide survivors may be less able to benefit from them because of the unreliability of the measurements produced. Taking accurate blood pressure reading for people with limb difference is difficult. A standard cuff may be unsuitable or it may have to be placed on the leg which produces a less reliable reading. The use of general population norm when interpreting results also raises questions of validity. Newbronner et al.¹⁵ also briefly discuss the complications of managing lifestyle related conditions such as diabetes and hypertension.

A second Japanese study³³ examined the prevalence of ‘internal

anomalies in Thalidomide embryopathy" in 22 "selected" participants using MRI and CT imaging. The study found a high prevalence of abnormalities of the inner ear, the vascular system and the gallbladder (which may have implications for general health). The paper concludes by noting the value of using MRI and CT imaging to identify internal abnormalities but unfortunately says nothing about the implications of these abnormalities for the health of Thalidomide survivors.

Mental health

Five studies explored the mental health of Thalidomide survivors. Of these, just two specifically set out to assess the prevalence of mental disorders. Imai et al.³⁴ examined the psychological and mental health problems of 22 Japanese Thalidomide survivors and compared them to a 'healthy' control group. The participants in this study (nine men and thirteen women) had been admitted to hospital for general medical examinations. Whilst their original Thalidomide impairments were briefly described, no information was provided about how representative they were of the population of Thalidomide survivors in Japan.

The General Health Questionnaire-28 (GHQ-28) was used to measure psychological distress and minor psychiatric disorders. Fifty-nine per cent (13 out of 22) were judged to have some kind of mental health problem. The average GHQ score for the Thalidomide survivors (7.36; SD 5.34) was significantly higher than the 'healthy' subjects group (2.76; SD 2.31; $P < 0.01$). Imai et al. also found that participants who were single or divorced had higher depression scores and higher scores for impaired social activity than married participants. However, the study did not comment on how this compared to the 'healthy' subjects. The authors also used MINI, a short structured psychiatric diagnostic interview instrument, to make diagnoses of psychiatric disorders. They found that 40.9% of participants had one or more psychiatric disorders but no comparison with the general population in Japan was made.

Peters et al.^{21,35} assessed the prevalence of what they described as 'psychological co-morbidities' using a structured clinical interview

for DSM-IV diagnosis and a clinical psycho-diagnostic interview. They obtained results for 95.6% ($n = 193$) of their study participants:

- 47.2% of participants had a point or 4-week prevalence of at least one mental disorder compared to a 12 month prevalence in the German general population aged 50 to 64 of 27.1%
- Male Thalidomide survivors were more likely to experience mental disorder than their female peers, which is in contrast to the general German population
- The four most frequent diagnostic groups were: depressive disorders (23.8%); somatoform disorders (18.1%); anxiety disorders (16%); and substance misuse (9.3%).
- For the two most frequently diagnosed disorders (depressive and somatoform), prevalence was higher amongst participants with no Dysmelia. However, it is important to note that almost two thirds of the no Dysmelia group were deaf or had a severe hearing impairment and many also has facial damage

The authors concluded that Thalidomide-survivors were more likely to be affected by mental disorder than the general German population, and that the lifetime prevalence of depressive disorders was more than double that in the general population.

In their survey of 870 German Thalidomide survivors, Kruse et al.²⁰ looked specifically at the prevalence of depressive disorders, using the Major Depression Inventory (MDI), a self-report mood questionnaire. They estimated that 11.7% of their survey respondents were suffering from a depressive disorder, compared to 8.1% of the general German population aged 50 to 65. Like Peters et al.²¹ they also found that in contrast to the general population, there was no substantial difference in prevalence between male and female Thalidomide survivors. They did, however, identify a number of factors that appeared to increase the risk of Thalidomide survivors experiencing depression, including: a poor social network; unemployment; recent experience of severe pain; the need for long term care and assistance; and the severity or extent of participants' Thalidomide-impairments (i.e. the number of limbs

Table 2
Initial grounded theory codes.

Descriptive Analysis Theme	Initial Grounded Theory Coding
Musculoskeletal Problems	<ul style="list-style-type: none"> • Musculoskeletal problems are the most common health issue amongst Thalidomide survivors • The prevalence and severity of musculoskeletal problems appears to increase with the severity of Thalidomide survivors impairments but this relationship is not simple or linear • Secondary damage to joints and muscles is primarily caused by 'overuse' and postural adaptations • The pain and movement restriction caused by secondary damage is compounding existing impairments
Pain and Neuropathic Symptoms	<ul style="list-style-type: none"> • Neuropathic pain and symptoms are more common amongst Thalidomide survivors (including those with no Dysmelia) than the general population • The causes of neuropathic pain and symptoms are disputed and often unclear • Thalidomide survivors are more vulnerable to compressive neuropathies but these can be harder to diagnose and treat
Dental Problems/Facial Damage	<ul style="list-style-type: none"> • Thalidomide survivors have higher levels of decayed, missing and filled teeth, and tooth wear than the general population • The causes of poorer dental health are multiple, including difficulties with dental hygiene, using teeth as tools and regurgitation • The dental and facial health of Thalidomide survivors is vulnerable
Deteriorating Sight and/or Hearing	<ul style="list-style-type: none"> • Thalidomide survivors are reporting deteriorating sight and hearing • It is unclear whether this deteriorating in sight and hearing is Thalidomide related or due to general aging • There is very little evidence about the extent and nature of deteriorating sight and hearing and the impact on Thalidomide survivors' quality of life
General Health	<ul style="list-style-type: none"> • It is difficult to accurately measure blood pressure and body mass index when people have missing or short limbs and this can make affective treatment/prevention difficult • Some Thalidomide survivors are aware that they are at risk of lifestyle related diseases but find their Thalidomide impairment make it difficult manage their weight or exercise
Mental Health	<ul style="list-style-type: none"> • Hypertension may be more common amongst Thalidomide survivors but more evidence is needed • Mental health problems appear to be more prevalent amongst Thalidomide survivors than the general population • Depressive disorders are the most frequently diagnosed or reported mental health problem • The relationship between mental health and severity of impairment is unclear but Thalidomide survivors with severe hearing impairment and facial damage appeared to be at greater risk of developing depression • Other risk factors for poor mental health are similar to the general population and include poor social networks; living alone; unemployment; the need for on-going assistance; and recent experience of pain

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affected; sensory impairments; internal organs damaged etc.).

In addition to the three studies described above, the TVAC survey¹⁹ found that, in the past five years, 23% (15 out of 65) of respondents reported experiencing depression. Kennelly et al.¹² also found increasing experiences of depression linked to the effects of living with physical impairments.

Discussion

The literature about the health of Thalidomide survivors as they age is not extensive. It is not of the highest level of scientific rigour and many of the biomedical studies have a narrow focus on specific conditions or pathologies. As such, there are parallels with the literature on ageing with cerebral palsy, where it took two decades to develop the evidence about functional decline associated with ageing.^{36,37} Nevertheless, the studies in this review make an important contribution to an under researched area and together they do present a picture of the secondary damage people are now experiencing. Table 2 below synthesises the evidence using initial grounded theory coding.

In particular the literature suggests that the two most common groups of health problems are musculoskeletal conditions and mental health problems. The prevalence of musculoskeletal conditions highlights the question of whether Thalidomide Survivors, like other people with early onset disability, should no longer be encouraged to continually maximise function but rather “conserve it and preserve it”.^{38,39} More broadly it suggests that whilst conditions like Thalidomide embryopathy and other birth defects are non-progressive, the consequences of them are not static, and so greater emphasis needs to be placed on people managing their bodies across the life course.⁴⁰

The apparently high proportion of Thalidomide survivors who are experienced depression and anxiety confirms the known link between disability and poor mental health.⁴¹ More particularly it suggests that the additional loss of function (especially difficulties with activities of daily living) caused by secondary damage, may increasingly be placing Thalidomide survivors at greater risk of mental health problems.⁴²

However, the biomedical literature only presents a partial picture. More extensive inclusion of comparative data of the health of the general population, and the use of assessment tools more sensitive to the experience of early on-set disability, would strengthen the evidence base. The literature would also benefit from a discussion of the social consequences of secondary damage being layered onto lifelong impairments across the life-course; greater consideration of co-morbidities; and as Molton and Yorkston (2016)⁴³ propose, a more relevant and inclusive application of the “successful ageing” paradigm. It is the grey literature (i.e. the reports for Thalidomide organisations and state institutions) that provides most insight into the wider implications of the changing health of Thalidomide survivors and suggests a direction for future research. In particular, further research could benefit from a connection to more social models of disability (and critical disability studies),⁴⁴ particularly in articulating the broader disabling experience in which human rights come more to the fore.

Limitations

This review has three key limitations: there was only one main reviewer, although screening and study selection was discussed with the second author, who also reviewed a sample of data extraction forms and contributed to the GT coding; the quality appraisal of the included papers was limited; and the studies reviewed were of variable scientific rigour.

Conclusions

There is growing evidence that Thalidomide survivors are increasingly experiencing secondary health problems as they age, in particular musculoskeletal and mental health problems. However, the research is of variable quality and the discussion of the social consequences of additional health problems and further loss of function is limited. Even for Thalidomide survivors who have had some financial compensation, the social and economic impact of life changes resulting from impairment, can be considerable and the source of disadvantage, hence the need for a broader perspective in future research.

Disclosure

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.dhjo.2017.09.004>.

References

- Smithells RW, Newman CG. Recognition of thalidomide defects. *J Med Genet*. 1962;29:716–723.
- McBride W. Thalidomide and congenital malformations. *Lancet*. 1961;1:358.
- Lenz W. Thalidomide and congenital abnormalities. *Lancet*. 1962;1:271–272.
- Stromland K, Miller MT. Thalidomide embryopathy: revisited 27 years later. *Acta Ophthalmol*. 1993;71(2):238–245.
- Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Inf Libr J*. 2009;26(2):91–108.
- Centre for Reviews and Dissemination. *Systematic Reviews: CRDs Guidance for Undertaking Reviews in Healthcare*. York: University of York; 2009.
- Spencer L, Ritchie J, Lewis J, Dillon L. *Quality in Qualitative Evaluation: A Framework for Assessing Research Evidence*. London: Government Chief Social Researcher's Office, Prime Minister's Strategy Unit, Cabinet Office; 2003.
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32 item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349–357, 2007.
- Dixon-Woods M, Agarwal S, Jones D, Young B, Sutton A. Synthesising qualitative and quantitative evidence: a review of possible methods. *J Health Serv Res Policy*. 2005;10(1):45–53, 2005 January.
- Keamey MH. Enduring love: a grounded formal theory of Women's experience of domestic violence. *Res Nurs Health*. 2001;24:270–282.
- Bailey C, Jones D, Goodall D. What is the evidence of the experience of having a fall across the life course? A qualitative synthesis. *Disabil Health J*. 2014;3:273–284, 2014 Jul 7.
- Kennelly C, Nelson M, Riesel J. *Thalidomide-impaired People: Quality of Life*. The College of Health/Thalidomide Society; 2002.
- Newbroner E, Chamberlain R, Borthwick R, Baxter M. *Taking the Pressure off: Evaluation of the Health Grant to Thalidomide-impaired People*. St Neots, UK: The Thalidomide Trust; 2011.
- Kayamori R. Post-thalidomide syndrome 50 Years on. *Jpn J Rehabil Med*. 2013;2013(50):957–996.
- Newbroner E, Chamberlain R, Borthwick R, Baxter M. *Looking to the Future: Evaluation of the Health Grant to Thalidomide-impaired People*. St Neots, UK: The Thalidomide Trust; 2012.
- Nippert I, Edler B, Schmidt-Heterich C. 40 Years later: the health related quality of life of women affected by thalidomide. *Community Genet*. 2002;5:209–216.
- Bent N, Tennant A, Neumann V, Chamberlain MA. Living with thalidomide: health status and quality of life at 40 years. *Prosthet Orthot Int*. 2007;31(2):147–156.
- O'Carroll A, O'Reilly F, Whitford DL. What has happened to people affected by thalidomide 50 years on? *Ir J Med Sci*. 2011;180(2):475–478.
- Vermette and Benegali. *Study on the Current Living Conditions of Canadian Thalidomide Survivors and Projections for the Future*. Thalidomide Victims Association of Canada; 2013.
- Knause A, Ding-Greiner C, Beckler G, Stolla C, Becker A-M, Bailler D. *Regular Surveys on Problems, Special Needs and Care Deficiencies of Victims of Thalidomide – Synopsis of Final Report Prepared to the Gostergan Foundation for People with Disabilities*. University of Heidelberg; 2013.

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21. Peters KM, Albus C, Lungen M, Niecke A, Pfaff H, Samel C. *Damage to Health, Psychosocial Disorders and Care Requirements of Thalidomide Victims in North Rhine Westphalia from a Long Term Perspective*. Cologne: Federal Health Centre North Rhine Westphalia; 2015.
22. Newman RJ. Shoulder joint replacement for osteoarthritis in association with thalidomide-induced phocomelia. *Clin Rehabil*. 1999; 13(3):250–252.
23. Ghassemi Jahani SA, Danielsson B, Karlsson J, Danielsson AJ. Long term follow-up of thalidomide embryopathy: malformations and development of osteoarthritis in the lower extremities and evaluation of upper extremity function. *J Child Orthop*. 2014;2014(8):423–433.
24. Ghassemi Jahani SA, Danielsson A, Ab-Fawaz R, Hebella H, Danielson B, Brisby H. Degenerative changes in the cervical spine are more common in middle-aged individuals with thalidomide embryopathy than in healthy controls. *PloS One*. 2016;11(5). e0155493. <https://doi.org/10.1371/journal.pone.0155493>.
25. Meyers BM, Jutul JW. The disability experience: living with a birth defect resulting from thalidomide exposure. *Interdiscip J Health Sci*. 2011;2(2).
26. Ohayon MM, Steng J. Prevalence and comorbidity of chronic pain in the German general population. *J Psychiatr Res*. 2012;2012(46):444–450.
27. Jankelowitz SK, Spiess JM, Burke D. Late-onset neurological symptoms in thalidomide-exposed subjects: a study of an Australasian cohort. *Eur J Neurol*. 2013;20(3):509–514.
28. Nicota A, Newman C, Johnson M, et al. Peripheral nerve dysfunction in middle-aged subjects born with thalidomide embryopathy. *PloS One*. 2016;11(4). e0152902. <https://doi.org/10.1371/journal.pone.0152902>.
29. Oshima Y, Okutsu I, Hamanaka I, Motomura T. Carpal tunnel syndrome accompanying radial dysplasia due to thalidomide embryopathy. *J Hand Surg*. 2006;31(3):342–344.
30. Ekfeldt A, Carlsson GE. Dental status and oral function in an adult group of subjects with thalidomide embryopathy – a clinical and questionnaire study. *Acta Odontol Scand*. 2008;66(5):300–306.
31. Sjogreen I, Kiliaridis S. Facial palsy in individuals with thalidomide embryopathy: frequency and characteristics. *J Laryngol Otol*. 2012;126(9):902–906.
32. Shiga T, Shimbo T, Yoshizawa A. Multicentre investigation of lifestyle-related diseases and visceral disorders in thalidomide embryopathy at around 50 years of age. *Birth Defects Res (Part A)*. 2015;103:787–798. 2015.
33. Tajima T, Wada T, Yoshizawa A, et al. Internal anomalies in thalidomide embryopathy: results of imaging screening by CT and MRI. *Clin Radiol*. 2016;71(2016). 1199.e11199.e7.
34. Imai K, Toshiharu I, Yamamoto M, Komatsu K, Nukui Y, Yoshizawa A. Psychological and mental health problems in patients with thalidomide embryopathy in Japan. *Psychiatry Clin Neurosci*. 2014;68(6):479–486.
35. Niecke A, Peters K, Samel C, et al. Mental disorders in people affected by thalidomide—a cross-sectional study of prevalence and psychosocial needs. *Dtsch Arzte M Int*. 2017;114:168–174.
36. Klingbeil H, Baer HR, Wilson PE. Aging with a disability. *Arch Phys Med Rehabil*. 2004;85(Supplement 3):S68–S73.
37. Haak P, Lenski M, Cooley Hidecker MJ. Cerebral palsy and aging. *Dev Med Child Neurol*. 2009;51(Supplement 4):16–23.
38. LaPlante M. Key Goals and indicators for successful aging of adults with early onset disability. *Disabil Health J*. 2014;7(2014):544–550.
39. Kemp and Misquenda. *Aging with a Disability: What the Clinician Needs to Know*. Baltimore: Johns Hopkins University Press; 2004:307. xv.
40. Moll LR, Cott CA. The paradox of normalisation through rehabilitation: growing up and growing older with cerebral palsy. *Disabil Rehabil*. 2013;35(15):1276–1283.
41. Turner RJ, Lloyd DA, Taylor J. Physical disability and mental health: an epidemiology of psychiatric and substance disorders. *Rehabil Psychol*. 2006;51(No. 3):214–223.
42. Meltzer H, Bebbington P, Brugha T, et al. Physical ill health, disability, dependence and depression: results from the 2007 national survey of psychiatric morbidity among adults in England. *Disabil Health J*. 2012;5(2012):102–110.
43. Molton IR, Yorkston KM. Growing older with physical disability: a special application of the successful aging paradigm. *J Gerontol Soc Sci*. 2016;72(No. 2):290–299. 2017.
44. Berghs M, Atkin K, Graham H, Hatton C, Thomas C. Implications for public health research of models and theories of disability: a scoping review and evidence synthesis. *Public Health Res*. 2016;4(8).

RESEARCH ARTICLE

The health and quality of life of Thalidomide survivors as they age – Evidence from a UK survey

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Abstract

Background

In the late 1950s and early 1960s the drug Thalidomide was marketed across the world as a non-addictive tranquilizer. Despite being given to pregnant women as a safe treatment for morning sickness, Thalidomide caused serious damage to the unborn child. Much has been written about the drug and the birth defects it caused but evidence about the health of Thalidomide survivors as they age is limited.

Aim

The aim of this study was to: explore the health and wellbeing UK Thalidomide survivors; document the health problems experienced by them as they reach their mid-50s; and examine the impacts on their health-related quality of life and employment.

Methods

A health and wellbeing survey of 351 UK Thalidomide survivors, which gathered information about home and employment circumstances, recent health problems, and health related quality of life (using SF12 Health Survey). Overall analysis focused on descriptive statistics; the association between respondents' health related quality of life and original impairment was examined using Pearson Correlation; and a three step Hierarchical Regression was used to explore the influence of five factors which narrative responses suggested might be important.

Results

As Thalidomide survivors reach their mid-50's they are experiencing a wide range of secondary health problems, in particular musculoskeletal problems, and depression and anxiety, with multimorbidity a growing issue. These health problems are having a negative impact on their employment (two fifths are unable to work) and their physical health related quality of life, which is significantly poorer than the general population.

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Discussion

Having lived relatively independent lives, many Thalidomide survivors are now having to adjust to growing disability. The study provides further evidence of the accumulative impact of disability over peoples' lifetimes and highlights the value of a life course perspective in understanding the complex experience of growing older with a disability.

Introduction

In the late 1950s and early 1960s the drug Thalidomide was marketed across the world as a non-addictive tranquilizer. Despite being given to pregnant women as a safe treatment for morning sickness, Thalidomide caused serious damage to the unborn child when taken during the first trimester. Much has been written about the drug and the birth defects it caused but evidence about the health of Thalidomide survivors as they age is limited. The wider literature on the experience of ageing with disability also remains relatively sparse, although there has been growing interest in the past decade, in part because the number of people with early acquired disabilities who are reaching mid and later life is increasing.

The aim of this study was to: explore the health and wellbeing UK Thalidomide survivors; document the health problems experienced by them as they reach their mid-50s; examine the impacts on their health-related quality of life and employment; and, where possible, make comparisons with the incidence of similar problems in the general population, and with research on Thalidomide survivors in other countries. By focusing on an identifiable group who are ageing together, the study was also designed to contribute to the wider understanding of ageing with early onset disability.

Our findings illustrates the challenges of ageing with lifelong impairments, particularly the interactions between original, congenital impairments and subsequent ageing processes. They shows the compounding and accumulated impact of impairment and ageing, in which the biological connects to the social, thereby exposing individuals to environmental factors that further generate the potential for disadvantage and social exclusion [1]. These include access to paid work and self-care, previously characterised by high levels of personal independence. As former adaptive mechanisms are compromised, new experiences of disability arise [2].

Background

Between 1958 and 1961, Thalidomide was widely prescribed in the UK as a safe, none addictive sedative and tranquiliser. It was manufactured by a German company, Chemie Grünenthal, and distributed in the UK by Distillers Company (Biochemicals) Limited. Despite being marketed as an entirely safe treatment for the discomforts of pregnancy (including morning sickness), Thalidomide caused serious damage to the unborn child when taken during the first trimester. Depending on the timing and level of ingestion, foetal damage typically included:

- Missing, shortened or malformed upper limbs—ranging from complete absence of the arm (upper limb Amelia) with one or more digits attached directly to the shoulder, to short or missing long bones and missing or damaged thumbs and fingers
- Shortened or malformed lower limbs—including short or missing long bones, congenital dislocation of the hip, club foot, and extra toes
- Eye, ear and facial damage—these are the second most common group of birth defects and include missing or damaged ears, narrow ear canals, small or damaged eyes, restricted eye movement and facial palsy

- Malformation of internal organs—such as damage to the heart, urinary and alimentary tracts, and reproductive organs [3].

Together, these birth defects are referred to as Thalidomide Embryopathy or Thalidomide Syndrome.

Thalidomide constituted a major medical safety scandal and has, in Sarah Ferber's [4] words become "emblematic of the advance then shocked reversal of the optimism of the 'pharmaceutical revolution' of the mid twentieth century" (p133). In the UK it prompted extended public campaigns by the Sunday Times newspaper and the parents of UK Thalidomide-damaged children for recognition and compensation. It led to global changes in the way in which drugs are tested and regulated [5], and in the UK to: the establishment of a Royal Commission on Civil Liability and Compensation for Personal Injury; changes to definitions of contempt in civil law cases; and a Law Commission report and legislation on civil liability in ante-natal injury.

A charitable trust—the Thalidomide Children's Trust (now the Thalidomide Trust—see www.thalidomidetrust.org), was established to oversee compensation payments from Distillers to the families affected by Thalidomide in the UK. Individual payments were determined through assessments of level of impairment, with points being given for different types and severity (totalling from 3.5 to 75 points). The Thalidomide Trust continues to distribute annual payments from the global company Diageo (successor to Distillers) to all UK born Thalidomide survivors. An elected beneficiary National Advisory Council (NAC) advises the Trust. Subsequent campaigns by Thalidomide survivors themselves have focused on the UK Government's ill-judged licensing of the drug, which had not been adequately tested. In response, in 2010 the Departments of Health (DH) in England, Scotland, Wales and Northern Ireland began paying an annual Health Grant to Thalidomide survivors, in recognition of their growing health and health-related needs. The DH grants, which have been agreed until April 2022, are also administered by the Thalidomide Trust and distributed annually in line with the severity of initial impairment.

Compared to Thalidomide survivors worldwide, UK survivors are relatively unusual in that their families, (and now they themselves) have received compensation payments from childhood. The level of this compensation has increased significantly over the past decade, as a result of both increased payments from Diageo and the DH Grants. This should offer a degree of protection against the disabling consequences of impairments [6]. In other countries compensation arrangements have been much poorer. In Canada for example, when an out of court settlement was reached between Richardson Merrell and 26 families, the company imposed a strict secrecy clause, which resulted in wide disparities in compensation amounts for individuals with similar levels of impairment [5]. In Spain Thalidomide survivors have never received any compensation from the company that made the drug. However, in 2011, after a long campaign by Avite (the Spanish Thalidomide group), the Spanish government did make a small payment to 23 Thalidomide survivors; a fraction of the number believed to have been born in Spain [7].

Ageing with Thalidomide Embryopathy and ageing with disability

The combination of impairments experienced by many Thalidomide survivors (particularly limb difference) is rare, and the historical, social and legal context of their experience is unique. However, because they are such an identifiable group who are ageing together, comparing the similarities and differences between their experiences of ageing with those of other groups with early onset disability may offer new insights into disability and the life-course.

Evidence about the health of Thalidomide survivors as they age is limited [8]. In particular, few studies have explored the interactions between original Thalidomide impairment, newly

emerging secondary damage and co-morbidities. There has also been little attempt to understand how changes to impairment impact on the disabling experience. In the 2000s, when Thalidomide survivors reached their 50s, more research into the health of Thalidomide survivors, began to be undertaken. Whilst many studies have a narrow biomedical focus, together they do suggest widespread age-related secondary damage, particularly musculoskeletal problems (often related to overuse of 'good' limbs) and common mental health disorders, notably depression and anxiety [9, 10, 11]. These two conditions may of course be related, if emerging musculoskeletal conditions and consequent loss of function (especially difficulties with activities of daily living and/or reduced ability to work) place Thalidomide survivors at greater risk of mental health problems [12].

In the broader field of disability research, the past decade has seen growing interest in the experience of ageing with disability [13, 14], not least because the number of people with from birth or early acquired disabilities who are reaching middle and older age is increasing [15, 16]. Several overarching themes emerge from the current literature. First, people ageing with disability often face particular difficulties such as secondary conditions and overuse syndromes, post onset syndromes (e.g. post-polio syndrome) and a sense of premature ageing. As Molton and Yorkston [16] note, even in conditions which are regarded as 'static' (e.g. Cerebral Palsy), peoples' functional limitations can change across the life course, creating further potential for disability. Moreover, they suggest that "there is now mounting evidence that the cumulative effects of living with a disability condition for many years contribute to premature declines in health" (p291). Secondly, people experiencing the later life effects of early acquired disabilities appear to be more at risk of depression and lower life satisfaction [15,17], although there is evidence that poor overall health, rather than the extent of (original) impairments is more significant in terms of social isolation [13]. Lastly, people growing older with disability often have an elevated risk of acquiring age-related chronic conditions [18, 19], which disability may in turn make more difficult to manage.

Within the disability literature, a few authors [1, 14, 20, 21] have proposed that a life course approach might provide a productive and more holistic framework for thinking about how disability affects people at different points in their lives, including ageing with disability. As Naidoo et al. [14] point out, "age and disability are not defining traits of an individual but overlapping phenomena that occur throughout the span of the life course" (p3). Drawing on the principles of life course theory developed by Elder et al. [22], they suggest that a life course perspective brings to the fore "individual choice and circumstance" and locates them "within larger social and historical context" (p3)

This paper contributes to the literature on ageing with disability by focusing on the experience of UK Thalidomide survivors. It presents evidence that the health problems caused by Thalidomide are not restricted to the well-documented neonatal impairments. On the contrary, it argues that survivors are encountering significant *new* Thalidomide-related challenges to their physical and mental health and well-being as they age; that these changes in health are linked to individual choice and circumstance; but also to the social and historical context in which Thalidomide survivors have lived their lives.

Methods

The UK Thalidomide Trust, which holds details of all those to whom it makes Diageo and DH payments, commissioned a survey of the health and wellbeing of its 467 beneficiaries to help develop appropriate support for beneficiaries as they aged. The survey was primarily intended to gather information to inform the Trust's work and specifically aimed to:

- Quantify the incidence of beneficiaries' health problems

- Examine beneficiaries' mental and emotional wellbeing
- Investigate beneficiaries' wider circumstances and anticipated future needs.

Survey questions were developed in collaboration with the Trust's Research Committee, Trust staff and NAC. They covered nine main topics: family and housing; work and pensions; original Thalidomide impairments; mobility and equipment; health problems; use of health services; social care support; emotional wellbeing; and health related quality of life. This final topic was explored using the Short Form 12 Health Survey (SF12), a 12-item version of the Short Form-36 Health Survey Questionnaire, widely used in health research in the UK and internationally, to measure health related quality of life. This paper draws on the survey data about respondents' characteristics and then focuses on two topics—health problems and health related quality of life. Data on the other topics explored in the survey have proved valuable to the Thalidomide Trust but are not discussed here.

The self-completion questionnaire was piloted online and on paper with ten beneficiaries with a range of impairment severity. Paper copies of the final version were sent to all beneficiaries in early August 2015 together with an information sheet and covering joint letter from the Trust Director and NAC Health and Wellbeing Committee Chair. Beneficiaries who had previously informed the Trust they were willing to be contacted by email were also sent the link to an online version; the option of a telephone interview with a member of the research team was also offered. One reminder letter was sent and the survey closed end September 2015 with responses from 351 Thalidomide survivors (75% response rate). Four responses were completed by family members/guardians on behalf of beneficiaries. Although respondents could opt to complete the survey anonymously, 87% gave their names, which enabled their survey responses to be linked to information held by the Trust about their impairment level and country of residence.

The overall analysis—using SPSS (version 24) focused on descriptive statistics. We also examined the association between respondents' health related quality of life and original impairment using Pearson Correlation, and then used a three step Hierarchical Regression to explore the influence of other factors, which the narrative responses in the survey had suggested might be important (i.e. step 1—original impairment level; step 2—being unable to work and qualifications; and step 3—gender and living alone). Multicollinearity checks were run on all predictor variables included in the models. Where possible and appropriate, the findings from the survey were compared with the general population of a similar age and/or to findings from studies of the health of Thalidomide survivors in other countries. Comments and additional information provided in free text boxes were analysed thematically. This are not reported here in detail but quotations from these narrative responses are used to illustrate findings from the survey.

Ethical approval was obtained from the Department of Health Sciences Research Governance Committee, at the University of UK on the 19 May 2014.

Results

Survey respondent characteristics

Here we describe the characteristics of the survey respondents, in order to provide context for the results presented in later sections. In the UK and internationally, limb defects, particularly missing or short arms, are the most commonly recognised feature of Thalidomide damage. However, damage took many forms and varied considerably in severity. The drug was also no respecter of class or culture, so survivors are a widely heterogeneous group. Respondents were evenly split between women and men (174 respectively; three respondent did not give their

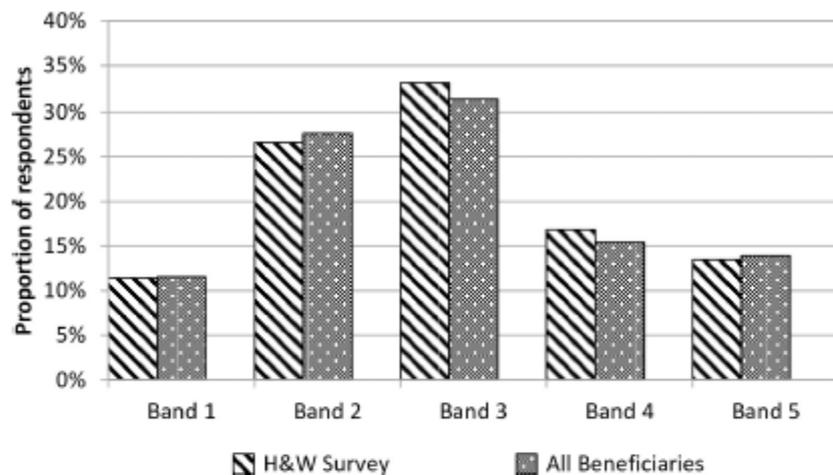


Fig 1. Distributions of survey respondents and all beneficiaries by impairment band. NOTE: $n = 302$; it was only possible to identify the impairment band for respondents who gave their names.

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gender). At the time of the survey, the Trust grouped its beneficiaries into five impairment bands, with band 1 covering beneficiaries with the least severe impairments and band 5 those with the most severe. Based on these bands, the distribution of the overall severity of their impairments was similar to that of all UK beneficiaries (Fig 1).

Respondents were asked to describe their original Thalidomide impairments using 25 categories covering limb damage, sensory impairments and internal organ damage, plus a free text box for other damage. For ease of analysis, these were collapsed into eight groupings and their incidence compared (in aggregate form) with data held by the Trust. This enabled us to check that the survey respondents were broadly representative, in terms of the range of impairment, of all UK Thalidomide survivors. For example, the proportions in survey and in the Trust's data were very similar for respondents with upper limb only damage (survey 58%/Trust 54%), lower limb only damage (survey 5%/Trust 4%), and no limb damage, (survey 12%/Trust 11%). However, there was a difference in the proportion with both upper and lower limb damage (survey 25%/Trust 34%).

However, because the Trust's information was collected at the time beneficiaries were assessed for their compensation claims i.e. from the 1970's onwards, the survey also provided a more up to date picture of impairments, particularly damage to internal organs which for many had only come to light later in life as a result of diagnostic scans. This was reflected in survey results. For example, 31% of survey respondents said they had damage to internal organs, whereas the Trust's data showed just 22% with this type of damage. Thalidomide survivors who were blind or partially sighted appear to be under represented in the survey. This may reflect the method of data collection, although large print version of the questionnaire were available and respondent could choose to complete the survey by telephone. Importantly, the survey confirmed that many Thalidomide survivors have multiple impairments e.g. 73 respondents had upper limb damage and were deaf/partially deaf and 27 respondents had both sight and hearing impairments; and almost all respondents reporting internal organ damage also had other impairment/s.

Almost two thirds of respondents lived with partners/spouses or with a partner/spouse and other family members. Nearly a quarter (76/22%) lived alone (compared to 17% of the general

UK population aged 50 to 64 [23]; 10% lived with another family member/s (e.g. parents/sibling). Nine respondents lived at home with full-time paid carers or in residential care. The majority of respondents (304/87%) owned their house or flat, compared to 75% of the general UK population aged 50 to 64 (75%) [24].

Self-reported health problems

The survey asked Thalidomide survivors about additional health problems, over and above their original impairments.

Musculoskeletal problems and pain. Almost all (93%) reported musculoskeletal problems (pain and/or loss of movement in joints, neck and/or back). Back problems were the most commonly reported musculoskeletal problem, closely followed by shoulder pain/loss of movement and problems with hands (Table 1). In comparison, less than 20% of adults aged 45–64 in the general population report chronic musculoskeletal conditions [25] and only 15% suffer low back pain [26]. The prevalence of musculoskeletal problems, particularly back problems, is therefore higher amongst UK Thalidomide survivors than in the general population, a pattern also found in Swedish Thalidomide survivors [27]. Many survey respondents reported multiple musculoskeletal problems, with a mean of 4.5 problems and over half reporting five or more problems.

Almost half (49%) of respondents reported generalised pain: 26% said this was severe and/or continuous and a further 23% described it as moderate and/or intermittent. Respondents with most severe Thalidomide damage were the most likely to report generalised pain. For some, the cause of the pain was unclear:

“Chronic neuropathic pain in peroneal nerves—both legs, below knee. 5 years. No cause found. Does not respond to treatment/pain management medication.” (Survey ID298)

“I have been suffering with regular bouts of pain in my side. I have had several tests done but I am told there is no conclusive reason for the pain.” (Survey ID104)

Two-thirds (66%) of respondents also reported one or more neurological symptom (e.g. tingling and numbness). Two fifths reported severe tiredness/fatigue; this was more common among respondents in Bands 1 and 2, possibly because they were more likely still to be in paid work and therefore less able to rest.

Mental health. Half the respondents said that they were currently or had recently experienced depression and/or anxiety (41% reported anxiety and 34% depression). This is in stark contrast to the estimated 20% of adults in the general UK population aged 50–54 reporting common mental health problems (e.g. depression, anxiety or panic) and the estimated 8%

Table 1. Prevalence of musculoskeletal problems.

Musculoskeletal Problem	Number/%
Back problems—prolapsed disc; damage to vertebrae; scoliosis and/or muscular pain	254/72%
Shoulder—pain, loss of movement or deterioration of the joint	211/60%
Hands—pain, loss of grip and/or dexterity	210/59%
Arms and wrists—pain, loss of strength and/or movement	197/56%
Neck pain and/or loss of movement	195/55%
Knee—pain or deterioration of the joint	168/48%
Hip—pain, loss of movement or deterioration of the joint	164/46%
Ankles, feet and toes—pain and/or loss of movement	100/28%

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12% adults of all ages reporting depression in any year [28]. The prevalence of poor mental health among UK Thalidomide survivors is also higher than a general population survey of 7500 physically disabled adults (all ages), of whom 19.5% reported depression or mixed depression/anxiety [17]. However, it is very similar to the prevalence of mental health problems among German survivors [11], where face-to-face psychiatric assessments found 47.7% of Thalidomide survivors currently or recently experienced mental health problems.

Hearing, sight and dental problems. Deteriorating sight/eye problems were a concern for 43% of respondents and 38% (133) said that they had deteriorating hearing/other ear problems. Although these figures will include normal age-related deterioration, this can cause additional problems for Thalidomide survivors e.g. having very short arms makes putting glasses on and off difficult, whilst wearing glasses can be problematic for those with facial damage (e.g. a missing ear). Thirty-four percent of respondents reported dental health problems. As with Swedish Thalidomide survivors [29], these problems may reflect difficulties with tooth brushing and a history of using teeth to grip and hold.

Other health problems. Respondents reported a range of other health problems, with weight management (n = 141/40%), bowel and digestive problems (n = 98/28%), bladder or continence problems (n = 72/20%) and asthma or breathing problems (n = 54/15%) being the most common. Again, these health problems may be more difficult to manage or exacerbated by Thalidomide damage. A recent Japanese study [30] suggests that hypertension is a particular concern because of the difficulties many Thalidomide survivors experience in exercising and managing weight, and the challenge of obtaining accurate blood pressure and body mass index measurements in people with limb impairments.

Multimorbidity. A high proportion of Thalidomide survivors reported multiple health problems (see Fig 2). Just 3% had no health problem but almost half (46%) reported between four and nine separate problems. Multimorbidity or the presence of multiple diseases in one individual is a growing concern in the UK population as a whole but these results suggest that a higher proportion of Thalidomide survivors are experiencing multimorbidity than would be

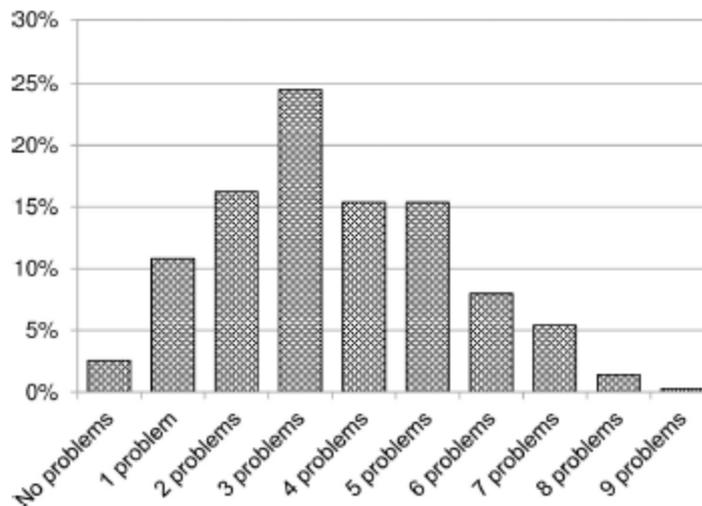


Fig 2. Proportions of Thalidomide survivors reporting multiple health problems.

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expected at this point in their life course. For example, in Barnett et al's [31] study of multi-morbidity in Scotland, around a third of patients aged 55 to 59 had two or more morbidities but less than 10% had four or more morbidities. Furthermore, for some Thalidomide survivors the morbidity burden i.e. the overall impact of several conditions on the individual's "physiologic reserve" and functioning [32] is significant. A comment added by one respondent vividly illustrates this:

"After having operations on both shoulders and left elbow the use of my arms and hand were considerably limited e.g. dressing, washing, cooking, and most basic household chores. Also having a mini stroke has made my balance a bit difficult. And then the cancer came along . . ." (Survey ID21)

The impact of health problems on paid work

These widespread health problems were reflected in survey respondents' employment status. Two-fifths (145/41.3%) were now unable to work because of their disability or health problems (Table 2). Previous research suggests that less than 10% of UK Thalidomide survivors have never worked [33]. As in the general population, there were significant differences between men and women: men were more likely to be working full-time; women were more likely to work part-time; and women were also marginally more likely to be unable to work because of their disability or health problems (69 men compared to 76 women).

The likelihood of not working increased with the severity of impairment: the proportions reporting currently being unable to work increased from 35% of those in Band 1 (least severe) to 75% in Band 5 (most severe); whilst the proportion currently in full-time work decreased from 32% (Band 1) to 8% (Band 5). Moreover, although respondents in impairment bands 1 and 2 were more likely than their peers with more severe impairments to still be in full time work, around a third of them still reported being unable to work because of their disability or health problems. Patterns for those working part-time were less clear.

Comparisons with the general population, and/or with people with disabilities as a whole are difficult, as different sources use different terminology, definitions and age groupings. However, in 2015, 82% of the general population aged 50–54 (78% of women, 86% of men) were in paid work [34] (DWP 2015), suggesting that only 18% of the age group were 'economically inactive', compared to 63% of Thalidomide survivors.

In the UK, disabled people may be four times as likely as their non-disabled peers to be unemployed or involuntarily out of work [35]. However, the lifetime economic activity patterns of Thalidomide survivors appear to be somewhat different from those of other disabled

Table 2. Work situation.

Work Situation—all respondents	Number/%
I'm unable to work because of my disability or health problems	145/41.4%
I work full-time	54/15.4%
I have chosen not to work in order to preserve my health/functioning	45/12.9%
I work part-time because of my disability or health problems	30/8.6%
I work part-time in order to preserve my health/functioning	29/8.3%
I work part-time for family or personal reasons	17/4.9%
I'm not working at the moment but would like to	15/4.3%
I've chosen not to work for family or personal reasons	8/2.3%
Other (e.g. education)	7/2.0%

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people. First, their current employment patterns do not reflect the lower levels of educational achievement which commonly disadvantage disabled people; their educational achievements were broadly similar to those of the general population of a similar age [36]. The proportion of Thalidomide survivors with no qualifications was similar to those of working age disabled people in general. On the other hand, the proportion with degree-level qualifications was higher than working age disabled people in general [37]. Similar educational qualification patterns have been found among German Thalidomide survivors [11]. Secondly, at each level of educational qualification, there was a range of severity and type of impairment (e.g. the 19 respondents with degrees working full time were spread across all five severity bands and most types of impairment). This suggests that whilst respondents' ability to work was strongly linked to the severity of their impairment, educational qualifications also had an important influence. Thirdly, the survey showed that Thalidomide survivors' work situation had changed significantly over the last 10 to 15 years. Overall, 207 respondents (59%) reported changes in their work situation since 2000, with most changes taking place in the last five years (Fig 3). This trend has also been seen amongst Thalidomide survivors in Canada and Germany [9, 38].

"Increasingly from 2002 onwards, at which time I was a Director of a limited company working in excess of 50 hours per week. I now struggle to manage 18 hours per week. I have now reached the point where stopping work altogether is imminent." (Survey ID2)

Less severely impaired respondents (Bands 1 to 3) were more likely to have reduced their working hours or changed the type of work they did. Although greater proportions of more severely impaired beneficiaries (Bands 4 and 5) had stopped working since 2000, this change had also occurred across all impairment bands. For example, over three quarters of respondents in bands 1 to 4 were working prior to 2000. By 2015, less than half of all respondents were working and, moving from band 1 to band 5, there was a gradual fall in the proportions still working.

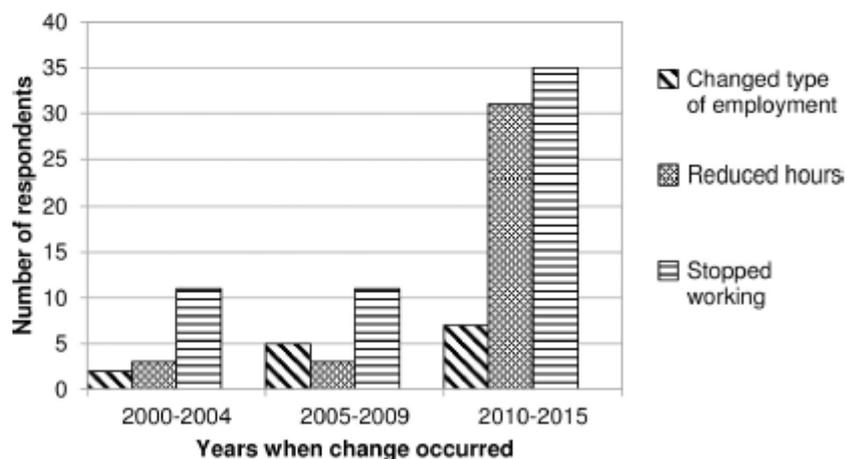


Fig 3. Changes in work situation since 2000. Note 15 respondents reported more than one change, so appear in more than one category; all had reduced working hours and all but one had changed the type of work they did.

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"2011 I was forced to make a difficult decision to stop working due to continued failing health." (Survey ID183)

"In 2009 I had to reduce my hours in line with medical advice. In 2010 I had further problems. . . and in 2011 I was medically retired (not at my request) as my employer had no role for me." (Survey ID276)

Thalidomide survivors’ health-related quality of life

The SF12 Health Survey was used to measure health related quality of life. SF12 consists of eight scaled sections (General Health; Pain; Physical Functioning; Role Limitation Physical; Mental Health; Role Limitation Emotional; Social Functioning; Vitality), which can be ‘aggregated’ into two domains: physical health related quality of life and mental health related quality of life. Of the 351 survey respondents, 335 returned SF12 questionnaires that were useable for analysis (i.e. no missing data) and for 285 of these we were able to link SF12 scores to level of impairment (as indicated by the number of impairment points the individual had). Fig 4 shows the range of scores for the survey respondents compared to the general population aged 45–54, based on responses to the Central England Healthy Life Survey [39].

In the physical health domain respondents had a markedly lower average aggregate score than the general population (i.e. a mean of 26.7 compared to 50) indicating that their physical health related quality of life is much poorer. 59.7% (n = 200) of the respondents had a score below 30 i.e. the same as or worse than the 2% of the general population group with the poorest physical health related quality of life, and only 7.5% (n = 25) of the respondents had a score above the average for the general population group.

In the mental health domain the average aggregate score for respondents was 46.5, slightly lower than the general population (score 50). This suggests that on average Thalidomide

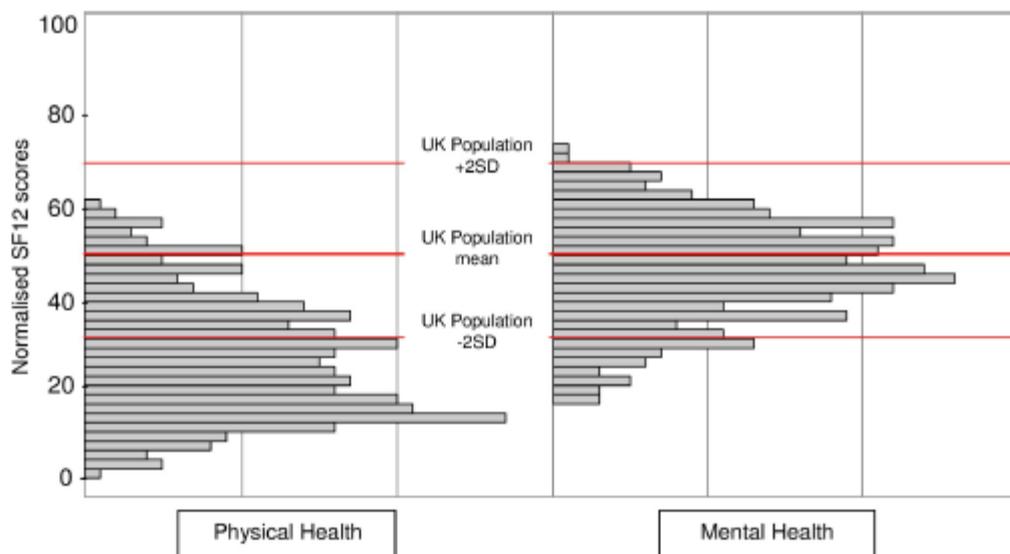


Fig 4. Normalised SF-12 physical and mental health scores for survey group.

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Table 3. Hierarchical Regression results for SF12 Physical.

	B	SE B	B (95% CI)	Sig.
Impairment Level	- 0.194	0.063	-0.31, -0.07	0.002
Unable to Work	11.556	1.572	8.46, 14.65	0.000
Qualifications	- 0.184	0.290	-0.75, 0.38	0.526
Gender	- 3.207	1.471	-6.10, -0.31	0.030
Live Alone	- 0.343	1.755	-3.79, 3.11	0.845

Note: Step 1 Adj $R^2 = 0.079$; Step 2 Adj $R^2 = 0.243$, $\Delta R^2 = 0.169$; Step 3 Adj $R^2 = 0.251$, $\Delta R^2 = 0.014$

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survivors' mental health related quality of life is only marginally poorer than their peers in the general population; indeed 40.9% of respondents ($n = 137$) had a score above the average for the general population. However, 10.7% ($n = 36$) had a score below 30 i.e. the same as or worse than the 2% of the general population with the poorest mental health related quality of life. Overall men had a higher mean score for physical health (28.6 compared to 24.7) which was significant ($t(327) = 2.567$, $p = 0.01$). Women had a higher mental health score (47.8 compared to 45.1), which was not significant ($t(327) = -1.981$, $p = 0.05$).

We also used the SF12 results to examine whether there was any relationship between health-related quality of life and level of impairment. We found that there was a strong negative correlation ($r = -.276$; $p = .000$) between lower SF12 physical health scores and severity of impairment i.e. the more severe a respondent's Thalidomide damage, the poorer their physical health related quality of life was likely to be. In contrast, when we examined the same relationship for mental health related quality of life, we found that the less severe a respondent's Thalidomide damage, the poorer their mental health related quality of life was likely to be i.e. there was a positive (but weaker) correlation between lower SF12 mental health scores and less severe impairment ($r = .148$; $p = .012$).

The responses to the narrative questions in the survey suggested that other factors, in particular being unable to work because of secondary health problems, could be important in explaining variance in both physical and mental health-related quality of life. To examine if this was the case we used hierarchical regression, using three sets of variables: original impairment level (as indicated by the number of impairment points) (step 1); being unable/able to work and qualifications (step 2); and gender and living alone/living with others (step 3). Tables 3 and 4 below show the results for SF12 physical and mental health scores.

The model predicting physical health was significant at: step 1— $F(1, 273) = 24.526$, $p < .001$; step 2— $F(3, 271) = 30.337$, $p < .001$; and step 3— $F(5, 269) = 19.396$, $p < .001$. The results for SF12 physical show that together the five variables explained 25% of the variance in physical health related quality of life. However, only three variables make a unique statistically

Table 4. Hierarchical Regression results for SF12 mental health.

	B	SE B	B (95% CI)	Sig.
Impairment Level	0.190	0.060	0.07, 0.30	0.002
Unable to Work	5.026	1.497	2.07, 7.97	0.001
Qualifications	- 0.355	0.276	-0.89, 0.18	0.200
Gender	2.077	1.401	-0.68, 4.83	0.140
Live Alone	0.974	1.671	-2.31, 4.26	0.561

Note: Step 1 Adj $R^2 = 0.016$; Step 2 Adj $R^2 = 0.067$, $\Delta R^2 = 0.058$; Step 3 Adj $R^2 = 0.069$, $\Delta R^2 = 0.009$

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significant contribution (i.e. $p = .05$ or less)—a higher level of original impairment, being unable to work, and gender (being male), predicted poorer physical health related quality of life, with being unable to work accounting for most of the variance.

The model predicting mental health was sig at: step 1— $F(1, 273) = 5.348, p = .021$; step 2— $F(3, 271) = 7.514, p < .001$; and step 3— $F(5, 269) = 5.080, p < .001$. For mental health related quality of life, the five variables explained just 7% of the variance in SF12 mental health scores, with only two variables—lower level of original impairment and being unable to work, making a unique statistically significant contribution to predicting poorer mental health related quality of life.

Discussion

Over the past five decades, the lives of UK Thalidomide survivors' have been documented in the media. They are (rightly) often portrayed as remarkable individuals who have overcome a unique range of physical impairments to lead active and productive lives. However, the findings from this first comprehensive investigation of the health of UK Thalidomide survivors in their early/mid 50s show that in addition to their original impairments, many are now reporting multiple secondary health problems and rapid loss of function, thereby creating the potential for further disabling consequences. The layering of these secondary health problems on to lifelong impairments is causing many Thalidomide survivors to give up paid work prematurely (a trend which has accelerated in the last 10 years), and need more help in their daily lives. From being hitherto relatively independent, they appear to be increasingly out of step with their non-disabled peers at the same stage in the life course.

Musculoskeletal problems were over four times as common amongst Thalidomide survivors as in the general population of a similar age, and a high proportion experience multiple musculoskeletal problems. These problems are leading to loss of function and associated difficulties with activities of daily living and for many this is having a negative impact on their mental wellbeing. This link has been found in other studies of disabled people. Melzer et al. [17] found that the number of Activities of Daily Living/Instrumental Activities of Daily Living that people with disabilities had difficulties with, had an incremental effect on the likelihood of them experiencing depression. The quotation below from a response to the narrative questions in the survey illustrates this effect in relation to Thalidomide survivors:

"My only normal hand is deteriorating badly. I've had 3 operations on it, they can't do anything more. I'm in pain with it nearly all the time. I can't do hardly anything for myself now. I'm terrified. I'm only 55—how much worse is it going to get? Having one hand I was never disabled but I am now. Luckily I have fantastic children who all automatically do everything for me that's needed. They cut my food up, do up my buttons, zips, and laces, and are amazing but I don't want to be a burden to them. Losing your independence is soul destroying." (Survey ID307)

Alongside secondary physical health problems, half the survey respondents said that they were currently or had recently experienced depression and/or anxiety. This self-reported prevalence of common mental health problems is significantly higher than in the same age group in the general population and higher than adults (all ages), with other physical disabilities. However, it is supported by evidence from clinical studies conducted with Thalidomide survivors in Germany.

The prevalence amongst UK Thalidomide survivors of 'lifestyle' diseases and other conditions associated with middle and older age is unclear. However, the practical challenges of

preventing and self-managing conditions such as diabetes, can be huge for people with limb difference. A high proportion of survey respondents reported the same risk factors for lifestyle diseases as other people with physical disabilities, notably weight management and difficulties exercising. The risk for Thalidomide survivors may be compounded by the problems of accurately measuring blood pressure and body mass index when people have missing or short limbs [30]. Crucially, many Thalidomide survivors reported multiple health problems. Moreover, a higher proportion of them were experiencing multimorbidity than would be expected at this point in their life course, and for some the morbidity burden appeared significant.

The study also showed that Thalidomide survivors experience significantly poorer physical health related quality of life compared to the general population but their mental health related quality of life was only marginally poorer than their peers in the general population. These findings are consistent with a German study of 186 Thalidomide survivors in North Rhine Westphalia, which used SF36. Peters et al. [11], reported that Thalidomide survivors had a mean aggregate physical score of 29.6 and a mean aggregate mental health score of 47.8. A Swedish study of 31 Thalidomide survivors [40] also found that their physical health related quality of life was significantly lower than the general population, although their mental health related quality of life was similar.

Whilst the more severe a respondent's original Thalidomide damage, the poorer their physical health related quality of life was likely to be, being unable to work accounted for most of the variance in SF12 scores. This suggests that secondary health problems and associated loss of function may be a far more important influence on physical health related quality of life than original impairment alone. In relation to mental health related quality of life, the narrative responses to the survey suggest that for Thalidomide survivors with lower levels of impairment, who have probably been actively employed for most of their lives, having to give up work (as opposed to choosing not to work) is having a detrimental effect on their mental wellbeing. However, the quantitative analysis showed that being unable to work accounted for just under 7% of the variance in SF12 scores, which implies that psychosocial factors, not explored in the survey, may be of more importance.

Studies of the wellbeing and quality of life of people with disabilities [41, 42], have found that those disabled from birth were likely to have higher subjective wellbeing than those disabled later in life. This study shows that whilst the majority of Thalidomide survivors have lived relatively independent lives, many are now having to adjust to growing disability. For those with mild to moderate impairments in particular, the experience of this change appears to be similar to people disabled later in life. However, Thalidomide survivors (as a group) are in some respects atypical of people with disabilities: they have a similar level of education to their peers in the general population; and at least in recent years, they have been more financially secure due to improved compensation payments and the DH Grant. Moreover, for many any employment disadvantage (as indicated by lower rates of labour market participation) is relatively recent. Nevertheless, at this relatively late stage in life they are experiencing exposure to the environmental and other disadvantages common to many disabled people.

This study provides further evidence of the accumulative impact of disability over peoples' lifetimes; it demonstrates that whilst from birth conditions like Thalidomide Embryopathy are non-progressive, they are not static; and it highlights the value of a life course perspective in understanding the complex experience of growing older with a disability. Our paper, by describing how impairments change over time, represents a starting point. More theoretically work connecting this to the accumulative potential for disability is required, along with a commitment to using these insights to inform a more nuanced policy, which is able to accommodate the fluid and changing nature of the disabling experience.

Supporting information

S1 Questionnaire. Thalidomide trust health and wellbeing questionnaire 2015.
(PDF)

S1 Dataset. Health and quality of life of UK Thalidomide survivors.
(XLSX)

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References

1. Berghs M, Atkin K, Graham H, Hatton C, Thomas C. Implications for public health research of models and theories of disability: a scoping review and evidence synthesis. *Public Health Research*. 2016; 4(8)
2. Power A, Bertlett R. Ageing with a learning disability: Care and support in the context of austerity. *Social Science and Medicine*. 2018; <https://doi.org/10.1016/j.socscimed.2018.03.028>
3. Smithells RW, Newman CGH. Recognition of thalidomide defects. *J Med Genet*. 1992; 29:716–723. PMID: [1433232](https://pubmed.ncbi.nlm.nih.gov/1433232/)
4. Ferber S. *Bioethics in Historical Perspective*. Palgrave Macmillan; 2013.
5. Brynner R, Stephens T. *Dark Remedy*. Perseus Publishing; 2001.
6. World Health Organization. *World Report on Disability*. Geneva: World Health Organization; 2011. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21665020>
7. Scott C. The forgotten victims. *Sunday Times*, 3 May 2015. Available from: <https://www.thetimes.co.uk/article/the-forgotten-victims-s6q3y0g8n88>
8. Newbronner E, and Atkin K. (2018). The changing health of Thalidomide survivors as they age: a scoping review. *Disability and Health Journal*. 2018; 11: pp184–191. <https://doi.org/10.1016/j.dhjo.2017.09.004> PMID: [29109034](https://pubmed.ncbi.nlm.nih.gov/29109034/)
9. Kruse A, Ding-Greiner C, Beckerr G, Stolla C, Becker A-M, Balke D. Regular surveys on problems, special needs and care deficiencies of victims of Thalidomide—synopsis of final report presented to the Contergan Foundation for People with Disabilities. University of Heidelberg; 2013.
10. Kayamori R. Post-Thalidomide Syndrome 50 Years On. *Japanese Journal of Rehabilitation Medicine*. 2013; 50; 957–96.
11. Peters KM, Albus C, Lungen M, Niecke A, Pfaff H, Samel C. Damage to Health, Psychosocial Disorders and Care Requirements of Thalidomide Victims in North Rhine Westphalia from a Long Term Perspective. Cologne: Federal Health Centre North Rhine Westphalia; 2015.
12. Turner RJ, Lloyd DA, Taylor J. Physical Disability and Mental Health: An Epidemiology of Psychiatric and Substance Disorders. *Rehabilitation Psychology*. 2006; Vol. 51, No. 3, 214–223.
13. Verbrugge LM, Yang L. Aging with disability and disability with aging. *Journal of Disability Policy Studies*. 2002; 12(4): 253–67.
14. Naidoo V, Putnam M, Spindel A. Key focal areas for bridging the fields of aging and disability: findings from the growing older with disability conference. *International Journal of Integrated Care*. 2012; Oct-Dec, URN:NBN:NL:U1:10-1-113853.

15. Klingbeil H, Baer HR, Wilson PE. Aging with a disability. *Arch Phys Med Rehabil*. 2004; 7:S68–S73.
16. Molton IR, Yorkston KM. Growing older with physical disability: a special application of the successful ageing paradigm. *J Gerontol B Psychol Sci Soc Sci*. 2017; Vol. 72, No. 2: 290–299. <https://doi.org/10.1093/geronb/gbw122> PMID: 27702638
17. Meitzer H, Bebbington P, Brugha T, McManus S, Rai D, Dennis M, et al. Physical ill health, disability, dependence and depression: Results from the 2007 national survey of psychiatric morbidity among adults in England. *Disability and Health Journal*. 2012; 5: 102–110. <https://doi.org/10.1016/j.dhjo.2012.02.001> PMID: 22429544
18. Jensen MP, Trullitt AR, Schomer K G, Yorkston KM, Baylor C, Molton IR. Frequency and age effects of secondary health conditions in individuals with spinal cord injury: A scoping review. *Spinal Cord*. 2013; 51: 882–892. <https://doi.org/10.1038/sc.2013.112> PMID: 24126851
19. LaPlante M. Key Goals and indicators for successful aging of adults with early onset disability. *Disability and Health Journal*. 2014; 7: S44–S50. <https://doi.org/10.1016/j.dhjo.2013.08.005> PMID: 24456885
20. Priestley M. *Disability and the Life Course; Global Perspectives*. Cambridge: Cambridge University Press; 2001.
21. Jeppsson Grassman E, Whitaker A. *Ageing with disability: A lifecourse perspective*. Bristol: Policy Press at the University of Bristol; 2013.
22. Elder GH Jr., Johnson MK, and Crosnoe R. The emergence and development of life course theory. In Mortimer JT, and Shanahan MJ, editors. *Handbook of the life course*. New York: Springer; 2004. pp. 3–19.
23. Office of National Statistics (2014). Living Alone in England and Wales. See: <http://www.ons.gov.uk/ons/rel/census/2011-census-analysis/db-the-demographic-and-socio-economic-characteristics-of-those-living-alone-in-england-and-wales-differ-from-the-general-population/sty-living-alone-in-the-uk.html>
24. Office of National Statistics (2013). Home ownership and renting in England and Wales—detailed characteristics. See: <http://www.ons.gov.uk/ons/rel/census/2011-census/detailed-characteristics-on-housing-for-local-authorities-in-england-and-wales/short-story-on-detailed-characteristics.html>
25. Office for National Statistics. *General Household Survey (2007)*. Available from: http://www.statistics.gov.uk/downloads/theme_compendia/GHS07GeneralHouseholdSurvey2007.pdf
26. Hoy D, March L, Brooks P, Blyth F, Woolf A, Bain C, et al. The global burden of low back pain: estimates from the Global Burden of Disease 2010 study. *Annals of the Rheumatic Diseases*. Published online March 24 2014.
27. Ghassemi Jahani SA, Danielsson A, Katsfoss J, Brisby H. Degenerative Changes in the Cervical Spine Are More Common in Middle-Aged Individuals with Thalidomide Embryopathy than in Healthy Controls. *PLoS ONE*. 2016; 11(5): e0155493. <https://doi.org/10.1371/journal.pone.0155493> PMID: 27175919
28. Mental Health Foundation. *The Fundamental Facts*. London: Mental Health Foundation; 2007.
29. Ekfeldt A, Carlsson GE. Dental status and oral function in an adult group of subjects with thalidomide embryopathy—A clinical and questionnaire study. *Acta Odontologica Scandinavica*. 2008; 66(5), 300–306. <https://doi.org/10.1080/00016350802307638> PMID: 18720052
30. Shiga T, Shimbo T, Yoshizwa A. Multicentre Investigation of Lifestyle-Related Diseases and Visceral Disorders in Thalidomide Embryopathy at around 50 years of age. *Birth Defects Research (Part A)*. 2015; 103:787–793.
31. Barnett K, Meicer SW, Norbury M, Watt G, Wyke S, Guthrie B. Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet*. 2012; 380: 37–43 [https://doi.org/10.1016/S0140-6736\(12\)60240-2](https://doi.org/10.1016/S0140-6736(12)60240-2) PMID: 22579043
32. Valderas JM, Starfield B, Sibbald B, Salisbury C, Roland M. Defining Comorbidity: Implications for Understanding Health and Health Services. *Annals of Family Medicine*. 2009; 7(4), 357–363. <https://doi.org/10.1370/afm.983> PMID: 19597174
33. Newbromer E, Baxter M. *Health, Quality of Life and Employment amongst Thalidomide-affected People—Evidence from the UK*. Firefly Research/The Thalidomide Trust; 2015.
34. Department of Work and Pensions (2015). *Employment statistics for workers aged 50 and over, by 5-year age bands and gender, from 1984 to 2015*. DWP; London.
35. Papworth Trust. *Disability in the United Kingdom 2014: Facts and Figures*. Cambridge; 2014.
36. Office for National Statistics (2011). *Highest levels of qualification across England and Wales*. Available from: <http://www.ons.gov.uk/ons/rel/census/2011-census-analysis/local-area-analysis-of-qualifications-across-england-and-wales/info-highest-qualifications.html>
37. Office for National Statistics Office for National Statistics (2012). *Labour Force Survey*. Available from: <http://webarchive.nationalarchives.gov.uk/20160107075206/http://www.ons.gov.uk/ons/rel/lms/labour-market-statistics/november-2012/statistical-bulletin.html>

38. Vermette N, Benegabi M. Study on the current living conditions of Canadian Thalidomide survivors and projections for the future. Thalidomide Victims Association of Canada; 2013.
39. Jenkinson C, Wright L, Coulter A. Quality of Life measurement in health care. A review of measures, and population norms for the UKSF-36, Oxford: Health Services Research Unit; 1993.
40. Ghassemi Jahani SA, Karlsson J, Btsby H, Danielsson AJ. Health-related quality of life and function in middle-aged individuals with thalidomide embryopathy. *J Child Orthop*. 2016; 10:691–703. <https://doi.org/10.1007/s11832-016-0797-6> PMID: 27854003
41. Uppal S. Impact of the timing, type and severity of disability on the subjective wellbeing of individuals with disabilities. *Social Science and Medicine*. 2006; 63: 525–539. <https://doi.org/10.1016/j.socscimed.2006.01.016> PMID: 16530906
42. Kemp BJ, Mosqueda L. Ageing with a Disability. Baltimore: The Johns Hopkins University Press; 2004.

Brief Report

“The Legacy of Thalidomide” - A Multidisciplinary Meeting Held at the University of York, United Kingdom, on September 30, 2016

Elizabeth Newbronner¹, Neil Vargesson^{*2}, and Karl Atkin¹

Background: Between 1957 and 1962 thalidomide was used as a nonaddictive, nonbarbiturate sedative that also was successful in relieving the symptoms of morning sickness in early pregnancy. Infamously, thousands of babies were subsequently born with severe birth defects. The drug is used again, today, to successfully treat leprosy, and tragically, there is a new generation of thalidomide damaged children in Brazil. While the outward damage in babies has been documented, the effects of the damage upon the survivors as they grow up, the lifestyle changes and adaptations required to be made, as well as studies into ageing in survivors, has received little attention and remains understudied. **Methods:** A unique multidisciplinary meeting was organized at the University of York bringing together thalidomide survivors, clinicians, scientists, historians, and social scientists to discuss the past, the current and the future implications of thalidomide. **Results:** There is still much to learn from thalidomide, from its complex history and ongoing impact on peoples' lives today, to understanding its mechanisms to aid future

drug safety, to help identify new drugs retaining clinical benefit without the risk of causing embryopathy. **Conclusion:** For thalidomide survivors, the original impairments caused by the drug are compounded by the consequences of a lifetime of living with a rare disability, and early onset age-related health problems. This has profound implications for their quality of life and need for health and social care services. It is vital that these issues are addressed in research, and in clinical practice if thalidomide survivors are to “age well”.

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Key words: thalidomide; thalidomide survivors; Thalidomide Society; thalidomide trust; Wellcome library; global health history; aging with early onset disability; drug safety

Introduction

Landmark papers in *The Lancet* by Dr. William McBride (McBride, 1961) and Dr. Widikund Lenz (Lenz, 1962) first drew the medical world's attention to thalidomide and the extensive damage the drug caused to babies when their mother took it to combat morning sickness in early pregnancy. In the immediate aftermath, much was written about the health of babies affected, the teratogenic effects of the drug, and the scientific and legal implications of the “thalidomide disaster” (Smithells and Newman, 1992). Given the drug is now used around the world again to successfully treat conditions like leprosy in Brazil, in 2014 a World Health Organization sponsored meeting of experts (World Health Organization, 2014; www.who-umc.org/graphics/28280.pdf) reexamined the diagnostic criteria of thalidomide embryopathy and the mechanisms of causation (Vargesson, 2015). This was in response to a new

generation of thalidomide damaged children being seen in Brazil (Schuler-Facini et al., 2007; Vianna et al., 2011; Vargesson, 2013). Yet, the effects of the damage upon the survivors as they grow up has only recently started to be studied. It is really in the past decade, as thalidomide survivors reached their 50s, that there has been renewed interest in their health and in particular the effects of ageing with thalidomide embryopathy. In November 2015, a symposium organized by the University of Tokyo focused on clinicians conducting research into ageing and early onset age-related effects in people with thalidomide embryopathy (Honoshita, 2015).

However, the issues, both practical and clinical, affecting the day-to-day life of thalidomide survivors have rarely been discussed. In addition, an understanding of the long-term consequences of thalidomide embryopathy in survivors remains understudied. A recent meeting in September 2016 organized by Ms. Elizabeth Newbronner and Prof. Karl Atkin (Department of Health Sciences, University of York) and held at the University of York aimed to start a dialogue to begin to address these issues. The Meeting was a truly interdisciplinary gathering exploring the broader legacy of thalidomide. It brought together thalidomide survivors, historians, scientists, clinicians, and social scientists to explore what lessons can be learned from the history and use of the drug, its impact and ongoing consequences today; and how this knowledge can benefit thalidomide survivors and others with rare impairments.

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Legacy of Thalidomide Meeting

The meeting had three sessions, each highlighting different perspectives: historical, contemporary, and personal. Professor Karl Atkin, Head of the Department of Health Sciences at the University of York, opened the day. He remarked on the importance of understanding the life course when making sense of long-term conditions, and in particular, how ageing with a disability creates specific disadvantages which need to be addressed.

The historical perspectives session began with a joint presentation by Dr. Ruth Blue, (Secretary of the Thalidomide Society and Curator at the Wellcome Library) and Mr. Brian Payne (Trustee of the Thalidomide Society; <http://www.thalidomidesociety.org/>). In their talk, *The Thalidomide Story: Archives and Voices*, they outlined the history of the Thalidomide Society and gave an overview of the practical work they are doing to conserve the history and advise researchers and the media. They also highlighted the wealth of thalidomide-related reports, papers, photographs, and films, held by the Wellcome Library (<http://wellcomelibrary.org/>). The archive also holds oral history recordings from thalidomide survivors and will soon hold recordings of parents who took the drug.

Dr. Julie Parle (Honorary Associate Professor in History, School of Social Sciences, University of KwaZulu-Natal, South Africa) a United Kingdom-born thalidomide survivor, gave a fascinating presentation on the research she and other historians have been doing on the "hidden histories" of thalidomide's distribution, impact, and use in African countries since the 1960s (Klausen and Parle, 2015). Her talk showed that thalidomide has many "shadow" histories around the world, even where it has not been proven to have directly affected mothers and babies, and how some thalidomide survivors are themselves now piecing these histories together, bit by bit. She argued that more archives need to be opened to researchers in pursuit of such histories.

The session concluded with a presentation about *Historic Photographs for Engagement and Outreach: Experiences from the Global Health Histories Project* by Dr. Alex Medcalf (Outreach Historian, Centre for Global Health Histories, Department of History, University of York; www.york.ac.uk/history/global-health-histories/). This project involves using visual images to tell a historical story. He highlighted some of the challenges and complexities they have faced in the project, in particular, the ethics of displaying difficult and sensitive material, and the importance of using the images to assist the argument or provoke additional questions.

The contemporary perspective session was opened by Dr. Neil Vargesson, (Senior Lecturer, School of Medicine, Medical Sciences and Nutrition, University of Aberdeen). In his presentation, *Thalidomide: Mechanisms of Action and*

Current Challenges, he gave an overview of current opinion on the drug's mechanisms, in embryos and in adults (Vargesson, 2015). The drugs action on blood vessel formation, its ability to induce cell death and interact with Cereblon are widely accepted as mechanisms of the drug's action. Indeed, he described how the drug's actions on blood vessels can result in a range of limb damage (Vargesson, 2009, 2015; Vargesson and Hootnick, 2016). He also described the advances his team has made in finding a "safe" form of the drug, retaining the clinical benefits but without the side-effect of embryonic damage (Beedie et al., 2016a,b). This is extremely relevant today as sadly new generations of thalidomide children have been born in recent decades in Brazil as the original drug is used to treat a form of Leprosy (Schuler-Faccini et al., 2007; Vianna et al., 2011; Vargesson, 2013).

The contemporary health of thalidomide survivors in Sweden was discussed by Dr. Shadi Ghassemi Jahani (Consultant Orthopaedic Surgeon, Institute of Clinical Sciences, University of Gothenburg, Sweden). Dr. Ghassemi Jahani has been researching the orthopedic problems experienced by thalidomide survivors in Sweden as they age (Ghassemi Jahani et al., 2014). She set out the findings from her work on osteoarthritis and cervical spine deterioration (Ghassemi Jahani et al., 2016) and then went on to discuss her recent work on health-related quality of life. Her research showed that thalidomide survivors have significantly lower physical health-related quality of life compared with the general population.

Ms. Liz Newbronner (PhD student, Department of Health Sciences, University of York) then described her research on the contemporary health of thalidomide survivors in the United Kingdom. Despite the drug being distributed in 48 countries, little research into the health of thalidomide survivors as they age has been undertaken and the research that has been carried out is limited to just seven countries: Australia (Jankelowitz et al., 2013), Canada (Vermette and Benegabi, 2013), Germany (Peters et al., 2015), Ireland (O'Carroll et al., 2011), Japan (Shiga et al., 2015), Sweden (Ghassemi Jahani et al., 2016), and the United Kingdom (Nicotra et al., 2016).

Findings from a new national health and well-being survey of U.K. thalidomide survivors (Newbronner and Baxter, 2016), undertaken for the Thalidomide Trust (<http://www.thalidomidetrust.org/>), were discussed. The data show that the health of thalidomide survivors is declining more rapidly than that of their peers in the general population. Although this experience is similar in many ways to other people with early onset disability, there are some distinctive aspects and pertinent wider lessons for health and care services. In particular, the complex nature of thalidomide damage and the implications of comorbidities, both of which call for a strongly collaborative approach between clinicians and thalidomide survivors.

In the final session of the day, three U.K. thalidomide survivors gave their personal reflections on living and ageing with thalidomide-induced damage. They highlighted the legacy of learning for thalidomide survivors across the world, other people with rare impairments (especially limb difference), and the clinicians and services that support them. Geoff Adams-Spink (Deputy Chair, European Dysmelia Reference Information Centre; <http://www.dysnet.org/>) discussed the power of networking between thalidomide survivors and others with limb difference. He emphasized the scope to use networking to address contemporary issues such as the need for peer support, the development of "workarounds" to support everyday tasks, and improved access to specialist health services. Mr. Rowland Bareham (Chairman, Thalidomide Trust National Advisory Council) focused on the experiences of thalidomide survivors with hearing damage. Around a third of thalidomide survivors have total or partial hearing loss and this "hidden" group of survivors often experience higher levels of poorer mental well-being. The day was closed by Dr. Craig Millward (Member, Thalidomide Trust National Advisory Council) who spoke movingly about finding out as a young adult that his disabilities had been caused by thalidomide, and how health problems in middle age had led him into greater involvement with the thalidomide community.

Conclusions

The meeting showed that there is still much to learn from thalidomide, both from its complex history and its impact on peoples' lives today. For thalidomide survivors, the original impairments caused by the drug are being compounded by the consequences of a lifetime of living with a rare disability, and early onset age-related health problems. Their health and functioning is changing, and this has profound implications for their quality of life and need for health and social care services. Clinicians and healthcare services often fail to understand the complex nature of thalidomide damage, nor do they always recognize the self-management knowledge thalidomide survivors have. It is vital that both these issues are addressed in research, and in clinical practice if thalidomide survivors are to "age well". Furthermore, the experience of thalidomide survivors provides lessons for supporting other people with rare impairments. In particular, there is a need for a flexible response which recognizes a person's active engagement with their condition and is sensitive to the consequences of the life course. Finally, the meeting was an important reminder of the continued need for research into drug safety and for pharmacovigilance.

Acknowledgements

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References

- Beedie SL, Rore HM, Barnett S, et al. 2016a. In vivo screening and discovery of novel candidate thalidomide analogs in the zebrafish embryo and chicken embryo model systems. *Oncotarget* 7:33237–33245.
- Beedie SL, Diamond AJ, Fraga LR, et al. 2016b. Vertebrate embryos as tools for anti-angiogenic drug screening and function. *Reprod Toxicol* doi: 10.1016/j.reprotox.2016.11.013. Available at: <http://dx.doi.org/10.1016/j.reprotox.2016.11.013>. In Press.
- Ghassemi Jahani SA, Danielsson B, Karlsson J, Danielsson AJ. 2014. Long-term follow-up of thalidomide embryopathy: malformations and development of osteoarthritis in the lower extremities and evaluation of upper extremity function. *J Child Orthop* 8:423–433.
- Ghassemi Jahani SA, Danielsson A, Ab-Fawaz R, et al. 2016. Degenerative changes in the cervical spine are more common in middle-aged individuals with thalidomide embryopathy than in healthy controls. *PLoS One* 11:e0155493. doi:10.1371/journal.pone.0155493
- Honoshita F. 2015. Report on the International Symposium on Thalidomide Embryopathy. Available at: http://www.thalidomide-embryopathy.com/common/data/pdf/sympo_report_160307_en.pdf.
- Jankelowitz SK, Spies JM, Burke D. 2013. Late-onset neurological symptoms in thalidomide-exposed subjects: a study of an Australian cohort. *Eur J Neurol* 20:509–514.
- Klausen S, Parle J. 2015. Are we going to stand by and let these children come into the world?: the impact of the 'thalidomide disaster' in South Africa, 1960-1975. *J South Afr Stud* 41:735–752.
- Lenz W. 1962. Thalidomide and congenital abnormalities. *Lancet* 1:271–272.
- McBride W. 1961. Thalidomide and congenital malformations. *Lancet* 1:358
- Newbronner E, Baxter M. 2016. The Thalidomide Trust: changing lives – the health and wellbeing of thalidomide survivors in middle age. Available at: <http://www.thalidomidetrust.org/wp-content/uploads/2014/01/HW-Survey-2015-FINAL-REPORT-20-May-20161.pdf>.
- Nicotra A, Newman C, Johnson M, et al. 2016. Peripheral nerve dysfunction in middle-aged subjects born with thalidomide embryopathy. *PLoS One* 11:e0152902. doi:10.1371/journal.pone.0152902
- O'Carroll A, O'Reilly F, Whitford DL. 2011. 'What has happened to people affected by thalidomide 50 years on?' *Ir J Med Sci* 180:475–478.
- Peters KM, Albus C, Lungen M, et al. 2015. Damage to health, psychosocial disorders and care requirements of thalidomide victims in North Rhine Westphalia from a long term perspective. Cologne: Federal Health Centre North Rhine Westphalia.
- Schuler-Faccini L, Soares RC, de Sousa AC, et al. 2007. New cases of thalidomide embryopathy in Brazil. *Birth Defects Res A Clin Mol Teratol* 79:671–672.

- Shiga T, Shimbo T, Yoshizwa A. 2015. Multicenter investigation of lifestyle-related diseases and visceral disorders in thalidomide embryopathy at around 50 years of age. *Birth Defects Res A Clin Mol Teratol* 103:787-793.
- Smithells RW, Newman CG. 1992. Recognition of thalidomide defects. *J Med Genet* 29:716-723.
- Vargesson N. 2009. Thalidomide-induced limb defects: resolving a 50-year-old puzzle. *Bioessays* 31:1327-1336.
- Vargesson N. 2013. Thalidomide embryopathy: an enigmatic challenge. *ISRN Dev Biol Article ID 241016*. Available at: <http://dx.doi.org/10.1155/2013/241016>.
- Vargesson N. 2015. Thalidomide-induced teratogenesis: history and mechanisms. *Birth Defects Res C Embryo Today* 105:140-156.
- Vargesson N, Hootnick DR. 2016. Arterial dysgenesis and limb defects: clinical and experimental examples. *Reprod Toxicol* doi: 10.1016/j.reprotox.2016.10.005. Available at: <http://dx.doi.org/10.1016/j.reprotox.2016.10.005>. In Press
- Vermette N, Benegabi M. 2013. Study on the current living conditions of Canadian Thalidomide survivors and projections for the future. *Thalidomide Victims Association of Canada*. Available at: http://www.thalidomide.ca/actualites_1827_en/.
- Vianna FSL, Lopez-Camelo JS, Leite JC, et al. 2011. Epidemiological surveillance of birth defects compatible with thalidomide embryopathy in Brazil. *PLoS One* 6:e21735.
- World Health Organization. 2014. Thalidomide embryopathy - report of a meeting of experts. Available at: www.who-umc.org/graphics/28280.pdf.

Appendix 11 Study Selection Form

Study Eligibility Form

Date Completed:

Study Title:			
Authors:			
Year of Publication:			
Language/Country:			
1. Is the study population Thalidomide-affected people born in the late 1950/early 1960's?			
Yes	<i>Unclear</i>	No	
2. Does the study report on the health and/or impairment of Thalidomide-affected people?			
Yes	<i>Unclear</i>	No	
3. Does the study report on the quality of life of Thalidomide-affected people?			
Yes	<i>Unclear</i>	No	
4. Does the study focus on the health/quality of life of Thalidomide-affected people as adults and/or as they age?			
Yes	<i>Unclear</i>	No	
Study Design:			
Additional Information:			
Final Decision:			
<i>Include</i>	<i>Unclear</i>	<i>Background</i>	No

Appendix 12 Example of Completed Data Extraction Form

Data extraction field	Information extracted
<i>Citation</i>	Jankelowitz, S. K., et al. (2013). Late-onset neurological symptoms in thalidomide-exposed subjects: A study of an Australasian cohort. <i>European Journal of Neurology</i> 20 (3): 509-514.
<i>Country</i>	Australia & NZ
<i>Aims of study</i>	<p>Over the past few years reports of increasing disability in thalidomide-affected subjects. These complaints provoked concern about a late degenerative disorder, raising parallels with 'post-polio' Syndrome.</p> <p>More recently, thalidomide and its analogue, lenalidomide, have regained acceptance as therapeutic agents in the treatment for multiple myeloma. The main complications of treatment in this setting are venous thrombosis for both drugs and peripheral neuropathy for thalidomide.</p> <p>In view of the peripheral neuropathy described in multiple myeloma patients treated with thalidomide, as well the sensory neuropathy that occurred in adults who used thalidomide as a sedative in the 1950s, we reviewed 16 thalidomide-deformed subjects presenting with new neurological complaints in their fifth decade. We wished to determine whether there was ongoing nerve damage/loss in this population as a 'late effect' of thalidomide exposure or whether the effects were due to exacerbation of the normal ageing process as a result of lack of the normal 'redundancy' within the nervous system.</p>
<i>Ethics – how ethical issues were addressed</i>	Informed consent was obtained from all subjects, and the study was approved by the Human Ethics Committee of the Sydney Southwest Area Health Service (now Sydney Local Health District).
<i>Study setting</i>	Hospital based examination
<i>Theoretical background of study</i>	
<i>Sampling approach</i>	16 of the 45 Thalidomiders in Australia/NZ presenting with new neurological symptoms who were able to give informed consent and able to participate when neurological team were available.
<i>Participants characteristics</i>	Of the 16 thalidomide-deformed subjects, 11 reported numbness or tingling in the upper limbs. Five of the 11 also reported sensory symptoms, with or without pain, in the lower limbs. The other five subjects reported cranial nerve problems. Upper limb symptoms were generally worse at night or with driving and were more prominent in the dominant limb. In four subjects, the sensory symptoms spread into the arm. A further five subjects reported

	<p>longstanding numbness and weakness of the face, with or without hearing loss and eye movement abnormalities. This ranged from mild unilateral weakness to complete absence of facial muscle movement.</p>
<p><i>Study design (data collection & analysis)</i></p>	<p>A detailed medical history was taken with particular reference to symptoms referable to the nervous system; a clinical neurological examination was tailored to the symptoms; neurophysiological testing was guided by the examination. <i>“Despite the heterogeneity of malformations, studies were performed on the assumption that nerves would be in a comparable anatomical site as in normal subjects”.</i></p>
<p><i>Findings</i></p>	<p>Adult-onset neurological symptoms in subjects exposed to thalidomide in utero appear to be due largely to compressive neuropathies or secondary to musculoskeletal deformity. In the present cohort, there was no evidence clinically or neuro-physiologically of late-onset generalized neuropathy. Compressive neuropathies were more common in the more disabled subjects, for example those who had no functioning lower limbs and were in wheelchairs.</p> <p>The chance of developing median nerve compression at the wrist is probably greater in thalidomide-affected subjects because the musculoskeletal deformities may lead to further narrowing of the carpal tunnel, and there is overuse of the hand to compensate for other limb deformities.</p> <p>Lower limb musculoskeletal symptoms were also present, being more prominent in the subjects with the greatest disability, and these were thought clinically to be due to the postural abnormality imposed by their disability. Given awareness of the long-term adverse consequences of the functional compensation for the thalidomide induced deformity, these effects could be anticipated and probably limited by physical therapies, such as the appropriate use of preventive measures, orthotics and technical aids.</p> <p>The present clinical study provides no reasons to implicate ongoing neuronal loss or late reactivated neural degeneration in adult thalidomide survivors who develop new neurological symptoms, and no evidence of a generalized peripheral neuropathy. Rather, the development of new symptoms in subjects can be explained by (i) compressive neuropathies, due to, for example, median nerve compression at the wrist, and (ii) compensatory postures employed to perform tasks of daily living. The former is likely a reflection of the overuse and abnormal postures required to accommodate the disability, poor mobility arising from the limb deformities and narrowing of the carpal tunnel by musculoskeletal defects.</p>
<p><i>Quality of the study</i></p>	<p>High quality; very relevant to thesis; provides comparison with UK neuropathy study (as yet unpublished).</p>

Completed: 25/5/15

Appendix 13 Interview Participants – Pseudonyms and Background Information

Participant Number	Pseudonym	Band	Male/ Female	Employment Status	Home Circumstances
101	Simon	B5	M	Working part-time – health/personal reasons	Lives alone
102	Jenny	B1	F	Working part-time – health reasons	Lives alone
104	Carol	B4	F	Not working – personal reasons	Lives alone
105	Moira	B3	F	Not working – unable to work	Lives with partner
106	Nicola	B2	F	Working part-time – health reasons	Lives with partner
107	Joyce	B2	F	Working part-time – health reasons	Lives with partner
108	Martin	B3	M	Working full-time	Lives with partner
109	Rowena	B1	F	Working part-time – health reasons	Lives with partner
112	Jim	B2	M	Not working – unable to work	Lives with partner
113	Gwen	B5	F	Not working – unable to work	Lives with children
114	Isobel	B3	F	Working part-time – health reasons	Lives with partner
115	Amy	B2	F	Not working – health/personal reasons	Lives with partner
117	Gary	B3	M	Not working – unable to work	Lives with partner
118	Kathleen	B3	F	Not working – health/personal reasons	Lives with children
119	Alison	B5	F	Not working – unable to work	Lives with children
120	Tracy	B3	F	Not working – health/personal reasons	Lives with partner
121	Rick	B1	M	Not working – health/personal reasons	Lives alone
124	Fiona	B3	F	Not working – unable to work	Lives with partner
125	Alan	B5	M	Not working – unable to work	Lives with partner

126	Jo	B4	F	Not working – unable to work	Lives with partner
127	Beth	B4	F	Not working – unable to work	Lives alone
128	Meg	B4	F	Not working – health/personal reasons	Lives with partner
129	Amanda	B3	F	Working part-time – health/personal reasons	Lives with partner
130	Ann	B1	F	Working full-time	Lives alone
131	Ben	B3	M	Not working – health/personal reasons	Lives with partner
134	Linda	B1	F	Working part-time – health/personal reasons	Lives with partner
136	Penny	B2	F	Working part-time – health/personal reasons	Lives with children
140	Tom	B5	M	Not working – unable to work	Lives with partner
141	Alex	B3	M	Not working – health/personal reasons	Lives with partner
142	Robbie	B4	M	Not working – unable to work	Lives with partner
143	Karen	B5	F	Not working – unable to work	Lives with partner
144	Colin	B2	M	Working part-time – health/personal reasons	Lives alone
145	Diane	B3	F	Not working – health/personal reasons	Lives with partner
147	Maria	B4	F	Not working – unable to work	Lives with partner
148	Malcolm	B4	M	Not working – personal reasons	Lives with children
149	Tessa	B5	F	Not working – unable to work	Lives with partner
151	June	B5	F	Not Working – unable to work	Lives with partner
153	Helen	B3	F	Not working – unable to work	Lives with partner

Appendix 14 Dissemination and Impact

Published Papers

The health and quality of life of Thalidomide survivors as they age - Evidence from a UK survey. Newbronner, Elizabeth; Glendinning, Caroline; Atkin, Karl; Wadman, Ruth.

In: PLoS ONE, Vol. 14, No. 1, e0210222, 16.01.2019.

The Changing Health of Thalidomide Survivors as they Age: A scoping review.

Newbronner, Elizabeth Vivien; Atkin, Karl Michael.

In: Disability and Health Journal, 28.10.2017.

'The legacy of thalidomide' - A multidisciplinary meeting held at the University of York, UK, on September 30, 2016. Newbronner, Elizabeth; Vargesson, Neil; Atkin, Karl.

In: Birth Defects Research Part A: Clinical and Molecular Teratology, Vol. 109, No. 4, 01.03.2017, p. 296-299.

Oral presentations

First International Thalidomide Embryopathy Symposium – November 2016, Tokyo, Japan

Presentation Title: *UK Health and Wellbeing Survey 2015 – Initial Results*

Second International Thalidomide Embryopathy Symposium – July 2019, Tokyo, Japan

Presentation Title: *Growing older with TE – research and support in the UK*

Thalidomide Society Annual Conference, April 2019

Presentation Title: *Adapting not Surrendering*

Poster Presentations

First International Thalidomide Embryopathy Symposium – November 2016, Tokyo, Japan.

NIHR Doctoral Training Camp – July 2018, Ashridge College, Berkshire, UK.

Other Activities and Events

Film Premiere

I organised the UK premiere of *50 Years of Shame*, a film about the situation of Thalidomide Survivors in Spain. The screening was held at the University of York on 21st April 2016, and was followed by a panel discussion involving the film's director, two Thalidomide survivors (one from Spain and one from the UK) and myself. The event was jointly funded by the Department of Health Sciences and the Centre for Global Health Histories at the University of York.

Legacy of Thalidomide Meeting

The meeting was held at the University of York in September 2016, and is one of just a few interdisciplinary gatherings to explore the broader legacy of Thalidomide. It brought together Thalidomide survivors, historians, scientists, clinicians and social scientists to explore what lessons can be learnt from the history and use of the drug, its impact today, and how this knowledge can benefit Thalidomide survivors and others with rare impairments. The meeting was supported by the Wellcome Trust funded Centre for Chronic Diseases and Disorders, at the University of York. A report from the meeting was published in Birth Defects Research (see Appendix 10)

Thalidomide Symposium - Hamburg

In October 2017 I attended a Thalidomide Symposium - *Mobility Maintenance of People with Thalidomide Embryopathy – Prevention, Pain Therapy and Alternative Therapeutic Procedures*, which was held in Hamburg, Germany.

Australian Senate Thalidomide Inquiry

In 2018/19 the Australia Senate Community Affairs Reference Committee held an inquiry in to support for Australian Thalidomide survivors. I made a written submission to the inquiry and was subsequently invited to give oral evidence (by teleconference) to the hearing held in Sidney on the 30th January 2019. My evidence was quoted extensively in the interim report from the inquiry which was published in February 2019. The report listed eight recommendations, one of which was that “*the Royal Australian College of General Practitioners, the Royal Australasian College of Physicians and the Australian College of Rural and Remote Medicine take steps to raise awareness of thalidomide and thalidomide injuries, including by incorporating a module on thalidomide injuries in their next round of Continuing Professional Development*”. I was invited to write the CPD module, along with Prof Neil Vargesson from Aberdeen University and Dr Dee Morrison from the Thalidomide Trust. The module is due to be available in spring 2020.

Public Lecture

In 2019 the National Science Museum undertook a major refurbishment of its medicines galleries. One of the galleries has a display about Thalidomide and Selina Hurley, the Curator of Medicine, approach me for my thoughts on how the drug might be represented. She then kindly agreed to give a public lecture at the University of York, about the new galleries, using Thalidomide as a case study. The lecture took place on the 28th January 2020 and was jointly organised by myself and colleagues in the History Department.

References

- Abrams, T. (2014). Boon or bust? Heidegger, disability aesthetics and the thalidomide memorial. *Disability & Society*, 29(5), pp.751–762.
- Age UK (2012). *Access all Ages: Assessing the impact of age on access to surgical treatment*. [Online]. Available at: http://www.ageuk.org.uk/Documents/EN-GB/For-professionals/Health-and-wellbeing/access_all_ages_final_web.pdf?dtrk=true [Accessed 13 December 2019]
- Arksey, H. and O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology*, Vol.8, No.1, pp19-32.
- Babchuk, W. A. (2015). *Pragmatist grounded theory: advancing mixed methods for educational inquiry*. Paper presented at the proceedings of the 34th Annual Research-to-Practice in Adult and Higher Education, University of Oklahoma City, OK.
- Balcombe, N. R. and Sinclair, A. (2001). Ageing: definitions, mechanisms and the magnitude of the problem. *Bailliere's Best Practice and Research in Clinical Gastroenterology*, 15 (6), pp.835–849.
- Barnett, K., et al. (2012). Epidemiology of multimorbidity and implications for health care, research, and medical education: a cross-sectional study. *Lancet*, 380: 37-43.
- Barnett-Page, E. and Thomas, J. (2009). Methods for the synthesis of qualitative research: a critical review. *BMC Medical Research Methodology*, 9:59.
- Barnes, M. (2006). *Caring and social justice*. Basingstoke, UK: Palgrave Macmillan.
- Bates, A.W. (2001). A case of roberts syndrome described in 1737. *Journal of Medical Genetics*, 38:565–567.
- Barbour, R.S. (2008). *Introducing qualitative research [electronic resource]: a student's guide to the craft of doing qualitative research*, Los Angeles, Calif. ; London: SAGE.
- Berghs, M., et al. (2016). Implications for public health research of models and theories of disability: a scoping study and evidence synthesis. *Public Health Research*, 4(8), pp.1–166.
- Berghs, M., et al. (2019) Do disabled people need a stronger social model: a social model of human rights? *Disability & Society*, 34:7-8, 1034-1039.
- Bent, N., et al. (2007). Living with thalidomide: health status and quality of life at 40 years. *Prosthetics & Orthotics International*, 31(2): 147-156.

- Bermejo-Sánchez, E., et al. (2011). Phocomelia: a worldwide descriptive epidemiologic study in a large series of cases from the International Clearinghouse for Birth Defects Surveillance and Research, and overview of the literature. *American Journal of Medical Genetics*, November 15; 0(4): pp305-320.
- Birks, M. and Mills, J. (2015). *Grounded theory: a practical Guide*. London: SAGE.
- Boslaugh, S. (2007). *Secondary data sources for public health: a practical guide*. Cambridge: Cambridge University Press.
- Bowling, A. (2005). *Measuring health: a review of quality of life measurement scales*. Maidenhead: Open University Press
- Bowling, A. and Dieppe, P. (2005). What is successful ageing and who should define it? *British Medical Journal*, 331 (7531), pp.1548–1551.
- Bowling, A. and Ebrahim, S. (2005) *Handbook of health research methods: investigation, measurement and analysis*. Maidenhead: Open University Press.
- Bradshaw, J.R. (1980). *The Family Fund: an initiative in social policy*. Routledge and Kegan Paul: London.
- Brown, M. A., et al. (1990). Thalidomide, pregnancy and renal failure. *Medical Journal of Australia*, 152(3): 148-149.
- Bryman, A., (2015). *Social research methods*. Fifth ed. Oxford : Oxford University Press.
- Brynner, R. and Stephens, T. (2001). *Dark remedy; the impact of Thalidomide and its revival as a vital medicine*. New York: Perseus.
- Bury, M. (1982). Chronic illness as biographical disruption. *Sociology of Health & Illness*, 4(2), pp.167–182.
- Carers UK (2014). Policy Briefing May 2014: *Facts about Carers*. Carers UK, London.
- Castilla, E., et al. (1996). Thalidomide, a current teratogen in South America. *Teratology*, 54(6), pp.273–277.
- Celgene (2020). Thalomid REMS. [Online]. Available at: <http://www.thalomidrems.com> [Accessed 21 January 2020].
- Centre for Reviews and Dissemination. (2009). *Systematic reviews: CRDs guidance for undertaking reviews in healthcare*. University of York, York.
- Charmaz, K. (1990). 'Discovering' chronic illness: using grounded theory. *Social Science & Medicine*, 30(11), pp.1161–1172.
- Charmaz, K. (2014). *Constructing Grounded Theory* (second edition). London: SAGE.

- Chorlton, M. (2013). Personal communication.
- Clarke, A. (2005). *Situational analysis: grounded theory after the postmodern turn*. Thousand Oaks, CA: Sage.
- Creswell, J. W. and Plano Clark, V. L. (2017) *Designing and conducting mixed methods research*. 3rd ed. Los Angeles: Sage.
- CRPD (2006). United Nations convention on the rights of people with disabilities. [Online]. Available at: <https://www.un.org/development/desa/disabilities/convention-on-the-rights-of-persons-with-disabilities.html> [Accessed 21 December 2019].
- Department of Health (2011). *An outcomes strategy for chronic obstructive pulmonary disease (COPD) and asthma in England*. London: Department of Health.
- Department of Work and Pensions (2015). *Employment statistics for workers aged 50 and over, by 5-year age bands and gender: From 1984 to 2015*. London: Department of Work and Pensions.
- Diabetes UK (2015). *Facts and Stats*. [Online]. Available at: https://www.diabetes.org.uk/Documents/Position%20statements/Diabetes%20UK%20Facts%20and%20Stats_Dec%202015.pdf [Accessed 13 December 2019]
- Dixon-Woods, M., et al. (2005). Synthesising qualitative and quantitative evidence: a review of possible methods. *Journal of Health Services Research and Policy*, January;10(1):45-53.
- Doyle, L., Brady, A. and Byrne, G. (2009). An overview of mixed methods research. *Journal of Research in Nursing*, 14: 175.
- Egan, M., et al. (2003). Health impacts of new roads: a systematic review. *American Journal of Public Health*, 93(9): 1463–7.
- Elder, G.H.Jr., Johnson, M.K. and Crosnoe, R. (2003). The emergence and development of life course theory. In J.T. Mortimer and M.J. Shanahan, (Eds.). *Handbook of the life course*. New York: Springer, pp. 3-19.
- Ekfeldt, A. and Carlsson, G. E. (2008). Dental status and oral function in an adult group of subjects with thalidomide embryopathy - a clinical and questionnaire study. *Acta Odontologica Scandinavica*, 66(5), 300-306.
- Ferber, S. (2013). *Bioethics in historical perspective*. [Place of publication not identified]: Palgrave Macmillan.

- Fetters, M.D., Curry, L.A. and Creswell, J.W. (2013). Achieving integration in mixed methods designs - principles and practices. *Health Services Research*, Dec; 48(6 Pt 2): pp2134–2156.
- Fevre, R., et al. (2016). *Closing Disability Gaps at Work - Deficits in Evidence and Difference in Experience*. Cardiff: Cardiff University
- FfDN (2014). *Thalidomide brand names*. [Online] Available at: <http://ffdn.se/web/names/> [Accessed 10 August 2014].
- Fowler, F.J., (2009). *Survey research methods [electronic resource]*. Thousand Oaks, Calif.; London: SAGE.
- Freedman, V. A. (2014). Research gaps in the demography of aging with disability. *Disability and Health Journal*, 7 (1 SUPPL), pp.60–63.
- Fullerton, P. M. and Kremer, M. (1961). Neuropathy after intake of thalidomide (Distaval). *British Medical Journal*, 2:855-858.
- Gerstman, B.B. (1998). *Epidemiology kept simple: an Introduction to classic and modern epidemiology*. New York: Wiley-Liss.
- Ghassemi Jahani, S. A., et al. (2014). Long-term follow-up of thalidomide embryopathy: malformations and development of osteoarthritis in the lower extremities and evaluation of upper extremity function. *Journal of Child Orthopaedics*, 8:423-433.
- Ghassemi Jahani, S.A. et al. (2016a) Degenerative changes in the cervical spine are more common in middle-aged individuals with Thalidomide Embryopathy than in healthy controls. *PLoS ONE* 11(5): e0155493. doi:10.1371/journal.pone.0155493.
- Ghassemi Jahani, S. A., et al. (2016b). Health-related quality of life and function in middle-aged individuals with thalidomide embryopathy. *Journal of Children's Orthopaedics*, 10(6), pp.691–703.
- Ghassemi Jahani, S.A., et al. (2017). Middle-aged individuals with thalidomide embryopathy have undergone few surgical limb procedures and demonstrate a high degree of physical independence. *PLoS ONE* 12(10): e0186388.
- Glasby, J. (2005). Direct Payments and the social model of disability. *Social Science Review*, 12(2), pp.48-58.
- Glaser, B. and Strauss, A, (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New York: Aldine. <https://doi.org/10.1371/journal.pone.0186388>
- Glaser, B. (1978). *Theoretical sensitivity: advances in the methodology of grounded theory*. Mill Valley, CA: Sociology Press.

- Grant, M.J. and Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information and Libraries Journal*, 26, pp.91-108
- Green, J., Thorogood, N. and Thorogood, N. (2009). *Qualitative methods for health research* 2nd ed., London: SAGE.
- Green, J.C., Caracelli, V.J. and Graham, W.F. (1989). Towards a conceptual framework for mixed-method evaluation designs. *Educational Evaluation and Policy Analysis*, Vol 11, No.3, pp.255-274.
- Groah, S.L., et al. (2012). Spinal cord injury and aging: challenges and recommendations for future research. *American Journal of Physical Medicine & Rehabilitation*, Volume 91 - Issue 1 - p 80–93.
- Groomes, D. A. G. and Leahy, M. J. (2002). The relationships among the stress appraisal process, coping disposition, and level of acceptance of disability. *Rehabilitation Counseling Bulletin*, 46(1), pp.14–23.
- Guetterman, T. C. et al. (2017). Contemporary approaches to mixed methods–grounded theory research: a field-based analysis. *Journal of Mixed Methods Research*, 13(2), pp.179–195.
- Haak, P. et al. (2009). Cerebral palsy and aging. *Developmental Medicine & Child Neurology*, 51(4), pp.16–23.
- Heaton, J. (1998). Secondary analysis of qualitative data. *Social Research Update*, Issue 22.
- He, M. et al. (2019). Association between activities of daily living disability and depression symptoms of middle-aged and older Chinese adults and their spouses: A community based study. *Journal of Affective Disorders*, 242, pp.135–142.
- Hennink, M. M., Kaiser, B. N. and Weber, M. B. (2019). What influences saturation? estimating sample sizes in focus group research. *Qualitative Health Research*, 29(10), pp.1483–1496.
- Hilberink, S.R., van Der Slot, W.M.A. and Klem, M. (2017). Health and participation problems in older adults with long-term disability. *Disability and Health Journal*, 10(2), pp.361–366.
- Hinoshita, F. et al. (2019). A nationwide survey regarding the life situations of patients with thalidomide embryopathy in Japan, 2018: First report. *Birth Defects Research*, pp.
- Hoy, D., et al. (2014). The global burden of low back pain: estimates from the global burden of disease 2010 study. *Annals of the Rheumatic Diseases*, 73(6), pp.968–96874.

Hsieh, H. F. and Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), pp.1277–1288.

Iezzoni L I (2011). Eliminating health and health care disparities among the growing population of people with disabilities. *Health Affairs* Oct:30(10): 1947-1954.

Iezzoni, L.I. (2014). Policy concerns raised by the growing U.S. population aging with disability. *Disability and Health Journal*, 7(1), pp.S64–S68.

Imai, K., et al. (2014). Psychological and mental health problems in patients with thalidomide embryopathy in Japan. *Psychiatry and Clinical Neurosciences* 68(6): 479-486.

Iwasaki, Y. and Mactavish, J. B. (2005). Ubiquitous yet unique: perspectives of people with disabilities on stress. *Rehabilitation Counseling Bulletin*, 48(4), pp.194–208.

Jankelowitz, S. K., et al. (2013). Late-onset neurological symptoms in thalidomide-exposed subjects: A study of an Australasian cohort. *European Journal of Neurology* 20(3): 509-514.

Jenkinson, C., et al. (1997). A shorter form health survey: can the SF-12 replicate results from the SF-36 in longitudinal studies? *Journal of Public Health Medicine*. Vol. 19, No. 2, pp. 179-186.

Jenkinson C, Wright L, and Coulter A. (1993). *Quality of Life measurement in health care. A review of measures, and population norms for the UKSF-36*. Oxford: Health Services Research Unit.

Jeppsson Grassman, E. et al. (2012). A long life with a particular signature: life course and aging for people with disabilities. *Journal of Gerontological Social Work*, 55 (2), pp.95–111.

Jeppsson Grassman, E. and Whitaker, A. (2013). *Ageing with disability: A life course perspective*, Policy Press.

Johnson, M. Stokes R. G. and Arndt T. (2018). *The Thalidomide Catastrophe*. Exeter: Onwards and Upwards Publishers.

Johnson, R.B. and Onwuegbuzie, A.J. (2004). Mixed methods research: a research paradigm whose time has come. *Educational Researcher*, 33(7), pp.14–26.

Johnson, R., McGowan, M. and Turner, L. (2010). Grounded theory in practice: Is it inherently a mixed method? *Research in the Schools*, vol. 17, pp. 65-78.

Karahalios, A. et al. (2019). *Social Psychiatry Psychiatric Epidemiology*. [Online} Available at: <https://doi-org.libproxy.york.ac.uk/10.1007/s00127-019-01688-9> [Accessed 26 December 2019].

- Kayamori, R. (2013). Post-Thalidomide Syndrome 50 years on. *Japanese Journal of Rehabilitation Medicine*. 2013; 50; 957-96.
- Kanno, O. (1987). Electroencephalographic study of 137 patients with thalidomide embryopathy. *Japanese Journal of Psychiatry Neurology*. 41: 197–205.
- Kearney, M. H. (2001). Enduring love: a grounded formal theory of women's experience of domestic violence. *Research in Nursing & Health* 24, 270-282
- Kemp, B.L. and Mosqueda, L. (2004). Aging with a disability: what the clinician needs to know. Baltimore: Johns Hopkins University Press; xiv, 307pp.
- Kennelly, C., Kelson, M. and Riesel, J. (2002). *Thalidomide-impaired people: quality of life*. The College of Health/Thalidomide Society.
- Kerr, M. (2017). *Chronic kidney disease in England: the human and financial cost*. Leeds, England: NHS Kidney Care.
- Kida, M. and Lenz, W. (1968). Thalidomide Embryopathy in Japan. *Arch Kinderkeid*. 1968/09/01 ed.
- Klausen, S. and Parle, J. (2015). Are we going to stand by and let these children come into the world?: the impact of the 'Thalidomide Disaster' in South Africa, 1960–1977, *Journal of Southern African Studies*, 41:4, 735-752.
- Klingbeil, H., Baer, H. R. and Wilson, P. E. (2004). Aging with a disability. *Archives of Physical Medicine and Rehabilitation* 85 (Suppl3):S68-73.
- Knightly, P., et al (1979). *Suffer the children: the story of Thalidomide*. London: Futura Publications.
- Kowalski, T.W., et al. (2015). Thalidomide embryopathy: follow-up of cases born between 1959 and 2010. *Birth Defects Research A Clinical Molecular Teratology*, 103: 794–803.
- Kruse, A., et al. (2013). *Regular surveys on problems, special needs and care deficiencies of victims of Thalidomide – synopsis of final report presented to the Contergan Foundation for People with Disabilities*. Heidelberg: University of Heidelberg.
- LaPlante, M. (2014). Key goals and indicators for successful aging of adults with early onset disability. *Disability and Health Journal*, 7 (2014) S44-S50.
- Lazarus, R.S. and Folkman, S. (1984). *Stress appraisal and coping*. New York: Springer.
- Levac, D., Colquhoun, H. and O'Brien, K. (2010). Scoping studies: advancing the methodology. *Implementation Science*, 5:69.

- Lavrakas, P. J. (2008). *Encyclopedia of survey research methods*. Thousand Oaks, CA: Sage Publications.
- Lenz, W. (1962). Thalidomide and congenital abnormalities. *Lancet* 1:271–272.
- Lenz, W. (1988). A short history of Thalidomide Embryopathy. *Teratology*, 28:203–215.
- Leslie Florence, A. (1960). Is Thalidomide to blame? *British Medical Journal*, 2, 1954.
- Lowton, K. and Higgs, P. (2010). New ageing populations. *Nursing Older People*, 22 (7). p. 10.
- Lowton, K., Hiley, C. and Higgs, P. (2017) Constructing embodied identity in a 'new' ageing population: a qualitative study of the pioneer cohort of childhood liver transplant recipients in the UK. *Social Science & Medicine*, 172. pp. 1-9.
- Magazanik, M. (2015). *Silent Shock*. Melbourne, Australia. The Text Publishing Company.
- McBride, W. (1961). Thalidomide and congenital malformations. *Lancet* 1:358
- McCredie, J. (2009). History, heresy and radiology in scientific discovery. *Journal of Medical Imaging and Radiation Oncology*, vol. 53, no. 5, pp. 433-441.
- McManus, R. J., et al. (1998). Review of the usefulness of contacting other experts when conducting a literature search for systematic reviews. *British Medical Journal*, 317;1562-1563.
- Meltzer, H., et al. (2012). Physical ill health, disability, dependence and depression: results from the 2007 national survey of psychiatric morbidity among adults in England. *Disability and Health Journal*, 5 (2012) 102-110.
- Mental Health Foundation (2007). *The Fundamental Facts*. London: Mental Health Foundation.
- Merkle, T. P., et al. (2016). Shoulder joint replacement can improve quality of life and outcome in patients with dysmelia: a case series. *BMC Musculoskeletal Disorders* 17:185.
- Millen, J. W. (1962). Thalidomide and limb deformities. *Lancet* 2, 599–600.
- Miller, M. T. and Strömmland, K. (1999). Teratogen update: Thalidomide: a review, with a focus on ocular findings and new potential uses. *Teratology*, vol. 60, pp. 306–321, 1999.
- Miller, M. T. and Strömmland, K. (2011). What can we learn from the thalidomide experience: an ophthalmologic perspective. *Current Opinion in Ophthalmology*, vol. 22(5), pp.356–364.

- Mills, J., Bonner, A. and Francis, K. (2006). Adopting a constructivist approach to grounded theory: implications for research design. *International Journal of Nursing Practice*, 12(1), pp.8–13.
- Moll, L.R., and Cott, C.A. (2013). The paradox of normalisation through rehabilitation: growing up and growing older with cerebral palsy. *Disability and Rehabilitation*, 35(15), 1276-1283.
- Molton, I. R. and Yorkston, K. M. (2017). Growing older with a physical disability: a special application of the successful aging paradigm. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*, 72 (2), pp.290–299.
- Moriarty-Simmonds, R. (2009). *Four fingers and thirteen toes*. AuthorHouse: Milton Keynes.
- Moro, A. and Invernizzi, N. (2017). The Thalidomide tragedy: the struggle for victims' rights and improved pharmaceutical regulation. *Historia, Ciências, Saude – Manguinhos, Rio de Janeiro*, v.24, n.3, jul.-set.
- Mustapha, N. M. (1990). Thalidomide-induced limb malformations - a prosthetic review. *Clinical Rehabilitation*, 4(3): 193-197.
- Naidoo, V., Putnam, M. and Spindel, A. (2012). Key focal areas for bridging the fields of aging and disability: findings from the growing older with a disability conference. *International Journal of Integrated Care*, Oct-Dec, Vol.12.
- National Advisory Council of the Thalidomide Trust (2012). *Securing our future: the disability and health costs of UK Thalidomide-affected people*. St Neots: Thalidomide Trust.
- National Joint Registry (2012). *Data collection for shoulder and elbow joint replacements*. [Online]. Available at: <http://www.njrcentre.org.uk/njrcentre/NewsandEvents/Shoulderandelbowjointreplacements/tabid/240/Default.aspx> [Accessed 10 March 2016]
- Newbronner et al 2011. *Taking the Pressure Off: Evaluation of the Health Grant to Thalidomide Impaired People*. Interim Report. St Neots: Thalidomide Trust.
- Newbronner. E., et al. (2012). Looking to the future: evaluation of the health grant to Thalidomide Impaired People. Second Report. St Neots: Thalidomide Trust.
- Newbronner, E. (2015) *Health, quality of life and employment amongst Thalidomide-affected People – evidence from the UK*. St Neots: The Thalidomide Trust.

- Newbronner, E., Vargesson, N. and Atkin, K. (2017). The legacy of thalidomide - a multidisciplinary meeting held at the University of York, United Kingdom, on September 30, 2016. *Birth Defects Research Part A: Clinical and Molecular Teratology*, vol 109, no. 4, pp. 296-299.
- Newman, C.G.H. (1985). Teratogen update: clinical aspects of thalidomide embryopathy – a continuing preoccupation. *Teratology*, 32:133–144.
- Newman C. G. H. (1986). The thalidomide syndrome: risks of exposure and spectrum of malformations. *Clinical Perinatology* 13:555–573.
- Newman, R. J. (1999). Shoulder joint replacement for osteoarthritis in association with thalidomide-induced phocomelia. *Clinical Rehabilitation*, 13(3): 250-252.
- NHS Digital (2016). *Health Survey for England, 2016*. [Online]. Available at: <https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/health-survey-for-england-2016> [Accessed 13 December 2019].
- NICE (2014). *Chronic kidney disease in adults: assessment and management (CG182)*. [Online]. Available at: <https://www.nice.org.uk/guidance/cg182/chapter/Introduction>. [Accessed 13 December 2019].
- NICE (2015). *Dementia, disability and frailty in later life – mid-life approaches to delay or prevent onset (NG16)*. [Online]. Available at: <https://www.nice.org.uk/guidance/ng16> [Accessed 13 December 2019].
- NICE (2016) *Multimorbidity: clinical assessment and management (NG56)*. [Online]. Available at: <https://www.nice.org.uk/guidance/ng56> [Accessed 19 November 2019].
- Nicotra, A., et al. (2016). Peripheral nerve dysfunction in middle-aged subjects born with Thalidomide Embryopathy. *PLoS ONE* 11(4): e0152902.doi:10.1371/journal.pone.0152902
- Niecke, A., et al. (2017). Mental disorders in people affected by thalidomide—a cross-sectional study of prevalence and psychosocial needs. *Deutsches Arzteblatt International*, 114(10), p.168- .
- Nippert I., et al. (2002). 40 years later: the health-related quality of life of women affected by Thalidomide. *Community Genet* 5: 209–216.
- Noyes, J. and Lewin, S. (2001). Extracting qualitative evidence. In: J. Noyes, A. Booth, K. Hannes, A. Harden, J. Harris, S. Lewin, and C. Lockwood (Eds.), *Supplementary Guidance for Inclusion of Qualitative Research in Cochrane Systematic Reviews of*

- Oliver, M. (1989). Disability and dependency: A creation of industrial societies. In L. Barton (Ed.). *Disability and Dependency*. London: The Falmer Press, pp 6-22.
- Oshima, Y., et al. (2006). Carpal tunnel syndrome accompanying radial dysplasia due to Thalidomide Embryopathy. *Journal of Hand Surgery*, 31(3): 342-344.
- Papworth Trust. (2014). *Disability in the United Kingdom 2014: facts and figures*. Cambridge: Papworth Trust.
- Parsons, S., et al. (2011). *A Heavy Burden*. Manchester: The University of Manchester.
- Peters, K., et al. (2015). *Damage to health, psychosocial disorders and care requirements of Thalidomide victims in North Rhine Westphalia from a long term perspective*. Cologne: Federal Health Centre North Rhine Westphalia.
- Plano Clark, V. L. and Ivankova, N. V. (2016). *Mixed methods research: a guide to the field*. Los Angeles : SAGE.
- Pope, C., Ziebland, S. and Mays, N. (2006). Analysing qualitative data. In C. Pope and N. Mays, (Eds). *Qualitative Research in Health Care* (3rd edn). Oxford: Blackwell Publishing, pp 63–81.
- Pope, C., Mays, N. and Popay, J. (2007). *Synthesising qualitative and quantitative evidence: a guide to methods*. Open University Press.
- Priestley, M. (2003). *Disability: a life course approach*, Cambridge: Polity.
- Priestley, M. et al. (2007). Direct payments and disabled people in the UK: supply, demand and devolution. *The British Journal of Social Work*, 37(7), pp.1189–1204.
- Public Health England (2013). *Obesity and disability - adults*. London. Public Health England.
- Rand Health Care (no year given). 36-Item Short Form Survey (SF-36). [Online]. Available at: https://www.rand.org/health-care/surveys_tools/mos/36-item-short-form.html Accessed 31 October 2019].
- Rabiee, P. (2013). Exploring the relationships between choice and independence: experiences of disabled and older people. *British Journal of Social Work*, 43 (5), pp.872–888.
- Rembis, M. A., et al. (2018). *The Oxford Handbook of Disability History*. New York: Oxford UP. Oxford Handbooks.

- Sahar, M., Baple, E. and Hall, C.M. (2019). A clinical review and introduction of the diagnostic algorithm for thalidomide embryopathy (DATE). *The Journal of Hand Surgery (European Volume)*, vol. 44(1) pp.96-108.
- Sandelowski, M. and Barroso, J. (2003). Classifying the findings in qualitative studies. *Qualitative Health Research*, 13(7), pp.905–923.
- Sbaraini, A., et al. (2011). How to do a grounded theory study: a worked example of a study of dental practices. *BMC Medical Research Methodology*, 11(1): 1-10.
- Schneider, S. (2011). Measuring Educational Attainment [Online]. Survey Question Bank. Available at:
https://ukdataservice.ac.uk/media/262853/discover_sqb_education_schneider.pdf
 [Accessed 19 June 2016].
- Schuler-Faccini, L., et al. (2007). New cases of thalidomide embryopathy in Brazil. *Birth Defects Research A Clinical Molecular Teratology*, 79:671–673.
- Schulte-Hillen, J. (2017). Blood pressure measurement in patients with TE and limb defects: technical problems, consequences and possible solutions. In F. Hinoshita (Ed.). *Proceedings of the international symposium on Thalidomide Embryopathy in Tokyo, 2015*. Tokyo: National Centre for Global Health and Medicine, pp.40-43.
- Shakespeare, T. and Watson, N. (2001). The social model of disability: an outdated ideology? In: *Research in social science and disability, volume 2, exploring theories and expanding methodologies*. Elsevier Science Ltd, pp. 9-28.
- Shakespeare, T. (2006). *Disability rights and wrongs*. Oxon: Routledge.
- Shakespeare, T., et al. (2018). Rehabilitation as a disability equality issue: a conceptual shift for disability studies? *Social Inclusion*, Vol. 6, Issue 1, pp.61-72.
- Shiga, T. Shimbo, T. and Yoshizwa, A. (2015). Multicentre investigation of lifestyle-related diseases and visceral disorders in Thalidomide Embryopathy at around 50 years of age. *Birth Defects Research (Part A)*, 103:787-793.
- Silverman, D. (2013). *Doing qualitative research* (4th ed.) London: SAGE.
- Sjogreen, L. and Kiliaridis, S. (2012). Facial palsy in individuals with thalidomide embryopathy: frequency and characteristics. *Journal of Laryngology and Otology*, 126(9): 902-906.
- Sjostron, H. and Nilsson, R. (1972). *Thalidomide and the power of the drug companies*. Middlesex, England: Penguin.

- Smithells, R.W. and Newman, C.G.H. (1992). Recognition of thalidomide defects. *Journal of Medical Genetic*, 29:716–723.
- Strauss, A.L. and Corbin, J. M. (1990). *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park, Calif.: Sage Publications.
- Strömmland, K. and M. T. Miller (1993). Thalidomide embryopathy: revisited 27 years later. *Acta Ophthalmologica*, 71(2): 238-245.
- Strömmland, K., et al. (1994). Autism in thalidomide embryopathy: a population study. *Developmental Child Neurology*, 36, 351-6.
- Szabo, V. and Strang, V.R. (1997). Secondary analysis of qualitative data. *Advances in Nursing Science*, 20(2), pp.66–74.
- Tajima, T., et al. (2016). Internal anomalies in thalidomide embryopathy: results of imaging screening by CT and MRI. *Clinical Radiology*, 71(11), pp.1199.e1–1199.e7.
- Tashakkori, A. and Teddlie, C. (2003). *Handbook of mixed methods in social & behavioral research*. Thousand Oaks, Calif.; London: SAGE Publications.
- Taylor, B.J. and Francis, K. (2013). *Qualitative research in the health sciences: methodologies, methods, and processes*. Oxfordshire, England; New York: Routledge.
- The Guardian. (2015). *German thalidomide survivors continue fight for compensation*, 23 February 2015.
- The Sunday Times. (2015). *The forgotten victims*, 3 May 2015.
- Thomas, C. (2004). How is disability understood? An examination of sociological approaches. *Disability and Society*, 19 (6), pp.569–583.
- Thomas, C. (2007). *Sociologies of disability and illness*. Basingstoke: Palgrave Macmillan.
- Thomas, C. (2010). Medical sociology and disability theory. In: G. Scrambler and S. Scrambler (Eds.). *New directions in the sociology of chronic illness and disabling conditions: assaults on the lifeworld*. Basingstoke, UK: Palgrave Macmillan, pp. 37-56.
- Thomas, C. (2012). Theorising disability and chronic illness: Where next for perspectives in medical sociology? *Social Theory & Health*, 10(3), pp.209–228.
- Timmermans, S, and Leiter, V. (2000). The redemption of Thalidomide: standardising the risk of birth defects. *Social Studies of Science*, 30, 1, 41-77, p.47.
- Townsend, N., et al. (2012). *Coronary heart disease statistics 2012 edition*. London: British Heart Foundation.
- Treichsmann, R. B. (1987). *Ageing with Disability*. New York: Demos.

- Turner, R.J. and Noh, S. (1988). Physical disability and depression: a longitudinal analysis. *Journal of Health and Social Behavior*, 29(1), pp.23–37.
- Uppal, S. (2006). Impact of the timing, type and severity of disability on the subjective well-being of individuals with disabilities. *Social Science and Medicine*, 63, pp525-539.
- Urquhart, C. (2007). The evolving nature of grounded theory method: the case of the information systems discipline. In A. Bryant and K. Charmaz (Eds.). *The SAGE Handbook of Grounded Theory*. London: SAGE, pp. 339-60.
- Vaismoradi, M., Turunen, H. and Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing and Health Sciences*, 15 (3), pp.398–405.
- Vargesson, N. (2013). Thalidomide embryopathy: an enigmatic challenge. *ISRN Developmental Biology*, 2013:1–18. doi:10.1155/2013/241016
- Vargesson, N. (2015a). Thalidomide: the drug with a dark side but an enigmatic future. [Online]. Available at: <https://theconversation.com/thalidomide-the-drug-with-a-dark-side-but-an-enigmatic-future-50330> [Accessed 25 August 2017].
- Vargesson, N. (2015b). Thalidomide-induced teratogenesis: history and mechanisms. *Birth Defects Research Part C - Embryo Today: Reviews*, 105 (2), pp.140–156.
- Vermette, N. and Benegabi, M. (2013). *Study on the current living conditions of Canadian Thalidomide survivors and projections for the future*. Canada: Thalidomide Victims Association of Canada.
- Warwick Medical School (2018). Warwick Edinburgh Mental Wellbeing Scale [Online]. Available at: <https://warwick.ac.uk/fac/sci/med/research/platform/wemwbs/> [Accessed 31 October 2019].
- Weinrich, J. M. et al. (2018). Assessment of congenital vascular and organ anomalies in subjects with thalidomide embryopathy using non-contrast magnetic resonance angiography. *Circulation Journal*, 82 (9), pp.2364–2371.
- Whiteside, M., Mills, J. and McCalman, J. (2012). Using secondary data for grounded theory analysis. *Australian Social Work*, 65 (4), pp.504–516.
- World Health Organisation. (2001). *International classification of functioning, disability and health*. Geneva: WHO
- Zarb, G. and Oliver, M. (1993). *Ageing with disability: what do they expect after all these years?* London: University of Greenwich.