Exploring the Associations between General Practitioners' Levels of Wellbeing, Burnout, and Patient Safety.

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The candidate confirms that the work submitted is his/her own, except where work which has formed part of jointly-authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

The systematic review reported in Chapter 2 and two papers from the focus group study (Chapter 3) have been published:

Hall, L. H., Johnson, J., Watt, I., Tsipa, A., & O'Connor, D. B. (2016). Healthcare staff wellbeing, burnout, and patient safety: A systematic review. *PloS one, 11*(7), e0159015.

Hall, L. H., Johnson, J., Heyhoe, J., Watt, I., Anderson, K., & O'Connor, D. B. (2017). Exploring the impact of primary care physician burnout and well-being on patient care: A focus group study. *Journal of Patient Safety.*

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LHH, JJ, and DOC developed the concept for the systematic review and were involved in formulating the search terms. LHH conducted the searches, screening, data extraction, analysis, and drafted the publication and thesis manuscript. All authors contributed to the screening, data extraction, provided comments and approved the final version for publication.

LHH, JH, and JJ contributed to the conception for the focus group study. LH designed the study with input from JH, JJ, DOC and IW. LHH set up the study, gained ethical approvals, collected all the data and conducted the analyses, with input from JH, JJ, and DOC. LHH drafted the publication and thesis manuscripts and all authors provided comments and approved the final versions.

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Abstract

Healthcare staff wellbeing and burnout have been fairly consistently found to be associated with patient safety outcomes (Hall *et al.* 2016; Salyers *et al.* 2016; Welp and Manser 2016). However, the research to date has been unable to determine a) whether burnout or wellbeing is more strongly linked to patient safety outcomes and b) whether these associations are evident within general practice. Furthermore, there is limited research on the temporal nature of these associations. This thesis aimed to fill these gaps in knowledge and additionally to determine whether specific occupational factors are associated with general practitioners' levels of wellbeing, burnout, and safety outcomes. A multi-method approach was taken to address these aims, in addition to a systematic review.

During Study 1, focus groups with GPs were conducted. This study identified various influencers of wellbeing, both internal and external to their practices, potential coping strategies (e.g. taking a break), and their understanding of how burnout and low wellbeing could impact on the quality and safety of patient care delivery. Study 2 used a cross-sectional survey design to quantitatively investigate the findings from the focus groups. This study found that practice support and number of hours spent on administrative work were associated with near misses and perceptions of acting as a safe practitioner, through the mediating roles of burnout and low wellbeing. Finally, study 3 used a daily diary method over seven days to determine whether daily fluctuations within general practitioners affected daily fluctuations in safety. This study identified that GPs' levels of stress in the morning, as well as whether they had a break with a positive interaction during the day, had the strongest impact on safety perceptions and behaviours later that same day.

In combination, these studies identified the importance of increasing support within the workplace to improve GP wellbeing, prevent and/or reduce burnout, and to potentially also see improvements in patient safety.

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Definitions

Patient Safety

The prevention of errors and adverse effects to patients associated with health care (World Health Organisation).

Patient Safety Incident (PSI)

Any unintended or unexpected incident that could have or did lead to harm for one or more patients receiving care (NHS National Patient Safety Agency).

Adverse Events

An injury resulting from a medical intervention that is not due to the underlying condition of the patient. These can be preventable or not (as they may not be attributed to errors) (Donaldson, Corrigan and Kohn 2000).

Near Miss

An error that had the potential to result in patient harm, but did not.

Error (a.k.a. Medical Error)

The failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim (Donaldson, Corrigan and Kohn 2000). These can be due to two kinds of failures: Error of Execution (the correct action does not proceed as intended), or Error of Planning (the original intended action is not correct) (Reason 2000).

Active Failure (a.k.a. Active Error)

“The unsafe acts committed by people who are in direct contact with the patient or system” (Reason 2000, p. 769). Can include slips, lapses, mistakes, and deviations from/violations of policy or procedures.

Latent Conditions (a.k.a. Latent Error)

Failures of the organisation or system design that contribute to the occurrence of error or allow them to cause harm to patients. They can cause adverse events through a) creating conditions within the local workplace that makes humans more prone to error (e.g. understaffing), or b) create long-lasting weaknesses in system defences (e.g. untrustworthy alarms). These conditions can lie dormant in organisations for years before resulting in an adverse event. (Reason 2000; Agency for Healthcare Research and Quality).

Primary Care Services

Services that provide the first point of contact in the healthcare system. These include general practice, dental practices, pharmacies, and optometry.

Secondary Care Services

Healthcare services that provide the second contact with a patient. These include hospitals and clinics. Often, patients are referred to these after their initial contact with a primary care service if they need specialist medical attention e.g. major surgery, MRI scan.

General Practice

The main way that primary care is provided in the UK. General Practices are set in the community and deal with a wide range of health problems. They also provide health education, vaccinations, and some specialist clinics (e.g. women's health). Doctors working in general practice are commonly called General Practitioners, although the terms Family Practitioner, Family Doctor, and Primary Care Physician are sometimes used, particularly in America.

Wellbeing

Wellbeing can be conceptualised as being on a spectrum, ranging from poor wellbeing, characterised by the presence of psychological illness (e.g. depression, anxiety), to good wellbeing, characterised by both the absence of psychological illness and the presence of feelings of happiness, healthiness, and flourishing.

Burnout

An affective response to chronic organizational stress, resulting in a 'state of vital exhaustion' (ICD-10). It is primarily characterised by feelings of work-related exhaustion (physical and emotional) and disengagement i.e. distancing oneself from work (including from patients, when working within healthcare). Whilst an individual's wellbeing can be affected by various aspects of their life, which may include their work, burnout is *solely* caused by an individual's work situation.

Chapter 1 Introduction

1.1 Setting the scene: Patient safety

Improving patient safety has been at the forefront of healthcare organisations priorities since the seminal reports “To Err is Human” (Donaldson, Corrigan and Kohn 2000) and “An Organisation with a Memory” (Department of Health 2000) were published. In these reports, healthcare organisations are compared with other high-risk industries, such as aviation, and found wanting in their approach to safety. The imperative need to improve patient safety and reduce errors across healthcare organisations globally is stated in these reports, with the authors declaring “a call to action”. Since then, there has been a huge increase in the number of safety initiatives, research groups, and organisations founded solely with the purpose of investigating and improving safety within healthcare settings: for example, the National Patient Safety Agency in the UK.

1.2 The scope of the problem

Investigations into patient safety in the UK’s National Health Service (NHS) have highlighted how broad the scope of the problem is, with failures in care being reported nationwide and with many organisational features found to contribute to the occurrence of errors (Berwick 2013; Francis 2013). These reports highlight the need for improvement, and recommend areas of change. However, despite improving patient safety being top of the agenda within the NHS, statistics around the prevalence of errors have seen little decrease over the years.

In 2000, adverse events were estimated as occurring in roughly 10% of NHS hospital admissions (Department of Health 2000). In 2016, 1,879,822 patient safety incidents (PSIs) were reported across NHS healthcare settings in England (excluding primary care settings), equating to between 11-12% of all hospital admissions (NHS Improvement 2017; NHS Confederation). This number is a 7% increase from the previous year, however, this may reflect increased hospitalisations, increased reporting behaviour and/or better reporting systems. Data from European countries indicate similar rates, with medical errors and adverse events (types of PSIs) occurring in 8% - 12% of hospitalizations (World Health Organisation). Comparable rates are also found within US health services (Zeeshan *et al.* 2014; Levinson and General 2010),

where medical error is cited as the third leading cause of death (Makary and Daniel 2016).

These adverse events are estimated to cost the NHS £2 billion a year due to excess hospital stays (Department of Health 2000). In America, measurable medical errors have been estimated to cost $17.1 billion annually in excess treatment costs (Van Den Bos *et al.* 2011).

1.3 Contributors to patient safety incidents

Due to the “uber-complex” nature of healthcare (Braithwaite, Churruca and Ellis 2017), there are a myriad of factors that can cause PSIs, or increase the likelihood of incidents. James Reason’s ‘Swiss Cheese’ Model amply describes how it is often the combination of system-level faults (such as understaffing) aligning with individual-level errors (such as a mistake or procedural violation), which results in a patient safety incident (Reason 2000). To Err is Human (Donaldson, Corrigan and Kohn 2000) and An Organisation With a Memory (Department of Health 2000) similarly discuss that whilst human error may be one of the greatest contributors to accidents, it is often the systems failures that are the underlying causes of error. As such, ““Errors can be prevented by designing systems that make it hard for people to do the wrong thing and easy for people to do the right thing”, (Donaldson, Corrigan and Kohn 2000, ix). This quote explains how we can take a human factors approach to help reduce error. Human factors in healthcare is the study of interrelationships between individuals and their environments in order to understand where, why, and how systems or processes break down (Donaldson, Corrigan and Kohn 2000). Often, it involves improving systems, equipment and processes to take into account human behaviours. Whilst we cannot make people themselves less ‘error prone’, we can design systems to try and reduce the likelihood of making a mistake.

The Yorkshire Contributory Factors Framework (YCF) further classified contributory factors for hospital errors and active failures into twenty domains, which similarly included both individual and organisational (system) factors (Lawton *et al.* 2012). Their work identified that 11% of errors/active failures were due to individual factors, such as fatigue. However, through taking the system-approach described by Reason (2000) and acknowledging that human behaviours are often a consequence of their environment, the majority of individual errors can be traced back to detrimental work environments and systems cultivating potentially dangerous behaviours and individual factors. For example, an error classified as caused by the individual-level factor ‘fatigue’,

may actually be as a result of the system-level factor of understaffing, resulting in staff working longer hours to cover shifts, leading to the fatigue.

1.3.1 Staff wellbeing

Staff wellbeing is another example of an individual factor that can contribute towards errors and is also a factor that can be heavily influenced by the immediate and surrounding work environment (i.e. system-level factors) (Wallace, Lemaire and Ghali 2009). Wellbeing is a broad concept and therefore difficult to define, with no gold standard definition or agreement within the literature as to what wellbeing is. It can encompass physical and psychological health and subsequently there are a wide array of measures that are used within both clinical and academic research. Common measures used include the General Health Questionnaire (GHQ) (Goldberg 1978), Ryff's Scales of Psychological Wellbeing (Ryff 1989), and a single item 'Quality of Life' linear analogue scale (West *et al.* 2006; West *et al.* 2009). Within clinical psychology, wellbeing is often described as on a spectrum, with psychological illness at one end (e.g. depression, anxiety, stress) and flourishing at the other (Johnson and Wood 2016). This latter outlook on wellbeing is used throughout this thesis, with the measures chosen reflecting this (such as the GHQ). However in order to provide more variation within the positive end of the spectrum, additional measures such as affect adjectives and quality of life scales will also be used.

Poor staff wellbeing is a common contributor towards patient safety incidents (Avery *et al.* 2012; Welp and Manser 2016). This is concerning because healthcare professionals have consistently reported lower levels of wellbeing than other workers and the general public over the last couple of decades (Caplan 1994; Mata *et al.* 2015; Wall *et al.* 1997). A recent meta-analysis reported that up to 43.2% of resident physicians were classed as suffering from depression (Mata *et al.* 2015). This is up to 24% higher than in the general population in the UK (Beaumont 2013). Reasons for this include shift-work, increasingly demanding workloads, stressful and fast-paced work environments, the emotional toll of patient care, and a lack of support (Brooks, Gerada and Chalder 2011; Shanafelt, Sloan and Habermann 2003). Within the NHS specifically, rising patient demand and expectations, understaffing, and underfunding is causing increasing pressures on staff (Campbell 2015). In fact, 50% of NHS doctors surveyed in June 2017 reported feeling unwell due to work-related stress (British Medical Association 2017b). These issues are resulting in high numbers of doctors considering retiring early, reducing their hours, or taking sick-leave as this environment takes a toll on their wellbeing

(British Medical Association 2017b; Gibson *et al.* 2015; Royal College of Physicians 2015).

Research globally has fairly consistently found healthcare staff wellbeing to be linked with both the quality of care provided, and patient safety (Welp and Manser 2016; Wallace, Lemaire and Ghali 2009). Two recent reports in the UK have identified the importance of (NHS) healthcare staff wellbeing for delivering high quality, safe patient care, "The Boorman Report" (Robertson and Cooper 2010), and "Work and Wellbeing in the NHS: why staff health matters to patient care" (Royal College of Physicians 2015). The latter offers another 'call to action', to the government, health boards, and NHS trusts, to take urgent action to improve the health and wellbeing of the NHS workforce. They state that investment in staff wellbeing is vital, with benefits for improved patient safety, reduced costs related to sickness absence and staff turnover, and personal benefits to staff (e.g. improved morale and job satisfaction). The existing research literature on the association between healthcare staff wellbeing and patient safety will be discussed in detail in chapter two.

1.3.2 Staff burnout

Another individual factor known to be a consequence of a demanding work environment, and to have potential implications for both patient safety and quality of care, is burnout (Salyers *et al.* 2016). Burnout is essentially an affective state resulting from chronic occupational stress. The term 'burnout' was originally coined by Herbert Freudenberger when he noticed the stress responses exhibited by staff working in "alternate institutions" such as healthcare organisations (Freudenberger 1974, p. 160). Scholarly research into burnout began predominantly within healthcare and other human service workers, due to the high emotional demands that these occupations require on a daily basis (Maslach, Schaufeli and Leiter 2001). Whilst there are a few measures of burnout, the original measure, the Maslach Burnout Inventory (MBI), defines burnout on three subscales; Emotional Exhaustion, Depersonalisation, (low) Personal Accomplishment. Emotional Exhaustion encompasses feeling "emotionally overextended and exhausted by one's work", Depersonalisation, "an unfeeling and impersonal response toward recipients of one's service, care, treatment or instruction", and the Personal Accomplishment subscale assesses "feelings of competence and successful achievements in one's work with people" (Maslach & Jackson, 1997 p.194).

More recent research since the development of the MBI has proposed that low personal accomplishment is not a necessary facet for the presence of burnout (Demerouti *et al.* 2003). Furthermore, emotional exhaustion has commonly

been broadened to also include physical exhaustion, and depersonalisation is often referred to as ‘disengagement’ in order to encompass feelings of burnout within professionals working outside of service industries (Demerouti *et al.* 2003). The majority of research investigating the role of burnout in patient safety has either dropped the measurement of personal accomplishment entirely, or has found little association between this subscale of burnout with safety (Hall *et al.* 2016). Moreover, often, exhaustion has been found to have the strongest association with patient safety incidents (Hall *et al.* 2016).

Whilst the presence of burnout and poor wellbeing in healthcare staff have both been shown to be associated with poorer patient outcomes, the literature is not clear cut: some studies have failed to find an association between wellbeing and/or burnout with safety. Reasons for this include studies that measure only burnout or only wellbeing, despite some overlap between the constructs which would suggest that both should be measured and controlled for in analyses (Bianchi, Schonfeld and Laurent 2015). Furthermore, findings differ depending on what measures have been used for wellbeing, burnout, and safety. As such, it is currently unclear which construct is more strongly related to patient safety. One of the aims of this thesis is to disentangle the two constructs, to understand which variable is more closely linked to patient safety outcomes.

1.4 The case in general practice

1.4.1 Patient safety in primary care

Whilst there has been much research within secondary care environments on patient safety in general, and the associations between burnout and wellbeing with patient safety specifically, patient safety in primary care settings is relatively under-researched. Primary care services are those that are the patients’ first point of contact for healthcare needs (excluding accident and emergency hospital services) and account for around 90% of all NHS contact (NHS Digital ‘Primary Care’). Primary care services include pharmacies, dental practices, community physiotherapists, and general practices. One reason for the lack of research in these settings is that they are highly heterogeneous. General practices (the predominant way that primary care is provided in the UK) operate as individual businesses, using different systems and working practices between them (Esmail 2013). As such, conducting research in this setting that can be generalised across practices and regions (let alone internationally) is a challenge.

The scarcity of research within primary care does not mean that patient safety incidents are uncommon. Whilst it is difficult to obtain accurate statistics on the

prevalence of error in primary care, a review of the existing literature has suggested that there are between 5 – 80 patient safety incidents per 100,000 consultations (equivalent to between .005% and .08%) (Sandars and Esmail 2003). A more recent study (in the Netherlands) reported that the prevalence is even higher, with 2% of all consultations resulting in a patient safety incident (Gaal *et al.* 2011). When investigating prescription errors in general practice alone, a study by Avery *et al.* (2012) retrospectively identified that 12% of all patients had an error, with 1 in 550 prescriptions associated with severe error. This study also classified the causes of these errors and found that stress associated with the working environment was an important contributor.

1.4.2 General practitioner wellbeing and burnout

General practitioners (GPs) are a subset of healthcare professionals whose levels of mental distress (i.e. depression, anxiety, stress) and risk of burnout are over and above those reported by secondary care doctors. Studies worldwide have reported that general practitioners have up to a 43% higher rate of burnout, and up to 22% higher rate of psychiatric illness compared to other healthcare professionals such as paediatricians and cancer clinicians, dependent on the measure and the particular comparison group used (Arigoni *et al.* 2009; Arigoni, Bovier and Sappino 2010; D. B. O'Connor 2000; Klersy *et al.* 2007; Lee, Stewart and Brown 2008; McManus *et al.* 2011; Poncet *et al.* 2007; Ramirez *et al.* 1995; Ross *et al.* 2009; Soler *et al.* 2008). In the UK, 46% of GPs surveyed in 2011 were classed as having high levels of emotional exhaustion, and 42% with high levels of depersonalisation (Orton, Orton and Gray 2012).

Morale within the workforce is also low. The British Medical Association's (BMA) quarterly tracker surveys of NHS doctors indicate that for almost all survey time points (July 2015 to June 2017), GP morale has been lower than consultants, junior doctors, and speciality and associate specialist (SAS) doctors (British Medical Association 2017b). Similarly, GPs also reported the lowest levels of satisfaction with their work-life balance compared to the other doctors surveyed, and were also the most likely to report working outside of their regular working hours "very often". This extra workload is due to various factors, one of which is a lack of practising GPs to meet the increasing patient demand and expectations: 48% of GPs surveyed reported GP vacancies in their practices, with 69% of these having been unfilled for at least six months (British Medical Association 2017b).

The Eighth National GP Worklife Survey (Gibson *et al.* 2015), a longitudinal survey (from 1998 to 2015) of GPs in the UK, provides further evidence of poor

wellbeing amongst general practitioners. This survey shows that GPs are reporting the lowest levels of job satisfaction since 2001 and the highest levels of stress since 1998. It is thus unsurprising that these surveys also found an increase in those expecting to quit direct patient care in the next five years, with 13.1% of GPs under 50 and 60.9% of those aged 50 and over expecting to quit. This has the potential to pose serious staffing issues for general practice, given the high number of vacancies reported by the BMA. All of these issues, along with increases in workload, in public expectations of the service, and decreases in funding, have led to General Practice in the UK recently being referred to as 'in crisis' (Baird *et al.* 2016).

Due to the complexities mentioned earlier, associations between wellbeing and burnout with patient safety have been under-researched within general practice. Existing literature within this setting has so far only taken a qualitative approach (with this research only having been published in the last year: Cheshire *et al*. 2017; Croxson, Ashdown and Hobbs 2017; Fisher *et al.* 2017). This thesis extends this research and also contains the first studies to use quantitative methods to investigate the links between GP wellbeing, burnout, and patient safety (chapters four and five). The limited, existing qualitative literature will be discussed further in chapter three. Furthermore this thesis aims to fill in the following gaps identified within the patient safety literature: 1) is burnout or wellbeing more strongly associated with patient safety? 2) are burnout and wellbeing associated with patient safety in general practice? 3) what are the underpinning mechanisms of the associations between burnout and wellbeing with safety? 4) what are the temporal relationships between burnout, wellbeing, and safety?

1.5 Distinctions

1.5.1 Second victim

Whilst this thesis focuses on whether GPs' levels of burnout and wellbeing impact on safety, we acknowledge that patient safety incidents often impact negatively on the health practitioners' wellbeing after the event occurs. In these situations, the healthcare professional involved in the incident is referred to as the 'second victim' (Wu 2012). This area is also under-researched within general practitioners, however it is beyond the scope of this thesis.

1.5.2 Patient safety versus quality of care

Patient safety is often described as a component of quality of care, however within this thesis a distinction is drawn between the two. Throughout this thesis,

patient safety is focussed on as the pertinent variable under investigation. Nevertheless, some of the research (e.g. Chapter 3) does incorporate findings specifically related to quality of care in addition to safety.

1.6 Thesis aims

This chapter has outlined the literature on patient safety and how staff wellbeing and burnout may play a part in the delivery of safe patient care. It has identified some gaps in the literature and highlighted the need for similar research to be undertaken within general practice. Based upon these gaps, this thesis aims to answer the following questions:

1. Is burnout, or wellbeing, more strongly related to patient safety measures in healthcare staff?

2a. Is there an association between GP wellbeing and burnout, with patient safety outcomes in general practice?

2b. Is GP wellbeing, or burnout, more strongly associated with patient safety?

3. What occupational factors are associated with GPs' levels of wellbeing and burnout, and are these also related to patient safety outcomes?

4. What is the temporal relationship between burnout and safety, and wellbeing and safety?

1.7 Thesis overview

To address the aims of this thesis, four studies were conducted and are reported in each subsequent chapter.

Chapter 2 relates to aim 1. A systematic literature review was conducted to synthesise existing research that has investigated the association between healthcare staff wellbeing and/or burnout with patient safety. The review included empirical, quantitative research studies that included a measure of burnout or wellbeing in healthcare professionals in secondary and primary care as well as a measure of patient safety. This review highlighted the absence of research within primary care settings, giving further justification for the resulting research within this thesis. Furthermore, it identified common measures of safety and wellbeing, which underpinned the design of the studies in the following chapters.

Chapter 3 relates to aims 2a and 3. A qualitative study involving focus groups with general practitioners was conducted to understand whether GPs perceive any links between their levels of wellbeing and burnout with the quality and

safety of patient care they deliver. Additionally, this study explored the workplace factors that GPs perceived to influence their wellbeing and burnout levels. Furthermore, this study had the additional aim (not primary to this thesis) of discussing potential interventions and coping strategies for GP wellbeing and burnout. The findings from this study informed questions in the subsequent chapter.

Chapter 4 relates to aims 1 - 3. A cross-sectional survey was conducted with GPs across the UK, to determine whether there is an association between GP wellbeing and/or burnout and patient safety measures. Moreover, the survey investigated whether certain occupational factors are associated with burnout, wellbeing, and patient safety. The outcomes of this study informed the final study in chapter five.

Chapter 5 relates primarily to aim 4. A daily diary methodology was used to assess how daily levels of burnout and wellbeing affect patient safety, and vice versa. Through measuring these variables each day, for seven days, an understanding of the temporal relationships between them was gained.

Chapter 6, the discussion, synthesises the findings from all of the studies in the previous chapters, to provide an overview of the associations between GP wellbeing, burnout, and patient safety. This chapter discusses what the implications of these findings are for GPs, healthcare organisations and policy-makers, along with the next steps that need to be taken within this field of research.

Chapter 2 Healthcare Staff Wellbeing, Burnout, and Patient Safety: A Systematic Review

A concise version of this review has been published in PLOS ONE (8th July, 2016): Hall, L. H., Johnson, J., Watt, I., Tsipa, A., & O'Connor, D. B. (2016). Healthcare Staff Wellbeing, Burnout, and Patient Safety: A Systematic Review. *PLoS One, 11*(7), e0159015.

2.1 Introduction

Research suggests that 16.6% of all hospital inpatient episodes in Australia and 3.7% in America lead to harmful adverse events, and in primary care, 1 in 20 prescriptions contain an error (Department of Health 2000; Avery *et al.* 2012). In total, errors are estimated to cost the NHS £1.3 billion in litigation costs, and £2 billion in additional bed days annually (Department of Health 2000). Alarmingly, these statistics are likely to be an underestimate due to the complexity of trying to capture errors and adverse events within such settings.

Many factors, latent and active, system and individual, interact to cause patient safety incidents. Human factors are important contributors, and recent research indicates an important role for staff wellbeing (West *et al.* 2006; Tanaka *et al.* 2012; Saleh *et al.* 2014). Burnout, a conceptually different variable from wellbeing, also has implications for patient safety. The burnout concept was originally developed amongst healthcare staff and is a 'state of vital exhaustion' in response to chronic organisational stress (World Health Organisation 2004). Although both wellbeing and burnout may be linked with patient safety, the current literature suffers from three limitations. First, the results of studies investigating the association between wellbeing or burnout and patient safety have been equivocal. Whilst several studies have reported an association, this finding has not always been replicated (Dorrian *et al.* 2006; Holden *et al.* 2010; Holden *et al.* 2011; Linzer *et al.* 2009; Suzuki *et al.* 2004; West *et al.* 2006). Second, burnout has often been treated as a proxy measure for wellbeing, but the determinants, symptoms and consequences of burnout and wellbeing are distinct, and it is unclear which is more reliably associated with patient safety (Schaufeli and Enzmann 1998). Third, the mechanisms underlying the association between these variables and patient safety are unclear.

Research on these associations is imperative now more than ever, due to pressures upon healthcare service budgets causing growing concerns around working conditions and the wellbeing of healthcare staff. In the UK, the financial

pressures on the NHS are impacting staffing levels, causing unmanageable workloads and subsequently impacting doctors' morale and stress levels (British Medical Association 2014; British Medical Association 2015a; Gibson *et al.* 2015). Similar pressures are evident in health systems elsewhere, for example, in the US, there is growing concern over a caregiver shortage occurring, due to population increases, chronic disease growth, and increased life expectancies. In light of this, we conducted a systematic review to investigate the extent to which wellbeing and burnout of healthcare staff are associated with patient safety.

2.2 Aims and objectives

The overarching aim of the review was to synthesize existing research investigating the association between wellbeing and/or burnout in healthcare professionals with the safety of patient care. The review had three specific aims:

1. To explore the association between wellbeing in healthcare professionals and patient safety.
2. To explore the association between burnout in healthcare professionals and patient safety.
3. To explore the studies that measure both wellbeing and burnout in relation to patient safety.

2.3 Method

The method for conducting this review will be outlined in the sections below. Prior to conducting the database searches, the protocol was registered on PROSPERO, registration number: CRD42015023340. The protocol can be accessed here: www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42015023340.

This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher *et al.* 2009), which can be found in Appendix A.1.

2.3.1 Search strategy

Four electronic bibliographic databases were last searched on the 20/07/2015, see Table 2.1, along with reference searching of all eligible articles. Authors of inaccessible articles were contacted to attain full texts. Both MeSH terms and keyword terms were used in a multi-field search, based on terms commonly

used within systematic reviews in the fields of patient safety, and wellbeing and burnout. A small number of articles were additionally identified through conversations with experts in the field upon attending an international conference on healthcare staff wellbeing.

Table 2.1. Electronic databases searched and number of results

Database	Papers Identified
PsycINFO (1806 – July 2015)	124
MEDLINE (1946 – July 2015)	4480
Embase (1947 – July 2015)	7139
Scopus (1823 – July 2015)	288
Total	12031

Papers were searched for those containing at least one term from each of the following blocks (although MeSH terms varied slightly between databases): (health personnel) AND (well?being OR occupation* stress* OR burnout OR mental health OR “quality of life”) AND (medical error OR patient safety OR quality of care OR error?). An example of full search terms used for one of the databases is provided in Appendix A.2.

2.3.2 Inclusion and exclusion criteria

Peer-reviewed observational, cross-sectional and prospective studies that were published and included both a measure of wellbeing and/or burnout in healthcare staff, and a measure of patient safety were included. No restrictions on the year of publication were imposed, but only articles written or translated into English were eligible. Qualitative research along with case studies, review articles, editorials, letters, conference abstracts, books, theses and opinions were excluded. Studies that only included healthcare staff that do not directly deal with patients (e.g. hospital receptionists) were excluded.

During the abstract screening process, additional exclusion criteria were applied by LH and JJ, due to a large number of studies measuring variables that were related to patient safety, but did not satisfy the author’s definitions of the variables of interest. The following terms, if not measured alongside a valid measure of safety resulted in rejection of the article: Job or work satisfaction, workability, motivation, productivity, and attitudes towards work. Additionally, litigation or legal action, without any explicit mention of the variables of interest was not included.

2.3.3 Study selection

A flow chart documenting the selection process can be viewed in Figure 2.1. Articles were screened for eligibility against the above criteria. After duplicates were removed, titles were screened by one author (LH). A second author (AT) checked 10% of the excluded titles, with 100% agreement. All abstracts were screened by LH, and double screened by the remaining authors (JJ, DOC, AT, IT) to check agreement at this stage. Non-agreement was resolved through discussion between at least two authors. Full texts were screened by LH, who ensured inclusion of any questionable articles for further consideration and discussion with a second author at the data extraction stage. Any differences in opinion between the authors regarding article eligibility, or key criteria during data extraction, were resolved through discussion with a third member of the research team when no consensus could be achieved.

2.3.4 Data extraction and quality assessment

The first 10% of eligible articles at this stage went through a standardized data extraction and quality assessment process (see appendices A.3 and A.4) by two authors (LH and AT) to reduce bias and ensure reliability. The two authors had good agreement, and so the remaining 90% of articles were extracted solely by LH. The data extraction form was refined during the extraction of the first few articles to ensure the forms were comprehensive.

A quality assessment tool was developed for this review, based on the criteria that were transferable to non-randomized clinical trial studies from the COCHRANE risk of bias tool, along with additional categories defined *a priori* by the authors to assess reliability and validity of the measures used (Appendix A.4). Each article was assessed using the quality assessment tool and then all articles were summarized together to give an impression of the overall quality of the studies included in the review.

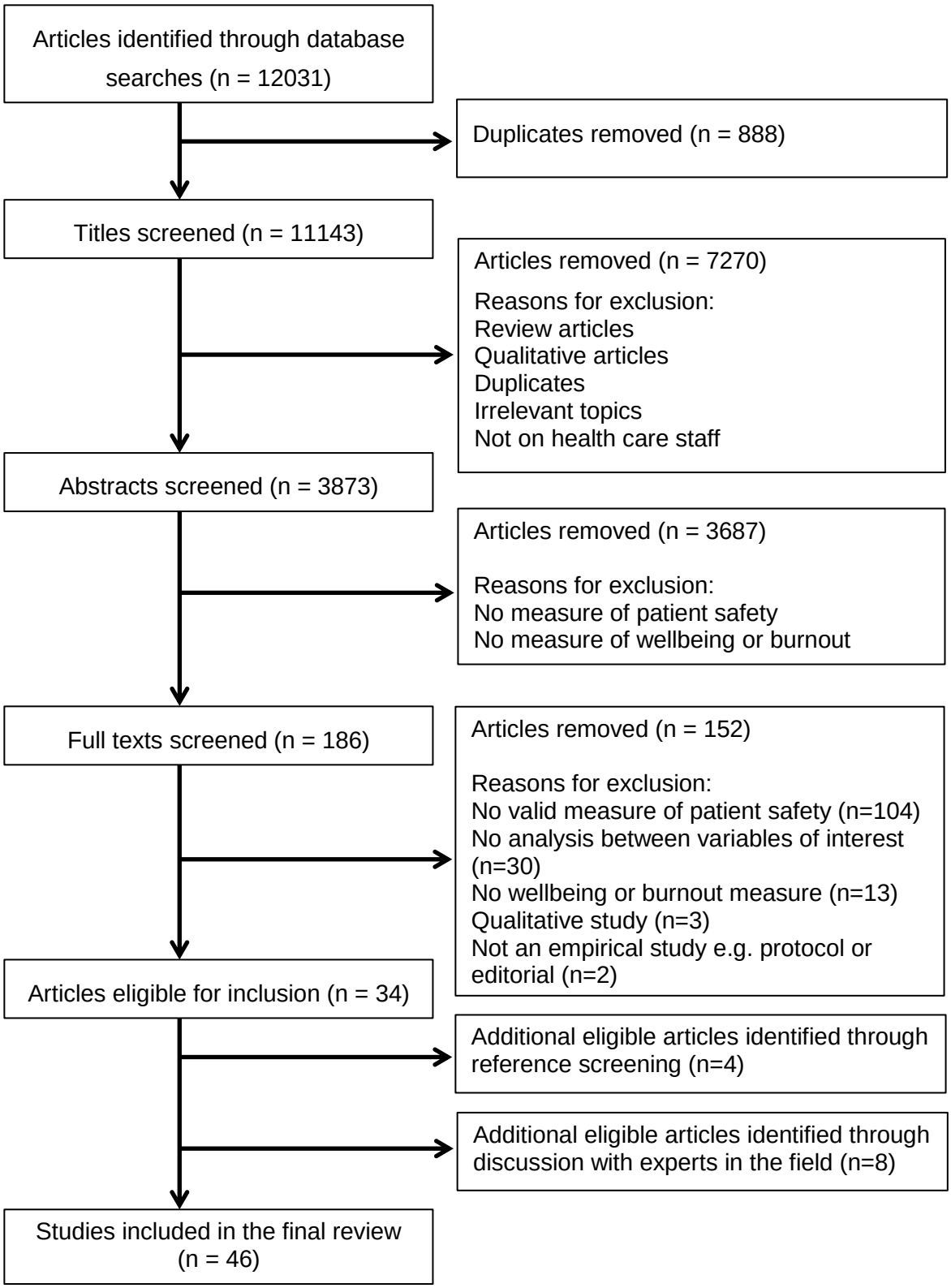

Figure 2.1 Flow chart documenting the screening process

2.4 Results

Forty-six studies were deemed eligible for inclusion in this review and they were subsequently grouped based on whether they measured wellbeing or burnout, or both. For a summary of all studies, please see Table 2.2.

2.4.1 Descriptive statistics and study characteristics

Nineteen studies measured burnout, sixteen measured wellbeing, and the remaining eleven included both a measure of burnout and of wellbeing. Of the burnout studies, the vast majority of studies (*n* = 24) used some variant of the Maslach Burnout Inventory (MBI) (Maslach, Jackson and Leiter 1996), such as the MBI-Human Services Survey, the Emotional Exhaustion (EE) scale of the MBI, or an international variation of the MBI. Alternative measures were; Shirom-Melamed's Burnout Scale, Copenhagen Burnout Inventory (CBI), Physician Well-Being Index, a single question approach and a symptom-based stress survey. The wellbeing measures were far more varied and included; General Health Questionnaire (GHQ), Harvard National Depression Screening Day Scale (HANDS), linear stress scales, Quality of Life scales, and emotional distress, among others. For a full list of measures and other study characteristics, see Table 2.2. Most of the measures used were pre-existing, validated and reliable measures.

The most common approach to measuring patient safety was to use a question on the frequency of self-perceived errors over a particular time frame, ranging from the previous four weeks to the past year. Other subjective and self-reported measures included stating the health professional's accident propensity (from 'not at all' to 'very likely') and their perceived likelihood of making errors. One study used a hand held computer device to gather medication events in real time. Six studies included objective measures of error using chart audits, checking official error reports, and conducting observations of staff (Cimiotti *et al.* 2012; Dugan *et al.* 1996; Fahrenkopf *et al.* 2008; Garrouste-Orgeas *et al.* 2015; Linzer *et al.* 2009; Saleh *et al.* 2014). Fahrenkopf and colleagues (2008), and Garrouste-Orgeas and colleagues (2015) were the only studies to use both objective and subjective measures of error. Although Welp and colleagues (2014) measured mortality rates and length of stay alongside a subjective measure of patient safety, these objective measures were not within our criteria for patient safety outcomes.

The studies were conducted across 16 different countries and six continents, with a large proportion being based in America (*n* = 19). Most (*n* = 33) utilised a cross-sectional survey design, with only nine using a prospective cohort study

methodology. The most commonly studied profession was nurses (*n* = 24 studies), followed by physicians (*n* = 7). The remaining study samples consisted of pharmacists (*n* = 2), a variety of hospital staff (*n* = 2), paramedics (*n* = 1), surgeons (*n* = 2), anaesthetists (*n* = 1) and doctors still in some form of training (*n* = 8). Only one study included primary care physicians, and they were grouped in with the hospital based staff in all the analyses.

Table 2.2. Summary of all studies included in the review

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Arakawa	2011	Japan	Cross-sectional survey	6445 Nurses	SF-36		Self-report medical errors or incidents, accompanied by collaborating information	Role (emotional) but not mental health predicted the occurrence of medical incidents and errors in logistic regression. OR 0.996, (0.993-0.999), p = .007	Partial
Arimura	2010	Japan	Cross-sectional survey	454 Nurses	GHQ (28-item)		Self-report of having been responsible for a medical error in the past month (accident or incident), and had submitted written explanation to the hospital	GHQ score significantly associated with errors (in multivariate analysis). OR 1.1, 1.0-1.1, $p < .05$. Total score on GHQ, somatic symptoms, anxiety/insomnia, social dysfunction, and depression were all significantly higher in those reporting errors when not controlling for other factors (t-tests).	Yes
Baldwin	1997	Scotland	Prospective, mixed methods	142 Medical students	GHQ (28-item)		Self-reported number of mistakes in the past year, by 3 levels of severity and 3 time periods	No sig. correlation between GHQ (total & subscales) and errors. 'Feeling overwhelmed' correlated with GHQ subscales and errors in past month.	No
Dollarhide	2014	USA	Prospective, longitudinal study	185 Attending physicians (residents and interns)	Emotional stress (From the Diary of Ambulatory Behavioural States, 1998)		Real-time medication event reporting tool (MERT) - self-reporting of medication events (errors and near misses)	Sig. higher emotional stress scores on days in which they reported a medication event ($p < .01$). Emotional stress scores were approximately 33% higher among 'event reporting' versus 'non-event reporting' physicians ($p < .05$) across all days of the study.	Yes
Dorrian	2006	Australia	Pilot, survey	23 Nurses	Stress from 'very' to 'not at all', fatigue, mental exhaustion		Frequency, type (out of 6), severity of errors and near errors made OR observed	Stress ratings didn't enter the final model that predicted errors.	No

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Dorrian	2008	Australia	Daily diary	41 Nurses	Stress from 'very' to 'not at all', fatigue, mental exhaustion		Frequency, type (out of 6), severity of errors and near errors made OR observed	Stress ratings (OR = 1.5) (and struggling to stay awake during shift) were significant predictors of error (p < .05).	Yes
Fogarty	2006	Australia	Cross-sectional survey	176 Nurses	Occupational PANAS		Error index; self-reported frequency of medication error in past 12 months	Significant correlation between errors and morale (r = -0.21, p < .01), and distress (r = 0.17, p < .05).	Yes
Hammer	1986	USA	Cross-sectional survey	374 Paramedics	MPSS-R		On-the-job behaviour inventory: 'critical' scale for judgment errors in patient care	Significantly more errors were reported by respondents with less somatic distress (t = -0.14) and less total stress (t = -0.15)	Yes
Houston	1997	England	Prospective cohort study	30 Junior house officers	GHQ (28-item)		Medical errors questionnaire, self-propensity to make errors and their frequency	Only the anxiety/insomnia subscale of the GHQ significantly correlated with errors, and only at Time 2 (r = .40, p < .05).	Partial
Niven	2015	UK	Cross-sectional survey	1205 Pharmacists	Mental strain (depression & anxiety)		Self-report errors (minor and serious) in the previous 4 weeks	Anxiety, but not depression had a significant effect on errors (both minor and serious). Anxiety also mediated the effect of presenteeism on errors.	Partial
Park	2013	Korea	Correlational study	279 Nurses	SF-KOSS (job stress)		First item of the AHRQ patient safety culture survey	Total job stress score significantly correlated with patient safety incidents (r = 0.217). In the multivariate regression, only lack of job autonomy and job instability subscales of job stress had significant effects on incidents	Partial

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Pelliciotti	2010	Brazil	Cross-sectional survey	94 Nurses	SF-36		Self-reported medication error in the previous 4 weeks	Those who reported errors had significantly worse mental health (p = .01).	Yes
Saleh	2014	Egypt	Cross-sectional survey	52 Nurses	CES-D		Medication errors observation sheet	Depression was a significant independent predictor of medication errors (β = 0.381). The more depressed, the significantly more errors made (r = 0.62, p < .001).	Yes
Suzuki	2004	Japan	Cross-sectional survey	4279 Nurses	GHQ-12		Experience of errors in previous 12 months	Poor mental health was significantly associated with all types of errors, in all analyses.	Yes
Tanaka	2012	Japan	Prospective cohort study	789 Nurses	NSS, HADS		Self-perceived near misses and AEs in previous 6 months	Depression and Job Stressors' significant association with medical error risk (AEs and near misses) was mediated through decreased attention.	Yes
Wilkins	2008	Canada	Cross-sectional survey	4379 Registered Nurses	Mental Health (1Q)		Self-report medication error in past 12 months	Fair or poor mental health and medication errors had an OR of 1.3 (0.8-2.3) compared to OR of 1 for good, very good, or excellent mental health and errors. This trended on significance but p = 0.075	No
De Oliveira	2013	USA	Cross-sectional survey	1417 Anesthetists	HANDS	MBI-12	Frequency of self-reported errors	Significant association between errors occurring often or multiple times and depression, EE, PA and DP (all p < .001)	Yes

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Dugan	1996	USA	Cross-sectional survey	293 Nurses	Stress Continuum Scale (SCS)	Symptom-based stress survey score (has been previously used to measure burnout)	No. of patient falls, medical errors and IV errors occurred during the month of the study, at the unit level. Obtained from hospital records.	Significant correlations between SCS scores and total patient incidents (r = .43), medication errors (r = .40), but not IV errors. Only total patient incidents was significantly correlated with SCS scores at all 3 time points. The higher the hospital unit's mean score on SCS, the significantly higher percentage of patient incidents, (F = 6.08, df = 1, 41, p = .02). No significant associations between symptom-based stress survey and patient incidents of any type.	Partial
Dyrbye	2013	USA	Cross-sectional survey	7288 Physicians (hospital-based and GPs)	Mental QoL PWBI	PWBI (burnout, PA of MBI)	Self-perceived errors in the last 3 months	Physicians who reported a recent error were more likely to endorse each item of the PWBI and a greater number of total items (p < .001 for all).	Yes
Fahrenkopf	2008	USA	Prospective cohort study	123 Residents	HANDS), self-reported depression, QoL	MBI	Self-reported errors, objective errors (chart review and daily reports)	Depressed pp's made sig. more (objectively measured) errors per month than non-depressed (p < .001), but no difference for self-reported errors. Burnt-out residents self-reported more errors than non-burnt-out (p = .02), but no difference using objective errors measures (p = .4). No mention of QoL and error associations.	Partial
Garrouste-Orgeas	2015	France	Prospective cohort study	1534 hospital staff (physicians, nurses, physio's etc.)	CES-D	MBI (Fontaine French version)	Research assistants collected data (chart audit etc.), plus Safety Attitudes Questionnaire (SAQ-ICU)	MBI and CES-D did not correlate with the SAQ-ICU score. Depression was an independent risk factor for error (p = .01), but burnout was not. Burnout was also not significantly associated with adverse events	Partial

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Hayashino	2012	Japan	Prospective cohort study	836 Hospital-based practising physicians	WHO-5	MBI 17 items	Self-perceived errors in the last year	The significant association between burnout (EE and DP) and depression with error was modified by Hope.	Yes
Linzer	2009	USA	Cross-sectional survey	422 Physicians	Job stress scale	Burnout (single item)	Objective error scores (treatment, management and prevention errors) by chart audits	No associations between physician reactions (stress and burnout) and patient care (or total error).	No
Shanafelt	2002	USA	Cross-sectional survey	115 Internal medicine residents	PRIME-MD	MBI (EE & DP)	Self-report suboptimal patient care "I made treatment or medication errors that were not due to a lack of knowledge or inexperience'	Depression was not significantly correlated with patient care practices. Burnt-out residents were significantly more likely to report making treatment or medication errors several times per year, monthly, and weekly than those not burnt-out $p < .05$	Partial
Shanafelt	2010	USA	Cross-sectional survey	7905 Surgeons	PRIME-MD, SF-12	MBI	Self-perceived error in the last 3 months	Reporting an error in the last 3 months was associated with significant increases ($p < .0001$) in EE, the risk for screening positive for depression, and a decline in mental QoL. Similarly, Increases in DP and EE were significantly associated with an increase in the likelihood of reporting an error, and increases in PA and mental QOL were associated with a decrease in the likelihood of reporting an error.	Yes

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
West	2006	USA	Prospective, longitudinal study	184 Internal medicine trainees	QoL, Depression (2-Q)	MBI	Self-perceived errors in the last 3 months	Error was significantly associated with an increase in EE and positive screening for depression in the subsequent time points. Higher levels of burnout (all domains) were significantly associated with increased odds of reporting an error in the following time points. Reciprocal relationship.	Yes
West	2009	USA	Prospective, longitudinal study	380 Internal medicine trainees	QoL, Depression (2-Q)	MBI	Self-perceived errors in the last 3 months	Diminished QoL, higher levels of burnout (all subscales) and positive screening for depression were each significantly associated with increased odds of reporting errors in the subsequent 3 months.	Yes
Bao	2013	Spain	Cross-sectional survey	234 Nurses		Shirom-Melamed's burnout scale	Accident propensity	Burnout was significantly correlated with accident propensity (r = .37, p < .001) and it fully mediated the effect of ethical value incongruence on accident propensity.	Yes
Block	2013	USA	Cross-sectional survey	55 First year internal medicine residents		MBI (modified)	Self-reported medical errors, Safety Attitudes Questionnaire	"Higher burnout scores tended to be associated with self-reported errors and poorer reported safety." p < .001 for difference between burnout tertiles and SAQ safety scores. p < .05 for burnout tertiles and errors made due to workload, and forgetting to convey important information.	Yes
Chen	2013	Taiwan	Cross-sectional survey	839 Physicians (including surgeons)		MBI-GS	"Medical error experience"	The number of medical errors reported was significantly and strongly associated with high-level of EE (p < .001)	Yes

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Cimiotti	2012	USA	Cross-sectional survey and secondary data analysis	7728 Nurses (estimated number)		EE scale of MBI-HSS	Objective data: Care-associated Surgical Site Infections (SSIs) and Urinary Tract Infections (UTIs)	The staffing-infection relationship was fully mediated by burnout. Burnout was associated with both UTIs (β = .085, p = .02) and SSIs (β = 1.54, p < .01).	Yes
Halbeslebe n	2008	USA	Cross-sectional survey	148 Nurses		EE and DP of MBI	AHRQ Patient safety culture survey	Higher burnout (EE and DP) was significantly associated with a lower patient safety grade, perceptions of a less safe environment, near-miss reporting frequency, but not with event report frequency.	Partial
Holden	2011	USA	Cross-sectional survey	199 Nurses		EE of MBI	Perceived likelihood of medication error	Burnout was not significantly associated with the likelihood of medication error.	No
Holden	2010	USA	Cross-sectional survey	79 Pharmacists (and Pharmacy technicians)		EE of MBI	Medication error and adverse event likelihood (single item self-report for each)	Burnout was significantly associated with medication error likelihood (OR = 1.60) and adverse drug event likelihood (OR = 1.52), both p < .05.	Yes
Kirwan	2013	Ireland	Cross-sectional survey	1397 Nurses		EE of MBI	AHRQ patient safety grade. Self-report number of formal adverse events they had submitted in the past year	Ward mean for EE didn't significantly contribute to the safety grade (p = .120), or to the number of formal adverse event reports (p = .089)	No
Klein	2010	Germany	Cross-sectional survey	1311 Surgeon		Copenhagen Burnout Inventory	Self-reported frequency of diagnostic & therapeutic errors	Burnout was only significantly associated with both therapeutic errors (OR = 2.54) and diagnostic errors (OR = 1.94) in male, and not in female surgeons.	Partial

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Laschinger	2006	Canada	Cross-sectional survey	8597 Nurses		MBI-HSS	Self-perceived adverse event in past year (falls, nosocomial infections, medical errors, patient complaints)	Burnout partially mediated the relationship between worklife factors and adverse events in the model with best fit. In bivariate analysis, there was a significant correlation between adverse events and EE (r = .30), DP (r = .34) and PA (r = -.22).	Yes
Prins	2009	The Netherlands	Cross-sectional survey	2115 Residents		Utrecht Burn-out Scale	Self-reported errors	Action/inexperience errors were significantly correlated with EE (r = .20, p < .0001), DP (r = .29, p < .001), PA (r = -.05, p < .001). Errors due to lack of time were significantly correlated with EE (r = .43), DP (r = .42), PA (r = - .08), all p < .001.Specific error questions were all significantly correlated with EE and DP, and the majority also correlated with PA. Residents with moderate or severe burnout reported sig. more errors than residents without burnout. And those with severe burnout reported sig. more errors due to lack of time than those with moderate burnout.	Yes
Profit	2014	USA	Cross-sectional survey	2073 Hospital staff (physicians, nurse practitioners etc.)		EE of MBI	Safety attitudes questionnaire	NICUs with a greater % of respondents reporting burnout had a smaller % of respondents reporting a good safety climate (r = -0.38, p = .01). A burnout score of less than 25 (signifying resilience) was significantly associated with safety climate (r = .60, p < .001).	Yes

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Ramanujan	2008	USA	Cross-sectional survey	430 Nurses		Workplace demands': EE and DP of MBI	Self-report 'perception of patient safety' Likert scale questions	In the final model, EE had a -0.056 effect on safety, but only an indirect effect (-0.056) through DP. DP had a -0.189 total effect on safety, which was a direct effect. The model had 'good fit'	Yes
Squires	2010	Canada	Cross-sectional survey	267 Registered Nurses in Acute Care		EE of MBI	Self-report Medication errors, 1Q	In the final model, medication errors lead to EE at a significant level ($p <$ .05), but with a small effect size (0.14) EE significantly correlated with medication errors in univariate analysis ($t = 0.22$, $p < .01$) in that higher levels of EE correlated with more medication errors.	Yes
Teng	2010	Taiwan	Cross-sectional survey	458 Nurses		MBI-HSS modified	Frequency of various patient safety indicators (e.g. administrative errors and nosocomial infections)	Significant correlation between patient safety and EE ($r = - .11$, $p <$ .05), and DP ($r = - .11$, $p < .05$). Burnout moderated the effects of nursing experience and medical centre on patient safety	Yes
Van Bogaert	2014	Belgium	Cross-sectional survey	1108 Nurses		MBI-HSS	Adverse patient event frequency (including medication errors)	Medication errors were predicted by DP. No association between PA and medication errors. Don't mention EE thus assumed it wasn't related with medication errors.	Partial

First author	Year	Country	Design	Sample	Wellbeing Measure(s)	Burnout Measure	Patient Safety Measure(s)	Key Findings	Significant correlation?
Welp	2014	Switzerland	Cross-sectional survey	1425 Nurses and Physicians in ICU		MBI-HSS	Clinician rated patient safety grade (Hospital Survey of Patient Safety Culture)	Correlations: At the individual level, Clinician-rated patient safety significantly correlated with EE (r = -0.25, p < .01), DP (r = -0.16, p <.01), and PA (r = 0.18, p < .01). Multilevel model results: All burnout subscales significantly predicted clinician rated patient safety (BEE = −0.13, t=−4.52, p<0.001, BDP=−0.07, t=−2.11, p=0.04, BPA = 0.16, t=3.38, p= 0.002).	Yes
Williams	2007	USA	Secondary analysis of the MEMO study data	426 Physicians		Burnout (single item)	Likelihood of future error - 9 items	In the model of best fit, burnout leads to error likelihood, significant at the p < .05 level (parameter estimate/intercorrelation = .13).	Yes
Zander	2013	Germany	Longitudinal, cross-sectional survey	4192 Nurses		EE of MBI	PES-NWI; patient safety on the ward	High patient safety was significantly associated with EE in both 1999 (p = .006, OR = .572) and in 2009 (p < .001, OR = .376). In 2009, high patient safety was a significant factor for lower EE.	Yes

CES-D, Centre for Epidemiological Studies – Depression Scale; GHQ, General Health Questionnaire; MPSS-R, Medical Personnel Stress Survey – Revised; NSS, Nursing Stress Scale; HADS, Hospital Anxiety and Depression Scale; PANAS, Positive And Negative Affect Schedule; SF, Short Form; SF-KOSS, Short Form - Korean Occupational Stress Scale; AHRQ, Agency for Healthcare Research and Quality; HANDS, Harvard National Depression Screening Day Scale; MBI, Maslach Burnout Inventory; EE, Emotional Exhaustion; PA, Personal Accomplishment; DP, Depersonalization; SCS, Stress Continuum Scale; GP, General Practitioner; QoL, Quality of Life; PWBI, Physician Well-Being Index; SAQ-ICU, Safety Attitudes Questionnaire – Intensive Care Unit; WHO, World Health Organisation; PRIME-MD, Primary Care Evaluation of Mental Disorders; SAQ, Safety Attitudes Questionnaire; MBI-GS, Maslach Burnout Inventory – General Survey; MBI-HSS, Maslach Burnout Inventory, Human Services Survey; SSI, surgical site infection; UTI, urinary tract infection; NICU, Neonatal Intensive Care Unit; PES-NWI, Practice Environment Scale – Nursing Work Index

2.4.2 Wellbeing findings

Of the articles measuring wellbeing, just over a half (16/27, 59.3%) found that poor wellbeing, as measured using a variety of definitions (depression, anxiety, job stress, mental health, distress), was associated with poorer patient safety (de Oliveira Jr *et al.* 2013; Dollarhide *et al.* 2014; Dorrian *et al.* 2008; Dyrbye *et al.* 2013; Fogarty and McKeon 2006; Garrouste-Orgeas *et al.* 2015; Hayashino *et al.* 2012; Pelliciotti and Kimura 2010; Saleh *et al.* 2014; Shanafelt *et al.* 2010; Suzuki *et al.* 2004; Tanaka *et al.* 2012; West *et al.* 2006; West *et al.* 2009; Arimura *et al.* 2010; Hammer *et al.* 1986). An additional six studies (22.2%) found some sort of relationship between wellbeing and patient safety, but with only some subscales of the wellbeing measures or safety measures correlating (Dugan *et al.* 1996; Fahrenkopf *et al.* 2008; Houston and Allt 1997; Niven and Ciborowska 2015; Park and Kim 2013; Arakawa, Kanoya and Sato 2011). Tanaka and colleagues' prospective cohort study in Japan (2012) found that higher depression scores were significantly associated with more near misses, but not with adverse events, as measured through frequency of self-perceived error in the previous 6 months. Of note is that both Houston and Allt's (1997) study and Niven and Ciborowska's study (2015) found that anxiety, but not depression, was significantly associated with errors, despite using different measures of anxiety, depression, and errors from each other.

Five studies found no correlation between wellbeing and patient safety (Baldwin, Dodd and Wrate 1997; Dorrian *et al.* 2006; Linzer *et al.* 2009; Shanafelt *et al.* 2002; Wilkins and Shields 2008). However, one of these, Dorrian and colleagues' (2006) study, was only a pilot study, with a sample size of 23. Their full study in 2008, however, did find that stress significantly predicted error, suggesting that the pilot study was underpowered.

Amongst the studies of wellbeing, Hammer and colleagues' (1986) cross-sectional study of 374 paramedics in the United States (US) was distinctive in that it indicated an association between low stress and increased error. They reported that those with less somatic distress and lower total stress scores (on the MPSS-R) made significantly more errors. This could perhaps be due to the measures used, which differ from all the other studies. The stress measure was of organisational stress, and did not measure the participants' own stress levels. The distress measure is also questionable, as although it taps into some concepts associated with poor wellbeing, such as, "I wake up feeling tired", others questions ask about behaviours that are not necessarily indicative of poor mental health, e.g. "I drink on the weekend to relax".

2.4.3 Burnout findings

Similarly to the wellbeing studies, the majority of studies (21/30, 70%) measuring burnout found that more errors were significantly associated with health practitioner burnout (Bao *et al.* 2013; Block *et al.* 2013; Chen *et al.* 2013; Cimiotti *et al.* 2012; de Oliveira Jr *et al.* 2013; Dyrbye *et al.* 2013; Holden *et al.* 2010; Laschinger and Leiter 2006; Prins *et al.* 2009; Profit *et al.* 2014; Shanafelt *et al.* 2010; Teng *et al.* 2010; West *et al.* 2006; West *et al.* 2009; Williams *et al.* 2007; Zander, Dobler and Busse 2013; Hayashino *et al.* 2012; Ramanujam, Abrahamson and Anderson 2008; Shanafelt *et al.* 2002; Squires *et al.* 2010; Welp, Meier and Manser 2014). Four studies additionally found partial associations between burnout and error (Fahrenkopf *et al.* 2008; Halbesleben *et al.* 2008; Klein *et al.* 2010; Van Bogaert *et al.* 2014). For example, Halbesleben and colleagues' (2008) cross-sectional survey of nurses in the US found that higher burnout was significantly associated with a lower patient safety grade and near miss reporting frequency, but not with event report frequency. Klein and colleagues (2010) found that burnout, as measured by the Copenhagen Burnout Inventory, was only significantly associated with therapeutic (OR = 2.54) and diagnostic errors (OR = 1.94) in male, but not in female surgeons in Germany.

Five studies did not find any significant associations between burnout and error (Holden *et al.* 2011; Linzer *et al.* 2009; Dugan *et al.* 1996; Kirwan, Matthews and Scott 2013; Garrouste-Orgeas *et al.* 2015). Of these studies, only one of them used a full set of MBI questions, although this was a translated version (Garrouste-Orgeas *et al.* 2015). The remaining studies used a single-item measure, only the EE subscale of the MBI, and a symptom-based stress survey, which although it had been previously used to measure burnout, the authors describe it as a stress, and not a burnout survey in this context (Dugan *et al.* 1996).

2.4.4 Studies measuring both burnout and wellbeing

Eleven studies measured both burnout and wellbeing in relation to patient safety outcomes (de Oliveira Jr *et al.* 2013; Dugan *et al.* 1996; Dyrbye *et al.* 2013; Fahrenkopf *et al.* 2008; Garrouste-Orgeas *et al.* 2015; Hayashino *et al.* 2012; Linzer *et al.* 2009; Shanafelt *et al.* 2010; West *et al.* 2006; West *et al.* 2009; Shanafelt *et al.* 2002). It is these studies that may facilitate a more intricate understanding of which variable is linked with the greater risk of error. Although the majority (7/11) found that both poor wellbeing and risk of burnout were significantly associated with errors, all these studies, bar one (Fahrenkopf *et al.* 2008), used only self-perceived errors as the outcome indicator. All but

one (Shanafelt *et al.* 2002) of the remaining studies that found either no link at all or only an association between either wellbeing or burnout with safety, were those that used objective measures of error, suggesting that perhaps objective measures are not sensitive enough (Dugan *et al.* 1996; Garrouste-Orgeas *et al.* 2015; Linzer *et al.* 2009). Linzer and colleagues (2009) conducted chart audits and found no associations between errors and wellbeing or burnout. Dugan and colleagues (1996) checked hospital records for errors and found that stress scores (stress continuum scale) but not a symptom-based stress survey (a possible burnout measure) correlated with patient incidents. Finally, Garrouste-Orgeas and colleagues (2015) found that in their prospective cohort study, depression was an independent risk factor for error (as assessed by chart audit), but that burnout was not. The one study that used both objective and subjective measures of error found that different measurement methods resulted in different findings for burnout than for wellbeing (Fahrenkopf *et al.* 2008). In this study, depressed resident doctors made significantly more errors than those who were not depressed, but only when using the objective, and not when using the subjective, measure of error. Additionally, they found that burnt-out residents made more errors than non-burnt-out residents when using subjective self-reported, but not objective, measures of error.

Four studies conducted analyses that could determine whether burnout and poor wellbeing were each independent predictors of error, or whether one explained the variance in the other (de Oliveira Jr *et al.* 2013; Dyrbye *et al.* 2013; Garrouste-Orgeas *et al.* 2015; Shanafelt *et al.* 2010). Garrouste-Orgeas and colleagues concluded that burnout was not directly associated with error, even when depression was controlled for in the analysis. Depression however, was found to be an independent predictor of error. The three remaining studies reported that both burnout and wellbeing were independent predictors of error when multivariate analyses were conducted (de Oliveira Jr *et al.* 2013; Dyrbye *et al.* 2013; Shanafelt *et al.* 2010).

2.4.5 Study quality and risk of bias

See Figure 2.2 for an overview of all the studies combined risks of bias, based on the format suggested by the COCHRANE guidelines. For separate quality rating graphs for the wellbeing and burnout studies, see appendices A.5.1 and A.5.2.

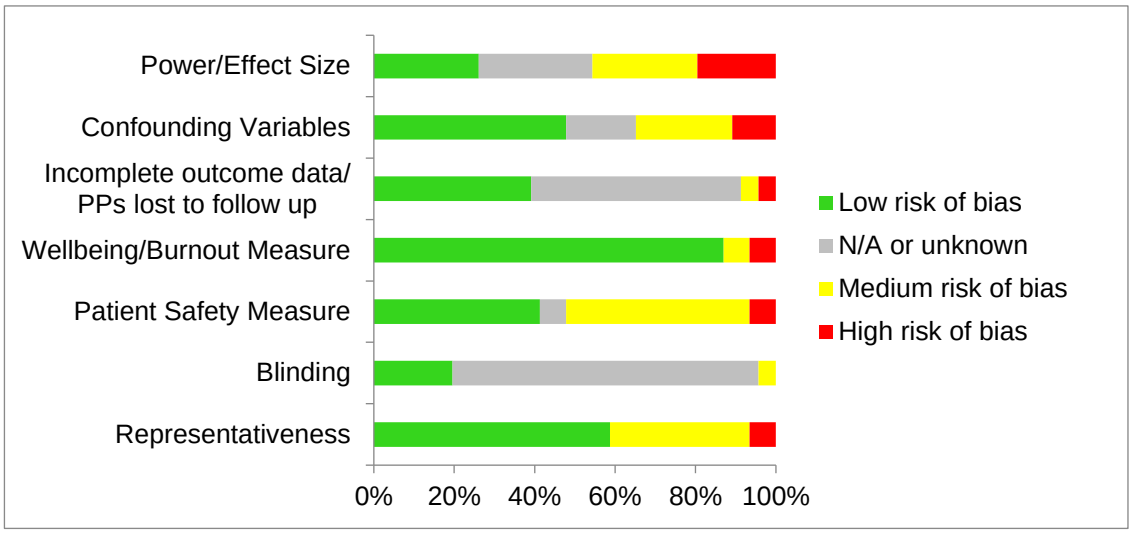

Figure 2.2. Risk of bias graph displaying the overall study quality for all 46 studies

A common concern amongst the studies with regards to quality was the measure of patient safety used, as the majority of studies used solely self-reported measures of error, which has a number of limitations including social desirability and fear of blame and retribution. This shall be discussed further in the following section.

There was not much variability in study quality/risk of bias between those that measured wellbeing and those that measured burnout. The criteria in which the burnout studies generally displayed a lower risk of bias than the wellbeing studies were; representativeness (73.3% v. 44.4%), and measures of burnout/wellbeing (93.3& v. 77.7%) respectively. There were a similar number of studies demonstrating a medium to large effect size for the relationship between patient safety and burnout as there were for patient safety and wellbeing (33.3% v. 25.9%).

2.5 Discussion

The majority of studies provided evidence that both wellbeing and burnout are associated with patient safety. In particular, poor wellbeing, (as characterized by depression, anxiety, poor quality of life and stress), and high levels of burnout, were found to be significantly associated with more self-reported errors, with a smaller number of studies showing an association between these factors and objective measures of error. A similar percentage of studies found significant associations between wellbeing and error (88.9% of studies) as those for burnout and error (83.3%), indicating the importance of both

variables. Studies reporting that both burnout and poor wellbeing were independently associated with poorer patient safety suggest the importance of both variables on their own (de Oliveira Jr *et al.* 2013; Dyrbye *et al.* 2013; Shanafelt *et al.* 2010). Indeed, one study (de Oliveira Jr *et al.* 2013) found that when resident doctors suffered from both high burnout and risk of depression, they reported even more errors than those who suffered solely from burnout or depression alone. These studies signify that both staff wellbeing and burnout may be important targets for patient safety interventions. However further research is needed first to properly understand the nature of the relationships between these factors.

Too few prospective studies have been conducted to definitively propose a causal relationship. West and colleagues' (2006) study attempts to clarify this, with a circular relationship between burnout and error being reported. However this circular relationship was not found for wellbeing and error, with errors significantly predicting subsequent quality of life and depression ratings, but not vice versa. An explanatory model for how wellbeing and burnout are associated is also needed, to enable the implementation of effective interventions. Fahrenkopf and colleagues' study found that 96% of depressed residents were also burnt-out, but only 25% of burnt-out residents were depressed, indicating that burnout may be a possible precursor to depression. If the findings from these studies could be extrapolated into an overarching model, it could be proposed that overworked staff become burnt-out, which may eventually lead to depression. Thus burnout and depression may manifest itself through fatigue, irritability and reduced cognitive functioning (Linden *et al.* 2005), all of which puts pressure on team relationships causing a poorer safety climate, and on their own individual work performance, resulting in more distanced staff, poorer quality of care and ultimately a higher risk of making errors.

2.5.1 Limitations of the studies

This review is limited in its ability to determine the nature of the associations between wellbeing, burnout and patient safety, due to the limitations of the studies included. The primary limitation was the measure of safety, which is a general problem within patient safety research. The measures used often relied on self-reported errors with recall as long as a year ago, making the results vulnerable to a variety of memory biases and cognitive failures. However despite these limitations, self-reported measures do provide a number of advantages over subjective measures; they are more sensitive, they can provide information across all types of errors, and they can be measured at the individual level more easily than objective measures can. There is a lack of

studies measuring both objective and subjective measures of safety, with those that measured both differing in the type of errors measured by the two different methods (Fahrenkopf *et al.* 2008).

2.5.2 Limitations of this review and further research

This review is restricted by its exclusion of non-English language papers. Additional limitations include the possibility of a publication bias due to the exclusion of grey literature, and the inability to quantitatively determine whether wellbeing or burnout is more strongly associated with patient safety due to the heterogeneity of the wellbeing and safety measures used. However, the eligible studies were from a wide range of locations and included a variety of job roles (nurses, surgeons etc.). Noteworthy is the lack of studies specifically within primary care, despite the prevalence of burnout and depression within primary care physicians. Future research is needed to address these issues, and interventions need to be trialed at various points of the organisational, staff and patient levels to determine where the most effective intervention for staff wellbeing and patient safety will fit.

2.6 Conclusion

The finding that burnout and poor wellbeing are both, in the majority of studies reviewed, associated with poorer patient safety has significant implications for policymakers and management teams within healthcare settings. To deliver quality patient care, the care must first and foremost be safe, and the findings from this review suggest that staff wellbeing and burnout may play an important role in patient safety. It would seem prudent that healthcare organisations provide a work environment that fosters staff wellbeing and protects against burnout, to subsequently provide a safe service to their patients.

Chapter 3 Contributors to Workplace Wellbeing, Potential Coping Strategies, and Consequences for Patient Care: A Focus Group Study

Two papers have been published from this study and have been combined to form this chapter:

Hall, L. H., Johnson, J., Heyhoe, J., Watt, I., Anderson, K., & O'Connor, D. B. (2017). Exploring the Impact of Primary Care Physician Burnout and Well-Being on Patient Care: A Focus Group Study. *Journal of Patient Safety.*

Hall, L. H., Johnson, J., Heyhoe, J., Watt, I., Anderson, K., & O'Connor, D. B. (2017). Strategies to improve general practitioner wellbeing: a focus group study. *Family Practice.*

3.1 Introduction

A large systematic review of the literature on healthcare staff wellbeing, burnout, and patient safety (Hall *et al.* 2016), (chapter 1) demonstrated that low levels of healthcare staff wellbeing and high levels of burnout are significantly associated with poorer patient safety. An additional meta-analysis by Salyers et al., (2016) found that higher levels of burnout are also significantly associated with reduced quality of care measures. In addition to highlighting the importance of healthcare staff wellbeing for patient outcomes, these reviews have identified a clear gap within the literature: there is a lack of studies investigating these associations within primary care. Research in this area in primary care is a priority for several reasons: 90% of all patient care takes place within primary care (NHS England 2013), general practitioners have the lowest levels of morale amongst doctors, and they also have the highest rates of burnout and depression compared to their secondary care colleagues (British Medical Association 2015b; Arigoni *et al.* 2009; Smith, Goldacre and Lambert 2017). Furthermore, a study by Avery and colleagues (2012) on the prevalence of prescribing errors in general practice in the UK reported that 12% of all patients had an error, with higher rates amongst elderly patients and those receiving five or more drugs. It is pertinent to note that some of the reasons given for errors by participants of their study included the physical and emotional health of the GP, and stress associated with their working environment (e.g. high workloads and time pressure).

Although there has been a lack of research investigating the links between general practitioner wellbeing and burnout with patient safety and quality of care, research from around the world has explored potential precursors and

causes of burnout and poor wellbeing within primary care. Quantitative, survey-based studies have been the primary method employed, with questions often based on the Job-Demands-Control (Karasek Jr 1979) and Job-Demands-Resources (Demerouti *et al.* 2001) theories of burnout. These studies have provided evidence for these theories of burnout within primary care settings (Calnan *et al.* 2001; Houkes, Winants and Twellaar 2008; Lee, Stewart and Brown 2008; McManus *et al.* 2011). For example, one study of Dutch GPs found that job demands predicted burnout (particularly emotional exhaustion) at future time points and job resources predicted future levels of depersonalization and personal accomplishment (Houkes, Winants and Twellaar 2008). Additionally, workload, work-family interference, and perfectionism predicted emotional exhaustion (Houkes, Winants and Twellaar 2008). In an American sample of family practitioners working in ambulatory clinics, perceptions of job control and demands (measured as time pressure and work pace) were associated with burnout and stress scores (Linzer *et al.* 2009). One survey within a UK GP sample by Calnan *et al.* (2001) also found that job demands, control, and social support were all significantly related to GHQ 'caseness' (mental distress). Whilst these studies offer support for the JDC and JDR models of burnout and can help understand the issues affecting GPs' levels of burnout and poor wellbeing, they are limited in their explanatory ability. The quantitative methods of these studies places restrictions on the number and type of measures used, and thus may not reflect the whole spectrum of workplace factors that could be influencing GPs' wellbeing. Furthermore, although identifying some issues important for GPs' wellbeing, they give little insight into potential explanations for any links between wellbeing, burnout, and patient care outcomes.

Research within the UK has recently begun to take a more exploratory approach, using qualitative methodologies to try to understand, in-depth, the nature of the problems facing general practice. Recent research by a group in Oxford conducted semi-structured interviews with 34 GPs working within NHS England in 2015 (Croxson, Ashdown and Hobbs 2017; Fisher *et al.* 2017). Their aims were to understand GPs' perceptions and attitudes towards their workload (Croxson, Ashdown and Hobbs 2017), and explore their existing or potential strategies for dealing with their workload (Fisher *et al.* 2017). They reported that GPs perceived their workload to have been increasing over recent years, reaching a point where it is now felt to be unmanageable. The increases were perceived to be due to "increased patient need and expectations; a changing relationship between primary and secondary care; bureaucracy and resources; and the balance of workload within a practice" and these were seen

to impact on their ability to provide continuity of care for their patients (Croxson, Ashdown and Hobbs 2017). The most common strategy used to deal with their workload was telephone triage. Other suggestions included increasing delegation of tasks to non-clinical staff, and educating patients to take greater responsibility for their health. Whilst this research has shed a light on some of the specific issues facing GPs within the NHS, these findings are specifically related to workload. Although workload is likely to be an important contributor to burnout, there may be additional contributors pertinent to the increases in burnout and depression experienced by general practitioners in the UK. Research exploring all workplace issues that may be contributing to these increases is therefore needed.

At the time of this study being conducted, no research had previously investigated the full range of causes of workplace-related poor wellbeing/burnout, potential coping strategies, or possible consequences of poor wellbeing/burnout in terms of quality of care and patient safety. There has, however, been one study that has since conducted focus groups with GPs in England to explore workplace stressors and coping strategies (Cheshire *et al.* 2017). Cheshire et al (2017) reported that GPs in the South of England felt unprecedented pressures resulting from various NHS factors such as the Quality and Outcomes Framework, the scrutiny of the Care Quality Commission's inspections, and the negative portrayal of general practice in the media and by politicians. Furthermore, administrative duties and other tasks on top of patient consultations were seen to be increasing their workloads, without an increase in resources or support, which has resulted in a constant feeling of time pressure. In terms of their participants' abilities to cope with these conditions, some GPs reported an inability to function effectively and an inadequate work-life balance. The strategies that participants used to try and deal with stress ranged from meditation and exercise, to adapting their work-routine by reducing their hours or changing their roles. Having a supportive practice was viewed as important for their wellbeing, although there was limited time to interact with colleagues. Notably, it was emphasized that organizational change is ultimately needed to improve their wellbeing, with their individual strategies only having limited, personal impact.

Whilst Cheshire et al's (2017) study helps to provide some preliminary answers to some of the questions that this study also seeks, our current study aimed to go beyond their objectives. In addition to exploring what GPs perceive to be the main workplace influencers on their levels of wellbeing and burnout, we also aimed to explore the ways in which the working conditions leading to stress may impact on patient care delivery in terms of quality and safety. Furthermore,

as well as discussing any existing strategies that GPs use to try and cope with work-related stress, we facilitated discussions around potential strategies that could be implemented to improve their wellbeing at a practice-level, and changes that may be needed at an external, organisational level.

3.2 Aims and objectives

To explore the perceived consequences of GP burnout and low wellbeing on patient safety and quality of care and to identify useful strategies to prevent burnout/low wellbeing. The specific objectives were:

1. To understand the workplace factors that affect GPs' levels of wellbeing and burnout.
2. To explore strategies that GPs use individually, or as a practice to try to prevent burnout, and improve wellbeing.
3. To discuss potential solutions/interventions to improve GP wellbeing and prevent or reduce burnout.
4. To explore GPs' perceptions of the consequences that low wellbeing and/or burnout may have on the quality of patient care, and patient safety.

3.3 Method

This study has been conducted and reported according to the COREQ checklist for reporting qualitative research (Tong, Sainsbury and Craig 2007).

3.3.1 Ethical considerations

This research received ethical approval from the University of Leeds School of Psychology Ethics Committee (ref #15-0075 accepted on 06/03/15), and Health Research Authority R&D approval (IRAS ref #178501). Due to the potentially personal and sensitive topics of wellbeing, burnout, and patient safety, there was a possibility of participants becoming distressed during the focus groups. To address this, participants were asked to read the information sheet in advance of the study, which informed them that; 1) they did not have to take part, 2) they may withdraw from the study at any time, including the removal of their data after the end of the study, before data analysis, 3) they did not have to contribute to any discussions or answer any questions that they did not wish to. Furthermore, as the topic of patient safety and medical errors is a highly sensitive topic, participants may have felt nervous that the information could be used against them. To address this, on the information sheet they were reminded that anything they said would be kept confidential and that anything

written up and/or published would be anonymous, as pseudonyms will be used. Additionally, all participants were provided with a debrief sheet containing relevant helpline information, in case they wished to seek support as a result of any distress experienced.

3.3.2 Design

A focus group methodology was chosen to address the research questions to allow a richer, in-depth understanding of General Practitioners' perceptions of workplace wellbeing, which would not be able to be achieved through quantitative methods. Focus groups hold various advantages over other qualitative methods, such as interviews: they provide opportunities for participants to interact with one another, allowing for conversations to take natural progressions and divergences; participants can collectively explore ideas and experiences which is particularly beneficial when discussing potentially taboo subjects (such as mental health and errors); it allows for collective- and self-reflection on wellbeing practices, which may spark positive changes in individuals and practices. Furthermore, focus groups are known to generate more critical comments than interviews (Watts and Ebbutt 1987). Generating critical comments whilst also exploring possible solutions are particularly valuable advantages of conducting focus groups when the objective is to improve services (Kitzinger 1995).

3.3.3 Participants

Five focus groups were conducted (when data saturation was reached), with a total of 25 practising General Practitioners who worked in the North of England in both urban and rural practices. Each group consisted of three to six GPs. Three focus groups consisted of GPs working within the same practices, the other two consisted of locum GPs. Participant and focus group characteristics are displayed in Table 3.1. Due to the recruitment method chosen (see below), we do not know how many participants refused or dropped out: the focus groups taking place within practices consisted of GPs who were available at that time, with participants not mentioning whether any of their colleagues chose not to take part. No participants requested withdrawal of their data after the focus groups were completed. In one focus group (FG5), the practice manager was present, but did not contribute to the discussions. The remaining focus groups consisted solely of active GP/locum participants and the facilitator (LH).

Questions *(prompts)*

- How would you define wellbeing?
- How would you define burnout?
- What would you consider to be the main contributors to wellbeing at work? *(Positive and negative contributors)*
- Do you have a way to try and minimize the impact these issues have on your wellbeing? *(Personally, as a practice)*
- Would you say that burnout is a worry generally among doctors?
- Do you do anything to try and prevent burnout occurring?
- Are you aware of any services or coping mechanisms that could help prevent burnout?
- Do you think that burnout and/or poor wellbeing is increasing amongst doctors? *(Why? What's changed?)*
- Do you think that wellbeing would be something that could impact on the quality of patient care? *(E.g. listening skills? Why do you think that – personal experience, literature, assumptions?)*
- Do you think that wellbeing would be something that could impact on patient safety? *(E.g. medical errors? Why do you think that - personal experience, literature, assumptions?)*
- Do you notice a difference in the quality and/or the safety of your delivery of patient care depending on your wellbeing on a day-to-day basis? *(Weekly? During busy periods/periods of low wellbeing or burnout?)*
- Do you think that burnout would affect patient care (quality and safety) more, or differently, to low wellbeing? *(How so? Why? Any examples?)*
- Are you encouraged to talk about your own wellbeing? *(To your colleagues, professionals, family? Is it a taboo?)*
- What, in your opinion, would be the best way to improve the wellbeing of GPs, and prevent burnout? *(Feasible ideas, if the sky was the limit)*

Figure 3.1 Discussion topic guide

3.3.4 Procedure

A snowballing recruitment method via email was used between August 2015 and April 2016. Potential participants were fully informed of the topics to be discussed during the recruitment stage, and were aware that the research project was to form part of a PhD. The semi-structured focus groups were conducted by LH (MSc in Psychology) who at the time of the focus groups was undertaking a PhD and had qualitative interviewing experience from during her undergraduate degree. The focus groups took place either on practice premises, or at a mutually convenient alternative location. Once written informed consent had been given by each participant, the questions listed in Figure 3.1 were asked, with some room for emerging discussions. The questions were developed in collaboration with a GP (IW), by drawing on current literature. The transcripts were audio-recorded and then transcribed verbatim. Focus groups lasted 45 minutes to 1.5 hours.

3.4 Analysis

Thematic analysis (TA) was conducted based on Braun and Clarke's (2006) six phase guidelines. The transcripts were coded by hand, based on inductive, semantic principles, from the first author's realist epistemological approach. This realist approach reflects that a "unidirectional relationship is assumed between meaning and experience and language" (Braun and Clarke 2006 p.14), in that participants' language is understood as reflecting their reality. By taking this approach, the data gathered is used as evidence about the phenomenon and can be used critically to develop ideas about the topic in question. The realist approach does not require restricting the questions to only focus on what can directly be observed, which an instrumentalist/positivist approach would require. Wellbeing, burnout, and patient safety do not always present obvious outward symptoms to observers, and thus it was necessary to frame questions around how GPs *perceive* these variables to be associated, instead of how they *observe* these variables to be associated, in themselves or others.

All transcripts were coded by LH, with 20% double coded by JH to provide outside insight, allow discussions about the emerging themes, and guard against investigator bias. After initial coding of all the transcripts, codes were grouped into themes and sub-themes. All themes were derived from the data, not identified in advance. Any disagreements regarding themes were discussed with one or more additional author until a consensus was agreed. Once a thematic map had been generated, the authors revisited the entire data set to

check that the themes accurately reflected the majority of the data. One participant checked over the themes and results and agreed that they accurately represented the discussions within their focus group.

3.5 Results

The focus groups were heterogeneous with regards to job position (partner, locum, etc.), but all discussed very similar themes. The focus groups varied in the eagerness and openness of participants to discuss their personal experiences, with those conducted amongst locum GPs showing more willingness to reflect on their personal experiences. This could possibly be due to the GPs in practices being more guarded as they were participating with their immediate colleagues, as opposed to being with members of what was often viewed as a support group.

The resulting themes are best described in three separate sections: 1) Those relating to objective one: workplace contributors to wellbeing and burnout, 2) objectives two and three: strategies to improve wellbeing, 3) objective four: associations between GP wellbeing and burnout with the quality and safety of patient care.

Table 3.1. Focus group and participant characteristics

Focus Group	GP surgery/ Locums	Urban/ Rural/ Both	Number of partners	Patient list size	Number of participants	Sex	Job roles	Part/Full-time work	Mean age (range)	Mean no. years as registered GP (range)
1	GP surgery	Urban	2	45,000	6	2M, 4F	2 Trainees 2 Partners 1 Salaried 1 Unknown	3 FT, 1 PT, 2 Unknown	35 (29 – 40)*	3.5 (0 – 11)*
2	Locums	Both	-	-	4	2M, 2F	4 Locums	4 PT	47 (36 – 57)	17.5 (4 – 28)
3	Locums	Both	-	-	5	2M, 3F	5 Locums	4 PT, 1FT	42.2 (34 – 56)	10.4 (0 – 28)
4	GP surgery	Both	7	15,000	6	4M, 2F	6 Partners	6 FT	46 (35 – 55)	17.2 (8 – 28)
5	GP surgery	Both	5	11,000	4	1M, 3F	3 Salaried 1 Partner	3 PT, 1FT	38.75 (33 – 44)	9.5 (4 – 17)

*M = Male, F = Female, *Missing two participants' data*

3.5.1 Objective 1: Workplace factors influencing GPs' levels of wellbeing and burnout

Factors that influenced participants' wellbeing and burnout levels fell under two main themes: 1) Influencers that were internal to the practice and/or the individual 2) Influencers that were external to the practice that they had no control over.

3.5.1.1 Internal influencers

Most participants talked about the day-to-day things that influenced their wellbeing inside the workplace, in particular those things that were specific to either themselves or their practice. These could be grouped under four sub-themes; Team support, Variety, Control, and Workload.

3.5.1.1.1 Team support

Participants frequently mentioned, across all focus groups, the importance of working in a 'supportive team'. A supportive team was voiced as being one that you felt a sense of belonging to, where you could ask for help when you needed it and where everyone worked well together. Additionally, simply interacting with your team, whether during a proper coffee break or just a quick hello in the morning, was apparent as an important factor for workplace wellbeing, with the lack of time to interact acting as a noticeable negative factor on GPs' wellbeing.

> *"Female (F)1: Support*
>
> *Male (M)2: Yeah*
>
> *F1: Support for me more than anything else. I think if you work in a supportive environment so that if you're struggling colleagues a) recognize that proactively, but also if you then feel that you could go and ask for help, and that means that changes a difficult day into something that then goes on making a difficult week and a difficult month actually to something that could be dealt with as a team and if you don't have that support then you're just on your own." [FG3]*

In contrast, feeling like you cannot ask for support from your team, being on your own and clinically isolated, was viewed as a negative contributor to wellbeing.

> *"M1: We used to get a lot more [time to interact with each other] than we do now and we still make a concerted effort when we can but it's much more difficult to, and I think that has had a slight negative impact on my wellbeing. I think you know, it was a lot better when we could spend more time together." [FG4]*

3.5.1.1.2 Variety

Having variation within the type of roles they have, the actual practice sites they work at, and the type of patients that they treat was viewed as helpful in preventing burnout, as the variation seemed to break the monotony of the job.

> *"F1: Something that prevents burnout is having um, a varied portfolio for what you do. So, for example, being a trainer, or um, doing something else like minor surgery or family planning means not just seeing patients all the time so you've got a slight variation in what you do, um definitely helps, sort of the mundane everyday-ness of it." [FG1]*

3.5.1.1.3 Control

Control over 'the situation' was deemed important for wellbeing, whether that situation be which practices they worked at if they had that opportunity to choose (e.g. locum workers), or control over their timetables within the day giving them the opportunity to have a short break between patients if they needed it. Not all participants had control over these particular things. However it was agreed that having control in relation to some aspects of the role was important for wellbeing. Inversely, things that were outside of their control were seen as stressful and negatively impacting on wellbeing.

> *"F1: So we're in control of the situation, I think being in control is quite, um when I think about the negatives, being in control of your environment makes a huge difference to how things are and how you feel about it….*
>
> *M2: We still see the same number of patients but we can add an extra break in if we want one and finish a bit later depending on how we feel so we have that freedom" [FG1]*

3.5.1.1.4 Workload

The intensity of the workload impacted negatively on participants' wellbeing. In particular they discussed that their workload feels unmanageable and never ending. This impacts on their feelings of coping, achievement, and importantly, their work-life balance.

> *"M1: The number of decisions that have to be made in a day, the complexity of those decisions, that's what tires me out, rather than the number of hours sitting at my desk.*
>
> *I: So it's the, would it be then the type of work?*
>
> *M1: The intensity.*
>
> *I: Okay*
>
> *F1: Yeah, I would agree with that." [FG4]*

3.5.1.2 External influencers

External influencers on GPs wellbeing and burnout were those things that were viewed as being outside of their own or their practice's control. The sub-themes within this category were; Increase in pressures and workload, Patient expectations, The negative portrayal of general practice, and Lack of support.

3.5.1.2.1 Increase in pressure and workload

The increase in the types of work GPs are expected to do alongside patient care was widely perceived to impact negatively on their wellbeing. Increases in administration, "tick-box exercises", requests for reports, and the perception that general practice is too target driven, was argued to have morphed GPs' roles into acting more as gatekeepers, managers, and administrators than they used to. This was considered to take away from what they considered their main role – direct patient care.

> *"F2: It's about releasing GPs to do what they do best and what they actually joined to do in the first place which is just deal with patients and help patients… [instead you are] going to spend that entire time doing prescriptions, visits, everything else that you've got to do in your day, letters, documents, whatever stuff you've taken on as a partner…… When I go to do a locum job I go in there and I see patients and I have a break and I have my lunch … I come away thinking, oh it's so nice to see patients isn't it?*
>
> *F1: You do a better job don't you?*
>
> *F3: And that's what we're trained for." [FG3]*

Additionally, an increase in financial pressures and contract pressures placed on GPs from external bodies such as the Care Quality Commission (CQC)[1] and the Quality and Outcomes Framework[2], were deemed contributors to a general negative feeling about and within General Practice.

3.5.1.2.2 Patient expectations

In some instances, patients were viewed as positive influencers of wellbeing, if they were perceived as appreciative. However it was often discussed that patient expectations of primary care services are widely perceived to have increased, with the government and the media being blamed for this. With the

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[1] Care Quality Commission: A public body, which is part of the Department of Health that monitors, regulates, and inspects health and social care services in the UK. (Care Quality Commission)

[2] Quality and Outcomes Framework: "The annual reward and incentive programme detailing GP practice achievement results. It rewards practices for the provision of quality care and helps standardise improvement in the delivery of primary medical services." (NHS Digital 'Quality and Outcomes Framework').

perceived increase in expectations, there has also been an increase in complaints.

> *"F1: and Patients can be quite negative about the service we provide…patients' expectations seem to be going up. And I think they feed off some of the stuff that's in the press." [FG5]*

3.5.1.2.3 Negative portrayal of general practice

A perceived negative portrayal of general practice by both politicians and the media was mentioned across all focus groups as negatively impacting their wellbeing. This negative portrayal was suggested as the reason for patients increasing expectations, demands, and complaints, as reported earlier in section 3.5.1.2.2. Three sources of negative views of GPs were identified; their patients, occasionally through the use of social media sites to make negative statements about the service they received; the government, through their contract changes and policies; the media, through online and print articles. These negative perceptions were perceived as a lack of support from the wider public.

> *"F1: It's one of the things that upsets me the most is when I see that negative perception, and I know it's a game and I know it's politicians and spin and they're just trying to sell papers and stuff, it still really upsets me. To be told that, you know, basically I'm rubbish, I'm lazy, I'm rubbish, nothing I do is good enough, I'm only interested in myself.*
>
> *F2: You're overpaid and lazy*
>
> *F1: Yeah*
>
> *F3: And it's our fault that everyone dies of everything [all laugh]*
>
> *F1: And we're missing too much, we're investigating too much, that is really demoralizing for a profession." [FG3]*

3.5.1.2.4 Lack of support

As well as the negative portrayal of general practice displaying a lack of support from the public, a wider lack of support from other services, such as mental health services, was also seen to negatively impact GPs' wellbeing. Patients that were perceived to be more appropriately cared for by those other services are instead getting pushed onto GPs, which was viewed as adding to the demands of the practice. But this is perhaps an issue with the lack of resources in those other services too.

> *"F3: I think one of the things I've found when patients are very challenging is if there is no wider system to support them and particularly with mental health problems, if you don't have very good mental health support it can be much more challenging"[FG3]*

3.5.2 Objectives 2-3: Strategies to improve GP wellbeing and prevent burnout

Participants were asked to suggest and discuss strategies that they currently use, both personally and as a practice, to look after their wellbeing, along with any strategies that could potentially be used that they don't already do, to prevent burnout. Additionally, they were asked what changes they would suggest to improve wellbeing, firstly if there was no limit to what they could do (e.g. no financial restraints, if there was a magic wand etc.), and secondly to suggest feasible solutions that could be implemented. Participants discussed these strategies on the same two levels as the contributors in the previous section; individual and practice level strategies, and external changes. The specific strategies will be outlined below in relation to those two themes. Across these themes there was the common subtheme of Support, as some of the strategies to improve support needed changes at the external, practice, and sometimes also the individual level, to be successfully implemented.

3.5.2.1 Individual and practice level strategies

The participants discussed methods that fell under the following categories; Breaks, Physical needs, Psychological strategies, Support, and Control. There was some overlap between these sub-themes as well, particularly between Breaks and Psychological strategies and Physical needs.

3.5.2.1.1 Breaks

'Breaks' served various benefits for participants. Coffee breaks were viewed as beneficial to wellbeing. Having a chance to leave their office, talk to their colleagues and have a short respite from work was seen as something that positively impacted on GPs' wellbeing in practices where this was already implemented, and something that those who did not get the chance to, wished they did.

> *"M1: (…) the coffee break in the middle of morning surgery. We try and get here and meet for a bit of rest and recuperation after morning surgery (…) … I've definitely recognized that it is a positive factor for our wellbeing and therefore it's something that we need to maintain and cherish …." [FG4]*

Breaks served as fulfilling psychological needs by having that mental break from work and from 'being the doctor' [M2, FG1], physical needs by having the chance to have a drink, some food, perhaps some fresh air, and a toilet break, and social needs through interacting with colleagues. For some, having a short, physical break from the work environment was a useful strategy. By putting a brief distance between themselves and their workplace, they had a chance to

'reset' themselves. In particular, it was mentioned that lunch breaks did not happen. One group even mentioned that it would be wonderful if they did, but they did not voice it as a realistic change that could happen.

3.5.2.1.2 Physical needs

Along with the physical needs mentioned in the breaks theme (e.g. food and drink), participants also discussed the need to make time for exercise to support physical and psychological wellbeing. Exercise additionally served their social needs through participating in team sports, and as a psychological strategy through being a form of 'escapism'.

> *"F2: I might go home and go for a run or go and play netball or, and I feel like I've had 10 hours sleep after I've done it, so it's sort of like a way of making yourself feel better. It's not necessarily a conscious, 'I need to do this to prevent the stresses of the day from getting on top of me', it's just something I need to do to feel physically well you know…*
> *I: Yeah. But you do notice that it does make you feel better?*
> *F2: Yeah, yeah. And I think there's more to it than that, you're doing something again which is social, which is an escape from work, and a team sport." [FG5]*

Participants agreed that the physical needs of GPs were not always given the importance that they should. GPs are not seen as having the same physical needs as other workers, and as such there was not enough emphasis on ensuring they had had enough to drink and eat throughout the working day.

> *"F3: Cos the thing that always interests me that intrigues me, (…) the nurses will say at half twelve, 'well I've got to go now to have a lunch hour' (…) there's a kind of expectation that cos you're a doctor you just, you keep going and get on with it. And isn't it bizarre, because we still need to eat and drink! We're human – you know Maslow and his hierarchy of needs… we need to eat, it's bizarre isn't it.*
>
> *F2: Different set of rules apply." [FG4]*

3.5.2.1.3 Psychological strategies

Due to the emotional toll that patient consultations can take on GPs, they felt that one way to try and prevent burnout was to be emotionally guarded by setting boundaries and defending their emotions, whilst trying to maintain their empathetic, sympathetic and caring behaviours.

> *"F1: I think I'm more defensive of my emotions now than I used to be. (….) I am now quite quick if I feel that patients are pulling on me personally and the barriers go up a little bit (…) but that balance between caring, you know, and I'm caring about them and I am empathetic and I appreciate what they're going through, but actually*

that it's not my problem, no, and I don't want to be giving myself more than I can manage, and that's a change in me." [FG2]

Having an awareness of the risk of burnout was voiced as a useful strategy that is already used by some participants personally. Additionally, it was mentioned that this could be implemented in practices through discussions and meetings, and externally at the training stage. It was evident that awareness was needed at the individual, practice, and external level.

"M1: And I think it probably starts with a recognition of the concept of wellbeing and having burnout in our consciousness, as things get harder and harder I think it's more important to recognise that as a real threat to our business if you like, or certainly to our profession, satisfaction and standards, and I'm not sure we've necessarily always been very explicit about recognising that.

I: So being more self-aware so that you protect staff against burnout?

M1: Well as individuals but as a team as well, you know, about thinking about the risks to the team.

M2: More corporate awareness of it all, from all teams actually." [FG4]

A psychological strategy used by some GPs was to isolate themselves when things got difficult, although they recognised this may not be healthy. This strategy was used by a doctor who had suffered from depression. As a result the team failed to notice anything was wrong until she walked out from work one day. This prompted the practice to introduce coffee breaks to promote a more caring practice.

3.5.2.1.4 Support (social, supervisory, workload, and from patients)

Having social support within the practice, peer-to-peer, and from both medics and non-medics outside of their practice was found to be useful for preventing burnout. To improve support at the practice level, buddying and mentoring systems were suggested, along with regular meetings to 'check in' with how all the staff are doing. Additionally, support with workload through increasing the number of administrative staff was suggested so that GPs could focus on patient care. It was recognised, however, that the feasibility of this depended on funding. One suggestion for improving support from patients was to communicate the state of the surgery with them and ask for their patience and support.

"F2: Interestingly one thing that my practice did recently was we got all the partners together and sat down and asked each one of them how are you doing, what are you doing, what do you see yourself doing in five, ten years' time, around the table, which is the first time I think that they've ever done that.

(…)

M1: I'm sure anyone who's nearer to 40 and plus would be saying, yeah, retire [laughs].

F2: But it was a full sort of frank exchange and I think that it was with burnout in mind, and actually enabled, freed up a lot of people to sort of say, actually, you know, I'm not happy and I'm worried and I'm not sure how long I can maintain this and it's getting harder and changes were made." [FG3]

3.5.2.1.5 Control

Control over how much, where, and when they worked was seen as a positive strategy that some GPs (mostly locums) used to prevent burnout. Many had chosen this manner of work specifically to prevent them from burning out. Or it was chosen as a way forward to protect their wellbeing after previously working full-time and suffering from burnout or depression.

"F2: I burnt out in hospital medicine and trained then as a GP and I've only actually been a GP since March last year … to make sure that I don't overload myself... instead of applying to be a full-time partner somewhere I've made it half time and then I take locum work to fill in financially, but also because I know that if one week I'm feeling like I can't, you know, then I can take my availability away...

I: So kind of having control over your workload?

F2: Yeah, and I think that that, the whole portfolio GP thing is a massive, you know, it's possibly the way forward to prevent burnout." [FG3]

3.5.2.2 External changes

The need for external changes resulting in more support, a reduction in pressures, and an increase in resources, was discussed.

3.5.2.2.1 Support (from the government, patients, public, media, and healthcare organisations)

GPs voiced the need for support from the government, their patients, the healthcare organisation as a whole, and the wider public and press through a reduction in negative media portrayal. Additionally, support from other external bodies was voiced as needed, for example from social services to ensure that patients only presented with medical problems and could go to social services in other instances.

"F1: But wider support about if it's an over the counter medication that you can buy from the chemist please don't request it from your doctor." [FG3]

3.5.2.2.2 Reduction in pressure

Participants called for a reduction in pressure from the government to do specific things and fulfil certain criteria. Specifically they stated the need for a reduction in the tasks that take away from their time that should be spent on direct patient care. These tasks included administrative work, quality assessment exercises, and additional work being pushed onto them from Secondary Care.

> *"F2: And get rid of ridiculous exercises like CQC which really just they're designed to make practices jump through hoops.*
>
> *F1: It's a manager's job, it's got nothing to do with GPs." [FG3]*

3.5.2.2.3 Increase in resources

Increasing resources for primary care was seen as an ideal solution that would help to improve all the previous factors mentioned, such as reducing pressures and enabling time for breaks. Ideally, having more GPs and funding to pay for more administrative staff would improve the wellbeing of the GPs and also the quality of care by enabling GPs to offer longer appointments.

> *"F1: So your options are you could increase funding in general practice back to the 11% it should be at, which would be a 3 or 4% rise, and that additional resource would pay for either more doctors or more staff within practices to do the things actually you don't need a doctor to do, and free up the doctors to then treat patients (...) it's better for the doctors but it's better for the patients as well" [FG3]*

3.5.3 Objective 4: Associations between GP wellbeing and burnout with the quality and safety of patient care.

There was a generally shared perception that burnout and/or poor wellbeing negatively impacted on both the quality of patient care and patient safety. The impact of burnout and poor wellbeing on i) quality of patient care and ii) patient safety, form two of the main themes, along with one additional theme that emerged discussing the temporal relationship of burnout and wellbeing with patient care.

3.5.3.1 Burnout and poor wellbeing impacts on the quality of patient care

All participants were in agreement that General Practitioners, including themselves, would not be able to deliver patient care of as high a quality as usual if they were suffering from burnout, depression, anxiety, or stress. Both daily fluctuations in wellbeing as well as poor wellbeing over a longer period of time were voiced as impacting quality of care. The specific ways that quality of care was perceived to be affected were through: 1) Decreased empathy and listening skills, 2) Negative attitudes towards patients, and 3) Increased inappropriate referrals and over investigation.

3.5.3.1.1 Decreased empathy & listening skills

Participants identified that burnt-out or stressed doctors are more likely to struggle to empathize and display good listening skills.

> *"M1: If you are burnt-out and depersonalized and no longer empathizing with your patient, you might still do an adequate job of diagnosing their muscular skeletal pain but they won't feel listened to so they are more likely to complain about you." [FG2]*

They additionally commented that this behaviour could also emerge in as short a time as a day; if they had had a stressful morning, the patients at the end of the day may not receive as high a quality of care as the patients in the morning, particularly by doctors suffering from burnout, as their ability to deal with daily fluctuations in stress is reduced.

3.5.3.1.2 Negative attitudes towards patients

The attitude that doctors display towards their patients can impact on how the patient feels both during the consultation, and upon leaving it. If a physician has poor wellbeing or is burnt-out, they are less likely to have good quality interactions with their patients, which may leave the patient feeling unnerved and without the reassurance that is often sought.

"M2: I think a big part of our job is to try and educate and reassure people. It's very very easy when you get someone come in with a cough (…) to say 'it's a virus, off you go'. If you're burnt-out you're more likely to do that, if you're feeling a bit more kind of enthusiastic, you're more likely to sit down and say, 'well look this is a virus, this is how this presents, this is the things to look out for, this is why there's no point in giving antibiotics now' and turn it into a discussion with the patient." [FG1]

3.5.3.1.3 Increased inappropriate referrals & over investigation

Participants discussed that poor wellbeing and/or burnout is likely to cause physicians to refer patients more than usual. In some cases this would result in unnecessary investigation, potentially causing patients undue distress. Referring seemed to be a way that physicians could remove themselves from a position of responsibility over the patient's outcome. Referring also offers a more straightforward decision than considering how to manage an individual in the practice. As such, referring may act as a potential safety mechanism used by physicians who realize that they are not functioning as well as usual and want to ensure that they are not missing any symptoms as a consequence of their reduced ability to make decisions.

"F3: I certainly noticed, burnt out, depressed, whatever, referral rates, passing the buck goes up, and not taking responsibility, not being aware of the overall picture, which may not be unsafe, but it may be inefficient in terms of NHS resources." [FG3]

3.5.3.2 Burnout and poor wellbeing impacts on patient safety

Participants generally concurred that both burnout and poor wellbeing have the potential to negatively impact on patient safety in various ways. However, it was voiced that patient safety is likely to be impacted only once the physician is 'at the end' of burnout (i.e., struggling with day to day work). Participants explored how burnout and poor wellbeing could impact patient safety both indirectly and directly, as discussed in the sub-themes below.

3.5.3.2.1 Indirectly

It was voiced that the ways in which burnout and poor wellbeing impacted on the quality of care could then subsequently indirectly lead to patient safety incidents. Expressions such as 'lack of headspace' and 'not taking a holistic approach' were often used to describe the indirect effects on safety. For example, not taking a step back to view a patient's multiple concerns as groups of symptoms for the same illness and instead fixing each symptom individually, could lead to a missed diagnosis.

"F1: Yeah, you're not getting the whole picture are you?

(…)

F2: And you don't have the time to connect dots, dots that might be from a while ago, might be they've been, in the last three months they've been here about this this and this, actually if you put those three things together that makes something that we really need to worry about and if you don't have the time and you don't have the brain space.

(...)

F1: Yeah, things get missed don't they?" [FG3]

Additionally, through poorer listening skills, physicians may not pick up on patient cues or hints towards what is really bothering them, which is both a quality of care issue and also a patient safety issue if it results in missed diagnoses.

"F2: If you can't pick up on their cues for, you know, because if you're on the ball and you're in the game you can tell, there's something else bothering them (…) if you're shutting them down because you have no resource to cope with it then you're not picking those things up.

M2: And on a busy stressed day (…) you're almost trying not to hear those cues." [FG3]

3.5.3.2.2 Directly

Burnout and poor wellbeing were almost unanimously voiced as having the potential to lead to increases in mistakes and errors, due to reduced cognitive functioning.

"F: Yeah I think very much if you're significantly stressed or approaching that burnout then I'm sure that the welfare of your patients would be quite significantly affected.

(…)

M1: (…) if your cognitive functioning is not as good as it should be then your decision making won't be as good as it should be and therefore at some point some harm will be fallen on somebody.

M2: I couldn't agree with what's been said more." [FG4]

Additional mechanisms suggested as responsible for the link between burnout/wellbeing and patient safety were reduced concentration and tiredness, which could lead to poorer decision making, potentially resulting in patient safety incidents.

"F1: So, even if you were thinking about tiredness as part of poor wellbeing, it's just harder to think clearly, to actually be able to have the space to listen to people's concerns and make an accurate diagnosis, so wellbeing I would say definitely has an impact on

patient care and I've seen that with a dozen doctors in difficulties (…) often wellbeing is low and you can see perhaps the mistakes that have been made." [FG2]

Examples of patient safety incidents and their causes included missing abnormalities on blood test results due to task fatigue, and prescribing the wrong dose of painkillers due to stress, a lack of time, and a lack of concentration.

3.5.3.3 Temporal relationship

Participants discussed which comes first – complaints and mistakes, or poor wellbeing and burnout. It was agreed that it seemed to be a negative downward spiral whereby the more burnt-out you are, the more likely to make a mistake or receive a complaint, but also that if you receive a complaint or make a mistake, this is likely to have a subsequent negative effect on your wellbeing.

"F2: And then it's a downward spiral from there isn't it, cos the more you make mistakes, the more stressed you'll get.

F1: If you get a complaint that makes you more stressed and then you don't sleep." [FG5]

Additional quotes for all themes can be found in Appendix B.

3.6 Discussion

3.6.1 Summary

Five focus groups of GPs discussed issues that they perceived contributed to their wellbeing and levels of burnout. They also considered possible strategies to improve wellbeing and prevent burnout. Furthermore, participants discussed if, how and through what mechanisms their wellbeing or burnout levels may affect their patient care delivery, in terms of both the quality of care, and patient safety. Regarding contributors to wellbeing, responses fell under two main themes; those that were internal to the individual and/or practice, and those that were external to themselves and their practice and therefore perceived to be outside of their direct control. Internal influencers of wellbeing mainly consisted of having good team support, variation within the job, job control, and unmanageable workloads. Individual and practice strategies to improve wellbeing and prevent burnout tied in with these. In particular, participants noted strategies to look after their physical needs (e.g. exercising), to have control (e.g. through choosing to locum or working reduced hours), having breaks, offering support, and psychological strategies such as increasing their self-awareness. External influencers of wellbeing were framed in negative terms and comprised perceived increases in pressure and workload, increasing

patient expectations and complaints, lack of support from multiple sources, and a perceived negative portrayal of general practice in the media and general public discourse. External changes to improve wellbeing also drew a parallel with these. Increases in support from the public, patients, media, and the government, reduction in pressures, and increases in resources (e.g. funding) were stated as the three main external changes that would be needed to improve wellbeing. It is important to note that control was seen as an important contributor to wellbeing and yet the changes most likely to have a big impact in improving all GPs' wellbeing were mainly things outside of their control, suggesting a state of helplessness and vulnerability to burnout within general practitioners.

All focus groups, despite heterogeneity in participants, were in agreement that poor wellbeing and/or burnout has the potential to negatively impact on both the quality of care that patients receive, and on patient safety. 'Wellbeing' and 'burnout' were often used interchangeably. The only time a clear distinction was made was during discussions around whether there would be patient safety implications. One participant voiced that they believed that only severe burnout would result in negative patient safety outcomes. When discussing the underlying mechanisms of the relationship between poor wellbeing/burnout and quality of care, participants often drew on their own experiences and cited examples that included; poorer listening skills, negative attitudes towards patients, lack of empathy, and increased inappropriate referrals. When discussing how burnout and poor wellbeing could impact on patient safety, participants were less likely to offer their own personal examples. Instead, they either gave examples from people they knew who had suffered from burnout or depression, or offered explanations of why and how suffering from these symptoms could manifest in patient safety incidents. In terms of the potential consequences for burnout and/or poor wellbeing, these were discussed as having both indirect effects on patient safety (e.g. not having the cognitive reserves to make connections between symptoms, making a missed diagnosis more likely), and direct effects such as making prescription errors. Additionally, GPs commented that burnout/poor wellbeing and patient safety are linked in a downward spiral whereby increases in one are likely to result in increases in another.

3.6.2 Previous literature

3.6.2.1 Contributors to wellbeing

These findings provide further qualitative support for the quantitative, international literature reporting links between workplace demands, control,

support, and resources with primary care physicians' levels of wellbeing and burnout (Calnan *et al.* 2001; Houkes, Winants and Twellaar 2008; Lee, Stewart and Brown 2008; Linzer *et al.* 2009; McManus *et al.* 2011; Murfett and Charman 2006). Specifically, these findings regarding the importance of perceived work control, a need for increases in resources, and the feeling of a lack of support from both inside and outside the immediate work environment were consistent with previous research from both within and outside the UK (Calnan *et al.* 2001; Houkes, Winants and Twellaar 2008; Lee, Stewart and Brown 2008; Linzer *et al.* 2009; McManus *et al.* 2011; Murfett and Charman 2006). Participants in this study additionally discussed how having variety within their job roles was beneficial to their wellbeing, for example through working across multiple sites. These findings also converge with the recent qualitative literature on causes of workplace stress within UK-based GPs (Cheshire *et al.* 2017; Croxson, Ashdown and Hobbs 2017; Doran *et al.* 2015). Particularly increases in administrative tasks, increasingly unmanageable and intense workloads, increasing patient demands and expectations, a perceived negative portrayal of general practice, lack of support, and a lack of resources were quoted as influencing GPs' levels of stress and also as reasons why GPs have left general practice in the UK (Cheshire *et al.* 2017; Doran *et al.* 2015). This study complements their findings, giving evidence that these issues are not geographically limited to the South of England, but are affecting GPs across the nation. It also extends their findings by suggesting both internal (to the practice) and external strategies to improve GP wellbeing, and the perceived link that GP wellbeing has with the quality and safety of patient care.

3.6.2.2 Coping strategies and interventions to improve wellbeing and prevent/reduce burnout

The studies by Fisher et al. (2017) and Cheshire et al. (2017) reported some similar coping strategies to those suggested by our participants. These included individual or practice level strategies such as looking after their physical needs (through exercise and nutrition), stress-management techniques, taking control over their work hours (through reducing hours or changing roles), and seeking support. Furthermore, they also discussed the need for external changes. Fisher et al. particularly noted the need for increases in funding to recruit more staff (GPs and administrators), reduce the paperwork required of GPs, and improve communication and support with other services e.g. secondary care. These were all also voiced by our participants as important changes required of primary care to improve GP wellbeing. Despite many similarities in themes and findings between our study, Fisher et al's, and Cheshire et al's, different questions and perspectives were taken by all studies.

Fisher and colleagues specifically address strategies to cope with increasing workload, whereas our current study had a broader focus and asked participants for strategies to generally improve workplace wellbeing. Cheshire and colleagues sought to understand strategies that GPs currently use to cope with workplace stress. Our study extends theirs by asking participants to suggest feasible strategies that could be implemented that they don't currently do or use, as well as potentially unfeasible but seemingly necessary organisational changes that are needed to improve wellbeing and prevent/reduce GP burnout.

Strategies that our participants suggested that were not reported in Fisher et al., and Cheshire et al's focus groups included 1) fostering peer support, 2) asking for support from their patients, 3) more self-awareness and stress management coaching from their education providers during the early stages of professional training, and 4) delegated time for a break during the working day. Having a daily coffee break was briefly mentioned by Fisher et al., however our participants were adamant that this could be an easy and hopefully feasible way to drastically improve wellbeing through providing time to look after their physical needs, whilst also providing the opportunity for social interactions, which could help foster a better team culture. Additional suggestions for how to foster peer support included implementing buddying/mentoring systems and Balint groups[3]. Balint groups could be one way of increasing both peer-support whilst also increasing competence, and are used by some physicians as a means to prevent burnout (Kjeldmand and Holmström 2008). Improving self-awareness of personal stressors and signs of stress was a suggestion that has been regularly and successfully trailed within healthcare staff, through mindfulness training courses, as an effective way to reduce burnout, stress, and anxiety (Cohen-Katz *et al.* 2005; Goodman and Schorling 2012; Krasner *et al.* 2009; Gilmartin *et al.* 2017). However the suggestion for more provision of this during the early stages of training is novel, and could encourage practitioner awareness of burnout whilst simultaneously encouraging a wider, organisational awareness of the risk of burnout.

3.6.2.3 Links to patient safety and quality of care

Our findings are in accord with previous studies on the links between burnout, wellbeing, and patient care within a variety of healthcare settings, which suggest that healthcare staff who are suffering from poor wellbeing and/or burnout are more likely to deliver a poorer quality of care to their patients, or to

[3] A group of clinicians/doctors who regularly meet to discuss their difficult patient cases in a safe and supportive environment.

make an error (Hall *et al.* 2016; Salyers *et al.* 2016; Welp and Manser 2016). As such, our results lend towards the conclusion that there is a similar relationship between burnout and quality and safety of patient care in primary care as there is within secondary care. Due to the higher rates of burnout and psychiatric disorders among GPs than doctors working in secondary care, combined with the fact that over 90% of all patient encounters are within primary care, this association is alarming. Further quantitative research on this association is needed however, to ascertain the validity of these perceptions.

Discussion over the direction of the relationship is not entirely new, with research within secondary care in the US finding that the relationship between burnout and errors is reciprocal, which is what the participants of this study also suggested (West *et al.* 2006). Furthermore, research into the 'second victim' has shown how being involved in a patient safety incident can result in subsequent negative psychological outcomes for the healthcare professional involved, such as shame, guilt, depression, and burnout (West *et al.* 2006; Seys *et al.* 2013; Sirriyeh *et al.* 2010). There is, however, limited literature investigating the mechanisms behind the links between burnout, wellbeing, and patient care.

3.6.2.4 Mechanisms and theories

Our findings regarding the workplace sources of poor wellbeing/burnout provide further evidence for the Job Demands-Control (Karasek Jr 1979), Job Demands Control Support (Johnson and Hall 1988) and the Job Demands Resources (Demerouti *et al.* 2001) models of burnout. These models, albeit deviating slightly from one another, generally propose that burnout occurs due to too high/many demands (such as workload, emotional, and physical demands) combined with not enough job control (a.k.a. decision latitude) and/or resources (including support and feedback) to deal with these demands. Additionally, our results can partially be explained by the third condition of the Conservation Of Resources (COR) theory (Hobfoll 1989; Hobfoll and Shirom 2001). GPs invest a lot of their own resources into the job (sacrificing family time, sleep, energy, emotions), for little resource gain (such as a lack of support and funding). COR states that this imbalance between resource investment and gain can lead to burnout. Once burnout or psychological distress has occurred, the individual will then be more cautious at investing future resources in the same situation. This may lead to 'pulling away' from patients, or depersonalisation, as a coping mechanism. Furthermore, GPs may develop negative affective states and attitudes, which may affect future performance (Halbesleben *et al.* 2008).

Whilst these models and theories offer explanations for the occurrence of burnout and a potential explanation for subsequent reduced quality of patient care, they fail to propose possible mechanisms for how and why burnout/poor wellbeing may result in the occurrence of patient safety incidents. Throughout the focus groups, participants of this study offered up justifications for why burnout/poor wellbeing could result in errors and near misses. These explanations generally had a biological basis, which is unsurprising given the sample's knowledge of common symptoms and consequences of burnout and depression (Linden *et al.* 2005). Based on the participants' suggestions, we propose a model (See Figure 3.2) to explain the potential mechanisms between burnout/poor wellbeing and both the quality of patient care and patient safety.

3.6.3 Strengths and limitations

3.6.3.1 Strengths

Through using qualitative methodology, this study has been able to provide first-hand, in-depth experiences and perceptions of the contributors to and consequences of workplace wellbeing and burnout within GPs. The use of focus groups discussions allowed participants to collectively suggest strategies that would be beneficial to their wellbeing, including feasible and quickly implemented changes to daily routines. Furthermore, a qualitative approach has allowed GPs to discuss and thus propose mechanisms that could be responsible for the links between wellbeing/burnout and patient care. Until now, potential mechanisms behind these associations have not been qualitatively explored. Another strength is the heterogeneity of the participants. Despite the mix of locum workers, full and part-time GPs, those in training, and partners, participants discussed the same themes within and between focus groups and were in agreement regarding the sources of burnout and wellbeing, strategies to improve wellbeing, and effects of these on patient care delivery. The similarity of our findings to studies within GPs in the South of England provides support for the generalizability of these issues to GPs nationwide (Cheshire *et al.* 2017; Croxson, Ashdown and Hobbs 2017; Fisher *et al.* 2017). This study also had more subtle and immediate benefits for the participants themselves: the discussions gave GPs a platform to discuss and explore these topics, giving them time and space to reflect on their own wellbeing and consider how important it is to themselves and their patients. Comments from GPs within the sessions suggested an appreciation for the opportunity to openly reflect and discuss their wellbeing.

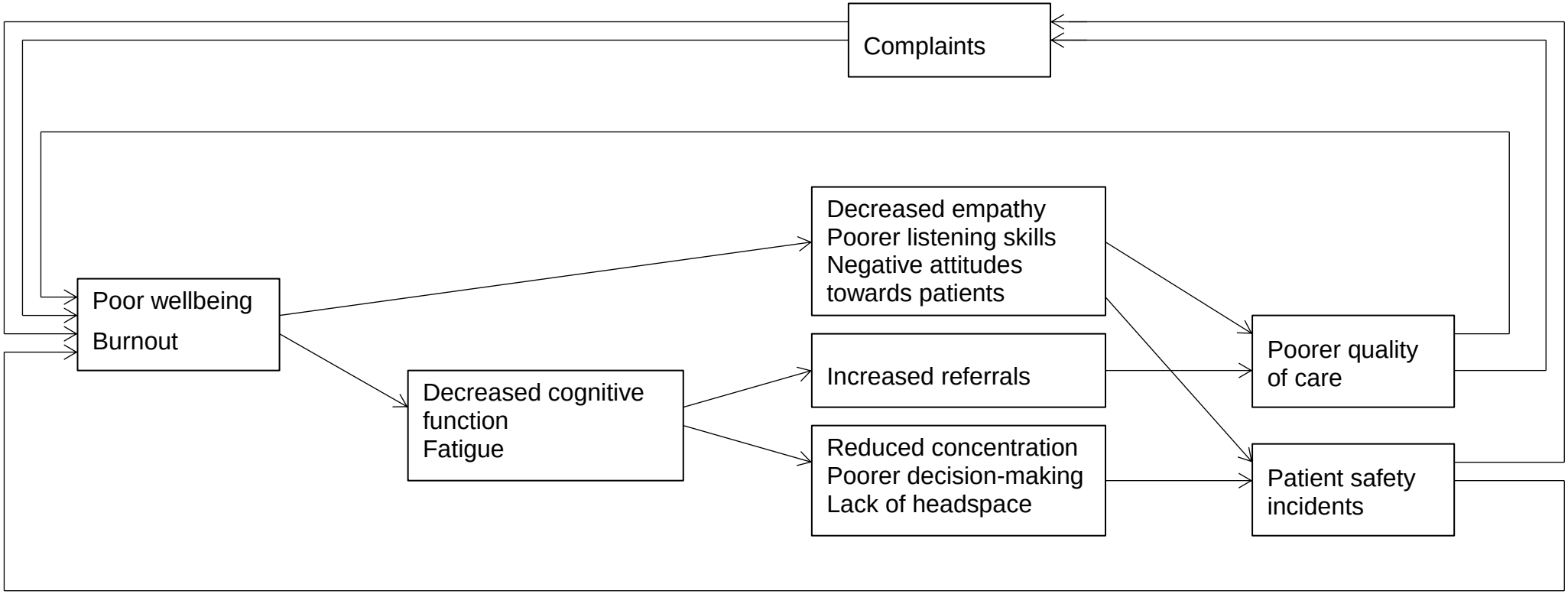

Figure 3.2. Diagram demonstrating potential mechanisms for the links between wellbeing/burnout and the quality and safety of patient care

3.6.3.2 Limitations

Due to the sensitive nature of this topic, the results may be prone to social-desirability biases. This may have been more pertinent within the focus groups held within practices, as hierarchical effects may have resulted in newer members of staff (e.g. trainees, salaried), not wishing to speak against the group norm, or to speak negatively about their current working conditions. Furthermore, the participants were all working within the NHS in the UK. As such the generalizability to other healthcare systems and countries may be limited. However, burnout levels are elevated in primary care physicians in a large number of countries, and research internationally has identified common themes regarding workplace stressors and outcomes, particularly regarding control and support. Therefore, the implications of these results are likely to be of importance worldwide.

3.7 Conclusion

GPs identified both practice-level and organizational-level factors that influenced their wellbeing, including support, variety, control, and workload. They suggested that the best, feasible way to reduce the negative impact of these factors on their wellbeing is through daily breaks. However, external changes were deemed vital to provide increases in resources to allow for more administrative staff, GPs, and time for patient contact, as well as an increase in support from various sources. Furthermore, poor wellbeing and burnout were perceived to negatively impact on both the quality of patient care, and patient safety. Potential mechanisms for this relationship included reduced cognitive functioning, fatigue, a lack of headspace, and increased inappropriate referrals. The strategies suggested to improve GP wellbeing warrant further consideration by researchers, physicians, healthcare organizations, and policy makers. Failure to do so may result in the workforce becoming even more burnt-out, depressed, and a subsequent increase in sick leave and early retirement. Additionally, these findings suggest that one route to ensure high quality and safe patient care within primary care could be to make changes that improve GP wellbeing and prevent burnout.

Chapter 4 A Cross-Sectional Survey of Wellbeing, Burnout, and Patient Safety amongst UK GPs.

4.1 Introduction

This chapter draws upon findings from the previous chapter, using a quantitative methodology to test the associations described in chapter three. In chapter three, focus groups with GPs explored a) what workplace factors influence their levels of wellbeing and burnout, and b) whether they perceive a link between their levels of wellbeing and burnout with the quality and safety of the patient care they deliver. The first main finding from the previous study that is relevant to this chapter is that support, job variation, control, and workload were viewed as important contributors to GPs' wellbeing and burnout levels. The second is that participants perceived poorer wellbeing and burnout to have potentially negative outcomes for patients, for example by increasing the likelihood of making a medical error. It is these two findings that are investigated further in the present chapter, using quantitative methods. To the best of our knowledge, this study is the first to use quantitative methods to investigate associations between GP wellbeing, burnout, occupational variables, and patient safety.

4.2 Aims

Specifically, this study aimed to investigate:

1. Whether occupational characteristics are associated with burnout and wellbeing in GPs.
2. Whether GP burnout and wellbeing are associated with patient safety outcomes.
3. Whether occupational characteristics are associated with patient safety outcomes.
4. Whether GP burnout and wellbeing mediate any associations between occupational characteristics and patient safety outcomes.

4.3 Hypotheses

1. GPs who have more demanding work environments (e.g. longer hours, higher patient load, more administrative work) and feel less supported by their practice will have higher burnout levels and poorer wellbeing.

2. GPs who have higher burnout levels and poorer wellbeing will report poorer patient safety outcomes than those with lower levels of burnout and better wellbeing.

3. Occupational characteristics related to more demanding and less supportive work environments will be associated with poorer patient safety outcomes (perceived and/or self-reported).

4. The association between demanding and unsupportive occupational characteristics and poorer patient safety outcomes will be mediated by GPs burnout and wellbeing levels.

4.4 Method

4.4.1 Ethical considerations

This study received ethical approval from the School of Psychology Ethics Committee (ref #16-0191 accepted on 19/07/2016) and the Health Research Authority (IRAS ref #207249).

As the topics of wellbeing and patient care can be sensitive topics, participants may have become distressed when asked to recall recent medical errors. To address this, participants were informed of the nature of the questions before they began the survey. At the end of the survey they were provided with contact information for relevant helplines. They were also informed prior to the questions that they could skip questions if they did not wish to answer them, and that they could quit the survey whenever they wished (by closing their internet browser window) and that their responses up to the point of quitting would be discarded.

Participants were also informed that their responses would be kept completely anonymous, and that should they provide contact information for themselves, it would be stored safely and securely from their survey responses so that their answers could not be traced back to them personally. Participants were asked to create a unique participant code so that if they wished to withdraw their responses, their data could be identified. Furthermore, they were informed that they may request their data to be withdrawn from the study, up until the point of analysis (1 month post survey completion).

4.4.2 Design

A cross-sectional survey design was used, with the questions in both online and paper formats. The survey took up to ten minutes to complete. The full set of questions can be found in Appendix C.1.

4.4.2.1 Participants and recruitment strategy

Currently practising GPs who work within the United Kingdom were eligible to participate, regardless of job role (e.g. locum, partner, GP trainee etc.). Potential participants were recruited in a number of different ways: 1) Participants from the previous study in chapter three who had given prior approval to be contacted about upcoming studies were emailed inviting them to participate and to forward the link for the survey on to any of their GP contacts, 2) Twitter was used to publicize the survey, through using relevant hashtags and tagging influential GPs and researchers, 3) GP media outlets (GPonline, PulseToday) were contacted asking whether they would advertise the survey on their websites and email out the link to their subscribers, 4) GP related professional bodies (Royal College of General Practitioners, British Medical Association (BMA)) were contacted in a similar manner to the media outlets, 5) Practice managers were contacted by email asking if they could forward on the email to their GP staff, 6) Paper versions of the questionnaire were sent via post to GPs at their surgeries, with pre-paid envelopes for return.

4.4.3 Measures

Demographics (e.g. age, gender, ethnicity, number of years working as a GP) were asked, along with measures relating to occupational characteristics, burnout, wellbeing, patient safety, and coping strategies used.

4.4.3.1 Occupational characteristics

The number of hours spent per week on patient contact, administrative tasks, working during antisocial hours (not including when they were on call), and in roles outside of their practice were asked, along with the average number of hours spent on call per month. The average number of patients seen per day, the location (urban, rural, suburban, other) and practice list-size were also asked. Furthermore, participants rated how supported they felt within their practice/workplace on an eleven-point linear analogue scale from 0 (’not at all supported’) to 10 (‘very supported’). If they were a locum worker, they were asked to answer this question by referring to how supported they felt in general, whether that be by a locum group or colleagues amongst the varying practices. This item was devised for this study and chosen over longer pre-existing measures of support in the workplace in order to reduce the time taken for

participants to complete the overall survey and thus reduce participant burden and increase engagement. This measure was deemed to contain good face validity by myself and the authors of the corresponding paper, (including one GP). Furthermore, similar single-item measures (e.g. job satisfaction) have been shown to allow for more flexibility and variance than multi-item measures (Nagy 2002).

4.4.3.2 Burnout

The English translation of the 16 item Oldenburg Burnout Inventory (OLBI) was used to measure burnout, on two distinct scales (Exhaustion and Disengagement), (Halbesleben and Demerouti 2005; Demerouti *et al.* 2003). Items are worded both negatively and positively. Negatively worded items were reverse coded so that higher scores on both scales indicated higher levels of burnout. An example question for Exhaustion is, “There are days when I feel tired before I arrive at work”. An example question for Disengagement is, “I always find new and interesting aspects in my work”. Participants answered on a four point Likert scale ranging from ‘Strongly agree’ to ‘Strongly disagree’. Scores on each scale were categorised into severity of burnout, based on the cut-off points used previously within the literature: 0–17.59 = ‘no exhaustion/disengagement’, 17.60–21.99 = ‘mild exhaustion/disengagement’, 22-32 = ‘severe exhaustion/disengagement (Björklund, Jensen and Lohela-Karlsson 2013; Demerouti *et al.* 2001).

In our sample, the OLBI showed very good internal consistency (Cronbach’s α = .844) across all items. Both subscales individually also showed very good internal consistency (Exhaustion α = .794; Disengagement α = .727). Internal consistency for Disengagement would slightly improve upon removal of item number 7 (increasing Cronbach’s α = .776).

4.4.3.3 Wellbeing

The 12-item General Health Questionnaire (GHQ-12) was used as measure of general wellbeing, with higher scores indicating poorer mental wellbeing (Goldberg 1972). Scores above three are indicative of a possible case of psychiatric illness, with this threshold having been applied within healthcare staff previously with good convergent validity (Hardy *et al.* 1999). Participants answered questions such as, “Have you recently lost much sleep over worry?” on a four-point Likert scale ranging from ‘Less than usual’ to ‘Much more than usual’. In our sample, the GHQ-12 showed good internal consistency (Cronbach’s α = .784) with no improvement to the reliability if any items were to be deleted.

A Quality of Life linear analogue scale was also used to measure general wellbeing. Participants indicated how satisfied they currently were with their life as a whole, on a scale from 0 ('As bad as it could be') to 10 ('As good as it could be'). This scale has been used and validated across a wide range of populations and has been used in studies of healthcare professionals (West *et al.* 2006; West *et al.* 2009).

4.4.3.4 Patient safety

4.4.3.4.1 Adverse events and near misses

Participants were asked whether they had been responsible for any a) adverse events (AEs) and b) near misses (NM) in the last three months (Yes or No responses for each question). If yes for either, they were required to classify the outcome of the adverse event/near miss from the following options, "Minor reversible patient harm, Minor irreversible patient harm, Major reversible patient harm, Major irreversible patient harm". This measure, or a close variant of it, has been commonly used in studies of patient safety and manages to capture error occurrence despite the expectation that social desirability and blame cultures may hinder error reporting (Arimura *et al.* 2010; Baldwin, Dodd and Wrate 1997; de Oliveira Jr *et al.* 2013; Shanafelt *et al.* 2010; Tanaka *et al.* 2012). If participants answered yes to either adverse events or near misses, they were also asked to indicate what type of adverse event/near miss it was, from a list comprising; "Diagnostic error/near miss, Medication or prescription error, Equipment error, Communication, Monitoring error, Other". This list was based on common errors/AEs identified in the literature (Dovey *et al.* 2002; Rubin *et al.* 2003; Sandars and Esmail 2003). Finally, participants had to indicate which of the following contributed, to any extent, to the adverse event/near miss; "System issue, Degree of fatigue, Lapse in concentration, Lapse in judgment, Lack of knowledge, Degree of stress or burnout, Other", with the option to select more than one. This question was taken from Shanafelt and colleagues' (2010) study on errors in surgeons, but slightly adapted from '"Which of the following was the single greatest contributing factor in this particular error?" to "Which of the following contributed, to any extent, to the adverse event/near miss?".

4.4.3.4.2 Safe practitioner

Participants rated the extent to which they felt like they deliver a safe practice, dependent on work-related conditions. The item stated: "My practice is not as safe as it could be due to work related factors/conditions" and participants gave their response on a five-point Likert scale ranging from 1 ('Strongly disagree')

to 5 (“Strongly agree”). This measure, known as the ‘Safe Practitioner’ measure (Louch *et al.* 2016) has previously been used in research in nurses where scores have been found to converge with other longer measures of patient safety (Louch *et al.* 2017; Johnson *et al.* 2017). The inclusion of this measure alongside adverse event and near miss reporting was chosen as it is a more sensitive measure of safety. Therefore, it should capture more variability in responses, which is important given that the occurrence of adverse events and near misses is relatively uncommon over a short time period in general practice (Sandars and Esmail 2003).

4.4.3.5 Coping strategies

Questions relating to the type and frequency of coping strategies used by participants were also asked. However these shall not be reported as they are beyond the focus of this chapter.

4.5 Data analysis and preparation

All responses were screened for outliers and eligibility, using boxplots. Two cases were removed for not meeting the eligibility criteria (one participant resided outside of the UK, one was retired), and two for only completing the consent questions. One outlier was changed due to reporting an implausibly high number of administrative hours per week. This was changed to one unit above the second highest score for that variable, following guidance on management of outliers by Field (2009), making the data for that measure now normally distributed. The other outliers remained unchanged as they were plausible values and did not affect the normality of distributions. Little’s MCAR test (Little 1988) for missing data was run on the full dataset of 228 participants and was not shown to be missing completely at random. However, as one participant had a large amount of missing data (> 20%), they were subsequently excluded from all further analyses and the missing data test was re-run on the remaining and final set of 227 participants. Little’s MCAR test suggested that the data were now missing completely at random (X^2 = 616.609, df = 611, p = .429). Missing data for each variable ranged from 0% missing (Years working as a GP, Practice List Size, Patient Contact Hours per week, Administrative Hours per week, Antisocial hours per week, Quality of Life, Supportive Practice, Near Misses), to 5.7% (Hours spent on Extra Roles per week, Hours spent On Call per week).

To deal with missing data when running analyses in SPSS and Stata, the data was imputed using the Multiple Imputation method, with five iterations conducted and all survey items used as predictor variables. Five iterations was

deemed sufficient due to the small percentage of missing values (<1% of all values, <15% of all participants) (Berglund and Heeringa 2014). For analyses run in AMOS 22, missing data cannot be imputed using the multiple imputation method. Instead, it was imputed using the inbuilt regression imputation method. First the proposed model is fit using maximum likelihood with model parameters set as equal to their maximum likelihood estimates. Then, each missing value is predicted based on a linear combination of the observed values for that case (Arbuckle 2013). Descriptive statistics and bivariate correlations were carried out in SPSS.

To address the first three aims, regression models using the five datasets created using the multiple imputation procedure were tested in Stata, as Stata has in-built functions to pool regression outputs based on imputed datasets, using 'Rubin's Rules' (Rubin 1987), whereas SPSS does not. To address the fourth aim, structural equation models (SEM) were built and tested in AMOS. SEM in AMOS was chosen over using the regression method for mediation using SPSS due to the ability in AMOS to use bootstrapping. Bootstrapping, a nonparametric re-sampling procedure, allows the use of data that is not normally distributed. We used 5000 bootstrap samples with a 95% bias-corrected confidence interval. Furthermore, SEM can control for measurement errors, which, if using the hierarchical regression method of mediation, can otherwise bias parameter estimates (Cheung and Lau 2008). To assess model fit, if the following criteria were met, the model was deemed a good fit, based on recommendations by Hooper, Coughlan and Mullen (2008) and Kenny (2015): Chi-square (X^2) $p > .05$, Comparative Fit Index (CFI) > .95, Root Mean Square Error of Approximation (RMSEA) < .07. However, the significance of the Chi-Square statistic should be interpreted with caution as it is often significant with large sample sizes (over 200) and when the model contains large correlations (Kenny 2015). For all regression models and SEM analyses, age, gender, and the number of years spent working as a GP were controlled for. To control for these variables, regressions were run in STATA both with and without the control variables and R^2 change was calculated. The output for the regressions that included the control variables are reported.

4.6 Results

4.6.1 Participants

4.6.1.1 Recruitment streams

Two-hundred-and-thirty-two GPs took part in total. Around 20 GPs who participated were recruited from participating in the previous study and from

Twitter. The majority of participants (*n* ~ 180) were recruited via the BMA who provided a link to the survey on their online GP forum, along with emailing the link to their subscribers. The remaining participants were recruited as a result of emailing practice managers and sending postal surveys addressed to GPs.

4.6.2 Descriptive statistics

Descriptive statistics for all variables prior to missing data imputation are reported in Table 4.1. Pearson's and Spearman's bivariate correlations for all variables are reported in Appendices C.2 and C.3, with significant correlations flagged. A new dichotomous variable was created called 'Patient Safety Incident' whereby Adverse Events and Near Misses were combined and scored such that if the participants had reported either, they were coded as 0, if they reported neither, it was coded as 1[1]. Additionally, Job Role responses were recoded to create a dichotomous variable to allow comparison between participants who worked as GP partners versus all other job roles.

Pearson's correlations indicated significant associations between Patient Safety Incidents with Quality of Life (r_p = .132, p = .047) and GHQ-12 (r_p = -.175, p = .008), suggesting that the worse a GP's quality of life and the higher their feelings of distress, the more likely they were to have reported being involved in a near miss or adverse event in the previous three months. When looking at Adverse Events and Near Misses separately, Adverse Events were not associated with any wellbeing or burnout variables, whereas Near Misses were significantly associated with GHQ scores (r_p = -.188, p = .004). Significant positive associations were also found between the Safe Practitioner measure with Burnout (OLBI score) (r_p = .287, p < .001), GHQ-12 (r_p = .187, p = .005), and Quality of Life (r_p = - .180, p = .007) indicating that the higher a GP's level of burnout and the lower their levels of wellbeing and quality of life, the less safe they perceived their practice to be. The Safe Practitioner measure was significantly associated with both facets of burnout (Exhaustion r_p = .313, p < .001; Disengagement r_p = .196 p = .003).

Using the cut-off values commonly used in the literature, 94.7% of participants were classed as having mild (22%) or severe (72.7%) exhaustion and 86.8% as having mild (37.9%) or severe (48.9%) disengagement (Björklund, Jensen and Lohela-Karlsson 2013; Demerouti *et al.* 2001). Additionally, 93.8% of participants were classed as likely to be suffering from a minor psychiatric

[1] Although seemingly counter-intuitive, it was coded this way to keep the direction and therefore the interpretation of correlations the same as for adverse events and near misses. AE and NM were coded this way automatically when exporting the data from the online survey website.

disorder, according to the commonly used cut-off value of scoring more than 3 on the GHQ-12 (Hardy *et al.* 1999).

Half (50.6%) of participants reported being responsible for one or more patient safety incident in the previous three months. A sixth (15.9%) of participants reported having been involved in an adverse event, and almost a half (44.1%) reported being involved in a near miss. Regarding the type of adverse events and near misses that were reported, medication or prescription errors/near misses were the most common, followed by communication errors/near misses. The majority of adverse events and near misses resulted in (or had the potential to result in) minor reversible harm. Only one adverse event resulted in major irreversible harm and six near misses had the potential to result in major irreversible harm. The most commonly self-reported contributor to the incidents was the GP's degree of fatigue, followed by a lapse in concentration, then their degree of burnout. For further details, please see Figure 4.1 and Figure 4.2, overleaf.

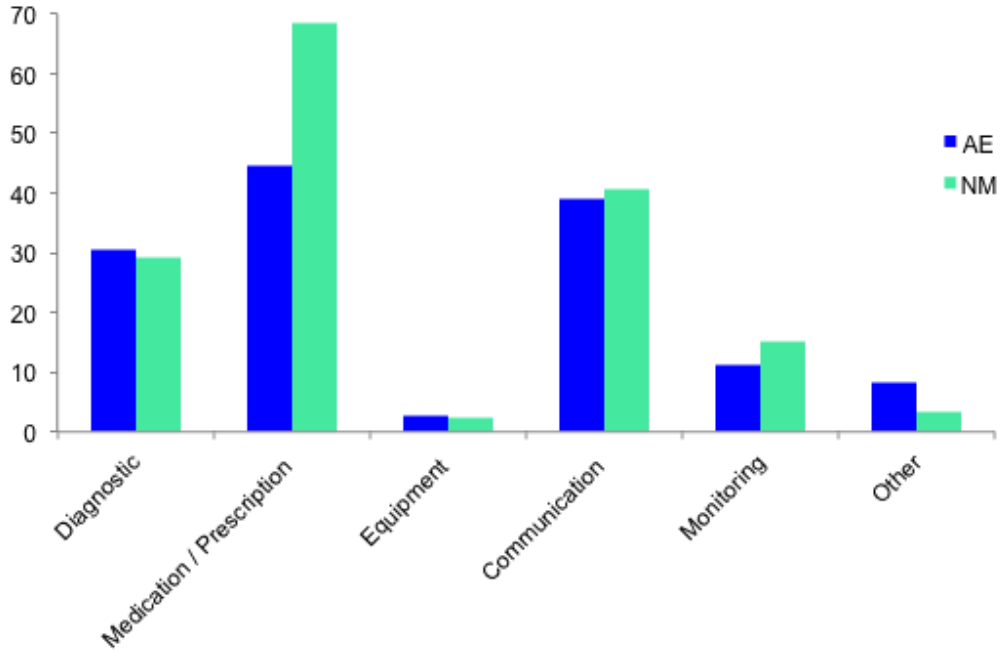

Figure 4.1 Bar graph showing the types of adverse events and near misses as percentages of the total number of adverse events and near misses.

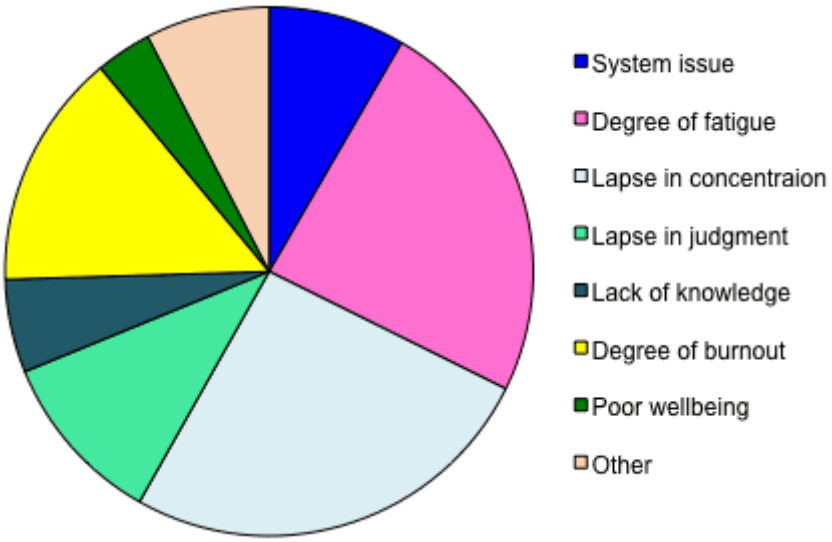

Figure 4.2 Pie chart showing the relative frequency of each contributor to the occurrence of adverse events and near misses.

Table 4.1 Descriptive statistics from original data (with missing cases)

Variable	Mean (s.d.)	Range	Frequencies
Age[a]	47.86 (10.691)	27 – 66	
Gender[f]			Female 59.5%, Male 39.2%, Undisclosed 1.3%
Years in practice[b]	17.97 (9.841)	0 – 55	
Job role[a]			Partner 69.2%, Locum 5.3%, Salaried 18.1%, Other (e.g. in training) 5.7%, Undisclosed 1.8%
Practice list size[b]	11517.09 (13079.180)	0 – 125000	
Practice location			Urban 35.7%, Suburban 42.7%, Rural 15.9%, Mixed 5.7%
Patient contact hours p/w[b]	23.278 (10.09)	0 – 50	
Patients seen p/d[c]	32.77 (7.963)	9 - 51	
Extra roles p/w[d]	4.322 (6.524)	0 - 35	
Admin hours p/w[b]	11.850 (7.579)	0 – 36	
Antisocial hours p/w[b]	9.22 (6.153)	0 – 36	
On call p/m[d]	21.63 (28.339)	0 - 160	
Supportive practice[b]	6.33 (2.575)	0 - 10	
Safe practice[b]	2.26 (1.188)	0 - 4	
QoL[b]	5.80 (2.02)	0 – 10	
GHQ-12[a]	7.91 (2.605)	0 – 12	Possible ‘case’ 93.72%, No case 6.28%
OLBI Exhaustion[c]	23.98 (3.952)	13 – 32	None 5.41%, Mild 21.62%, Severe 72.97%
OLBI Disengagement[f]	21.48 (3.582)	13 – 32	None 12.95%, Mild 37.50%, Severe 49.55%
OLBI total score[e]	45.47 (6.729)	28 - 64	
Adverse events[g]			One or more 15.9%, None 83.7%, Missing 0.4%
Near misses[b]			One or more 44.1%, None 55.9%

[a]*n* = 223, [b]*n* = 227, [c]*n* =222, [d]*n* = 214, [e]*n* = 220, [f]*n* = 224, [g]*n* = 226, s.d. = standard deviation

4.6.3 Aim 1: Associations between occupational variables with burnout and wellbeing

Five separate multiple regressions were performed between all the occupational variables related to work demands and support (Job role, Practice list size, Antisocial hours worked, Hours worked in Extra roles, Hours on call, Patients seen per day, Patient contact hours, Supportive Practice, and hours spent on Administrative work) with each burnout and wellbeing measure in turn (OLBI total score, Exhaustion, Disengagement, GHQ-12, and Quality of Life). All five regressions found that the models explained a significant amount of the variance in each of these measures in turn (all *p* values < .001).

The R^2 change between the models with and without the inclusion of the control variables (age, gender, years working as a GP) were conducted to determine whether the inclusion of these control variables explained significant amounts of variance in the outcome variables. R^2 change was significant in the models with the following outcome variables; OLBI total score (*p* = .03), GHQ-12 (*p* = .02), and Disengagement (*p* = .035). This indicates that age, gender, and years working as a GP explained a significant amount of the variance in these variables, despite not making significant independent contributions when the effects of all other (predictor and control) variables were controlled for.

Each model varied in which occupational variables were significantly associated with the burnout/wellbeing outcome variable and are reported in Table 4.2. For the model with OLBI total scores as the outcome variable: Administrative hours per week (β = .205, *p* = .006), Supportive practice (β = -.413, *p* < .001), and Patients seen per day (β = .131, *p* = .038) were significantly associated with burnout scores. For the models for both GHQ scores and OLBI Exhaustion: Administrative hours (β = .233, *p* = .002; β = .200, *p* = .010) and Supportive practice (β = -.301, *p* < .001; β = -.346, *p* < .001) made significant, independent contributions. For OLBI Disengagement: Administrative hours (β = .165, *p* = .029), Supportive practice (β = -.396, *p* < .001), and Patients seen per day (β = .154, *p* = .019) made significant independent contributions to the model. Finally, when Quality of Life was the outcome variable: Administrative hours (β = -.227, *p* = .002), Supportive Practice (β = .339, *p* < .001), Patients seen per day (β = -.137, *p* = .030), Patient contact hours (β = -.237, *p* < .001), and hours worked in Extra Roles (β = -.210, *p* < .001) made significant independent contributions to the model.

Table 4.2 Significant predictor variables and outputs for regression models related to Aims 1 and 3

	Model F statistic	Model *p* value	Model R^2 (mean)	Job Role	Practice list size	Antisocial hours	Admin hours	Extra roles	On Call	Patients per day	Patient contact hours	Supportive practice
Safe Practitioner	**1.90**	**.035**	**.101**	x	x	x	✓	x	x	x	x	x
PSI	1.14	.318	-	x	x	x	x	x	x	x	x	x
AE	0.61	.837	-	x	x	x	x	x	x	x	x	x
NM	1.36	.179	-	x	x	x	x	x	✓	x	x	x
OLBI	**7.90**	**< .001**	**.313**	x	x	x	✓	x	x	✓	x	✓
OLBI: D	**6.60**	**< .001**	**.275**	x	x	x	✓	x	x	✓	x	✓
OLBI: E	**5.77**	**< .001**	**.249**	x	x	x	✓	x	x	x	x	✓
GHQ-12	**5.87**	**< .001**	**.252**	x	x	x	✓	x	x	x	x	✓
QoL	**9.20**	**< .001**	**.345**	x	x	x	✓	✓	x	✓	✓	✓

Note: Variables listed vertically indicate model outcome variables, variables listed horizontally indicate predictor variables. Bold font indicates significant models. All regressions controlled for age, gender, and years in practice. ✓ = made a significant independent contribution to the model, x = did not make a significant independent contribution to the model, - = n/a due to the type of regression model (logistic)

4.6.4 Aim 2: Associations between burnout and wellbeing with patient safety

Model statistics and significant predictor variables for each model can be found in Table 4.3.

4.6.4.1 Patient safety incident

A logistic regression analysis was conducted to determine whether the occurrence of a Patient Safety Incident was associated with Quality of Life, OLBI, and GHQ-12 scores. A test of the full model against a constant model was not statistically significant, indicating that the predictor variables could not reliably distinguish between participants who had and had not reported making an adverse event or near miss in the previous three months ($F(6, 44057.1) = 1.33$, $p = .242$. No individual variable made a significant contribution to the model, however GHQ scores approached significance ($p = .063$).

4.6.4.2 Adverse events

A second logistic regression analysis was conducted to determine whether the occurrence of Adverse Events were associated with Quality of Life, OLBI, and GHQ-12 scores. A test of the full model against a constant model was not statistically significant, indicating that the predictor variables could not reliably distinguish between participants who had and had not reported making an adverse event in the previous three months ($F(6,41255.8) = 0.79$, $p = .576$). No individual variable explained a significant amount of variance in the model (all p values > .05).

4.6.4.3 Near misses

A third logistic regression analysis was conducted to determine whether the occurrence of Near Misses were associated with Quality of Life, OLBI, and GHQ-12 scores. A test of the full model against a constant model was not statistically significant, indicating that the predictor variables could not reliably distinguish between participants who had and had not reported making a near miss in the previous three months ($F(6,45235.8) = 1.44$, $p = .196$). Despite the full model not being of good fit, the Wald criterion demonstrated that GHQ scores made a significant independent contribution to explaining the variance in near misses ($p = .026$). Exp(B) value for GHQ indicated that when GHQ scores increased by 1 standard deviation (s.d. = 2.6 points) there was a 0.856 standard deviation (s.d. = .498) increase in participants' likelihood of making a near miss. No other variables were found to make significant contributions.

Table 4.3 Significant predictor variables and outputs for regression models related to Aim 2

	Model F statistic	Model *p* value	Model R^2 (mean)	OLBI	OLBI: D	OLBI: E	GHQ-12	QoL
Safe Practitioner[1]	**3.58**	**.002**	.091	✓	-	-	**x**	**x**
Safe Practitioner[2]	**5.02**	**< .001**	.105	-	**x**	✓	-	-
PSI	1.33	.242	-	**x**	-	-	**x**	**x**
AE	0.79	.576	-	**x**	-	-	**x**	**x**
NM	1.44	.196	-	**x**	-	-	✓	**x**

Note: Variables listed vertically indicate model outcome variables, variables listed horizontally indicate predictor variables. Bold font indicates significant models. Bold font indicates significant models. All regressions controlled for age, gender, and years in practice. ✓ = made a significant independent contribution to the model, x = did not make a significant independent contribution to the model, - = n/a, [1] = Model included only total OLBI score and not scores from the two separate scales, [2] = Model included disengagement scores and exhaustion scores but not total OLBI score

4.6.4.4 Safe practitioner

A multiple regression was conducted to see if scores on the safe practitioner measure were associated with OLBI, Quality of Life, and GHQ-12 scores. It was found that this model explained a significant amount of the variance in safe practitioner scores (F (6, 216.4 = 3.58, p = .002, R^2 = .091, $R^2_{adjusted}$ = .066). The analysis showed that only burnout was significantly associated with safe practitioner scores, (β = .267, t(189.26) = 3.18, p = .002) indicating that higher burnout levels were associated with poorer perceptions of safety.

A second multiple regression was then conducted to determine whether scores on the safe practitioner measure were significantly associated with a specific subscale of burnout, by including Exhaustion and Disengagement as the two predictor variables in the regression. It was found that this model explained a significant amount of the variance in safe practitioner scores (F (5, 215.9) = 5.02, p < .001). However, the analysis showed that only the Exhaustion component of burnout was significantly associated with safe practitioner scores (β = .300, t(180.38) = 3.73, p < .001).

4.6.5 Aim 3: Associations between occupational variables and patient safety

Model statistics and significant predictor variables for each model can be found in Table 4.2.

4.6.5.1 Patient safety incident

A logistic regression analysis was conducted to determine whether the occurrence of a Patient Safety Incident was associated with occupational variables related to work demands and support. A test of the full model against a constant model was not statistically significant, indicating that the predictor variables could not reliably distinguish between participants who had and had not reported making an adverse event or near miss in the previous three months (F(12,170228.0) = 1.14, p = .318). Despite the overall model not being statistically significant, the Wald criterion demonstrated that hours on call per month was a significant, independent contributor to the model (p = .022). Exp(B) value for hours on call indicated that when there was a 1 s.d. increase in hours on call (28.3 hours per month), there was a 0.988 s.d. increase in the likelihood of reporting an adverse event or near miss (s.d. = .501). No other variables made significant contributions to the model.

4.6.5.2 Adverse event

A second logistic regression analysis was conducted to determine whether the occurrence of Adverse Events were associated with these occupational variables. A test of the full model against a constant model was not statistically significant, indicating that the predictor variables could not reliably distinguish between participants who had and had not reported making an adverse event in the previous three months (F(12, 96674.7) = 0.61, *p* = .837). No variables made significant independent contributions to the model.

4.6.5.3 Near misses

A third logistic regression analysis was conducted to determine whether the occurrence of Near Misses were associated with the same occupational variables. A test of the full model against a constant model was not statistically significant, indicating that the predictor variables as a set could not reliably distinguish between participants who had and had not reported being responsible for a near miss in the previous three months (F(12,190684.8) = 1.36, *p* = .179). However, the Wald criterion demonstrated that hours on call per month made a significant contribution to the model (*p* = .003). Exp(B) values indicated that as hours on call increased by 1 s.d. (28.3 hours per month), the likelihood of reporting a near miss in the previous three months increased by .983 s.d (s.d. = .498). No other variables were significant, although hours spent in extra roles per week neared significance (Odds Ratio = .959, *p* = .060).

4.6.5.4 Safe practitioner

Finally, a multiple regression was conducted to see if scores on the safe practitioner measure were associated with these occupational variables. This model explained a significant amount of the variance in safe practitioner scores (F(12, 210.3) = 1.90, *p* = .035, R^2 = .101, $R^2_{adjusted}$ = .051). The analysis showed that only the number of hours spent on administrative tasks per week were significantly associated with safe practitioner scores, (β = .323, t(168.91) = 3.88, *p* < .001).

4.6.6 Sensitivity analyses

All of the above regressions were also conducted on the original dataset prior to multiple imputation. In all cases, the significance (or lack of) of the models remained the same when cases were excluded pairwise. However, there were slight variations in which occupational variables made significant independent contributions to some of the models when using the dataset containing missing data: For OLBI total scores, the number of patients seen per day did not make

a significant independent contribution. Number of patients seen per day also failed to reach significance as an independent contributor for Disengagement. For Exhaustion, practice list size was found to make a significant independent contribution to the model (β = .143, *p* = .033). Finally, hours spent on call per week was not a significant independent contributor in the model explaining the variance in Patient Safety Incidents.

4.6.7 Aim 4: Modelling all variables

Three structural equation models were tested using AMOS. The first tested whether wellbeing (GHQ-12) mediated the association between occupational variables (Supportive Practice, Administrative Hours, Hours On Call) and Near Misses. The second tested whether burnout (OLBI) mediated the association between occupational variables (Supportive Practice, Administrative Hours, Patients seen per day) and the safe practitioner measure. The third tested whether Exhaustion mediated the association between occupational variables (Supportive Practice, Administrative Hours) and the safe practitioner measure. The occupational variables chosen for inclusion in each model were based on their significance in the regression models in Aims 1 and 3. If an occupational variable made a significant, independent contribution to *either* the models with a wellbeing/burnout outcome variable *or* a significant, independent contribution to the models with a patient safety outcome variable, then it was included in the relevant structural equation model in this analysis. See Table 4.2 for reference. Age, Gender, and Years working as a GP were controlled for in all models. No model was tested using Adverse Events as the outcome, due to a lack of significant associations in the previous regressions.

4.6.7.1 Model 1: Wellbeing and near misses

This model tested whether the occupational variables Administrative hours, Supportive practice, and On Call were indirectly associated with near misses, with wellbeing mediating the association. The model was found to be of good fit when the covariance between Administrative hours and On Call was controlled for (X^2 (11) = 16.930, p = .110; CFI = .984, RMSEA = .049 (Confidence Intervals (CI) = .000 - .092)). The pathways between Administrative Hours and Supportive practice to GHQ were statistically significant, as was the pathway between GHQ and Near Misses (Figure 4.3). This suggests that working in less supportive practices and spending a high number of hours on administrative work were associated with poorer wellbeing, which in turn was associated with a higher likelihood of being involved in a near miss.

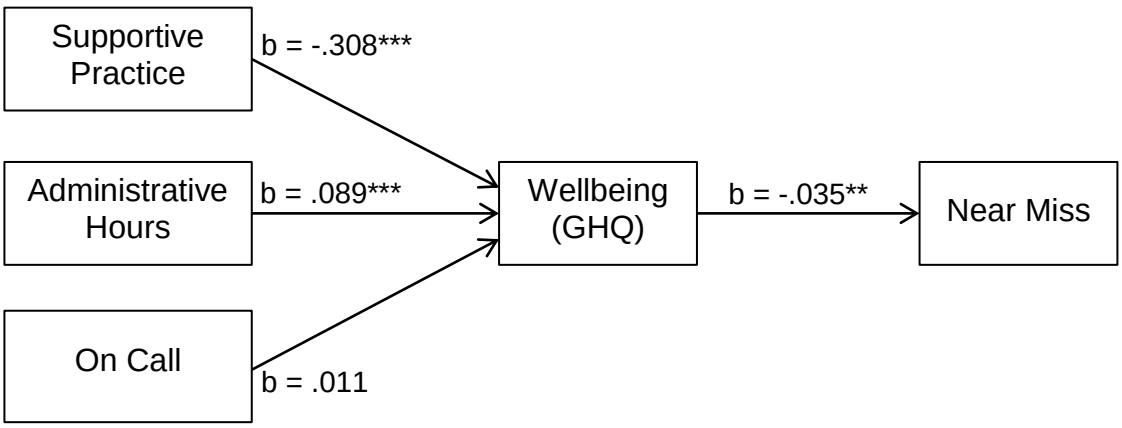

Figure 4.3. Occupational variables, wellbeing, and near misses
** indicates p < .01, *** indicates p < .001

This model was also run including the variable 'Extra Roles' as a predictor, because it had neared significance (p = .060) in the earlier regression for explaining variance in near misses. However when included in this SEM, the model was of poorer fit (X^2 (14) = 22.864, p = .063; CFI = .977, RMSEA = .053 (CI = .000 - .091)).

4.6.7.2 Model 2: Burnout and safe practitioner

The second model tested whether the occupational variables Administrative hours, Supportive practice, and Patients seen per day were indirectly associated with the safe practitioner measure, with burnout mediating the association. Despite a significant chi-square, this model was still found to be of adequate fit according to the other fit indices, when the covariance between Administrative hours and Patients seen per day was controlled for (X^2 (11) = 21.001, p = .033; CFI = .976, RMSEA = .063 (CI = .017 - .104)). All of the pathways in the model were statistically significant, suggesting that a less supportive practice, a high number of hours spent on administrative work, and a higher number of patients seen per day were associated with higher burnout levels, which in turn was associated with lower perceptions of safety (Figure 4.4).

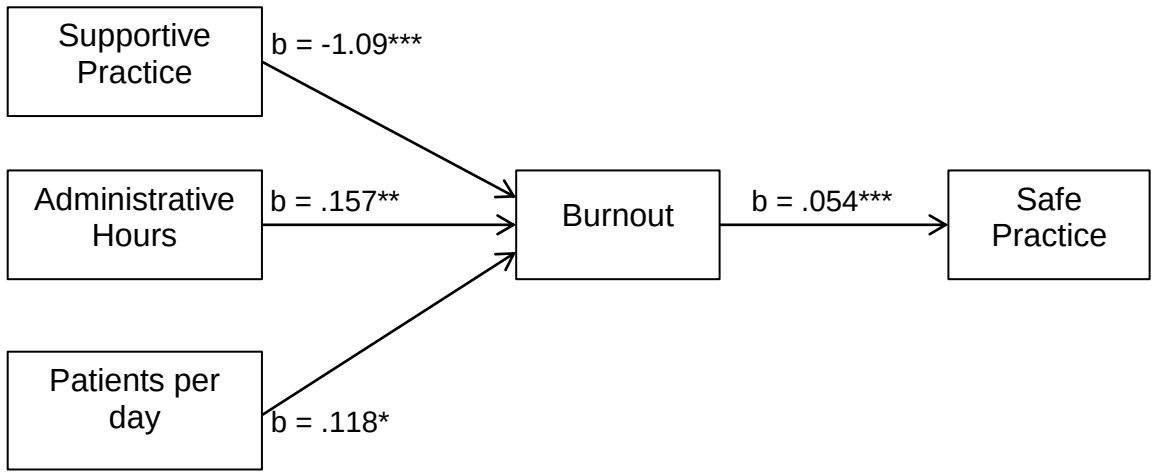

Figure 4.4. Occupational variables, burnout, and safe practitioner
* indicates p < .05, ** indicates p < .01,*** indicates p < .001

Model 3: Exhaustion and safe practitioner

The final model tested whether the occupational variables Administrative hours and Supportive practice were indirectly associated with scores on the safe practitioner measure, with exhaustion mediating the association. This model was found to be of adequate fit according to the majority of the fit indices (X^2 (9) = 17.748, *p* = .038; CFI = .977, RMSEA = .066 (CI - .015 - .110)). All of the pathways in the model were statistically significant, suggesting that high number of hours spent on administrative work, and a less supportive practice were associated with exhaustion, which in turn was associated with lower perceptions of safety (Figure 4.5).

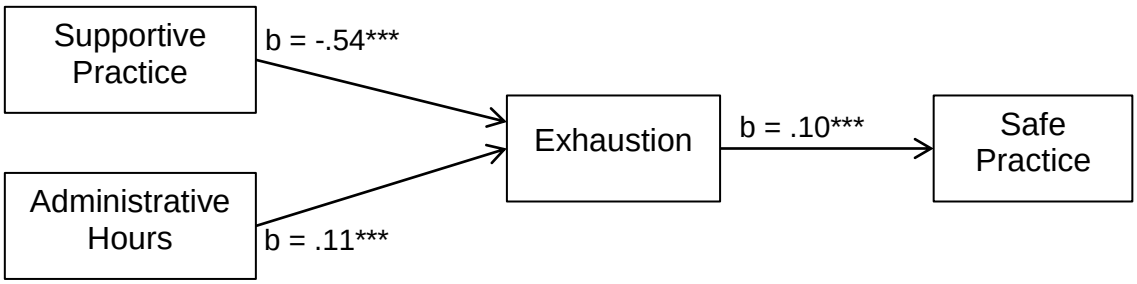

Figure 4.5. Occupational variables, exhaustion, and safe practitioner
*** indicates *p* < .001

4.7 Discussion

4.7.1 Summary of findings

Logistic and multiple linear regressions were conducted to determine whether a) occupational variables were associated with burnout and wellbeing in GPs, b) occupational variables were associated with patient safety outcomes, and c) wellbeing and burnout were associated with patient safety outcomes. The multiple regressions demonstrated that the more hours spent per week on administrative work and the less supported participants felt by their practice, the worse their wellbeing was and the more burnt-out they were (higher scores on OLBI, Exhaustion, Disengagement, GHQ-12, and lower Quality of Life scores). Additionally, seeing a higher number of patients each day was associated with higher levels of total burnout and the Disengagement facet of burnout. Furthermore, more hours spent on administrative work, a less supportive practice, a higher number of patients each day, more patient contact hours per week and spending more hours in extra roles outside of their primary GP role per week, were associated with lower Quality of Life scores. Hours

working on call per month, job role, practice list size, number of antisocial hours worked per week, and number of years working as a GP were not significant independent predictors of any burnout or wellbeing measures.

The second set of regressions demonstrated that poorer wellbeing, as measured by higher scores on the GHQ-12, was associated with a higher likelihood of reporting a near miss in the previous three months. Higher levels of burnout were associated with perceptions of a less safe practice. Furthermore, the exhaustion facet of burnout was shown to be the only subscale of burnout associated with perceptions of a safe practice. Burnout was not found to be significantly associated with near miss reporting, and wellbeing was not found to be associated with perceptions of a safe practice. Neither burnout nor wellbeing were found to be associated with reporting adverse events or patient safety incidents in general.

In the third set of regressions, only the model with occupational variables explaining the variance in the safe practitioner measure was found to be significant. However, specific occupational variables were shown to make significant independent contributions to even the non-significant models: a higher number of hours spent on call per month was associated with a higher likelihood of reporting patient safety incidents and near misses. Furthermore, a higher number of hours spent on administrative work per week was associated with viewing the practice as less safe.

The SEM models supported hypothesis four, in that wellbeing and burnout mediated the associations between occupational variables and patient safety outcomes. In the first model (Figure 4.3), spending a higher number of hours on administrative tasks and on call, as well as feeling less supported in their practice, were associated with a higher likelihood of reporting a near miss in the previous three months, through an association with lower levels of wellbeing (indicated by high scores on the GHQ). In model two (Figure 4.4), a higher number of hours spent on administrative tasks, a higher number of patients seen per day, and not feeling well supported were associated with worse perceptions of safety, through an association with higher burnout levels (OLBI total scores). Finally, in model three (Figure 4.5), a higher number of hours spent on administrative tasks and not feeling well supported were associated with worse perceptions of safety through an association with greater feelings of exhaustion.

All of the models found that hours spent on administrative tasks and the amount of support in the practice were significantly indirectly associated with patient safety outcome variables, indicating that these two occupational

variables are perhaps the most important when it comes to GPs' wellbeing, burnout levels, and patient safety outcomes.

4.7.2 Comparison with existing literature

4.7.2.1 Occupational factors influencing burnout and wellbeing

The variables found to be commonly associated with all of the burnout and wellbeing measures were the number of hours spent on administrative work per week, and the level of support within the practice. These findings offer support for previous studies based upon the Job Demands Control and Job Demands Resources theories of burnout (Calnan *et al.* 2001; Houkes, Winants and Twellaar 2008; Lee, Stewart and Brown 2008; McManus *et al.* 2011). They also support previous qualitative research on this topic reporting that GPs state the need for a reduction in administrative work, or for more administrative support staff to take on the paperwork that does not need to be completed by a GP (Croxson, Ashdown and Hobbs 2017; Hall, Johnson, Heyhoe, Watt, Anderson and O'Connor 2017). In fact, paperwork was the fourth biggest stressor in a GP survey in the UK in 2015 (Gibson *et al.* 2015). Furthermore, it is well acknowledged that levels of support are important to staff wellbeing and burnout levels across all sectors, including healthcare (Kinman, Wray and Strange 2011; Park, Wilson and Lee 2004; Sloan 2012). Fostering a more positive and supportive team culture through formal (e.g. mentoring systems) or informal (e.g. communal breaks) ways should be a serious consideration amongst practice staff and healthcare organisation managers.

The importance of these stressors is not recent, as historical surveys amongst GPs in England reported similar findings (Appleton, House and Dowell 1998). In 1998, Appleton, House, and Dowell conducted a survey amongst 285 GPs in Leeds, England. The qualitative extracts from their study reported that GPs found paperwork and administration to be one of the most stressful aspects of their work. Additional stressors impacting on their physical and mental health included the amount of time spent on call (which this study also found), practice list size, and excessive hours (which these findings did not support). It is therefore interesting that whilst general practice under the NHS has undergone many changes[5] between 1998 and now, the factors affecting GPs' wellbeing remain the same, with stress levels increasing over the years (Gibson *et al.*

[5] Since 1998, General Practice has had more emphasis placed on performance-related pay as measured by the Quality and Outcomes Framework, the introduction of annual appraisals, the need to register with the Care Quality Commission, a mandatory revalidation process has been instated, and a change in care provision through expanded roles for other practice staff, among others (The King's Fund 2011).

2015). Evidently, these occupational factors may have been undervalued regarding the importance they have on staff wellbeing over the years.

4.7.2.2 Burnout, wellbeing, and patient safety

The findings also support the majority of the literature within secondary care doctors in that poorer wellbeing and burnout are associated with patient safety measures (Hall *et al.* 2016; Salyers *et al.* 2016; Welp and Manser 2016). Regarding the lack of a significant association between wellbeing/burnout and adverse events in this sample, previous studies in secondary care have reported similar findings, specifically for burnout (Garrouste-Orgeas *et al.* 2015; Kirwan, Matthews and Scott 2013). However, one of these studies did find an association between depression and adverse events (Garrouste-Orgeas *et al.* 2015), with another finding an association with burnout (Laschinger and Leiter 2006). It is possible that detecting an association when using adverse events as the safety measure is more difficult due to a lack of statistical power to detect an effect in this sample, due to a relatively small proportion of participants that reported being responsible for an adverse event, compared to those reporting near misses (15.9% versus 44.1%, respectively). The lack of reporting does not necessarily mean a lack of incident however, with the possibility existing that GPs may not be aware or certain that they have been responsible for an adverse event, as harm may only be apparent once the patient has left primary care. Nonetheless, previous research does suggest that the rate of adverse events in primary care is usually much lower than near misses (Kostopoulou and Delaney 2007; The Health Foundation 2011). The results also confirm findings from the previous chapter, whereby GPs acknowledged that their levels of wellbeing and burnout can impact on both the quality of care they give (e.g. through displaying negative attitudes towards patients) and patient safety (e.g. through reduced concentration and fatigue increasing the chances of making a mistake).

4.7.2.3 The mediating role of burnout

This study's findings that occupational variables are associated with patient safety through the mediating roles of burnout and wellbeing provides support for previous research within secondary care. Laschinger and Leiter's (2006) study of Canadian nurses reported that work environments (including support, and staff and resource levels) were associated with adverse events through the key mediating role of burnout. Along with showing support for the mediating role of burnout (and wellbeing) within general practice, our findings show that it is the level of support and the amount of administrative work in particular that impact on burnout and wellbeing and subsequently lead to changes in safety.

4.7.3 Strengths and limitations

4.7.3.1 Strengths

This main strength of this study is that it is the first quantitative study investigating and demonstrating associations between occupational characteristics, burnout, wellbeing, and patient safety within GPs. Previous literature discussing the link between wellbeing/burnout and patient safety in GPs has solely been qualitative (Hall, Johnson, Heyhoe, Watt, Anderson and O'Connor 2017). The second strength of this study is the use of wellbeing and burnout measures simultaneously within analyses. The importance of measuring both has been highlighted previously, in chapter two, as findings have differed according to which of the two has been measured. Furthermore there are few studies that measured both and controlled for the effects of the other in the analyses (Hall *et al.* 2016). This current chapter shows that both wellbeing and burnout have important implications for safety outcomes.

4.7.3.2 Limitations

Limitations of this work include a relatively small sample size, compared to the population sample, which was due to difficulty in recruiting. A further limitation is the inability to determine cause and effect due to the cross-sectional nature of the method used. Previous research suggests that patient safety and wellbeing/burnout are linked in a cyclical nature (Hall, Johnson, Heyhoe, Watt, Anderson and O'Connor 2017; West *et al.* 2006). Furthermore, for a true test of the mediating role of burnout and wellbeing, occupational variables, burnout and wellbeing, and safety need to be assessed over time. Whilst this study cannot comment on the direction of the relationships, establishing that these variables are in fact associated is a necessary first step within this research, with research on the direction of the relationships discussed in the next chapter. Finally, the self-selecting nature of the participants causes potential for a biased sample, which has implications for the generalisability of the results. It is possible that only GPs who are currently suffering from burnout or poor wellbeing chose to participate. This would, in part, explain the high levels of burnout and GHQ scores within our sample. Whilst this may be true to some extent, it could be argued that this sample is still fairly representative of the wider GP population in the UK, with previous surveys on GP wellbeing and burnout having also reported fairly high rates and prevalences (Orton, Orton and Gray 2012; Davies 2013; Appleton, House and Dowell 1998). Furthermore, these measures did still display normal distributions, with a wide range of scores shown for all measures.

4.7.4 Implications for clinicians and policymakers

General Practitioners' job stress levels are rising, which could lead to increases in burnout and depression, and therefore action is warranted from relevant authorities (Gibson *et al.* 2015; McManus, Winder and Gordon 2002; Weinberg and Creed 2000). The finding that occupational variables relating to workload were associated with patient safety outcomes and that these relationships were mediated via burnout and wellbeing is important for clinicians, practice managers, and policymakers alike, and provides a strong reason for intervening. These findings suggest two places that interventions could be targeted: 1) at a system or practice level through addressing the occupational characteristics themselves i.e. through increasing support within practices, reducing the amount of administrative work, or hiring more administrative staff, or 2) at the individual level, through increasing resilience in order to prevent burnout i.e. through mindfulness or resilience training. Both have their advantages and disadvantages. One issue with the first option is the difficulty in affecting change on a wider level, and particularly in creating a team atmosphere that is supportive within practices where there is not already a positive team culture. However the advantages of this approach include the ability to positively affect all team members, and address some of the root causes of the problems. The main disadvantage of the second option is the lack of addressing the issues that cause burnout/poor wellbeing in the first place, and ultimately placing the responsibility on the GPs themselves to ensure they do not burnout, despite remaining in an environment that is conducive to burnout. One advantage to this option, however, may be that individual change is easier and quicker to implement. Ultimately, it is likely that a dual-approach is needed to successfully reduce burnout, improve wellbeing, and subsequently reduce patient safety incidents.

Cost-effectiveness evaluations of the relative approaches are also warranted to help identify the most feasible solutions within an already underfunded organisation. It is worth noting that when taking cost into account, it is likely to be more cost effective to intervene on these issues than not to, with figures reported in the NHS Health and Well-being Review Interim Report estimating that improving staff health and wellbeing in Primary Care Trusts could save £213,806 annually (Boorman 2009).

4.7.5 Unanswered questions / future research

Future research needs to take a longitudinal approach to understand the temporal relationships of these variables. This will enable a clearer understanding of whether burnout and poor wellbeing do in fact lead to poorer

patient safety, whether the reverse is true, or whether it is in fact a cycle. Furthermore, studies that allow for the assessment for the mediating role of burnout and wellbeing on the association between occupational variables and safety over time is needed. Then, various interventions should be trialled at different points of the cycle to see how best to break the potential path of detrimental work environments leading to burnout and poor wellbeing, leading to unsafe practices, leading to even worse wellbeing and burnout. This approach will be taken in the next chapter to address the question of cause and effect.

4.8 Conclusion

Occupational variables were associated with poorer perceptions of safety in the practice, and near misses, through increasing GPs' levels of burnout and decreasing their levels of wellbeing. Specifically, higher number of hours spent on administrative work, and lower levels of support within the practice lead to poorer wellbeing, increased burnout, and subsequently poorer patient safety outcomes. To improve patient safety within general practices, changes could be made at both the organisational and practice level, and the individual level, to promote a healthier work environment for staff and patients.

Chapter 5 Exploring the Temporal Associations between GP Wellbeing, Burnout, and Safety: A Daily Diary Study

5.1 Introduction

The previous chapter provided evidence for an association between general practitioners' levels of wellbeing and the likelihood of making a near miss, and their levels of burnout and their perceptions of safety. Furthermore, the importance of working in a supportive practice was identified: a lack of support was associated with poorer patient safety behaviours and perceptions, through the mediating roles of burnout and wellbeing.

Whilst these findings indicate the importance that GP wellbeing and burnout has for patient safety, these results, along with the majority of similar studies conducted within secondary care doctors, suffer from two important methodological limitations: 1) the cross-sectional nature of these studies forgoes the ability to determine cause and effect, 2) participants are asked to recall past patient safety incidents from up to a year ago, subjecting the results to memory biases and problems associated with memory recall. A further limitation in the literature within secondary care settings is that the measures of patient safety incidents ask participants to report incidents that may have occurred up to one year ago, whilst the measures of wellbeing and burnout ask participants to comment on their current state of wellbeing and burnout, or in some cases their state in the last week/month. Therefore, there is the possibility that participants who reported currently being burnt-out/having poor wellbeing may not have necessarily been burnt-out or had poor wellbeing at the time when the error was made. Similarly, it is also possible that participants who reported having good wellbeing, or not currently being burnt-out at the time of the survey, may have answered differently during the period of time when the error was made. The previous study in this thesis overcame two of these limitations through including a current measure of safety, the Safe Practitioner measure. However the limitation regarding causality remained. Additionally, these studies have investigated associations between burnout/wellbeing and safety between individuals. Few studies, and none within primary care, have examined whether these associations found between individuals are also evident within individuals at a daily level.

Although wellbeing and burnout have been shown to remain fairly stable over time, they have also been shown to fluctuate on a daily basis (Matthew 2011;

Louch *et al.* 2017). To the best of my knowledge, there have been no studies investigating whether these daily fluctuations in wellbeing and burnout have associations with daily levels of safety within healthcare staff generally, or General Practitioners specifically. There are, however, studies investigating daily and within-person changes in stress and the effects of daily stressors (or hassles) on subsequent behaviours (Louch *et al.* 2017; O'Connor *et al.* 2008). Regarding research within healthcare, one study in nurses reported that both chronic stress and daily hassles contribute to daily perceptions of safety (Louch *et al.* 2017). Due to Louch et al's (2017) findings, alongside the knowledge that stress (and job stress in particular) has strong associations with burnout and depression, the importance of measuring stress in addition to burnout and wellbeing levels is acknowledged and therefore included in this present study (Iacovides *et al.* 2003).

The impact of daily social interactions on wellbeing and burnout will also be explored, based on the premise that regular social interactions throughout the working day act as a form of social and emotional support. The absence of support has previously been found to be a determinant of burnout (Prins *et al.* 2007; Constable and Russell 1986) and the presence of high support and connectedness has previously been found to be associated with lower levels of burnout and higher levels of wellbeing (Chapter 4), (Santen *et al.* 2010; Reis *et al.* 2000). Additionally, studies have shown that various types of support (organizational, supervisory, co-worker) can directly (and indirectly) influence safety outcomes, across a variety of industries, including healthcare (Hofmann and Morgeson 1999; Mearns and Reader 2008; Wilkins and Shields 2008), (Chapter 4). In chapter 3, GP participants of focus groups suggested that having a break during the work day where they can interact with colleagues could (and does) have a large effect on their wellbeing that day. Whilst there has been one study that has taken a daily diary approach to examine whether colleague support impacts on perceived quality of care (Jones and Johnston 2013), no studies have explored the daily effects of coworker support demonstrated through regular interactions, or whether daily levels of positive social interactions with coworkers can affect patient safety outcomes. This study will investigate these associations, with the expectation that positive social interactions will improve patient safety perceptions (and potentially reduce the likelihood of being responsible for a patient safety incident), through improving daily levels of wellbeing and burnout.

This current study builds upon the findings from the previous study, investigating the association between GP wellbeing, burnout, support, and patient safety, through studying the temporal relationships between these

variables in an attempt to gain insights into causality and begin to overcome the aforementioned limitations evident within previous cross-sectional data. To establish cause and effect between variables in an empirical study, three criteria must be met: 1) the variables must covary, i.e. when one variable occurs, the other also does, and when it does not, the other does not either, 2) there must be evidence that the causal variable occurred *before* the second variable, 3) internal validity must be demonstrated i.e. any other plausible alternatives have been ruled out. This study builds upon previous survey-based research that had met conditions one and three, by ensuring condition two is also met, through the use of a daily diary design.

Previous research from West *et al.* (2006) has suggested a circular relationship between burnout and errors in medicine trainees, but not with wellbeing measures, when assessed at three month intervals. To the best of my knowledge, no previous research has been undertaken within a primary care setting using this methodology. This study will use a daily diary design to allow for within-person comparisons whereby each individual acts as their own control. Through measuring daily states in wellbeing and burnout, alongside baseline trait measures, this design allows for a more in depth understanding of the interactions between colleague support, individual wellbeing and stress, and safety outcomes.

5.2 Aims

This study aimed to investigate how daily changes in General Practitioners' wellbeing and burnout levels interact with daily changes in patient safety measures.

The specific aims were as follows:

Primary aims

To investigate whether:

1. Daily changes in wellbeing correspond with daily changes in safety perceptions and the likelihood of being responsible for a patient safety incident.
2. Daily changes in burnout correspond with daily changes in safety perceptions and the likelihood of being responsible for a patient safety incident.
3. Stress in the morning predicts patient safety outcomes later that day.

4. The level of burnout and/or wellbeing and/or morning stress on one day predicts the level of patient safety the following day?

Secondary aims

To investigate whether:

5. Breaks generally, and those with positive social interactions specifically, affect daily levels of wellbeing, burnout, and patient safety.

6. Burnout and wellbeing mediate the association between breaks with safety outcomes.

5.3 Hypotheses

1. Participants reporting lower daily wellbeing (as measured by higher ratings of negative affect and lower ratings of positive affect), will rate their practice as less safe that day, and will also be more likely to report being responsible for a patient safety incident that day than participants with better wellbeing.

2. Participants reporting higher burnout levels that day will be more likely to rate their practice as less safe on the same day, and will also be more likely to report being responsible for a patient safety incident that day than participants with lower levels of burnout on that day.

3. Participants with higher stress levels in the morning will report lower safety perceptions later that day, and be more likely to report being responsible for a patient safety incident than those who reported lower levels of stress in the morning.

4. Participants reporting low wellbeing, higher burnout, and higher morning stress levels will be more likely to report poorer perceptions of safety and being responsible for a patient safety incident on the following day than participants with higher wellbeing, lower burnout, and lower stress levels.

5a. Having a break with a positive social interaction will be associated with lower levels of burnout, negative mood, and higher levels of positive mood that day.

5b. Having a break with a positive social interaction will be associated with better safety perceptions and a reduction in the likelihood of being involved in a patient safety incident that day.

6. Burnout and wellbeing will mediate the effect of breaks on safety, in that GPs who have a break will therefore have lower burnout levels, less negative

affect, and more positive affect and will subsequently report their practice as more safe.

5.4 Method

5.4.1 Ethical considerations

This study received ethical approval from the University of Leeds, School of Psychology Ethics Committee (ref #17-0185, date: 27/06/17) and Health Research Authority approval (IRAS # 216260). Participants were fully informed of the types of questions that would be involved in the study prior to consenting to take part. They were also informed that they may skip any questions they wished to, and that they may withdraw from the study at any point before, during, and after taking part, up until the point of analysis (one month post study completion). They were also informed that their responses would be kept completely anonymous through the use of a unique participant code, with any contact information stored securely and separately to their participant code and survey responses. Finally, contact information for relevant support/helplines were provided at the end of the study in the event that participants became distressed as a result of the potentially sensitive nature of the study.

5.4.2 Design

A within-subjects, interval contingent, daily diary design was used. Participants completed a short questionnaire consisting of a sleep and a stress measure just before work in the morning (or after getting up on their days off) and a longer questionnaire before bed, for seven consecutive days. The end of the day time point was to capture participants' wellbeing over the entire day. Allowing a break between the immediate end of their working day and completing the questions facilitated time for reflection over their wellbeing throughout the day and thus may reduce the influence of their current state of wellbeing. Similar designs have previously been used in studies of wellbeing in the workplace (Harris, Daniels and Briner 2003). An interval contingent rather than event contingent approach was used so as to reduce participant burden and therefore increase participant motivation and compliance (Green *et al.* 2006). The advantage of using online surveys over paper allowed the entries to be time-stamped and therefore the data could be checked for any back-filling of questions.

5.4.3 Participants

Practising general practitioners in the UK, regardless of role, who worked six sessions a week or more, were eligible.

5.4.3.1 Incentives

Participants were awarded a £20 ‘love to shop’ voucher upon completion of the study along with a certificate of participation that they could use as evidence of continued professional development in their appraisal portfolios. Additionally, there was a prize draw at the end of the study, with the winner (drawn at random using an online random number generator) receiving an additional £75 in ‘love to shop’ vouchers.

5.4.3.2 Recruitment

Various recruitment streams were used:

1. Participants from previous studies within this PhD who had consented to being contacted about future studies were recruited via email.
2. GP organisations and media outlets were contacted requesting their collaboration in recruitment (e.g. placing an advert on their site and in their e-newsletters).
3. Social media was used: a GP contact posted in their private GP groups on facebook and study details were posted on twitter.
4. Personal networks were utilised to email the study information to local GPs.
5. Primary care research teams within Clinical Research Networks forwarded the recruitment email to practices in their regions that were keen to participate in research.
6. Fliers were handed out at local GP TARGET events.

5.4.4 Measures

5.4.4.1 Baseline questionnaire

Demographic variables (age, gender, ethnicity, location) and occupational variables (workload, practice list size, number of hours spent on various work tasks etc.) were measured at baseline, prior to the first morning set of questions, along with wellbeing, burnout, support, and perceptions of a safe practice.

5.4.4.1.1 Wellbeing measures

Due to the complexity of defining and measuring wellbeing, five different wellbeing measures were used across this study, with each capturing a different perspective of wellbeing.

General Health Questionnaire – 12 (GHQ-12)

The GHQ-12 (Goldberg 1978) was used during the baseline questionnaire and the final questionnaire, as a measure of mental distress. Participants rated how often they had recently been feeling or acting in certain ways e.g. 'Have you recently been able to concentrate on whatever you're doing?' with four answer options: 'less than usual', 'no more than usual', 'rather more than usual', 'much more than usual'. The GHQ has been previously used in studies of healthcare staff wellbeing (including in the previous chapter) with good variability (Arimura *et al.* 2010; Baldwin, Dodd and Wrate 1997; Houston and Allt 1997; Suzuki *et al.* 2004). Cronbach's alpha in our sample showed good internal consistency (α = .820).

Quality of Life (QoL)

QoL was used to measure a broader sense of participants' overall wellbeing at baseline and the final time point. Participants were asked, "How would you rate your current quality of life?" on a scale from 0 (as bad as it could be) to 10 (as good as it could be). This scale has been validated across a large variety of populations and medical conditions (Gudex *et al.* 1996; Spitzer *et al.* 1981; West *et al.* 2009) and has been widely used in the literature studying the associations between healthcare staff wellbeing and patient safety (Dyrbye *et al.* 2013; Fahrenkopf *et al.* 2008; West *et al.* 2006; West *et al.* 2009).

Perceived Stress Scale (PSS)

The four-item shortened version of the PSS (the PSS-4) was used to measured participants' baseline levels of stress over the last month on a scale from 0 (never) to 4 (very often) (Cohen, Kamarck and Mermelstein 1983). An example item is, 'In the last month, how often have you felt confident about your ability to handle your personal problems?'. Cronbach's alpha in our sample demonstrated good internal consistency (α = .809).

5.4.4.1.2 Burnout

Burnout was measured at baseline using the 16 item English translation of the Oldenburg Burnout Inventory (OLBI) (Demerouti *et al.* 2003; Halbesleben and Demerouti 2005). This burnout measure uses positive and negative wording to measure burnout on two distinct scales; Exhaustion, Disengagement. An example question for Exhaustion is, "There are days when I feel tired before I arrive at work". Participants answer on a four point Likert scale ranging from 'Strongly agree' to 'Strongly disagree'. Cronbach's alpha in our sample demonstrated good internal consistency of the items (α = .878).

5.4.4.1.3 Patient safety

The Safe Practitioner Measure (Louch *et al.* 2016) was used to measure doctors' perceptions about how unsafe their practice generally is because of work related factors, on a five point scale from 1 (strongly disagree) to 5 (strongly agree). This measure has been previously used and validated in daily diary studies of wellbeing and safety in nurse samples (Louch *et al.* 2017).

5.4.4.1.4 Support

Practice level support was measured at baseline and at the end of the study with a visual analogue scale (VAS) asking participants, "How supported do you feel within your practice/workplace?", on a scale of 0 (not at all supported) to 5 (very supported). This question has been previously used within the WellGP project (in Chapter 4) and found to be an important contributor to wellbeing and burnout.

5.4.4.2 Morning questionnaire

Prior to work, participants were asked to answer the following three questions on sleep; 1) "How many hours did you sleep for last night?" 2) "How long did it take you to fall asleep last night?" 3) "How would you rate the quality of your sleep last night" on a scale from 0 (very poor) to 10 (very good). Similar questions have been used in daily diary studies of sleep (Shapiro *et al.* 2003; Valrie *et al.* 2007). They were additionally asked to complete one question on stress; "How stressed do you feel this morning?" on a scale from 0 (not at all) to 10 (very much so). Single item measures of stress have been shown to have good content, criterion and construct validity (Elo, Leppänen and Jahkola 2003; Littman *et al.* 2006), reduce participant burden in comparison with longer measures, and demonstrate good daily variability when used in daily diary studies (Freeman and Gil 2004; Gil *et al.* 2004).

5.4.4.3 Evening questionnaire work days

5.4.4.3.1 Wellbeing: Positive and negative affect

Daily levels of wellbeing were measured using positive and negative affect adjectives. Participants rated the extent to which they felt each mood that day, from 0 (not at all) to 10 (very much so). The positive affect score was the cumulative of six items (''happy', 'successful', 'satisfied', 'excited', 'capable', and 'calm'), (Cronbach's α = .909) and the negative affect score comprised eight items ('sad', 'anxious', 'defeated', 'lonely', 'guilty', 'hopeless', 'irritable', and 'stressed'), (Cronbach's α= .922) showing very good internal consistency for the dataset where *n* = 241. These adjectives were developed for this study

with some adjectives taken from the Positive and Negative Affect Schedule (Watson, Clark and Tellegen 1988), some from Diener and Emmon's affect scale (1984), and the remaining adjectives added due to specific relevance to this study (successful, satisfied, capable, calm, defeated, lonely, hopeless). This approach for measuring affect is consistent with other studies that repeatedly measure mood (Myin-Germeys, Delespaul and deVries 2000), with similar approaches having been found sensitive enough to capture fluctuations in response to daily stressors (Bolger *et al.* 1989). Factor analysis was conducted within our sample and found that the presence of two different factors (one for negative affect, one for positive affect) was substantiated.

5.4.4.3.2 Burnout

We developed a shortened version of the OLBI for daily use to increase compliance and engagement. It was developed through choosing three items from each burnout scale with good face validity and that have high factor loadings on the relevant scales (Halbesleben and Demerouti 2005). Similar approaches have been used to abbreviate the Maslach Burnout Inventory (McManus, Winder and Gordon 2002). Additionally, the wording was adapted for use at the daily level, based on similar studies that did this and found good day to day variability (Matthew 2011). An example item is, 'Today I found new and interesting aspects in my work', with the answer options being the same as the original OLBI. Cronbach's $\alpha = .818$ showing these tailored items had good internal consistency. Factor analysis with the extraction criteria set for two factors demonstrated the correct loading of disengagement onto one factor, exhaustion onto the other.

5.4.4.3.3 Patient safety

Safe Practitioner

The safe practitioner measure (Louch *et al.* 2016) was used to measure daily safety perceptions through replacing the word 'Generally' with 'Today' so that the question asks, "Today, my practice is not as safe as it could be because of work related factors/conditions". This item has previously been used as a daily measure by the authors who devised it, with good variability found across days (Louch *et al.* 2017).

Adverse Events & Near Misses

Participants were asked whether they had been responsible for any a) adverse events (AEs) and b) near misses (NM) that day (Yes or No responses). If yes to either question, they were required to classify the outcome of the AE/NM from

the following options, “Minor reversible patient harm, Minor irreversible patient harm, Major reversible patient harm, Major irreversible patient harm”.

This question, or some variant of it, is commonly used in studies of patient safety, including the previous study in this thesis (Arimura *et al.* 2010; Baldwin, Dodd and Wrate 1997; de Oliveira Jr *et al.* 2013; Shanafelt *et al.* 2012; Tanaka *et al.* 2012). If participants answered yes to either adverse events or near misses, they were also asked to indicate what type of adverse event/near miss it was, from a list comprising; “Diagnostic error/near miss, Medication or prescription error, Equipment error, Communication, Monitoring error, Other”. This list was based on common errors/AEs identified in the literature (Dovey *et al.* 2002; Rubin *et al.* 2003; Sandars and Esmail 2003). Finally, participants had to indicate which of the following contributed, to any extent, to the adverse event/near miss; “System issue, Degree of fatigue, Lapse in concentration, Lapse in judgment, Lack of knowledge, Degree of stress or burnout, Other”, with the option to select more than one. This item was used previously in this thesis, and was adapted from a measure used in previous literature (Shanafelt *et al.* 2010).

5.4.4.3.4 Support

Coworker support and work breaks were measured through asking participants how many breaks they had each day, how long each break was, and in how many of the breaks they had positive and negative interactions with colleagues.

5.4.4.4 Evening questionnaire days off

On participants’ days off, they only answered the wellbeing questions, and five burnout items adapted for daily use, that were relevant for non-work days. However, data from days off were not analyzed for this thesis as they were beyond the scope of this chapter.

5.4.5 Materials

Participants completed each set of questions via an online link that they were sent in a text and an email, at each time point (morning and evening). The online survey was mobile compatible.

5.5 Data preparation and analysis

The level 1 data set was created by matching participants’ morning responses to their evening responses. Responses from days off work were excluded for the purposes of this study. Surveys time points that were completely missing were deleted, along with their corresponding morning responses (n = 8).

Survey time points that were completed on the wrong day (i.e. backfilled) were excluded from the analysis (*n* = 16) along with one participant who did not complete any evening surveys. The final number of participants was 58, with a total of 241 completed days (or half days) at work. This gave an average of 4 completed survey days (at work) per participant.

A new dichotomous variable was created called 'Patient Safety Incident' whereby Adverse Events and Near Misses were combined and scored such that if the participants had reported either, it were coded as 1, if they reported neither, it was coded as 0. This was done to increase the power of detecting patient safety events, as low numbers of adverse events and near misses were reported across the study.

For the lagged analyses (aim 4), participants were included if they had completed three or more consecutive days at work. To create the data file, participants' burnout, wellbeing, stress rating, and safety scores from the subsequent day were mapped onto the previous day's row, and the final day's scores from that participant deleted. This resulted in 41 participants with a total of 128 days, giving an average of 3 days per participant.

To address all of the aims, hierarchical linear modelling in HLM7 was conducted (Raudenbush 2004). Hierarchical linear modelling allows the data to be assessed both within a particular level and between levels. Relationships can be established at a daily level and more accurate conclusions can be drawn through this type of analysis compared to only between-participant analyses, as each participant essentially acts as their own control. The data from this study was across two-levels. Level 1 contained within-participant variation (e.g. daily burnout, wellbeing, safety perceptions) with predictor variables centred around the group mean. Level 2 contained between-participant variability (e.g. baseline levels of burnout and wellbeing, age, years in practice) with these variables centred around the grand mean (Bryk and Raudenbush 1992; Kreft, De Leeuw and Aiken 1995). Each model controlled for participants' age, gender, and years in practice. Age and years in practice were grand centred, gender was uncentred because it was dichotomous. For the main effect of e.g. burnout/wellbeing on safety perceptions (controlling for age, gender, and number of years in practice), the following equation was used:

$$\text{Outcome variable (e.g. safe practitioner)} = \beta_{00} + \beta_{01}\,(\text{age}) + \beta_{02}\,(\text{gender}) + \beta_{03}\,(\text{years in practice}) + \beta_{10}\,(\text{predictor variable e.g. Burnout}) + \varepsilon$$

Whereby:

β_{00} = Mean level of outcome variable (e.g. safe practitioner)

$\beta_{01 - 03}$ = Indicates the extent to which this average is influence by age/gender/years in practice

β_{10} = Indicated the extent to which this average is influence by level of the predictor variable (e.g. burnout).

ε = Error term

For models where the daily measure predictor was shown to be significant, additional terms were added to the model to control for baseline traits related to the daily measure e.g. if daily burnout was shown to be significant, baseline burnout was added to the model to control for its effects on the outcome variable.

For analyses involving outcome variables that were dichotomous (PSI, AE, NM), the level 1 models were replaced by Bernoulli models (Raudenbush 2004).

The data was screened for outliers using boxplots and missing data analyses were run. For level 2 (baseline measures) data, Little's MCAR test showed that the data were missing completely at random (X^2 = 146.575, df = 136, *p* = .253). Missing data in this level for each variable ranged from 0 % missing (majority of variables) to 1.7% (OLBI:E3, OLBI:E7, OLBI:D8, PSS2). Missing data in level 2 were replaced with the column mean. For level 1 data, Little's MCAR test showed that the data were not missing completely at random (X^2 = 347.105, df = 271, *p* = .001). Missing data in this level for each variable ranged from 4% missing (OLBI:D3, OLBI:E2, OLBI:E3, Safe Practitioner, Happy, Satisfied, Excited, Capable, Lonely, Guilty, Stressed, Adverse Events, Near Misses) to 5.6% (Morning Stress). Missing data in level 1 were replaced with the person mean for that item. Although Little's test showed the data were not missing at random, because there was no obvious theoretical basis for why there would be a pattern to the missing data, coupled with the small percentage of missing data overall, it was decided that dealing with the missing data by column and person means was acceptable and pragmatic, in order to maintain enough power to detect effects. Sensitivity analyses were run on the main analyses using the original data files with missing data. Differences in results between analyses with and without missing data are reported in the next section. For all analyses with continuous outcome variables, the estimation of fixed effects with robust standard errors are reported. For analyses with dichotomous outcomes variables and therefore where Bernoulli distribution was used, the estimation of

fixed effects for the unit-specific models with robust standard errors are reported.

5.6 Results

5.6.1 Participants

Fifty-nine practising GPs took part in total. The majority of participants were recruited through a) our local network of GPs and researchers within primary care encouraging their colleagues to participate, and b) primary care research leads within the CCGs forwarding on the recruitment materials to practices (practice managers and general practitioners directly) within their regions.

5.6.2 Descriptive statistics

Descriptive statistics for all variables are reported in Appendix D. In the dataset used for same-day analyses (n = 58 with missing data imputed), 51 (87.9%) of participants would have been classed as having a possible case of minor psychiatric illness based on the commonly used cut-off value of scoring above 3 on the GHQ-12 (Hardy *et al.* 1999). Furthermore, using the cut-off values commonly used in the literature, 50 (86%) participants were classed as having mild (29%) or severe (57%) exhaustion and 44 (76%) participants as having mild (40%) or severe (36%) disengagement (Björklund, Jensen and Lohela-Karlsson 2013; Demerouti *et al.* 2001).

The most common outcome for adverse events and near misses was (potential for) ‘minor reversible patient harm’ (92% of AEs, 76% of NM). The most common AE and NM types were medication or prescription AE/NM (42% and 38%, respectively), followed by communication AE/NM (25% and 35%, respectively). Lapse in concentration was the most cited contributor for the adverse event or near miss (27%), followed closely by degree of fatigue (24%) and degree of stress or burnout (15%).

5.6.3 Aim 1: Daily levels of wellbeing and same day safety outcomes

The results for each predictor variable modelled independently on each safety outcome variable are presented in Table 5.1 and Table 5.2.

5.6.3.1 Daily wellbeing and same day safe practitioner score

Negative affect had a significant positive association with safe practitioner scores. GPs who had higher ratings of negative affect that day reported that they were less able to act as a safe practitioner on the same day. This association held when controlling for baseline GHQ-12 scores (β = .016, p = .022) and baseline QoL scores (β = .016, p = .020) in separate models. There was no significant association between positive affect and same day safe practitioner scores.

5.6.3.2 Daily wellbeing and same day patient safety incidents

Negative affect had a significant positive association with patient safety incidents. GPs who had higher ratings of negative affect that day were more likely to report that they had been responsible for a patient safety incident that day. This association held when controlling (separately) for baseline GHQ-12 (β = .037, p = .041) and QoL (β = .039, p = .035) scores. There was no significant association between positive affect and being responsible for a patient safety incident that day.

Negative affect was also significantly associated with adverse events. GPs who had higher ratings of negative affect that day were more likely to report that they had been responsible for an adverse event that day. Again, this association held when controlling for baseline GHQ-12 and QoL scores (β = .016, p = .005 and β = .017, p = .005, respectively). There was no association between positive affect and adverse events.

Neither negative nor positive affect was significantly associated with reported near misses on the same day.

5.6.4 Aim 2: Daily levels of burnout and same day safety outcomes

The results for each predictor variable modelled independently on each safety outcome variable are presented in Table 5.1 and Table 5.2.

5.6.4.1 Daily burnout and same day safe practitioner score

Total burnout scores had a significant positive association with safe practitioner scores on the same day. GPs who reported higher levels of burnout on that day reported that they were less able to act as a safe practitioner on the same day. This association remained significant when controlling for baseline burnout scores (β = .073, p = .031). When using the subscales of burnout independently, exhaustion was found to have a significant positive association with safe practitioner scores that day, even when controlling for baseline exhaustion scores (β = .011, p = .038). GPs with higher levels of exhaustion reported acting less safe that day. Disengagement was not significantly associated with safe practitioner scores.

5.6.4.2 Daily burnout and same day patient safety incidents

Total burnout scores were not significantly associated with reporting being responsible for a patient safety incident on the same day. When using the subscales of burnout independently as predictors in separate models, neither exhaustion nor disengagement had significant associations with same day patient safety incident reporting. When specifying the types of PSI as either AE or NM, burnout, exhaustion, and disengagement were still not significantly associated with either outcome measure.

Table 5.1 Within-person associations between wellbeing and burnout variables with safe practitioner scores on the same day

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: Safe Practitioner	β_{00}	2.381	.233	< .001
Level 1 slope: Positive Affect - SP	β_{10}	-.011	.013	.421
Intercept: Safe Practitioner	β_{00}	2.362	.232	< .001
Level 1 slope: Negative Affect - SP	β_{10}	.015	.007	.027
Intercept: Safe Practitioner	β_{00}	2.339	.231	< .001
Level 1 slope: OLBI - SP	β_{10}	.073	.033	.031
Intercept: Safe Practitioner	β_{00}	2.381	.232	< .001
Level 1 slope: OLBI:D - SP	β_{10}	.091	.057	.117
Intercept: Safe Practitioner	β_{00}	2.321	.227	< .001
Level 1 slope: OLBI:E - SP	β_{10}	.111	.053	.041

Note: Level 1 n = 241, statistics when controlling for age, gender, and years in practice only, HLM = Hierarchical linear modelling, β = hierarchical multilevel linear modelling symbol, Coeff = unstandardized coefficient, SE = standard error, SP = Safe Practitioner, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI, OLBI:E = Exhaustion subscale of OLBI

Table 5.2 Within-person associations between wellbeing and burnout variables with reported patient safety incidents on the same day

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: PSI	β_{00}	-2.270	.742	.003
Level 1 slope: Positive Affect - PSI	β_{10}	-.053	.034	.123
Intercept: PSI	β_{00}	-2.343	.741	.003
Level 1 slope: Negative Affect - PSI	β_{10}	.039	.018	.036
Intercept: PSI	β_{00}	-2.238	.738	.004
Level 1 slope: OLBI - PSI	β_{10}	.142	.082	.089
Intercept: PSI	β_{00}	-2.235	.735	.004
Level 1 slope: OLBI:D - PSI	β_{10}	.134	.154	.389
Intercept: PSI	β_{00}	-2.207	.736	.004
Level 1 slope: OLBI:E - PSI	β_{10}	.264	.137	.060
Intercept: AE	β_{00}	-3.960	1.082	< .001
Level 1 slope: Positive Affect - AE	β_{10}	-.031	.022	.170
Intercept: AE	β_{00}	-3.964	1.089	< .001
Level 1 slope: Negative Affect - AE	β_{10}	.018	.006	.004
Intercept: AE	β_{00}	-3.952	1.086	< .001
Level 1 slope: OLBI - AE	β_{10}	.058	.096	.551
Intercept: AE	β_{00}	-3.943	1.089	< .001
Level 1 slope: OLBI:D - AE	β_{10}	-.002	.204	.993
Intercept: AE	β_{00}	-3.968	1.086	< .001
Level 1 slope: OLBI:E - AE	β_{10}	.143	.123	.247
Intercept: NM	β_{00}	-2.588	.769	.001
Level 1 slope: Positive Affect - NM	β_{10}	-.031	.038	.417
Intercept: NM	β_{00}	-2.625	.755	.001
Level 1 slope: Negative Affect - NM	β_{10}	.035	.021	.103
Intercept: NM	β_{00}	-2.525	.749	.001
Level 1 slope: OLBI - NM	β_{10}	.115	.094	.228
Intercept: NM	β_{00}	-2.586	.755	.001
Level 1 slope: OLBI:D - NM	β_{10}	.116	.180	.521
Intercept: NM	β_{00}	-2.452	.749	.002
Level 1 slope: OLBI:E - NM	β_{10}	.201	.154	.196

Note: Level 1 *n* = 241, statistics when controlling for age, gender, and years in practice only, β = hierarchical multilevel linear modelling symbol,
Coeff = unstandardized coefficient, SE = standard error, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI,
OLBI:E = Exhaustion subscale of OLBI, PSI = Patient Safety Incident, AE = Adverse Event, NM = Near Miss

5.6.5 Aim 3: Morning stress and patient safety outcomes later that day

The results for morning stress modelled on each safety outcome variable reported later that day are presented in Table 5.3.

5.6.5.1 Morning stress and same day safe practitioner score

Morning stress had a significant positive association with safe practitioner scores that day. GPs who reported higher levels of stress in the morning reported being less able to act as a safe practitioner later that day. This association remained significant when controlling for baseline levels of stress (β = .100, *p* = .002).

5.6.5.2 Morning stress and same day patient safety incidents

Morning stress had a significant positive association with patient safety incidents that day. GPs who reported higher levels of stress in the morning were more likely to report being responsible for a patient safety incident later that day. This association remained significant when controlling for baseline levels of stress (β = .299, *p* = .006).

Morning stress had significant positive associations with both adverse events and near misses, separately. GPs who reported higher levels of stress in the morning were more likely to report being responsible for adverse events and near misses later that day. These associations remained significant when controlling for baseline levels of stress (β = .276, *p* = .031 and β = .279, *p* = .017 respectively).

5.6.5.3 Multiple predictors for same day associations between wellbeing, burnout, and stress variables with safety outcomes

Predictor variables that were statistically significant in the above models were then considered simultaneously in the same model, to determine which predictors were more strongly associated with safety, when controlling for the effects of the other variables.

When stress in the morning, burnout (OLBI total scores), and negative affect were all entered into the model predicting safe practitioner scores, only morning stress remained significant (β = .071, *p* = .019). Similarly, when morning stress, exhaustion, and negative affect were all entered into the model predicting safe practitioner scores, again, only morning stress remained significant (β = .067, *p* = .024). Morning stress still remained the only significant predictor variable even when controlling for baseline levels of stress (perceived stress score), (β = .068, *p* = .018 and β = .071, *p* = .014, respectively).

When morning stress and negative affect were simultaneously entered into the model predicting patient safety incidents, again only morning stress remained significant (β = .252, *p* = .020). This remained the case when controlling for baseline stress (β = .300, *p* = .008). When morning stress and negative affect were simultaneously entered into the model predicting adverse events, neither remained significant, although morning stress neared significance (β = .293, *p* = .056).

Table 5.3 Within-person associations between morning stress and safety outcomes later that day

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: Safe Practitioner	β_{00}	2.409	.225	< .001
Level 1 slope: Morning Stress - SP	β_{10}	.094	.030	.003
Intercept: PSI	β_{00}	-2.359	.764	.003
Level 1 slope: Morning Stress - PSI	β_{10}	.299	.106	.007
Intercept: AE	β_{00}	-4.275	1.051	< .001
Level 1 slope: Morning Stress - AE	β_{10}	.294	.133	.031
Intercept: NM	β_{00}	-2.679	.788	.001
Level 1 slope: Morning Stress - NM	β_{10}	.275	.113	.018

Note: Level 1 *n* = 241, statistics when controlling for age, gender, and years in practice only, HLM = Hierarchical linear modelling, β = hierarchical multilevel linear modelling symbol, Coeff = unstandardized coefficient, SE = standard error, SP = Safe Practitioner, PSI = Patient Safety Incident, AE = Adverse Event, NM = Near Miss

5.6.6 Aim 4: Daily levels of burnout and wellbeing with next day patient safety outcomes

The results for each predictor variable modelled independently on each safety outcome variable for the lagged analyses are presented in Table 5.4 and Table 5.5.

5.6.6.1 Burnout and next day safe practitioner score

Burnout in general did not have a significant association with safe practitioner scores on the following day. However, when entering the subscales of burnout into separate models as predictors, disengagement showed a significant positive association with next day safe practitioner scores, but exhaustion did not. GPs who reported higher disengagement levels on one day were more likely to report perceiving their practice as less safe on the following day. This association remained significant when controlling for their levels of disengagement on the following day (β = .0241, p = .007), as well as when simultaneously controlling for their baseline levels of disengagement (β = .237, p = .006).

5.6.6.2 Burnout and next day patient safety incidents

Burnout had a significant negative association with reporting a patient safety incident on the following day. Participants who reported higher levels of burnout on one day were less likely to report being responsible for a patient safety incident on the following day. This association remained significant when controlling for burnout scores on the following day (β = -.334, p = .003) and also when controlling for baseline burnout scores simultaneously (β = -.344, p = .003).

When entering exhaustion and disengagement into separate models as predictors, both showed significant negative associations with reporting a PSI on the subsequent day. GPs reporting higher levels of exhaustion, and higher levels of disengagement on one day, were less likely to report being responsible for a PSI on the subsequent day. This association remained when controlling for exhaustion on the subsequent day and at baseline (β = -.560, p = .003), and similarly when controlling for disengagement on the subsequent day along with baseline disengagement scores (β = -.322, p = .007).

When investigating specific types of patient safety incidents, burnout was found to have a significant negative association with reporting adverse events on the following day. GPs reporting higher levels of burnout on one day were less likely to report being responsible for an adverse events on the following day. This association remained significant when controlling for baseline burnout and

burnout scores on the following day (β = -.560, p = .003). Furthermore, both subscales of burnout also showed the same negative associations with adverse events, when controlling for baseline and next day exhaustion, and disengagement, respectively (β = -.367, p < .001 for exhaustion, and β = -1.526, p = .002 for disengagement).

Exhaustion was also found to have a significant negative association with near misses on the following day. This association remained significant when controlling for exhaustion on the following day along with baseline exhaustion scores (β = -.614, p = .016). Total burnout scores and disengagement were not significantly associated with near misses on the following day.

5.6.6.3 Wellbeing and next day safe practitioner score

Neither positive nor negative affect on one day predicted safe practitioner scores on the following day.

5.6.6.4 Wellbeing and next day patient safety incidents

Neither positive nor negative affect on one day predicted the reporting of patient safety incidents, adverse events, or near misses on the following day.

5.6.6.5 Morning stress and next day safe practitioner score

How stressed GPs felt in the morning did not have any association with how safe they rated their practice on the following day.

5.6.6.6 Morning stress and next day patient safety incidents

How stressed GPs felt in the morning did not predict the reporting of patient safety incidents, adverse events, or near misses on the following day.

Table 5.4 Within-person associations between wellbeing, burnout and morning stress with next day safe practitioner scores

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: Safe Practitioner	β_{00}	2.246	.281	< .001
Level 1 slope: OLBI - SP	β_{10}	.060	.039	.134
Intercept: Safe Practitioner	β_{00}	2.292	.278	< .001
Level 1 slope: OLBI:D - SP	β_{10}	.209	.081	.013
Intercept: Safe Practitioner	β_{00}	2.147	.287	< .001
Level 1 slope: OLBI:E - SP	β_{10}	.006	.052	.903
Intercept: Safe Practitioner	β_{00}	2.056	.293	< .001
Level 1 slope: Positive Affect - SP	β_{10}	- .001	.013	.929
Intercept: Safe Practitioner	β_{00}	2.053	.294	< .001
Level 1 slope: Negative Affect - SP	β_{10}	- .000	.010	.990
Intercept: Safe Practitioner	β_{00}	2.093	.288	< .001
Level 1 slope: Morning Stress - SP	β_{10}	- .032	.040	.427

Note: Level 1 *n* = 128, statistics when controlling for age, gender, and years in practice only, β = hierarchical multilevel linear modelling symbol,
Coeff = unstandardized coefficient, SE = standard error, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI,
OLBI:E = Exhaustion subscale of OLBI, SP = Safe Practitioner

Table 5.5 Within-person associations between wellbeing, burnout, and morning stress with next day patient safety outcomes

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: PSI	β_{00}	-3.442	1.193	.006
Level 1 slope: OLBI - PSI	β_{10}	-.334	.107	.003
Intercept: PSI	β_{00}	-3.224	1.143	.008
Level 1 slope: OLBI:D - PSI	β_{10}	- .230	.137	.034
Intercept: PSI	β_{00}	-3.526	1.210	.006
Level 1 slope: OLBI:E - PSI	β_{10}	- .553	.171	.002
Intercept: PSI	β_{00}	-3.427	1.115	.004
Level 1 slope: Positive Affect - PSI	β_{10}	.017	.040	.677
Intercept: PSI	β_{00}	-3.202	1.132	.007
Level 1 slope: Negative Affect - PSI	β_{10}	- .009	.013	.494
Intercept: PSI	β_{00}	-3.800	1.175	.003
Level 1 slope: Morning Stress - PSI	β_{10}	- .154	.169	.366
Intercept: AE	β_{00}	-5.173	2.034	.015
Level 1 slope: OLBI - AE	β_{10}	- .517	.184	.008
Intercept: AE	β_{00}	-5.110	2.085	.019
Level 1 slope: OLBI:D - AE	β_{10}	- .977	.389	.016
Intercept: AE	β_{00}	-4.819	1.940	.018
Level 1 slope: OLBI:E - AE	β_{10}	- .448	.119	< .001
Intercept: AE	β_{00}	-4.930	1.863	.012
Level 1 slope: Positive Affect - AE	β_{10}	.074	.043	.095
Intercept: AE	β_{00}	-4.876	2.069	.024
Level 1 slope: Negative Affect - AE	β_{10}	- .047	.039	.240
Intercept: AE	β_{00}	-4.730	1.927	.019
Level 1 slope: Morning Stress - AE	β_{10}	- .241	.153	.123
Intercept: NM	β_{00}	-3.832	1.291	.005
Level 1 slope: OLBI - NM	β_{10}	- .248	.162	.133
Intercept: NM	β_{00}	-3.671	1.237	.005
Level 1 slope: OLBI:D - NM	β_{10}	- .046	.239	.849
Intercept: NM	β_{00}	-4.125	1.388	.005
Level 1 slope: OLBI:E - NM	β_{10}	- .599	.240	.017
Intercept: NM	β_{00}	-3.915	1.242	.003
Level 1 slope: Positive Affect - NM	β_{10}	- .023	.042	.588
Intercept: NM	β_{00}	-3.722	1.254	.005
Level 1 slope: Negative Affect - NM	β_{10}	.022	.030	.469
Intercept: NM	β_{00}	-4.171	1.281	.002
Level 1 slope: Morning Stress - NM	β_{10}	- .067	.188	.723

Note: Level 1 *n* = 241, statistics when controlling for age, gender, and years in practice only, β = hierarchical multilevel linear modelling symbol,
Coeff = unstandardized coefficient, SE = standard error, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI,
OLBI:E = Exhaustion subscale of OLBI, PSI = Patient Safety Incident,
AE = Adverse Event, NM = Near Miss

5.6.7 Aim 5: Breaks and same day wellbeing, burnout, and patient safety

The results for each break variable modelled independently on each wellbeing, burnout and safety outcome variable in turn are presented in Table 5.6 and Table 5.7.

5.6.7.1 Breaks and same day wellbeing

Having a break during the day was not significantly associated with positive or negative affect on the same day.

Breaks with a positive interaction(s) had a significant positive association with positive affect, and a significant negative association with negative affect. GPs who had one or more break(s) during the day that had one or more positive interaction(s) with a colleague(s) reported higher levels of positive affect and lower levels of negative affect that day. These associations remained significant when controlling for baseline wellbeing scores (GHQ-12: β = 3.258, p = .010 for positive affect, β = -6.621, p = .002 for negative affect, and QoL: β = 3.45, p = .011 for positive affect, β = -6.603, p = .002 for negative affect).

Breaks with a negative interaction had a significant positive association with negative affect. GPs who had one or more break(s) during the day that had one or more negative interaction(s) with a colleague(s) reported higher levels of negative affect that day. This remained significant when controlling for baseline GHQ and QOL scores (β = 10.108, p = .013 and β = 9.245, p = .022 respectively). There was no significant association between breaks with a negative interaction and positive affect.

5.6.7.2 Breaks and same day burnout

Having a break during the day had a significant negative association with disengagement scores. GPs who had one or more break during the work day reported lower levels of disengagement that day. This association remained significant when controlling for baseline levels of disengagement (β = -.433, p = .040). There was no significant association between breaks and total burnout scores or exhaustion.

Breaks with a positive interaction had a significant negative association with total burnout scores. GPs who had one or more break(s) during the day that had one or more positive interaction(s) with a colleague(s) reported lower levels of burnout that day. This association held when controlling for baseline levels of burnout (β = -.927, p = .032). When using the subscales of burnout independently, breaks with a positive interaction were significantly negatively associated with both disengagement and exhaustion. GPs who had one or

more break(s) during the day that had one or more positive interaction(s) with a colleague(s) reported lower levels of disengagement and exhaustion that day. Disengagement remained significant when controlling for baseline disengagement scores (β = -.639, *p* = .001). Exhaustion was no longer significant when controlling for baseline exhaustion scores (β = -.432, *p* = .111).

Breaks with a negative interaction had a significant positive association with total burnout scores. GPs who had one or more break(s) during the day that had one or more negative interaction(s) with a colleague(s) reported higher levels of burnout that day. This remained significant when controlling for baseline burnout scores (β = 1.595, *p* = .005). When using the subscales of burnout independently, only exhaustion had a significant (positive) association with breaks with a negative interaction. GPs who had one or more break(s) during the day that had one or more negative interaction(s) with a colleague(s) reported higher levels of exhaustion that day. This remained significant when controlling for baseline exhaustion scores (β = 1.671, *p* = .001).

5.6.7.3 Multiple predictors for same day associations between the break variables and burnout

A MLM model was run to determine whether it is breaks per se or breaks with a positive interaction with a colleague that are associated with burnout (specifically, disengagement) scores. Both breaks, and breaks with a positive interaction were entered simultaneously into the model with disengagement as the outcome variables. Only breaks with a positive interaction remained significantly associated with disengagement (β = -.866, *p* < .001). This association remained significant when controlling for baseline disengagement scores (β = -.674, *p* = .006).

5.6.7.4 Breaks and same day safe practitioner scores

Breaks with a positive interaction had a significant negative association with safe practitioner scores that day. GPs who had one or more break(s) during the day that had one or more positive interaction(s) with a colleague(s) reported being more able to act as a safe practitioner that day. Breaks per se, and breaks with a negative interaction were not significantly associated with safe practitioner scores.

5.6.7.5 Breaks and same day patient safety incidents

Breaks per se, breaks with a positive interaction, and breaks with a negative interaction were not associated with reporting being responsible for a patient safety incident in general, an adverse event, or a near miss that day.

Table 5.6 Within-person associations between break variables with wellbeing and burnout outcome variables

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: OLBI	β_{00}	15.271	1.086	< .001
Level 1 slope: Breaks - OLBI	β_{10}	- .795	.422	.065
Intercept: OLBI	β_{00}	15.193	1.018	< .001
Level 1 slope: Positive Int. - OLBI	β_{10}	-1.490	.398	< .001
Intercept: OLBI	β_{00}	14.223	1.075	< .001
Level 1 slope: Negative Int. - OLBI	β_{10}	1.945	.577	.001
Intercept: OLBI:D	β_{00}	6.767	.533	< .001
Level 1 slope: Breaks – OLBI:D	β_{10}	- .590	.211	.007
Intercept: OLBI:D	β_{00}	6.735	.496	< .001
Level 1 slope: Positive Int. – OLBI:D	β_{10}	- .853	.192	< .001
Intercept: OLBI:D	β_{00}	6.466	.524	< .001
Level 1 slope: Negative Int. – OLBI:D	β_{10}	-.106	.418	.800
Intercept: OLBI:E	β_{00}	8.365	.677	< .001
Level 1 slope: Breaks – OLBI:E	β_{10}	- .219	.268	.418
Intercept: OLBI:E	β_{00}	8.404	.651	< .001
Level 1 slope: Positive Int. – OLBI:E	β_{10}	- .663	.258	.013
Intercept: OLBI:E	β_{00}	8.113	.625	< .001
Level 1 slope: Negative Int. – OLBI:E	β_{10}	1.792	.404	< .001
Intercept: Positive Affect	β_{00}	24.867	3.672	< .001
Level 1 slope: Breaks – Positive Affect	β_{10}	1.043	1.245	.410
Intercept: Positive Affect	β_{00}	25.503	3.527	< .001
Level 1 slope: Positive Int. – Positive Affect	β_{10}	3.734	1.333	.007
Intercept: Positive Affect	β_{00}	28.605	3.775	< .001
Level 1 slope: Negative Int. – Positive Affect	β_{10}	-3.861	2.731	.163
Intercept: Negative Affect	β_{00}	28.772	5.723	< .001
Level 1 slope: Breaks – Negative Affect	β_{10}	-3.461	2.088	.103
Intercept: Negative Affect	β_{00}	28.456	5.594	< .001
Level 1 slope: Positive Int. – Negative Affect	β_{10}	-7.124	2.068	.001
Intercept: Negative Affect	β_{00}	24.906	5.984	< .001
Level 1 slope: Negative Int. – Negative Affect	β_{10}	8.992	3.940	.026

Note: Level 1 *n* = 241, statistics when controlling for age, gender, and years in practice only, HLM = Hierarchical linear modelling, β = hierarchical multilevel linear modelling symbol, Coeff = unstandardized coefficient, SE = standard error, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI, OLBI:E = Exhaustion subscale of OLBI, Int. = Interaction

5.6.8 Aim 6: Burnout/wellbeing as a mediator of the association between breaks with positive interactions and safety

Three models were proposed for testing for mediation, based on whether breaks with a positive interaction was shown to be significantly associated with both a burnout or wellbeing variable and a safety measure. The models tested:

1. If burnout mediates the association between breaks with positive interactions and safe practitioner scores.
2. If exhaustion mediates the association between breaks with positive interactions and safe practitioner scores.
3. If negative affect mediates the association between breaks with positive interactions and safe practitioner scores.

In all three cases, the criteria for mediation was not met, as negative affect, exhaustion, and burnout were not significantly associated with safety when controlling for breaks with a positive interaction. However, breaks with a positive interaction remained significant when entered into the regression model simultaneously with each of the wellbeing or burnout measures. This indicates that breaks with a positive interaction is the pre-eminent variable for GPs' perceptions of acting as a safe practitioner. Following this finding, we then entered morning stress and breaks with a positive interaction into the model simultaneously to see which of these predictor variables had a stronger effect on safety perceptions later that day. Both stress and breaks with a positive interaction remained significant in the analysis, indicating that each explained a significant, independent amount of variance in safety perceptions later that day and are therefore both important predictors of safety perceptions.

Table 5.7 Within-person associations between break variables and safety measures

HLM Effect	Symbol	Coeff	SE	*p* - value
Intercept: Safe Practitioner	β_{00}	2.528	.225	< .001
Level 1 slope: Breaks - SP	β_{10}	- .224	.127	.083
Intercept: Safe Practitioner	β_{00}	2.532	.218	< .001
Level 1 slope: Positive Int. - SP	β_{10}	- .343	.126	.008
Intercept: Safe Practitioner	β_{00}	2.383	.232	< .001
Level 1 slope: Negative Int. - SP	β_{10}	- .042	.231	.858
Intercept: PSI	β_{00}	-2.014	.765	.011
Level 1 slope: Breaks – PSI	β_{10}	- .350	.375	.355
Intercept: PSI	β_{00}	-2.064	.749	.008
Level 1 slope: Positive Int. – PSI	β_{10}	- .425	.354	.234
Intercept: PSI	β_{00}	-2.273	.736	.003
Level 1 slope: Negative Int. – PSI	β_{10}	.622	.581	.289
Intercept: AE	β_{00}	-3.968	1.333	.004
Level 1 slope: Breaks – AE	β_{10}	.132	.604	.828
Intercept: AE	β_{00}	-3.732	1.235	.004
Level 1 slope: Positive Int. – AE	β_{10}	.044	.626	.944
Intercept: AE	β_{00}	-4.121	1.074	< .001
Level 1 slope: Negative Int. – AE	β_{10}	.246	.606	.686
Intercept: NM	β_{00}	-2.282	.765	.004
Level 1 slope: Breaks – NM	β_{10}	- .243	.412	.558
Intercept: NM	β_{00}	-2.304	.749	.003
Level 1 slope: Positive Int. – NM	β_{10}	- .387	.377	.308
Intercept: NM	β_{00}	-2.583	.761	.001
Level 1 slope: Negative Int. – NM	β_{10}	.855	.562	.134

Note: Level 1 *n* = 241, statistics when controlling for age, gender, and years in practice only, HLM = Hierarchical linear modelling, β = hierarchical multilevel linear modelling symbol, Coeff = unstandardized coefficient, SE = standard error, OLBI = Oldenburg Burnout Inventory (total score), Int. = Interaction, SP = Safe Practitioner, PSI = Patient Safety Incident, AE = Adverse Event, NM = Near Miss

5.6.9 Sensitivity analyses

Analyses for the same day effects (Aims 1-3, 5-6) were carried out with the original data files, prior to filling in the missing data. In HLM, level-1 missing data was deleted when running each analyses, resulting in a maximum of 222 days, a minimum of 216, with 54 participants (as there were 54 complete level 2 cases). The majority of main effects were unchanged by the use of the un-imputed dataset, however the following analyses produced different results:

- Negative affect was no longer associated with safe practitioner scores on the same day.
- When morning stress and burnout (OLBI total score) were both entered into the model simultaneously, stress was no longer significantly associated with safe practitioner scores. Burnout remained un-associated.
- When morning stress and exhaustion were both entered into the model simultaneously, stress was no longer significantly associated with safe practitioner scores. Exhaustion remained un-associated.
- Having a break in the day was found to be associated with lower levels of burnout.
- Having a break with a negative interaction with a colleague was no longer found to be associated with higher levels of negative affect that day.

It is likely that the lack of significance in these analyses are a result of a smaller dataset and thus may reflect a lack of power.

5.7 Discussion

5.7.1 Summary of findings

For an overview of which wellbeing, burnout, and morning stress measures had significant associations with same and next-day patient safety outcomes, please refer to Table 5.8. For an overview of how breaks were associated with burnout, wellbeing, and patient safety outcomes, please refer to Table 5.9.

5.7.1.1 Aims 1 and 2: Do daily changes in wellbeing and burnout correspond with daily changes in safety outcomes on the same day?

Within-person models were run with each burnout and wellbeing variable entered into separate models, with each safety outcome variable in turn. The analyses showed that GPs who reported higher levels of burnout, and in particular higher levels of exhaustion, and those who reported higher levels of negative affect, were more likely to report being less able to act as a safe practitioner on that same day. When using the self-reported measures of

patient safety incidents, GPs who reported higher levels of negative affect were significantly more likely to report having been responsible for a patient safety incident that day, and in particular, an adverse event (but not a near miss). Burnout was not found to be associated with reporting a patient safety incident that day. These findings partially support hypotheses 1 and 2.

5.7.1.2 Aim 3: Does stress in the morning predict patient safety outcomes later that day?

Within-person models were run to determine whether GPs' levels of stress in the morning before work could predict their levels of safety later that day. The analyses showed that GPs who reported higher levels of stress before work reported being less able to act as a safe practitioner during the day, and were also more likely to report being responsible for an adverse event and near miss. These findings support hypothesis 3.

When morning stress was entered into the models alongside burnout/exhaustion and negative affect, with safe practitioner scores as the outcome variable, only morning stress remained significant. This indicates that the level of stress in the morning is the pre-eminent factor driving levels of safety that day, with the effects of stress levels in the morning over-riding the effects of negative affect and burnout during the day on safety perceptions.

5.7.1.3 Aim 4: Do the levels of burnout, wellbeing, or morning stress on one day predict patient safety outcomes on the following day?

Within-person models were run with each burnout, wellbeing, and morning stress predictor variable in separate models with each safety outcome variable in turn. Disengagement, despite not being associated with safe practitioner scores on the same day, was found to significantly predict safe practitioner scores on the following day: GPs who reported higher levels of disengagement on one day reported being less able to act as a safe practitioner on the following day, compared to GPs who had reported lower levels of disengagement the previous day. No other burnout or wellbeing variables, or morning stress predicted safe practitioner scores on the following day. These findings partially support hypothesis 4.

Total burnout scores, disengagement and exhaustion independently, had significant associations with patient safety incidents, and adverse events in particular: GPs who reported higher levels of disengagement, exhaustion, and burnout generally on one day were less likely to report being responsible for an adverse event the following day compared to GPs reporting lower levels of burnout. Similarly, GPs who reported higher levels of exhaustion on one day

were less likely to report being responsible for a near miss on the next day. These findings do not provide support for hypothesis 4 as they are in the opposite direction to that hypothesized.

5.7.1.4 Aim 5: Do breaks generally, and those with positive social interactions specifically, affect daily levels of wellbeing, burnout, and patient safety?

Separate within-person models were run with breaks per se, breaks with a positive interaction, and breaks with a negative interaction as predictor variables, and each burnout, wellbeing, and safety measure as outcome variables, in turn. Whilst breaks per se were found to be significantly associated with disengagement scores, further analysis revealed that breaks with a positive interaction was the more important factor: GPs who had at least one break with at least one positive interaction with a colleague reported significantly lower disengagement scores at the end of the day than those who did not have a break with a positive interaction with a colleague. Breaks with a positive interaction with a colleague were also found to be significantly associated with higher levels of positive affect and lower levels of negative affect, burnout (total score) and exhaustion that day. Similarly, breaks with a negative interaction with a colleague were significantly associated with higher levels of negative affect, burnout (total scores), and exhaustion that day. These findings provide support for hypothesis 5a.

Having at least one break with at least one positive interaction with a colleague was also found to be significantly associated with perceptions of acting as a safe practitioner that day. Breaks (of any sort) were not found to be associated with reporting patient safety incidents that day, thus providing partial support for hypothesis 5b.

5.7.1.5 Aim 6: Do burnout and wellbeing mediate the association between breaks with safety outcomes?

There was no evidence to support hypothesis 6 as Baron and Kenny's conditions for mediation were not met (Baron and Kenny 1986). However, when breaks with a positive interaction and burnout/negative affect were entered into the models simultaneously, breaks remained significantly associated with safe practitioner scores whilst burnout and negative affect were shown to no longer be significant. This indicates that breaks with a positive interaction is the pre-eminent factor for perceptions of acting as a safe practitioner.

5.7.2 Interpretation of results

The findings that higher levels of burnout on one day predict being less likely to report a patient safety incident on the following day, despite predicting being less able to act as a safe practitioner on the following day, should be interpreted with caution. One possible explanation for this finding is that participants become more aware of their burnout levels following completion of their daily diary. As a result participants who reported high levels of burnout on one day may have acknowledged that their levels of burnout could pose a safety risk, and therefore they conducted behaviours on the following day that minimized risk to patients (e.g. through referrals and double-checking notes/prescriptions etc.). The finding that they still reported being less able to act as a safe practitioner on days that followed high levels of burnout suggest that it is their awareness that they may not be able to act safely that actually prompts safer behaviours. If this is the case, then urging GPs to be more active in monitoring their levels of burnout and their perceptions of safety may be a possible intervention to improve patient safety within general practice. This idea is consistent with the broader health psychology literature, where self-monitoring has been found to be an important factor in changing behaviour (Abraham and Michie 2008).

To validate the proposed monitoring effect, further analyses were conducted to determine whether safety perceptions on one day predicted patient safety incidents on the same and the following day. Neither analyses were significant, suggesting that these findings are not likely to be due to the proposed monitoring effect (for the measures available here).

It is more plausible, therefore, that these findings are due to the low frequency of PSIs within the sample. Within the lagged data files there were only 15 near misses (11.7% of cases) and 6 adverse events (4.7% of cases) reported, resulting in a very skewed dataset with the large majority of days reporting no incidents. As such, the effect was likely to have been driven by the large number of ‘no incident’ days. Therefore, findings relating to patient safety incidents (AE and NM) should be interpreted with great caution, with further research and replication of these findings needed to confirm their robustness or otherwise reject them.

Table 5.8 Significant within-person associations between wellbeing, burnout, and morning stress variables with same and next day patient safety outcome variables

	SP	PSI	AE	NM
OLBI				
Same Day	✓	x	x	x
Next Day	x	✓	✓	x
OLBI:D				
Same Day	x	x	x	x
Next Day	✓	✓	✓	x
OLBI:E				
Same Day	✓	x	x	x
Next Day	x	✓	✓	✓
Positive Affect				
Same Day	x	x	x	x
Next Day	x	x	x	x
Negative Affect				
Same Day	✓	✓	✓	x
Next Day	x	x	x	x
Morning Stress				
Same day	✓	✓	✓	✓
Next Day	x	x	x	x

Note: Same day *n* = 58, number of days = 241, Next day *n* = 41, number of days = 128, SP = Safe Practitioner, PSI = Patient Safety Incident, AE = Adverse Event, NM = Near Miss, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI, OLBI:E = Exhaustion subscale of OLBI

Table 5.9 Within-person associations between types of breaks with wellbeing, burnout, and safety outcome variables

	Positive Affect	Negative Affect	OLBI	OLBI:D	OLBI:E	SP	PSI	AE	NM
Breaks	x	x	x	✓	x	x	x	x	x
Breaks with a positive interaction	✓	✓	✓	✓	✓	✓	x	x	x
Breaks with a negative interaction	x	✓	✓	x	✓	x	x	x	x

n = 58, number of days = 241, SP = Safe Practitioner, PSI = Patient Safety Incident, AE = Adverse Event, NM = Near Miss, OLBI = Oldenburg Burnout Inventory (total score), OLBI:D = Disengagement subscale of OLBI, OLBI:E = Exhaustion subscale of OLBI

5.7.3 Comparison with existing literature

5.7.3.1 Associations between burnout and wellbeing/affect, with patient safety

This study's findings that higher burnout levels (specifically exhaustion) and higher levels of negative affect are associated with perceptions of acting as a safe practitioner that day supports the majority of the literature within secondary care doctors and nurses (Hall *et al.* 2016). This present study provides evidence for this association within general practitioners, who are very underrepresented within the literature, as well as providing further support to the findings surrounding these associations reported in the previous chapter. Through using a daily diary methodology this study has also provided evidence that the associations between individuals experiencing different levels of burnout and wellbeing with safety are also evident within-individuals: GPs who experience higher levels of burnout and negative affect on one day viewed their practice as less safe on the same day, in comparison to the same GP experiencing less burnout and negative affect on one day and viewing their practice as more safe that day. These effects were found even when controlling for baseline trait levels of burnout and wellbeing, highlighting the importance of daily states on safety. This finding is novel, as previous literature using similar methodologies has either measured a) negative affect and perceived quality of care (Jones and Johnston 2013), or b) daily hassles and safety (Louch *et al.* 2017) within nursing samples.

The majority of research on the associations between healthcare staff wellbeing, burnout, and safety has taken a cross-sectional approach, thus limiting the ability to determine cause and effect. A few studies, in addition to the couple mentioned above, have overcome this methodological limitation. West *et al.* (2006) and Welp, Meier and Manser (2016) both conducted surveys at 3-month intervals of internal medicine residents, and physicians and nurses in intensive care units, respectively. Both studies reported some evidence that staff with higher levels of burnout were more likely to report making an error or report lower levels of safety at subsequent survey time-points. Whilst Welp, Meier and Manser (2016) did not find this trend to be significant, they reported that emotional exhaustion predicted less effective teamwork, which in turn predicted poorer safety ratings. The findings from this chapter using the lagged analyses provide support for the evidence that burnout predicts future levels of safety, even across a short time frame. It was found that higher levels of disengagement predicted GPs reporting that they were less able to act as a safe practitioner on the following day. This finding is novel within general

practitioners, but also within healthcare staff generally, as this is the first study to employ this method with these variables in healthcare staff.

One of the key findings from this present study is that the level of stress reported by GPs in the morning, before work, predicted their safety perceptions and the occurrence of patient safety incidents later that day. This is the first study to show a strong, causal link between stress and safety, with the effects still evident when controlling for baseline levels of stress, as well as when controlling for levels of burnout and negative affect that day. Whilst Louch and colleagues' (2017) study reported that daily hassles (commonly used as a measure of daily stress, (Chamberlain and Zika 1990; O'Connor *et al.* 2009)) are associated with poorer safety perceptions that day, our study extends this through the use of the morning survey time-point allowing cause and effect to be determined.

5.7.3.2 Breaks and positive social interactions with burnout, wellbeing, and safety

Having a break during the working day is, anecdotally, a good way to ensure staff productivity and workplace wellbeing. One paper by Lyckholm (2001) offering practical advice to oncologists for overcoming burnout advises to take frequent breaks within the working day. However there has not been much empirical research on whether taking a break during the day actually improves healthcare staff burnout and wellbeing levels. Our findings offer evidence that having at least one break within the day is associated with lower levels of disengagement.

Regarding whether breaks are important contributors to safety, there is more evidence in the literature. A review in 2003 across various industries concluded that regular breaks can be "an effective means of maintaining performance, managing fatigue, and controlling for the accumulation of risk over prolonged task performance" (Tucker 2003, p.123). This review did not contain many studies from within healthcare settings, however. Since that review, one study among nurses in the USA reported that nurses who reported having a break also reported fewer errors or near misses, though, this association did not quite reach significance (Rogers, Hwang and Scott 2004). They did, however, find a significant effect of the length of the break, with longer breaks significantly associated with fewer errors and near misses than shorter breaks. Whilst we did not analyse the effect of the length of break within this present study, this is something that could be investigated in future research.

The findings within this chapter propose that it is not taking a break per se that has an effect on burnout, wellbeing, or safety, but that it is having a break that

includes a positive interaction with a colleague that is important. The importance of colleague support has previously been reported within healthcare environments, both in cross-sectional studies and in those employing diary methods (Chapter 4), (Constable and Russell 1986; Jones and Johnston 2013; Prins *et al.* 2007). Interventions that have focussed on improving workgroup civility through increasing positive social behaviour amongst teams have been successful in alleviating burnout (Maslach and Leiter 2017). These interventions are fairly novel in their approach in that they place emphasis on all members of the workforce sharing responsibility to strengthen the team culture. This results in the workforce being empowered as well as reducing the responsibility from lying solely with the individual or the organisation.

To the best of my knowledge, there are no studies within healthcare that have specifically investigated whether having breaks and/or positive interactions with colleagues can affect patient safety. The buffering effect of breaks with a positive interaction on the associations between burnout and negative affect on safety perceptions does, however, partially support one previous study in a nursing sample. Jones and Johnston (2013) found that nurses who reported high negative affect during a clinical incident and who did not receive colleague support reported a lower perceived quality of care that day than those who did receive colleague support. Whilst their study differs to ours in that breaks were not investigated and the perceived quality of care instead of safety was measured, the evidence for the importance of interacting with colleagues is supported. These findings also provide quantitative support to the anecdotal evidence that breaks and team support improve wellbeing, which was presented earlier in this thesis (Chapter 3) from the focus groups with GPs.

5.7.4 Strengths and limitations

5.7.4.1 Strengths

The primary strength of this study is that it is the first study within general practitioners specifically, to investigate how wellbeing, burnout, and stress may impact on patient safety on a daily level and within individuals. Additionally, the majority of studies investigating the associations between these variables within secondary care staff have been cross-sectional in design and so this study is novel when brought into the broader healthcare context too. Furthermore, the design of the study allowed for a time-lagged analysis, which enabled the direction of the relationship between these variables to be investigated. This is also the first study to assess whether having breaks during the work day are associated with daily levels of burnout, wellbeing, and safety.

The majority of participants completed all diary entries, which, given that it is notoriously difficult to recruit and engage GPs into research studies, especially ones that are fairly time consuming for little reward, was above all expectations. One reason for this may be due to the focus of the study being of particular interest to GPs, given the current climate of stress and burnout within general practice in the UK (Baird *et al.* 2016; Gibson *et al.* 2015). Throughout the course of this study, numerous participants gave (un-prompted) feedback on the study, stating how useful and interesting they found it to reflect on their wellbeing levels and safety perceptions. One participant even wrote how participating in the study had helped them identify their need for professional support (and seek it) to address and deal with their high levels of burnout/poor wellbeing.

5.7.4.2 Limitations

To decrease participant burden and increase compliance, some of the questions were limited in their scope. For example, the survey filtered participants who selected that it was their 'day off' to a subset of the evening questions, which subsequently did not include questions on safety. However this then could not capture GPs who do some work from home on their days off and thus could not capture any errors or near misses made on those days. Whilst this is only a small issue as data from days off were not analysed for this thesis, adverse events or near misses occurring on 'days off' could subsequently impact on their sleep that night and their stress, wellbeing, and burnout levels the following day.

Similarly to the previous chapters, there may be an issue regarding the representativeness of the sample. It is possible that GPs who are currently burnt-out or have low wellbeing were more likely to want to be involved in this study. However, the baseline wellbeing and burnout scores were relatively normally distributed, with good variability, therefore the results are likely to be generalizable across the UK (and abroad).

The difficulty in capturing patient safety incidents in general practice is highlighted in this study. One participant who emailed their reflections on this study pointed out that most adverse events do not become apparent until some time after the event (sometimes months after), with most GP weeks not involving any. This could partially explain the low number (n = 12) reported in this study. This issue was anticipated, which is why the safe practitioner measure was used in parallel, as a more sensitive and proxy measure of safety. As such, the results relating to reported adverse events, near misses, and the combined measure 'patient safety incidents' should be interpreted with

great caution, as previously mentioned. The frequency of each of these events was very low (16.6% and below), resulting in a very skewed dataset. Replication of the findings using these measures is needed, with a much larger sample size, before confidence can be placed in them.

Additionally, the use of self-reported safety measures is a limitation across this study and the previous chapter. However, it would not have been practical or feasible to employ objective measures of safety, especially due to the difficulty in capturing errors in general practice across a short period of time, as also previously mentioned.

5.7.5 Implications for clinicians, healthcare managers and policymakers

The finding that burnout, stress, and negative affect are associated with (and in some instances predict) poorer patient safety warrants attention from policy makers. General Practitioners' wellbeing should be a government and organisational priority, given a) the high rates of burnout, stress, and poor wellbeing amongst GPs in the UK currently and b) the implications these have for patient care and associated organisational costs. One reason why many GPs do not take breaks include the high patient loads they deal with on a daily basis, thus feeling like they do not have time to take a break, even though it is ultimately in their own and their patients' best interests. As GPs are feeling a lot of workload pressure put onto them from governing bodies and other organisations, which is leading to the feeling of a lack of time for breaks, this is something that could be addressed at the system-level (Hall, Johnson, Heyhoe, Watt, Anderson and O'Connor 2017).

Healthcare managers and practice managers should also take note of these findings, and can act on them by supporting GPs to restructure their work-day to include time for a communal break. Some onus may ultimately be on GPs themselves to build time into their schedules to allow for a break, which may be difficult to do in a system that is under pressure and overworked. However, GPs need to acknowledge that ultimately it may be beneficial to themselves and their patients to do so, perhaps even reducing workload through the improvement of safety and the decrease in staff taking sick leave, which often results in a loss of productivity (and profit) for the practice (Royal College of Physicians 2015).

For the break to be beneficial for staff wellbeing, burnout, and patient safety, some form of positive social interaction may be key. As such, it is important that GPs do not take breaks in isolation, but agree on a time during the day that all

members of staff can take a break together, even if only brief, to reap the benefits of social support and build a better team culture.

Ultimately, having a break during the work day where GPs can interact with their colleagues may be one path to improve wellbeing, alleviate and prevent burnout, and improve patient safety. Importantly, this solution, whilst it may not be the ultimate answer to the GP crisis, is practical, feasible, and could be implemented with relatively little difficulty compared to alternative solutions (such as resilience training or recruiting more staff to reduce workload burdens and other causes of job-stress).

The findings that daily states of burnout, wellbeing, and stress are associated with daily levels of perceptions of acting as a safe practitioner offers an opportunity for another type of intervention: workshops or self-practice to increase GPs' awareness of their current state of burnout, wellbeing, and stress. This could help GPs identify when they are feeling burnt-out/stressed/in a negative mood. This awareness could then a) be factored into how they conduct their practice that day (e.g. acknowledge that they may be more at risk of an error and conduct behaviours to minimise this risk) and b) act as a prompt to do something to improve their current state, which could be seeking out a colleague for a break and some positive social interactions.

5.7.6 Unanswered questions / future research

The question of whether burnout and wellbeing predicts the actual occurrence of making an error or near miss remains uncertain due to the small frequency of adverse events and near misses in our lagged dataset. Therefore, further research with a larger sample across a longer time-period is needed before conclusions can be drawn.

It would be interesting to investigate the differences between locum workers, who write their own contract which often allows time for a break and lunch in the day, with partners and salaried GPs. If locum workers do indeed take breaks most working days, are they also generally more safe, or would there still be variability across days, within-individuals? Whilst our sample did contain locums, partners, and salaried GPs, we were unable to explore differences between groups due to the low number of locum workers participating (only one, which is likely due to the eligibility criteria specifying that participants must work at least 6 sessions a week).

Not all GPs reported having breaks, which is worrying given the importance of breaks for their wellbeing, burnout levels, and patient safety that has been reported in this chapter. Building in a compulsory break into the work day

should be implemented in practices where this is not given practice, and subsequent changes in burnout, wellbeing, and patient safety should be monitored to evaluate the effectiveness of the breaks. The acceptability of breaks should also be evaluated in such practices, as it is possible that practices that do not make a habit of taking breaks may offer some resistance to taking this time out at first: they may feel that it adds to their workload by making them work later to compensate for that time, which was suggested by a minority of participants in the focus groups reported in chapter 3. Furthermore, as the importance of positive interactions was highlighted, team culture and civility should be assessed. Breaks with colleagues may have a negative impact in practices where staff do not get on, and in those instances, that would therefore need addressing first.

5.8 Conclusion

Higher levels of burnout and negative affect are associated with poorer perceptions of safety that day. Whilst there was limited evidence for burnout and wellbeing having implications for safety on the following day, evidence of causality was found when measuring stress and safety within a day: GPs who reported higher levels of stress before going to work were more likely to report being less able to act as a safe practitioner at work that day and were also more likely to report being responsible for an adverse event and/or near miss that day. Additionally, breaks with a positive interaction with a colleague were found to be significantly associated with lower levels of burnout and negative affect, higher levels of positive affect, and with being more able to act as a safe practitioner that day. Furthermore, breaks with a positive interaction with a colleague were found to have a buffering effect on the association between burnout and negative affect on safety. These findings, when taken together indicate the importance of General Practitioners taking a proper break during the work day, to improve their own wellbeing levels, protect against burnout, and protect against the effect that burnout and wellbeing can have on patient safety. Implementing a break during the day should be considered by all practices, with benefits likely to be seen in staff morale, wellbeing, patient safety outcomes, and possibly also savings seen in associated costs.

Chapter 6 General Discussion

6.1 Chapter summary

Whilst each previous chapter has provided in depth discussions related to the individual studies, this chapter brings all of the findings together and relates them back to the original aims of the thesis. Additionally, general reflections and limitations of the thesis are discussed, along with recommendations for future research and interventions. Finally, practical implications that the findings have for healthcare organisations, general practitioners, patients, and policy makers are outlined.

6.2 Thesis aims and summary

Since the seminal patient safety reports “To Err is Human” (Donaldson, Corrigan and Kohn 2000) and “An Organisation with a Memory” (Department of Health 2000) declared a ‘call to action’ in 2000, improving patient safety has been top of the agenda within healthcare organisations globally. Staff wellbeing has been identified as an important contributing factor for the delivery of safe and high quality patient care (Avery *et al.* 2012; Welp and Manser 2016). Work environments that are detrimental to staff wellbeing and conducive to burnout have also been linked to poorer quality and safety outcomes for patients within secondary care settings (Laschinger and Leiter 2006; Wilkins and Shields 2008). This is worrying given that healthcare staff have been consistently found to report high levels of burnout, depression, and job-related stress over the last decade (Arigoni, Bovier and Sappino 2010; Boorman 2009; Caplan 1994; Mata *et al.* 2015; Orton, Orton and Gray 2012; Wall *et al.* 1997). Whilst there has been research demonstrating the association between staff wellbeing and burnout with patient safety in secondary care settings, research within primary care has been sparse (Hall *et al.* 2016). General Practitioners are a subset of healthcare professionals whose levels of mental distress and risk of burnout are over and above those reported by secondary care doctors (Arigoni *et al.* 2009; Arigoni, Bovier and Sappino 2010; British Medical Association 2017b; Lee, Stewart and Brown 2008; Soler *et al.* 2008; Klersy *et al.* 2007; McManus *et al.* 2011; Poncet *et al.* 2007). As such, research on the impact this may have on patient care within primary care is imperative.

The primary aim of this thesis has therefore been to fill this gap in the literature by investigating if and how General Practitioners’ levels of burnout and

wellbeing are associated with patient safety. The specific research questions within this thesis were as follows:

1. Is burnout, or wellbeing, more strongly related to patient safety measures in healthcare staff?

2a. Is there an association between GP wellbeing and burnout, with patient safety outcomes in general practice?

2b. Is GP wellbeing, or burnout, more strongly associated with patient safety?

3. What occupational factors are associated with GPs' levels of wellbeing and burnout, and are these also related to patient safety outcomes?

4. What is the temporal relationship between burnout and safety, and wellbeing and safety?

To address these research questions, four pieces of research were conducted: a systematic literature review, a focus group study, a cross-sectional survey, and a study employing the use of daily-diaries over the course of a week. In chapter two, a systematic literature review was undertaken to determine whether healthcare staff wellbeing or burnout is more strongly associated with patient safety outcomes. In chapter three, focus groups were conducted to explore a) which occupational factors impact on general practitioners' levels of wellbeing and burnout, b) current and potential coping strategies to deal with workplace stress and burnout, and c) whether general practitioners perceive a link between their wellbeing and burnout levels with the quality and safety of care they deliver. In chapter four, a cross-sectional survey of GPs in the UK was conducted to quantitatively examine the perceived associations between occupational variables, burnout and wellbeing, and patient safety outcomes that were highlighted in the focus groups. Finally, in chapter five, a daily diary methodology was used to examine the temporal relationships between GP stress, burnout, wellbeing, patient safety and colleague support. Each of the aims outlined above are addressed, in turn, below. Additionally, an overarching model of the significant associations reported in the survey and daily diary chapters is presented in Figure 6.1).

6.3 Summary of key findings

6.3.1 Aim 1: Is burnout, or wellbeing, more strongly related to patient safety measures in healthcare staff?

Forty-six studies were identified and included in the systematic review (chapter two) that had investigated an association between healthcare staff wellbeing and patient safety outcomes, healthcare staff burnout and patient safety outcomes, or both. A fairly equal number of studies found associations between wellbeing with safety and burnout with safety. Whilst on the surface there was not any evidence of either wellbeing or burnout being more strongly related to safety outcomes than the other, the current literature suffered from one particular limitation that made addressing this aim challenging: few studies that measured both wellbeing and burnout allowed for the independent contribution of each variable to be determined in their analyses. As such, more research is needed whereby both wellbeing and burnout are measured and the relative, independent significance of each variable on safety outcomes are calculated. The limited number of studies that did allow for a distinction to be made (by controlling for the effects of the other variable in the analyses) suggested that both wellbeing and burnout in healthcare staff working in secondary care are independently associated with safety outcomes. Furthermore, one study reported that suffering from both may be associated with an even greater safety risk than suffering from one or the other exclusively. The review also highlighted the lack of research within primary care, justifying the need for the following studies reported within this thesis.

6.3.2 Aim 2: Is there an association between GP wellbeing and burnout with patient safety outcomes in general practice, and is one more strongly related to safety than the other?

During the focus group discussions with GPs (chapter three), participants stated that they perceived both low levels of wellbeing (characterised by depression, anxiety, and/or high stress) and burnout to impact negatively on patient safety. Little distinction was made by the majority of participants between the effects of wellbeing and burnout on safety outcomes. Participants also discussed possible explanatory mechanisms for how safety could be impaired in suffering GPs. For example, the symptoms of fatigue and reduced cognitive functioning could cause a lack of headspace to see multiple symptoms as a group of symptoms for one disease, which could then lead to a missed or wrong diagnosis.

The cross-sectional survey results in chapter four began to distinguish between the effects of low levels of GP wellbeing (characterised by high scores on the GHQ-12 and/or low QoL scores) and burnout on different measures of patient safety. High levels of burnout were shown to be associated with perceptions of being less able to act as a safe practitioner, when controlling for the wellbeing measures. Wellbeing, however, was not shown to be significantly associated with this safety measure once the effect of burnout had been controlled for. Conversely, only poor wellbeing, (as measured by high scores on the GHQ-12), was found to be significantly associated with self-reported near misses in the previous three months, even when controlling for any effect of burnout, whereas burnout was not found to be significant. These findings suggest that burnout may be associated with perceptions of acting safely, whereas wellbeing may be associated with safety-related behaviours (e.g. being responsible for an error).

Similarly, the daily diary study (chapter five) confirmed the differential findings between wellbeing and burnout measures with different safety measures, when investigating these associations on a daily basis. Whilst daily burnout and low levels of wellbeing (measured by negative affect) were both associated with perceptions of acting as a safe practitioner, only wellbeing was associated with reporting safety-related behaviour (reporting the occurrence of being responsible for an adverse event that day). This again shows that it is possible that burnout is responsible for safety perceptions, and wellbeing for safety behaviours. However, it is worth noting that when morning stress levels were entered into these analyses, the effects of burnout and wellbeing became non-significant, indicating that perhaps it is in fact the level of stress at the start of the day that has more bearing on both safety perceptions and behaviours. This finding indicates the importance of future research measuring stress *in addition* to burnout and wellbeing in healthcare professionals.

6.3.3 Aim 3: What occupational factors are associated with GPs' levels of wellbeing and burnout, and are these also related to patient safety outcomes?

The participants of the focus groups (chapter three) discussed a variety of workplace factors that they felt impacted, or could impact, on their own and their colleagues' levels of wellbeing and burnout. The main themes from this study fell under two types of factors; those that were internal to their practice or the individual, and those that were external factors. The internal influencers of GP wellbeing consisted of team support, the amount of variety within their role,

the amount of control they had over their schedule and the intensity of their workload. External influencers comprised the increase in pressure and workload, patients' expectations, the negative portrayal of general practice, and the lack of support from a variety of sources (e.g. the public and the government).

Building upon these findings, the cross-sectional survey (chapter four) measured an array of occupational factors to determine whether they influenced participants' levels of wellbeing and burnout, and safety outcomes. Whilst there was some variability in which factors were associated with burnout, wellbeing, and safety, the two factors that were shown to be significant for all of these outcome variables were the number of hours spent on administrative work per week and the level of support within the practice. Structural equation modelling analyses suggested that spending a high number of hours on administrative work per week and feeling not very well supported in their practice were associated with higher levels of burnout and poorer wellbeing, which were subsequently associated with reporting being less able to act as a safe practitioner, and more likely to report having been responsible for a near miss in the previous three months. These findings corroborate some of the qualitative findings, as well as supporting the wider literature based on the job-demands-control-support and job-demands-resources models of burnout within secondary care staff.

Taking the importance of practice support into account, and including the focus group participants' accounts that having a break during the day can have a substantial impact on their wellbeing, the daily diary study (chapter five) measured stress, burnout, wellbeing, breaks with a positive interaction (as a form of support), and safety outcomes. Results from this study confirm the importance of colleague support for burnout, wellbeing, and safety outcomes. On days when GPs had one or more break during the day with a positive interaction with a colleague, they reported lower levels of burnout, higher levels of positive affect, lower levels of negative affect, and being more able to act as a safe practitioner. There was also some evidence that having a break with a positive interaction with a colleague was the pre-eminent factor (over burnout or wellbeing) for safety perceptions that day. Taking the findings of these three studies together, the importance of support at work is evident, for GPs own wellbeing, but also for patient safety outcomes.

6.3.4 Aim 4: What is the temporal relationship between burnout and safety, and wellbeing and safety?

One of the main limitations in the previous literature that was identified in the systematic review (chapter two) was the lack of ability to determine cause and effect between these variables. The majority of previous studies utilised a cross-sectional study design to measure safety and wellbeing or burnout, which cannot, therefore, demonstrate the direction of these relationships. Limited previous research in secondary care that has overcome this limitation has suggested a circular relationship between burnout and error, but only a one-direction relationship between depression and error, with errors predicting subsequent depression but not vice versa. The final study in this thesis aimed to further address this limitation, within a primary care setting, to determine whether burnout, wellbeing, and stress could predict safety perceptions and behaviours on the following day. The evidence for this was mixed, due in part to the safety measures used. When using the safe practitioner measure of safety, which was shown to be more sensitive and have more variability than the measures of self-reported incidents, higher scores on the disengagement facet of burnout on one day predicted reporting being less able to act as a safe practitioner on the following day. This suggests that higher levels of this type of burnout may lead to poorer safety perceptions. The question that remains, however, is whether poorer perceptions of safety actually do result in poorer safety behaviours and worse patient outcomes. This shall be discussed later in this chapter.

Whilst there was not very strong evidence for burnout and wellbeing predicting future safety perceptions and behaviours, the results from the daily diary study did identify a strong, causal effect of stress on safety. On days where GPs reported higher levels of stress in the morning, they were significantly more likely to subsequently report being responsible for an adverse event and near miss later that day, as well as reporting being less able to act as a safe practitioner.

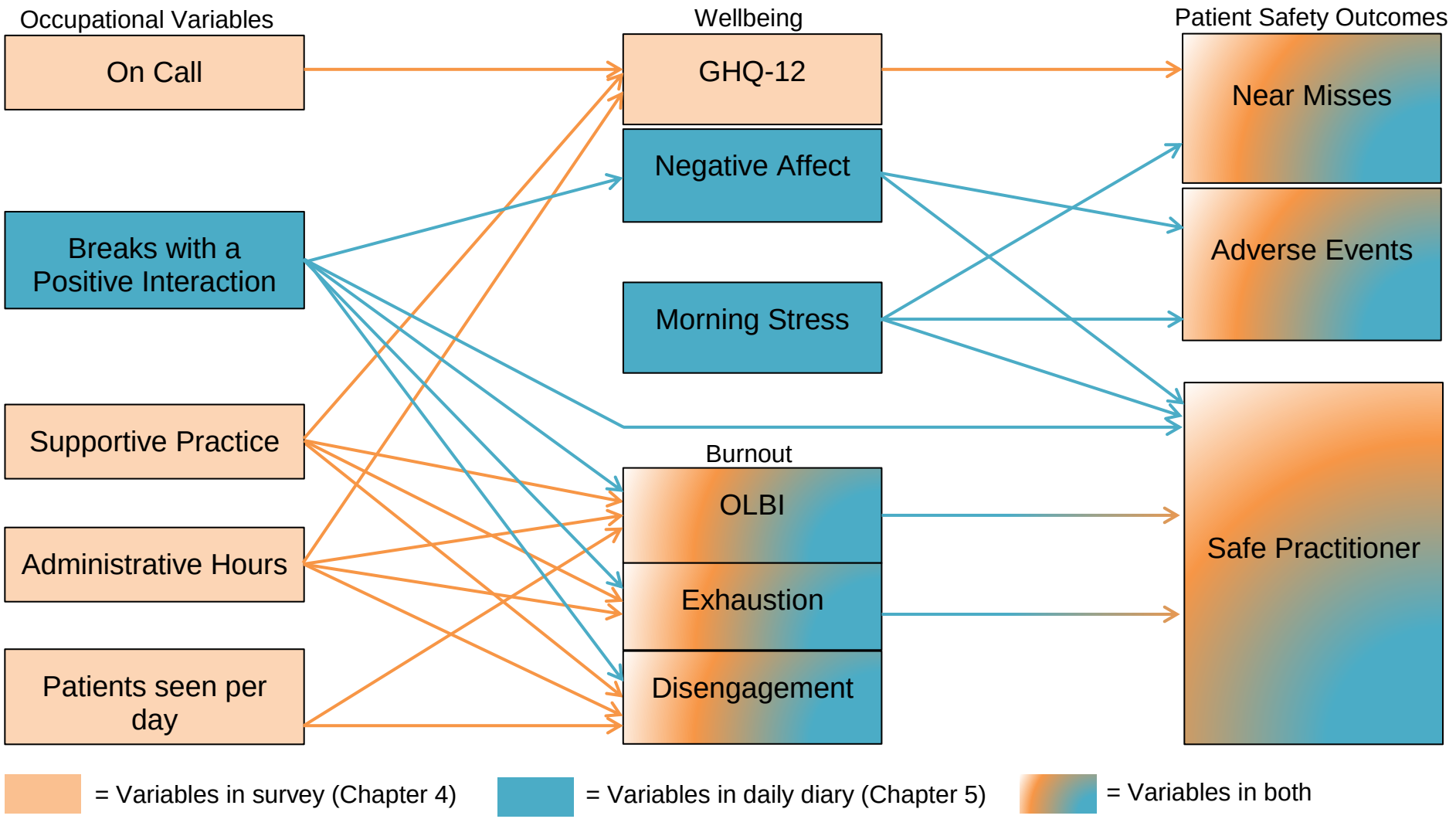

Figure 6.1 Diagram of significant associations found throughout this thesis

6.4 Thesis reflections and limitations

6.4.1 Safety perceptions versus behaviours

One of the limitations of this thesis is the reliance on self-reported measures of patient safety. 'Patient safety' is a fairly broad term, which makes measuring it challenging in any healthcare setting. Whilst it is possible to measure objective safety outcomes, for example through formal incident reports or chart audits, it is not always feasible or pragmatic to do so, especially within the confines of a PhD project. Furthermore, whilst objective measures may yield a good overview of patient safety within secondary care settings, the relatively low frequency of errors within primary care would likely result in issues with analysing this type of data (e.g. lack of power and data skewness) (Gaal *et al.* 2011; NHS Confederation 2017; NHS Improvement 2017; World Health Organisation; Sandars and Esmail 2003). A common alternative to capturing objective measures of error has been to simply ask healthcare professionals whether they have made an error or near miss in a selected time frame. Whilst this could pose issues around memory recall and social desirability biases, the literature within secondary care has consistently found that healthcare professionals do report these occurrences within research studies, possibly due to the assurance of participant anonymity and therefore no fear of blame, retribution, or litigation (Uribe *et al.* 2002).

Within this thesis, the studies employed the use of self-reported adverse events and near misses. However the issues around their low frequency was still apparent. This was anticipated, which was why the use of the 'safe practitioner' measure was also included (Louch *et al.* 2016). The safe practitioner measure measured the GPs' perceptions that they are able to act as a safe practitioner, and thus it is a measure of *perception* of safety behaviours. Whilst this measure was shown to be more sensitive and provide more variability across participants and across days within the same participants, the question about whether this measure accurately measures safety behaviour remains: do perceptions of safety behaviours correlate with actual safety behaviours? If they do, then measuring safety perceptions as a proxy to safety behaviours offers a very pragmatic method to measure safety, in various healthcare settings, but especially within primary care (due to the low frequency of traditional, objective measures of safety i.e. errors (Sandars and Esmail 2003)).

The safe practitioner measure, when designed, was tested by its authors for correlation with self-reported involvement in patient safety incidents. They found that perceptions of being less able to act as a safe practitioner were

significantly (positively) associated with reporting being involved in various types of patient safety incidents (Louch 2014). However, within both studies in this present thesis, this measure was not found to correlate with self-reported adverse events (AE), near misses (NM), or the combined measure of patient safety incidents (PSI). This finding has two possible interpretations and implications: 1) the lack of correlation was due to the low frequency of AE, NM and PSI, or 2) in contrast to nurses, general practitioners' perceptions of safety behaviours are not related to their actual safety behaviours. Whilst the first interpretation is quite plausible, both studies in this thesis found that these self-reported measures of safety incidents correlated with wellbeing and stress measures. This suggests that they did have enough variability and power to detect effects relating to differing levels of wellbeing and stress, and thus offers a counter argument to the first interpretation option. There is some evidence to support interpretation number two in that both studies in this thesis found different measures of practitioner health to be related to the different safety measures. If safety perceptions and behaviour are highly correlated, one would expect burnout and wellbeing measures to be associated with both of these measures of safety. However in both studies, this was not found to be the case: burnout was not significantly associated with self-reported adverse events or near misses, despite showing strong, significant associations with scores on the safe practitioner measure.

The knowledge that perceptions of behaviour and actual behaviour are not one and the same has been previously documented within other areas of health psychology: differences in outcomes are common, depending on whether subjective or objective measures of behaviours have been used (Reilly *et al.* 2008; Duncan *et al.* 2011; Armitage and Conner 2001). Such research therefore supports the second interpretation. Ultimately, it is likely that the findings throughout this sample are due to a combination of both of these interpretations. As such, future research within healthcare settings generally, and primary care specifically, needs to be especially mindful when selecting patient safety measures, as different results and therefore conclusions, may be evident depending on the measures chosen. One suggestion is that if objective or self-reported patient safety incidents are the chosen measures, it could be advantageous for the study to run over a long period of time, to allow for enough frequency of these events to provide suitable variability for the analyses.

6.4.2 Cause and effect

One of the aims of this thesis was to determine whether cause and effect could be established between wellbeing or burnout and patient safety. Whilst the evidence that morning stress could predict safety perceptions and behaviours later that day was fairly strong, due to the caveats around the measures of safety mentioned earlier, more research is needed to support these findings. Furthermore, there was not enough evidence to draw conclusions around whether burnout and wellbeing levels can predict the occurrence of patient safety incidents, or GPs' perceptions of acting safely on the following day.

The ideal follow up study to try and determine cause and effect would be to follow medical students from right at the beginning of their training, prior to any clinical experience, throughout their careers. This would allow for occurrences of burnout, depression (and other wellbeing measures), and patient safety incidents to be investigated over time, without any previous patient safety incidents requiring controlling. Similarly, the specific effects of occupational stress could be measured over time. Whilst this longitudinal cohort approach has been taken previously, with many studies including measures of burnout or wellbeing, so far in the literature, measures of safety over time have not been included (Frank *et al.* 2006; Guthrie *et al.* 1998; McManus *et al.* 2005; McManus, Keeling and Paice 2004; Rosal *et al.* 1997).

6.4.3 Engaging GPs in research

Throughout this project, recruiting general practitioners, who are typically hard to recruit professionals (Goodyear-Smith *et al.* 2009; Salmon *et al.* 2007), has been a challenge. However, the main difficulty was not in convincing GPs to participate, as anticipated, but was in accessing them to make them aware of the studies in the first instance. Once successful platforms to advertise directly to GPs had been identified and secured, there was surprisingly little difficulty in engaging with potential participants and recruiting them to the studies. Indeed, for the final study, once the CCGs had agreed to help recruit through their mailing lists, there was an influx of interested GPs who had emailed the primary researcher wishing to take part. For that study, there was the potential for a larger number of participants to take part, however a lack of funding combined with the time-scale of the study drawing towards the end, limited the final numbers. Additionally, quite a few GPs wished to take part, but did not meet the inclusion criteria of working six sessions a week. It may be that GPs who had reduced their hours, perhaps to prevent or overcome burnout, were naturally more interested in the study. Alternatively, this may represent the current trend evident within general practice in the UK that many GPs are

moving away from ‘full-time’ work and/or diversifying the roles that they take on (Baird *et al.* 2016).

Without prompting any feedback from participants of the final study, the researcher received numerous emails from participants upon completion of the study saying how insightful they had found participating to be. Various participants also requested their individual responses for further reflection. One participant in particular emailed to inform the researcher that taking part in the study had helped them identify that they were not coping with their levels of work-related stress and had prompted them to seek professional help. This email really highlighted the importance of this research and of the real need to improve the working environment within general practice to ensure that this person’s experience is an anomaly and not the norm.

6.5 Recommendations: Future research and interventions

One of the next steps that is needed within this research area is the conducting of a larger, longitudinal study of GPs, preferably beginning during the first stages of training. The study should follow them throughout their careers, to confirm (or refute) earlier suggestions of cause and effect that have been reported in this thesis. Such a study would ideally include objective and subjective measures of safety behaviours, measures of wellbeing, burnout and stress, and occupational factors (particularly their level of support within their workplace). In addition to this further research, it is evident that interventions to improve GP wellbeing and prevent burnout should be trialled and properly evaluated for their impact on GP stress, wellbeing and burnout, as well as their potential impact on patient safety outcomes. Below are a couple of possible interventions, based upon the findings in this thesis, which have the potential to positively impact on GPs’ levels of stress, wellbeing and/or burnout.

1) Self-awareness, stress management, and resilience training. This could entail formal training during their educational training years, as well as/or as courses run as continued professional development throughout their careers. There is early evidence from local initiatives in the UK that training GPs in mindfulness (particularly mindfulness-based-cognitive-therapy, which promotes self-awareness and can been used as a stress-management aid) and ACT (acceptance and commitment therapy, (Flaxman, Bond and Livheim 2013)) significantly reduces their levels of stress, increases their levels of resilience, and anecdotally also improves the quality of care they deliver (Hortynska 2017). This course is now currently being run as a randomised control trial to thoroughly investigate its effectiveness. However, the effect of this intervention

on patient safety outcomes is not, to my knowledge, being measured. Whilst this is a good starting point, these sorts of initiatives should, if found effective, be introduced as routine training during the early stages of education. Building them into the curriculum would demonstrate support from the higher levels of the organisation for the necessity of mentally preparing new clinicians for the emotional toll that patient care can have, and for the stressful environment that they are about work within. Currently, the new Patient Safety Translational Research Centre based in Bradford is piloting resilience training as part of the curriculum for various medical students. It is too early however to report on the effectiveness and acceptability of this training to date.

2) Improving support within the workplace. This could take on many different forms, from formal mentoring and buddying systems, scheduling regular communal breaks, to official team building interventions. Recent interventions aimed at improving civility and prosocial behaviour amongst teams within healthcare staff have been found effective at reducing burnout, providing promising evidence that this could be a viable route (Maslach and Leiter 2017).

It is imperative to acknowledge that these suggestions are not given with the purpose of suggesting that there may be a ‘quick fix’ for the issues evident within general practice in the UK at present. The issues surrounding workload, morale, burnout, and increasing pressures evidently need addressing at an organisational and governmental level to improve the detrimental work environments currently present. However the suggestions listed above offer feasible ideas that could be trialled and implemented more efficiently and more immediately than any system-level changes. Furthermore, individual and practice-level interventions may also empower GPs and practice teams to make their wellbeing a priority.

6.6 Practical implications

6.6.1 Implications for healthcare organisations

The high rates of burnout and poor wellbeing reported by GPs throughout this thesis warrants a call to action to management within the NHS to investigate areas where they can make improvements to reduce GP stress. It is partially their responsibility, as the organisation in control of the GP Contract, to look after GPs’ health, especially when so many are suffering as a result of the immediate work environment and surrounding pressures. Whilst action should be taken for GPs health purposes in their own right, this thesis also highlights how the organisation itself and wider public may benefit from improving GP

health, through the potential to subsequently improve the quality and safety of patient care.

Improving GP wellbeing could also result in significant money savings for the NHS, through less sick days taken and less cover/locum staff hired, who cost more than full-time or salaried GPs (Royal College of Physicians 2015). Furthermore, errors that result in patient harm have associated costs for the healthcare system (e.g. additional bed days, litigation costs) and add additional strain to an already overstretched and underfunded NHS (Department of Health 2000). By improving GP wellbeing, there may be a potential reduction in errors and thus a reduction in the associated costs of errors.

6.6.2 Implications for general practitioners

The focus groups in particular highlighted that many GPs do not prioritise their own wellbeing. Historically, doctors are not very good at seeking help or 'being the patient' and looking after their own needs, due to a variety of reasons including; structural barriers to seeking help (appropriate confidential services), psychological barriers (belief that doctors do not get ill), and personality factors (perfectionists and martyrs) (Wessley and Gerada 2013). This thesis highlights the importance of GPs' wellbeing, not only for themselves, but also for their patients. If GPs will not prioritise their own wellbeing for their own benefit, the argument that improving their wellbeing will enable them to better serve their patients may be more convincing.

Practical suggestions that GPs could implement themselves to improve their workplace wellbeing include:

1. Monitoring their levels of stress (e.g. through mindfulness or keeping a diary), and finding positive coping strategies to reduce their stress levels when they are high. An example of a positive strategy could be to take a break, perhaps get some fresh air and food and drink if there is time, and seek out a colleague to have a chat to.

2. Work with colleagues to foster a healthier culture of support within the practice, where colleagues find time each day to interact and check in with how they are each doing.

3. Further to the above suggestion, GPs could work with colleagues to foster a more open culture of talking about wellbeing and burnout. Whilst there is more and more research around the wellbeing of healthcare professionals, and specialist support services are being set up to help those in need, there is still a long way to go in making mental health less of a taboo subject.

6.6.3 Patient – focussed implications

The finding that GP stress, wellbeing, and burnout may have negative consequences for the quality and safety of care patients receive inherently has implications for patients. However, what is less obvious is what patients can do to help this situation. The focus groups suggested a couple of ways that patients could offer support to GPs, which could help reduce burden on the system and thus ultimately have benefits for patients. One suggestion was for better self-management of common symptoms (e.g. colds and hayfever) and chronic illnesses by patients. However, previous public health campaigns to improve self-management have not been overly successful (Bury and Pink 2005; Jordan and Osborne 2007). The second suggestion was for an increased awareness by the public of the situation (i.e. increasing demand and staffing shortages) in general practice. This would initially require practices to prompt such awareness and relevant behaviour changes. In doing so, if patients acknowledge and understand the pressures facing general practice, they may be more understanding and sympathetic when faced with a longer waiting time for example. Increased patient awareness and support could also decrease patient expectations, which may then reduce some of the pressure and stress that GPs are currently dealing with.

6.6.4 Implications for policy makers

A recurring theme within the focus groups was a call for more funding and resources to improve capacity within general practice to deal with the increasing patient demand and decreasing workforce. As the NHS is a public service, this is the responsibility of the government and those in charge of the healthcare budget. A recent BMA (British Medical Association) report highlighted that despite the General Practice Forward View promising increased funding, it will not be enough to reach the amount calculated by the BMA that is needed to ensure the sustainability of general practice: a smaller proportion of the NHS budget is being spent on general practice than in previous years, despite more care being moved from secondary to primary care (British Medical Association 2017a).

Similarly, although there was a pledge by the Health Secretary for 5,000 more GPs by 2020, this initiative has been making little progress, with the amount of whole-time-equivalent GPs actually reducing by 542 between September 2015 and December 2016 (Kaffash 2017). The Royal College of General Practice estimates that even if 5,000 GPs were successfully recruited, the number needed to cover the workforce shortages would be nearer double that (Royal College of General Practitioners 2013; Kaffash 2017). As such, better policies

and initiatives need to be developed to attract more qualified doctors into general practice. However, it will be difficult to attract and retain GPs if the work environment is detrimental to their wellbeing. Therefore, finding ways to improve general practice to foster a healthy and engaged workforce should result in more doctors choosing general practice, more GPs choosing full-time work and partnerships over sessional work, which will then help reduce the workload burden on all staff and subsequently also improve patient care.

6.7 Concluding comments

The historical and recent pressures facing General Practice in the UK have resulted in increasingly high levels of strain on the workforce, resulting in large numbers of GPs suffering from burnout, depression, work-related stress and low morale. Ensuring the workforce is healthy and happy should be a priority for any organisation, with evidence that staff engagement is linked to performance outcomes. When the organisation is the NHS, performance outcomes include the quality and safety of patient care. This thesis has shown that specific workplace factors, especially the level of support, can impact on GPs' levels of wellbeing and burnout, and that their levels of stress, wellbeing, and burnout can subsequently lead to variation in safety levels. The absence of support in the workplace (either perceived support or physically having time to connect with colleagues during the day) is one area where improvements could be feasibly implemented, with improvements likely to be seen in both staff health and patient outcomes. Based on the findings from the novel studies carried out within this thesis, several suggestions have been made throughout the chapters on both changes that are needed at a system-level, and strategies or interventions that could be implemented at an individual or practice-level, to improve the wellbeing of GPs, help protect against burnout, and potentially also improve patient safety.

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NB: * = article included in systematic review

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Appendix A
Chapter 2 (Systematic Review) Appendices

A.1 PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	10
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	n/a for thesis
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	10, 11
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	11
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	11
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	12
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	11, 12, Table 2.1

Section/topic	#	Checklist item	Reported on page #
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix A.2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	12-14, Fig. 2.1
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	13
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	Table 2.2, Appendix A.3
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	13, Appendix A.4
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	Table 2.2
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	15

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	29, 30, Fig. 2.2
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
RESULTS			

Section/topic	#	Checklist item	Reported on page #
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Fig 2
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Table 2.2
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	29, 30, Figure 2.2, Appendices A.5.1, A.5.2
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	Table 2.2, 27-29
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	Fig. 2.2
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	30, 31
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	31, 32
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	32
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	n/a for thesis

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097.

A.2 Search criteria for Medline (Ovid)

1. *health personnel/ or exp medical staff/ or exp nurses/ or *nursing staff/ or exp physicians/
2. Exp mental health/ or * anxiety disorders/ or exp *depressive disorder, major/
3. Exp Stress, Psychological/
4. Exp Occupational Health/
5. Exp “Quality of Life”/
6. 2 or 3 or 4 or 5
7. Exp medical errors/ or *patient care/
8. Occupation* stress*.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
9. well?being.mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier]
10. exp Patient Safety/
11. exp “Quality of Health Care”/
12. 7 or 8 or 9 or 10 or 11
13. 1 and 6 and 12
14. limit 13 to (english language and (classical article or "corrected and republished article" or journal article or meta analysis or "review" or "scientific integrity review" or systematic reviews)

A.3 Data extraction template

Researcher's initials:		**Date Performed:**
Publication Details		
Author:	**Year:**	**Country:**
Title:		
Stated aim:		
Study design:		
Participant Details		
Number:	**Age:**	**Gender:**
Roles:	**GP Surgery / Hospital**	**Partners / Salaried / NA**
Part time/Full time:		
Other Info *(e.g. Demographics, years worked etc.)*:		
Number of sites:	**Geographical locations:**	
Inclusion criteria:		**Recruitment method:**
Measures		
Wellbeing/Burnout/Both		
Measures: ***Collection method:***		
Patient Safety		
Measures: ***Collection method:***		
Additional measures:		

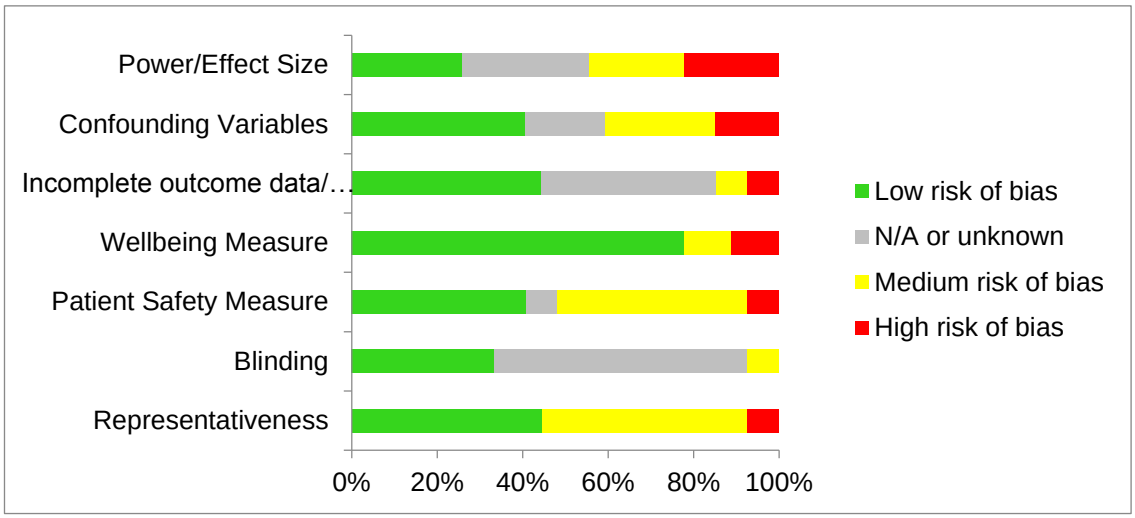
Collection method:
Direction of relationship:
Study Information
Duration:
Follow up duration:
Limitations:
Results
Statistical analyses:
Summary of results *(including correlation coefficient):*
Effect size *(page number)*:
Author's conclusion:
Accept/Reject
Reason for exclusion:
Reviewer's comments:
Overall quality of study:

A.4 Quality assessment tool and scoring guide

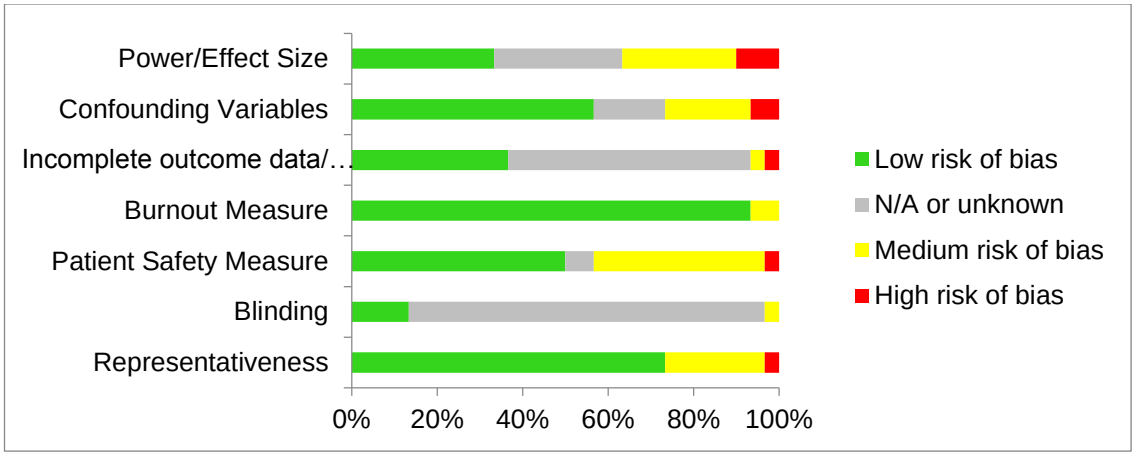
Criteria	Poor/High risk of bias	Average/Medium risk of bias	Good/Low risk of bias	Unknown/N.A
Representativeness	Self-selected sample from one site (and one ward), with a low proportion of eligible participants taking part	Self-selected sample, from more than one ward, with a medium proportion of eligible participants taking part	More than one site, high proportion of eligible participants taking part	
Randomisation	Self-selected participants	Recruitment sent to all/random sample of eligible participants, but <50% participated	Recruitment sent to all/random sample of eligible participants, but >50% participated	
Blinding	No blinding or incomplete blinding, which is likely to influence the outcome	Attempted blinding, but likely not carried out effectively	Outcome not likely influenced by lack of/broken blinding. Or, effective blinding.	
Measure of patient safety/quality	Measure developed for this study, with no mention of validity, reliability or piloting	Measure developed for this study, with attempts to display validation (e.g. concurrent validity)	Validated, well known measure OR new measure with validity and reliability displayed (e.g. more than one type of validity)	
Measure of wellbeing/burnout	Measure developed for this study, with no mention of validity, reliability or piloting	Measure developed for this study, with attempts to display validation (e.g. concurrent validity)	Validated, well known measure OR new measure with validity and reliability displayed (e.g. more than one type of validity)	
Participants lost to follow up/Incomplete outcome data	Participants lost, but no mention of differences between completers or non-completers. No intention to treat analysis on missing data.		Analysis to check for differences between completers and non-completers, with significant differences controlled for in main analysis. Intention to treat analysis for missing data	
Confounding variables	No evidence of attempting to account for possible confounding variables in analysis (or recruitment)	Accounted for basic potential confounding variables at either recruitment or analysis (e.g. Age, Gender)	Accounted for basic confounding variables and additional potential confounding variables, at either recruitment or analysis (e.g. Years in practice)	
Power and effect size	Power analysis reported, with below small effect size	Power analysis reported, with small - medium effect size	Power analysis reported, with medium – large/large effect size	

A.5 Quality Assessment Graphs

A.5.1 Quality assessment for wellbeing studies (*n* = 27)



A.5.2 Quality assessment for burnout studies (*n* = 30)



Appendix B
Chapter 3 (Focus Group Study) Appendices

B.1 Additional supporting quotes for 'Internal Influencers' theme

Sub-theme	Focus Group	Quote
Team Support	FG4	*M1: We used to get a lot more [time to interact with each other] than we do now and we still make a concerted effort when we can but it's much more difficult to, and I think that has had a slight negative impact on my wellbeing. I think you know, it was a lot better when we could spend more time together.*
	FG1	*F1: But we're part of a team, the thing that reassures me is that we're part of a team, and actually that's what makes it OK, is that when things do seem.. sort of for example, you've got several off sick, or um you feel like you can't keep up with the volume of work, because it's part of a bigger team, because it's not just us, there's the [xxx] part as well, if we're really struggling, there is actually a capacity to say 'help us'.*
	FG2	*F2: I think the friendliness of the staff can make a difference. So as a locum you go to different places and you don't know anybody, nobody knows you and you can be treated very differently in different places. So it's a positive thing when people make you feel welcome, they might make you a cup of tea or just check that you're ok do you need any support. So extra support from [indecipherable] that's a positive.*
	FG5	*F1: Having good relationships with your colleagues. Feeling like you can communicate well with your colleagues, feeling like you can go to people if you're having problems.*
Variety	FG1	*F3: I mean, we have an advantage in this centre, we have three different sites… that's something I find quite good, and different timetables, so you're not stuck to (inaudible). Yes a lot of senior GPs do do something else like training, or infants or specialities like minor surgery or family planning, but a few things how we do in this surgery breaks that, er, monotony, and I find that quite good*
	FG1	*F1: Something that prevents burnout is having um, a varied portfolio for what you do. So, for example, being a trainer, or um, doing something else like minor surgery or family planning means not just seeing patients all the time so you've got a slight variation in what you do, um definitely helps, sort of the mundane everyday-ness of it.*

Sub-theme	Focus Group	Quote
	FG5	*F3: But, do you know, by separating the GP practices, perhaps its because I go off and do something completely different, actually, you add up all the hours it's loads, but I find it easier having the GP bit separated.* *I: mm, so different roles help*
Control	FG1	*F1: So we're in control of the situation, I think being in control is quite, um when I think about the negatives, being in control of your environment makes a huge difference to how things are and how you feel about it….* *M2: We still see the same number of patients but we can add an extra break in if we want one and finish a bit later depending on how we feel so we have that freedom*
	FG2	*I: that sense of control in that way that you can choose which practices you go to, does that, would you say that contributes to your sense of wellbeing?* *M1: it does considerably*
	FG1	*F1: We do have bad spells, when y'know things that have really hit us are when again I suppose it's stuff that's outside your control (…) when an unhappy patients goes on a facebook site and slags you off, in public, and there's absolutely nothing you can do about it.*
	FG4	*"M1: The number of decisions that have to be made in a day, the complexity of those decisions, that's what tires me out, rather than the number of hours sitting at my desk.* *I: So it's the, would it be then the type of work?* *M1: The intensity.* *I: Okay* *F1: Yeah, I would agree with that."*
Intense and unmanageable workload	FG4	*F1: Workload I think impacts.* *M1: I would suggest it's the workload rather than the hours worked*
	FG2	*F2: Finishing on time is a positive one as well. You can finish sometimes with a load of paperwork to do. So it's managing workload, I think that if you feel like you've got the job done that day, you can go home having finished that day's work that contributes to a sense of wellbeing*
	FG3	*M2: I think I'd put a manageable workload in there as well contributing to wellbeing, so something that isn't overwhelming, beginning of the day looking at a list and thinking, oh my god, so something that's… seems I don't know, weighted to your capabilities.*

Sub-theme	Focus Group	Quote
	FG5	*F2: well the nature of the work is that there's never an end to it. And my other half his job, he's an engineer, so they have a project, which they can see the start, they can see the end goal, reach it, job done. Whereas with ours you never get that feeling of there being a light at the end of the tunnel* *F1 + M: mmm no* *F2: because there never is! Even if you clear your task box, clear your blood results, you come back the next day (…): and it's full again so there's never any light at the end of it. That's why you can never feel like it's getting better, cos you never do complete it.* *F1: yeah and there is no completion yeah* *F2: and that's that's a bit demoralising.* *M: But that's all consultants are all like that as well, but I suppose that's medicine* *F2: it is, yeah yeah. But when you're feeling like you're just keeping your head above water, sometimes it's nice to feel like you've completed something, do you know what I mean? We never get that feeling do we.*
	FG4	*M: you'll have six different inboxes for different things that you try and keep on top of, as soon as you clear one you can look back and there'll be ten more in it, and so you can sit there just all day if you wanted to just trying to clear your boxes going around in circles, and always tripping, and it gives you a sense of you don't get that feeling of completion, I've cleared this, I've done that, you don't get that, (…)* *M: Yeah, emails, blood tests, letters, they're just all flowing in continuously.*

B.2 Additional supporting quotes for 'External Influencers' theme

Sub-theme	Focus Group	Quote
Increase in pressure and workload	FG5	*F1: I would say I would say that there is definitely a negative feeling out there about the NHS and General Practice and the future of General Practice and the pressures on… I suppose financial… From a partners point of view, there is a big financial squeeze, um, those sorts of financial pressures, contract pressures, and a lot of stuff from outside really. So not just patient care, it's like running the business and keeping primary care going. (…) Primary Care is on the brink and that we're only just keeping afloat and you know it won't take much more to make Primary Care start to fail.. can't say how long it will take but.. And I think ultimately that negative stuff seeps into the way you feel about your job and day to day working. (…) You're not unaware of the pressures* *F2: But the negative attitude towards general practice in terms of, we can't see it getting any better and all of the extra demands that are being put on, I think that influences us, cos I think…*
	FG3	*M1: I think the respect for the profession has gone, I think that for me that's the biggest thing, whereas in the past you used to have that respect for the profession, so people used to think, I don't want to go and waste the doctor's time with silly things, I'm going to try and manage these myself, I've got people around me who I can speak to, we can do things at home, but that's completely gone now, that's doctors gone, so anything happens run to the GP.*
	FG5	*F2: and I think there's pressures in in other places as well. Nursing homes and things they're being inspected and having to so all things differently and having all different bits of paperwork and stuff. And that's having an impact on us cos then they're on the phone a lot more than they used to be putting a lot more demand on us than they were cos they've got to have it documented and all the eyes and t's crossed as it were, that the doctors were informed and you know, that's because of the pressures they're under, but impacting on us yeah.*
	FG1	*M1: (…) and practices are struggling, getting more and more patients, and less and less doctors*

Sub-theme	Focus Group	Quote
	FG3	*M2: the target driven culture and all that is coming into play, general practice is nothing like that now, it's a kind of slog each day to get through everything*
Increase in patient expectations and complaints	FG3	*F3: But I think yes, I think the government has raised expectations of what patients should do.*
	FG3	*M2: the volume of complaints has risen, I think that has… I've certainly seen that, the way we have to deal with them has changed (…) but I think certainly the volume of complaints, people seem much more ready to complain about a missed appointment, a late running surgery or much more trivial things, (...) but it seems that patients are happier now to complain about much more trivial things.* *M1: I think the respect for the profession has gone, I think that for me that's the biggest thing, whereas in the past you used to have that respect for the profession, so people used to think, I don't want to go and waste the doctor's time with silly things, I'm going to try and manage these myself, I've got people around me who I can speak to, we can do things at home, but that's completely gone now, that's doctors gone, so anything happens run to the GP.*
	FG5	*F1: Patients can be quite negative about the service we provide, when I still feel that we provide a good service. But patients' expectations seem to be going up. And I think they feed off some of the stuff that's in the press*
	FG3	*F1: Yeah, but it's this expectation that your GP is the answer to everything, if you're not sure go and see your GP and also this expectation that has been driven I think by the government that patients expect a world class top notch private level American service from a state funded NHS, and the reality that those two just don't match,*

Sub-theme	Focus Group	Quote
Negative portrayal of general practice	FG5	*F1: I would say I would say that there is definitely a negative feeling out there about the NHS and General Practice and the future of General Practice (…) you know it won't take much more to make Primary Care start to fail.. can't say how long it will take but.. And I think ultimately that negative stuff seeps into the way you feel about your job and day to day working. I know these guys probably don't have the same business pressures, but they're totally aware of it aren't you* *F2 & M1: yeah* *F1: You're not unaware of the pressures* *F2: But the negative attitude towards general practice in terms of, we can't see it getting any better and all of the extra demands that are being put on, I think that influences us, cos I think…*
	FG3	*F1: Everybody hates you.* *F2: And that's the other thing, the media perception of you is actually that you earn far too much money and you're lazy 'cos you aren't prepared to work nights and weekends.* *(…)* *F1: It's the feeling that nobody's backing you up, and that yeah inevitably it results in a complaint*
Lack of support (from the media, government, public, patients, other organisations)	FG3	*F3: I think one of the things I've found when patients are very challenging is if there is no wider system to support them and particularly with mental health problems, if you don't have very good mental health support it can be much more challenging.*
	FG3	*F1: Everybody hates you.* *F2: And that's the other thing, the media perception of you is actually that you earn far too much money and you're lazy 'cos you aren't prepared to work nights and weekends.*
	FG1	*F1: We do have bad spells, when y'know things that have really hit us are when again I suppose it's stuff that's outside your control when patients aren't satis- when an unhappy patients goes on a facebook site and slags you off, in public, and there's absolutely nothing you can do about it.*

B.3 Additional supporting quotes for 'Individual and Practice Level Strategies' theme

Sub-theme	Focus Group	Quote
Breaks	FG2	*F1: If the sky was the limit?* *I: umm both, why not?* *F1: The lunch breaks were if the sky's the limit (chuckles)* *M1: Yeah, because joking apart, there's many things that could be done, but with the current resource can't be done. So, lunch breaks, adequate time for refreshment, for all GPs, not just those who work to a [locum] type contract* *F1: yeah yeah*
	FG3	*F2: We made it compulsory to have coffee break and it's just 15 minutes, 15 minutes before second surgery starts so we can't extend any longer than that, (…) everyone goes up to at quarter to 11 in the morning knowing that they're going to have to come back down at 11, but the coffee's made and it's like 15 minutes, right, well everybody can do 15, you know, it's you can take your tea back down with you if you haven't time to drink it, you're there, you're making it, you're interacting. (…) You actually can go the whole day without really seeing anyone except patients constantly and just seeing other people that you know and can just talk nothing with, (…), just makes a massive difference, at the end of the day you feel less… you feel shattered but you feel less shattered. (....) and the value has been seen immediately by people who even, you know, initially were sceptical.* *M2: And the problem is people don't see it as productive, but actually it's much more productive than the opposite of everyone working in a silo way 'cos you get refreshed don't you?*

Sub-theme	Focus Group	Quote
	FG3	*F3: Coffee break.* *I: Coffee break.* *F1: Coffee and cake I would suggest.* *F3: Oh yeah.* *I: So just coffee and cake [laughs]?* *F1: Yeah [all laugh].* *F2: 15 minutes just to be able to…* *F1: Compulsory 15 minutes.* *F2: Compulsory 15 minutes where everything stops before a session starts and you have to go up and meet.* *(…)* *F1: I mean straightaway that's one thing you can realistically do. Coffee breaks for everyone, notice up.*
	FG3	*F3: I did have an episode with depression which was probably a contribution of home life and work life, and at that point I just managed to shut myself off, nobody knew until I wasn't fit to walk, and I would walk out of the building sometimes, not to be there, and I think they were mortified that they hadn't spotted it, (…) so after that we introduced coffee break and it was in response to that, the fact that, you know, when you're just too busy you didn't see each other and nobody spotted, so I think it did make a big difference to how people worked, and I think you know, caring practice.*
	FG4	*[about coffee breaks to improve wellbeing]* *M: And we're in a similar situation I think, so yeah, yeah, that would be one thing that you could do reasonably simply.*
Physical needs	FG5	*F2: I might go home and go for a run or go and play netball or, and I feel like I've had 10 hours sleep after I've done it, so it's sort of like a way of making yourself feel better. It's not necessarily a conscious, 'I need to do this to prevent the stresses of the day from getting on top of me', it's just something I need to do to feel physically well you know…* *I: Yeah. But you do notice that it does make you feel better?* *F2: Yeah, yeah. And I think there's more to it than that, you're doing something again which is social, which is an escape from work, and a team sport*

Sub-theme	Focus Group	Quote
	FG1	*M1: You can literally leave 9 hours later and the whole climate's changed, it's sometimes that, sometimes taking, even if you're on the same site, sometimes with visits you go out anyway, but going out for even that, just that to the shop for 5, just to rekindle, again reset your brain a little bit*
	FG3	*M1: I've actually made it a point nowadays [To drink water], I used to carry a 1.5 litre bottle(…) if I have that water in front of me I'm more inclined to drink it than if I don't.*
	FG1	*F3: I think having regular cups of tea on your breaks (all laugh). I do honestly! And having something to eat as well, if you've got a long day*
Psychological strategies	FG5	*F3: And actually, I say no with the boundaries probably more to protect me, definitely.*
	FG1	*M1: That's right, someone else was saying that, yes, getting somewhere where you're just in the zone where you're just, that that's all you can think about for that period of time* *F3: escapism* *M1: It just resets your brain a little bit.*
	FG3	*M2: I've seen a few different strategies, I've seen the doctors that actually become more reclusive and sort of barricade themselves almost into their room, so they're trying to keep all this stuff away and everything pushed away from them,*
	FG5	*F3: I do mindfulness.*
	FG4	*M1: And I think it probably starts with a recognition of the concept of wellbeing and having burnout in our consciousness, as things get harder and harder I think it's more important to recognize that as a real threat to our business if you like, or certainly to our profession (…)* *I: So being more self-aware so that you protect staff against burnout?* *M1: Well as individuals but as a team as well, you know, about thinking about the risks to the team.* *M2: More corporate awareness of it all, from all teams actually.*
	FG2	*M1: If you brought it down to individuals, there's probably lots of things that individuals can do, either early in their career training or later on just to remind themselves... everything from learning to meditate, through becoming mindfulness practitioners through to just being empowered enough to say 'no' to a number of contractual obligations*

Sub-theme	Focus Group	Quote
	FG3	*F2: I schedule a week off every two months which uses my annual leave effectively and it means that I know that within eight weeks I will get a week off, you know, and make sure that you take that time appropriately and recuperate, it's about being aware of burnout and doing what you can to prevent it.*
	FG5	*F2: Yeah, yeah. And I think there's to it than that, you're doing something again which is social, which is an escape from work, and a team sport. You're getting a chance to socialise with people who aren't medics. When you do socialise with other medics, no offence to you guys, but you just end up talking about medicine and I never found that very helpful myself, so I tend to not socialise with medics, just because then I feel like I get a bit of a more rounded view of the world, you know what I mean (haha)* *I: Yeah, a break from work properly* *F2: Yeah a break from work completely, yeah, and the stresses of medicine and everything that brings.*
Control	FG2	*M: An individual decision I made a while back now was looking at how much I was working in an average week and saying, "I don't really see myself sustaining this for another 34 years until I retire, how am I going to battle this work life balance?" and I cut down from nine clinics a week to eight and that made a big difference to me, having an extra day away from here, just recharge the batteries a bit.* *I: Okay.* *F: I dropped my out-of-hours work.*
	FG2	*M2: So I think salaried is becoming, became a much more, better option, but I think it's got quite a lot of problems to it personally.* ***At least with salaried you've got a bit of say.*** *So locuming to me, is the option, but I'm kind of unhappy with it really. Ideally I'd like a really functional practice, but I just don't think… they are very few and far between!*
	FG1	*M2: We still see the same number of patients but we can add an extra break in if we want one and finish a bit later depending on how we feel so we have that freedom. At (insert different practice name) it's 10 minute slots, which definitely does make a difference, just that couple of extra minutes.*

Sub-theme	Focus Group	Quote
Support	FG1	*F1: I did see, I saw something(…) about a practice that had er a monthly meeting where they literally talked about how they felt, about, what they were doing, and they talked about their emotions regarding particular consultations. Um, I can't remember what it was called* *M1: Is it like a balint group? There used to be those balint groups* *F2: oh yeah* *I: mm* *F1: No but it wasn't, it was something else. (…) it was quite interesting (…) And they did it on skype, between sites as well, and how it had improved about how they felt about what they were doing.... But thinking about it, to a certain extent it's what we're doing already, because if we're having a bad day and we've had a particularly difficult patient, I don't think we feel… shy about er, telling each other! (laughs)*
	FG3	*F1: I think communicate with patients better, I think we're not good at telling patients what's happening (…) there's very few practices that have put up on the noticeboard, "This surgery's at risk of closure in the next six months, this surgery's three doctors down, we are already short 50 appointments this week, your waits are longer because we're under…" you know, we're not telling patients, and most patients know the NHS is under pressure and actually when you talk to them one-on-one they're quite understanding about that and we need to ask for their help and say you might find the doctor directs you to the pharmacy, you might find that you're told to ring physio before you see the GP, please support us with this, and I think straightaway if you start doing that the majority of patients would be supportive.*
	FG3	*F2: Interestingly one thing that my practice did recently was we got all the partners together and sat down and asked each one of them how are you doing, what are you doing, what do you see yourself doing in five, ten years' time, around the table, which is the first time I think that they've ever done that. (…)* *M1: I'm sure anyone who's nearer to 40 and plus would be saying, yeah, retire [laughs].* *F2: But it was a full sort of frank exchange and I think that it was with burnout in mind, and actually enabled, freed up a lot of people to sort of say, actually, you know, I'm not happy and I'm worried and I'm not sure how long I can maintain this and it's getting harder and changes were made.*
	FG2	*M: I just want to say a small thing, I am part of a study group with the people I left the VTS training scheme with about nine years ago, we meet once a month and although I know I've got colleagues in this room where I can talk about work stuff with, sometimes it's quite nice to have that peer group that*

Sub-theme	Focus Group	Quote
		I've come through training with, meet up with and it's amazing just how much I try not to miss those, they really mean a lot to me and I think it's a sign that I find them in terms of sharing and kind of unburdening both clinical cases and just the way things are going locally, we also work with insularly within the practice and having some things outside the practice just helps you get an overall feel that everybody's in the same boat and everyone's going through a similar kind of thing at the same time so I really value that.
	FG5	*F2: Could you have like a buddying system where you're buddied up with another colleague and you take it in turns every, or every few months you make, you have some time dedicated to coming together and asking about each other's' wellbeing or I don't know…*

B.4 Additional supporting quotes for 'External Changes' theme

Sub-theme	Focus Group	Quote
Support	FG2	*M1: Adequate support staff so the paperwork that could be, sorry the administrative work that could be done by the people, is done by them rather than ending up with the GPs.*
	FG5	*F1: And I think um, the press to stop bashing us so much* *(…)* *F1: yeah, I feel like we don't, we're constantly being kind of dragged down and just not respected as much really*
	FG3	*F1: It's not what you can do as an individual, but you know, it needs to be included in training, needs to be part of GP training.* *F2: They're starting to make it more… part of the… yeah, well, fitness to work is part of the syllabus isn't it, and that's about being aware of yourself and whether you are fit to continue to practice, reflecting on that, so yes to an extent, but I'm not sure that they're, apart from encouraging people to exercise they're really…*
	FG2	*F1: .. and maybe have sort of coaching mentoring type of support to identify how to handle things*
Reduction in pressure	FG3	*"F2: Get rid of ridiculous exercises like CQC [A public body, part of the Department of Health, which monitors, regulates, and inspects health and social care services in the UK] which really just they're designed to make practices jump through hoops.* *F1: It's a manager's job, it's got nothing to do with GPs." [FG3]*
	FG3	*F2: It's about releasing GPs to do what they do best and what they actually joined to do in the first place which is just deal with patients and help patients, not in a ten minute constrained time period because actually you've got to get X many patients in the door in one day because the demand is so great, and not in a rushed manner because actually you know that when you've finished one surgery before you start the next when are you going to spend that entire time doing prescriptions, visits, everything else that you've got to do in your day, letters, documents, whatever stuff you've taken on as a partner, all that stuff, you know, it's easing up on the, really the ticky box exercises and stuff that we have to do to enable us to do, which is one of the reasons why, and another reason why I still locum, even though I have a partnership, because when I go to do a locum job I go in there and I see patients and I have a*

Sub-theme	Focus Group	Quote
		break and I have my lunch and I see more patients and I don't have to do any of the other stuff and I come away thinking, oh it's so nice to see patients isn't it? *F1: You do a better job don't you?* *F3: And that's what we're trained for.*
	FG2	*M1: Um, less [stuff] centrally imposed by the government, pushing off of work so everything's being dissolved to primary care where the nearest patient (inaudible) but it's also putting the workload on GPs where there is no force to do that*
	FG5	*F1: Um, and a change of patient expectation* *F3+2: Yeah* *F2: That's the big one for me, definitely* *F1: They've got to stop coming in and burdening us with –* *F2: - crap* *F1: crap yeah*
Increase in resources	FG2	*M1: Adequate support staff so the paperwork that could be, sorry the administrative work that could be done by the people, is done by them rather than ending up with the GPs.*
	FG4	*F: Magic wand?* *I: yeah magic wand what would be the best way.* *F: More resource.* *(…)* *I: So more resource, do you mean more GPs?* *M: Yeah.* *I: More funding?* *M: Yeah.* *I: More everything [laughs].* *F: More admin, more doctors.* *M: Yeah.*
	FG2	*M1: so there's lots of practical things, but they're not going to happen because there's not money for them.*

Sub-theme	Focus Group	Quote
	FG5	*F1: More resource, More GPs, 20 minutes per patient* *I: mmhmm. So more GPs* *F3: definitely the gold fountain of 15 minutes*
	FG3	*F1: So your options are you could increase funding in general practice back to the 11% it should be at, which would be a 3 or 4% rise, and that additional resource would pay for either more doctors or more staff within practices to do the things actually you don't need a doctor to do, and free up the doctors to then treat patients (...) but those patients with these complex multi-morbidities that need that overview, that need the 20 minute consultation, the home visits that are complex and that need our intervention, that's what you need to do and that immediately is better for doctors but it's better for patients as well, satisfaction ratings are higher, and you're safer because you've got the time and the breathing space to actually concentrate on that patient.*

B.5 Additional supporting quotes for 'Quality of Care' theme

Sub-theme	Focus Group	Quote
Empathy & Listening skills	FG5	*F1: (…) . But it's not just about error is it it's about the…* *M: level of empathy* *F1: Level of empathy, the kind of niceness of the doctor that you are, and I had a lady and she came up with her fourth problem and I really, I could almost hear myself tutting out loud cos I was SO cross, that she thought that she could give me another problem and I'd spent 25 minutes with her. And then she leaves the room and you feel bad cos you think 'oh, I really shouldn't have been like that, that wasn't very nice, and it's not her fault and' umm but you do, don't you*
	FG5	*F1: I think even… It could be as much at that, I think possibly my first 5 patients that I saw this morning might have got a better deal than my last 3, because by the end I was running an hour late and I had just had enough. I didn't want to hear about anyone else's problems. It sounds awful but I just didn't want to have to hear about anyone else's problems, or their 5 things that they'd brought in to see me this day, or you know, how David Cameron's tax benefit cut here had had a massive impact on life* ***, cos actually I'd reached my threshold of being able to empathize and sympathize and it can be as much as throughout a surgery. And so that's I suppose the way you put yourself across and stuff,***
	FG1	*F1: … I think take the top slice off, which might be empathy, the extra bit, but I'm not sure that's about safety, that's much more about y'know, patient satisfaction, how they feel they've been dealt with really.*
	FG1	*M2: - it's the empathy bit, it's the relationship bit with the patient. I don't think it is, certainly not until you're a long way down the burnout scale, it's not the safety side of it so much, but definitely that empathy, that patient satisfaction, and things like that* *M1: yeah* *I: so the way that you –* *M2: - quality*
	FG1	*F1: I think it's far more likely that you just go through the paces but without, maybe with not much empathy*
	FG1	*M1: I think, it does probably mean that when people are burnt-out they're not going to listen in the same way and so they're more likely to take their face value first opinion on what's wrong with the patient and run with that rather than spending the time to investigate further and think well maybe there's other things going on. So it then does come back to patient safety I guess.*
Attitude	FG4	*F: Yes, I think very much so really, I think if your tolerance, you talked about being a bit more short with patients or whatever, but I think if you're not feeling physically or mentally in the right place then I think yes and I think definitely attitudes towards the patient themselves or whatever, I think will change. And as much as you try and, you know, we all have better days than others where you feel like you've had a better day where you've given the patient everything you think that went really well, there are some days where actually, you know, for whatever reason you've got a bad cold or whatever, you look back and think well actually perhaps I didn't do quite how I would have liked it, and no day's perfect, but yeah I think very much if you're significantly stressed or approaching that burnout then I'm sure that the welfare of your patients would be quite significantly affected.*

Sub-theme	Focus Group	Quote
	FG2	*M1: Complaints are probably a reasonable measure of err wellbeing or stress for the same individual cos if some people have more complaints than others and everybody gets complaints**, but I've certainly spoke to doctors who have seen at times in their lives where they recognize the going's harder, there's been an increase in complaints. That doesn't mean they've made mistakes, but it can be attitude, which comes across,** if you are burnt-out and depersonalized and no longer empathizing with your patient, you might still do an adequate job of diagnosing their muscular skeletal pain but they won't feel listened to so they are more likely to complain about you.*
	FG1	*F1: when we were doing triage in a very short period, we do triage on a day to day basis, so we do ring anyone that wants an urgent appointment, and I mean that can be anything from sort of 30 to 70 people in a morning. We used to try and do it in a much shorter period of time, and we did get quite a few complaint that we were being snappy with patients, and it was partly because of the pressure of work and the need to deliver it quickly, and we changed that and it's just changed, everything, in terms of our wellbeing, but also our patients' wellbeing, they feel quite happy with the system and you can tell that just in the way they thank you for taking the time to ring them, whereas before we'd get a rude telephone call sort of saying, y'know, "I wasn't happy with the attitude of the GP". So, if you just sort of, that's that's just an example of how, you know pressure of work can sometimes affect the way you behave with patients*
	FG5	*M: But I suppose there's sort of making those mistakes but then there's also just not caring* *F3: Burnout you don't care do you* *M: You're just like, pfft pffft [shrugging shoulders noises]* *I: I guess detached, it's not even you, in a way, maybe* *M: Well no no But like not caring as in the outcomes* *I: Ok mm* *F1: They can have a hard time I don't care, they can keep drinking I don't care*
	FG3	*F1: and I just think the way you interact with patients, you greet patients, straightaway, you know, I started off, I had a good day this morning, before it all went a bit wrong, and patients, going, "Morning, come and have a seat, I'm Dr Norris, nice to meet you, what can you do for you today?" and you immediately establish a good rapport, whereas when you're stressed, "What!" [all laugh], quick quick quick.*
Increased Referrals & Over-investigation	FG1	*M1: You see another practice where they're, perhaps more firefighting than we are, that's what tends to happen. Referral rates go up, they just don't manage people as actively.*
	FG1	*M2: I think I send for a couple more ultrasounds at the end of the day than the beginning of the day.* *(all laugh)* *M2: well I've never really looked into it, but it feels like it.*
	FG1	*F1: I think M1's right, that you're much more likely to refer, or to send people into hospital if you've got a higher level of anxiety, rather than take the risk yourself. In which case they end up being over-investigated probably. So you're passing the buck.* *M2: And that does make patients worse when they're over-investigated. It doesn't make them feel better.*

Sub-theme	Focus Group	Quote
	FG2	*F1: OR, the opposite sometimes happens where people then over –check and are over cautious because they're probably aware that they are not perhaps thinking at top speed and so then that can have a negative effect as well.*
	FG4	*M: Yeah, it becomes a vicious circle of over-investigation, then which generates… possible over-investigation*
	FG1	*M1: Health economics though as well, in terms of, y'know, GPs deal with a lot of the gate keepers, and deal with a lot of things that other countries, probably do get sent to specialists and things, and that. The more burnout-out GPs are the more that model will struggle I think. People will act more defensively potentially, sending people for tests they wouldn't necessarily need, because they haven't got the emotional energy or the time to deal with it without doing that so….*

B.6 Additional supporting quotes for 'Patient Safety' theme

Sub-theme	Focus Group	Quote
Indirectly	FG1	*M1: Whereas the more burnt-out you are it's very, not easy, but I think you can just kind rush patients through.*
	FG4	*M: And the whole job is based upon managing uncertainty and your ability to manage that uncertainty is reduced from feeling burnout.*
	FG1	*M1: I think, it does probably mean that when people are burnt-out they're not going to listen in the same way and so they're more likely to take their face value first opinion on what's wrong with the patient and run with that rather than spending the time to investigate further and think well maybe there's other things going on. So it then does come back to patient safety I guess.*
	FG2	*F1: So, even if you were thinking about tiredness as part of poor wellbeing, it's just harder to think clearly, to actually be able to have the space to listen to people's concerns and make an accurate diagnosis, so wellbeing I would say definitely has an impact on patient care and I've seen that with a dozen (doctors in?) difficulties (inaudible) often wellbeing is low and you can see perhaps the mistakes that have been made, or, I'm not saying that complaints are always related to poor wellbeing but you can see the link.*
	FG3	*F2: And if you get one, you know, if you start the session off with one patient, so a couple of weeks ago I started off with a suicidal patient, that's 25 minutes at least, and everyone else is still waiting 'cos there's no slack in the system for someone else to pick up your patients and do it and then you're running behind and I looked at the consultation I'd written after I'd seen that guy for 25 minutes and I couldn't remember the consultation and my documentation was horrendous, and I would say that usually my documentation is pretty good, I write quite a lot, but at that stage I was so stressed about being so far behind that I made a… and I had no memory of what the patient had told me at all and that's, you know, that's a knock-on safety affect.*
	FG1	*F2: Mm yeah and then indirectly as well, as F4 was saying, if you're not, if you're feeling burnt-out and unmotivated you're not going to be as keen to keep up with your medical knowledge, and just not going to feel enthusiastic in terms of filling in your missing gaps and things so I think it could indirectly have an effect in that way.*
	FG5	*F2: I think we've all had those consultations with patients as well, going back to when you were saying does it impact on patient care, where they sit down and they reel off their 20 problems and that instant thought pops into your head 'I'm not going to take any of this on today, how quick can I get them out the room'. That sounds awful, so you quickly screen and make sure nothing sounds dangerous, and think, let me just get them a blood test form and get them out, and I'll deal with it next time, because I can not physically absorb it now.* *F1: Cos you reach a threshold of what you can deal with. But then you feel just as bad next time.* *F2: yeah you do you do you do, but sometimes they, sometimes you end up doing something and they're gone and you think god that was just really, I didn't really sort anything out, but I just couldn't, you know, I just couldn't physically take it on and my brain couldn't…* *F1: you get to the point where you just have no more to give* *F2: no*

Sub-theme	Focus Group	Quote
	FG3	*F1: I would say there's kind of an issue between soft and hard safety issues, we're talking about a lot of these soft safety issues where actually it's a cumulative effect, and yeah nine times out of ten it's not going to be a problem but there will patients out who that's happened to and stuff has been missed and diagnoses have been delayed.* *(...) admitted them to the hospital straight away.... somebody should have seen that.*
	FG3	*M2: It is more about discovering of the things and the patients' holistic care, where it (burnout) makes an impact, (…) we just deal with urgent issues and that's all, but actually patient safety is compromised because we're not doing the holistic care, and that's, I think that's where we feel I think as there's a link in all of this* *(…)* *F1: And I think we've all seen it probably, maybe with things like cancer diagnoses, or with significant events where you look back in the notes, a patient's died or they've had something, and you look back and you realise it was all there, and it's been missed, not because of neglect, or clinical negligence, but just because nobody has taken that holistic review and nobody's put the dots together and looked at the whole picture, or known that patient well enough. (…) but I think that just inherent time pressure of day-to-day practice you're firefighting, you come with this one problem, I will fix this one problem, you've come with this problem the next day, I will fix this, there's no health promotion, there's no holistic advice, there's no putting it all together and dealing with things, it's one thing at a time.*
	FG3	*I: Do you think your wellbeing as a whole can impact the quality of care?* *M1: I think the short answer is yes [all laugh].* *F1: Yes, anyone disagree [all laugh]?* *M2: (…), but I think this long-winded answer to the yes, is that if we have more time, if we're less stressed, if we're able to focus more on the patient we will make better decisions.*
	FG3	*F1: and diagnostically as well, if you have head space, you know, they come in and they say, "It hurts when I pee," and you go, right, UTI, here's some Trimethoprim, whereas actually if you have a little bit of head space you're thinking well actually what are the other things that it could be (…) and you start to then mentally explore it. (…) but if you're pressured and you're running late it's a lot easier just to go, it's a UTI, than to then start thinking outside the box, (…) you avoid doing anything that generates more work if your wellbeing is low,*
Directly	FG4	*F: your ability to make decisions is less, your ability for you to tolerate the risk, all the things that go with that*
	FG5	*I: So, in what ways (could wellbeing impact on patient care)?* *M: Massive difference, between life and death I suppose couldn't it* *F1: I think even… It could be as much at that, (…) but absolutely if you're busy and you feel rushed you might forget to write yourself the little message to say refer somewhere.* *F3: mmhmm (agreement noises)*
	FG2	*F 1: - It seems logical - Yeah it just seems difficult to prove. It seems logical doesn't it that, well it does to me, that if wellbeing is poor then people won't be performing at their best.*

Sub-theme	Focus Group	Quote
	FG2	*F1: I suppose it's that thing about performance equals your potential minus any interference, and if interference is part of poor wellbeing then they're not going to perform at their potential, and therefore will be more prone to making mistakes.*
	FG2	*F2: I think it depends on how you take it clearly, some person can take it as just part of how you're doing really, a part of everyday life that you have a bit of a down episode or something like that, but another person can take it to extreme and that can have an impact on patient safety. So it all depends, it's all subject to that person's personalities, so you can't kind of generalize it.*
	FG5	*F1: Or you might be filing so many blood results that you miss the tiny little abnormality that is significant in that person, or, er, you, or I think, I haven't done one recently but I know a colleague recently who prescribed completely the wrong dose of painkiller because she was feeling stressed and pushed for time and just hadn't had the same amount of concentration on the task that she was doing. So there's much more potential for error*
	FG1	*F2: If you had somebody really burnt-out, I think, somebody sitting there really burnt-out that can't be bothered, yeah definitely they could make mistakes.*
	FG3	*F1: I think when you're very burnt out you make mistakes, and I've certainly seen mistakes made and I've been aware I've been making mistakes when I had burnout, but I think that just inherent time pressure of day-to-day practice you're firefighting, you come with this one problem, I will fix this one problem.*
	FG1	*M1: But, then there'll be, there's supposed to be our own housekeeping where if there's a difficult patient you sort of reset yourself and start again. That is hard sometimes when you're busy, there's no question that you're, the way you deal with things changes depending on your stress levels, and how much you've got on and If you've got too many things on, if you start spinning too many plates things start falling off them. That has got implications for patient care and patient safety.*

B.7 Additional supporting quotes for 'Temporal Relationship' theme

Sub-theme	Focus Group	Quote
	FG1	*F1: yeah also if you get burnt-out and you make a mistake, you're going to feel even worse about it and that's just going to spiral.*
	FG2	*F1: mm no, And I suppose there's always the thing about the chicken and the egg, do complaints lead to poor wellbeing or does poor wellbeing lead to complaints cos they're both, it's probably both as I've certainly seen people who have struggled more having had a few complaints.*
	FG2	*M1: I think one of the, for me, a doctor that was maybe having issues with burnout, might find they're quite leaky for things. And that maybe, that vicious circle. That they're actually opening themselves up to little set backs, and problems in the day that actually hit them, when it shouldn't,* *I: they don't have a barrier?* *M1: yeah*
	FG4	*M: Yeah, it becomes a vicious circle of over-investigation, then which generates… possible over-investigation which generates more workload, which generates more things that you're finding which then generates further workload and it's just, it's probably, you know, piles onto poor wellbeing really and stress and workload.*

Appendix C
Chapter 4 (Survey) Appendices

C.1 Online and paper questionnaire

YQSR Yorkshire Quality and Safety Research Group

WellGP: Survey

UNIVERSITY OF LEEDS

Questions, Version 3: 10/07/2016 UoL Ethics Reference #16-0191 Accepted on: 19/07/2016 IRAS Project ID: 207249

If you would rather answer these questions online, please fill in the survey at this web address:
https://leeds.onlinesurveys.ac.uk/wellgp

Section 1

Demographics

Age:

Sex:

Ethnicity:

Number of years as a practising GP:

Position: Partner/Locum/Salaried

Location: Urban/Suburban/Rural

Location (county):

Practice list size (Approximately):

Workload

Average number of hours per week spent:

1) with patient contact:
2) on administrative tasks:
3) on roles outside your practice (e.g. hospital clinic/CCG):

Average number of hours on call per month:

Average number of antisocial hours worked per week, not including those spent on call (Antisocial hours include anything before 9am, after 5pm, or on the weekend):

Average number of patients seen a day:

Section 2: Wellbeing

Please tick one box for each statement

	Strongly Agree	Agree	Disagree	Strongly Disagree
I always find new and interesting aspects in my work				
There are days when I feel tired before I arrive at work				
It happens more and more often that I talk about my work in a negative way				
After work, I tend to need more time than in the past in order to relax and feel better				
I can tolerate the pressure of my work very well				
Lately, I tend to think less at work and do my job almost mechanically				
I find my work to be a positive challenge				
During my work, I often feel emotionally drained				
Over time, one can become disconnected from this type of work				
After working, I have enough energy for my leisure activities				
Sometimes I feel sickened by my work tasks				
After my work, I usually feel worn out and weary				
This is the only type of work that I can imagine myself doing				
Usually, I can manage the amount of my work well				
I feel more and more engaged in my work				
When I work, I usually feel energized				

Have you recently…

	Less than usual	No more than usual	Rather more than usual	Much more than usual
been able to concentrate on whatever you're doing?				
lost much sleep over worry?				
felt that you were playing a useful part in things?				
felt capable of making decisions about things?				
felt constantly under strain?				
felt you couldn't overcome your difficulties?				
been able to enjoy your normal day-to-day activities?				
been able to face up to your problems?				
been feeling unhappy or depressed?				
been losing confidence in yourself?				
been thinking of yourself as a worthless person?				
been feeling reasonably happy, all things considered?				

How would you rate your current quality of life?

Please circle one number

As bad as it could be **As good as it could be**

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Section 3: Patient care

Please refer to the following definitions when answering the next questions:

A **near miss** is any event that could have had adverse consequences but did not, and was indistinguishable from fully-fledged adverse events in all but outcome (e.g., incorrect potentially harmful drug drawn up but not administered, wrong drug prescribed to the patient but no harm resulted).

An **adverse event** is something that goes wrong that results in some degree of patient harm (e.g. wrong site surgery, harmful drug overdose).

		Yes	No
Q1a.	Have you been responsible for any adverse events in the last three months?		

If no, please move on to Question *1d.*

Q1b. Was the adverse event(s) a:

(Tick all that apply)

	Yes
Diagnostic error	
Medication or prescription error	
Equipment error	
Communication error	
Monitoring error	
Other	

If 'other', please state what type of adverse event occurred: _____

Q1c. Please choose which statement (or statements if more than one adverse event occurred) best describes the outcome of the adverse event(s):

Adverse event with minor reversible patient harm	
Adverse event with minor irreversible patient harm	
Adverse event with major reversible patient harm	
Adverse event with major irreversible patient harm	

		Yes	No
Q1d.	Have you had any near misses in the last three months?		

If no, please move on to Question *1e.*

Q1di) Was the near miss(es) any of the following?

(Tick all that apply)

	Yes
Diagnostic near miss	
Medication or prescription near miss	
Equipment near miss	
Communication near miss	
Monitoring near miss	
Other	

If 'other', please state what type of error was made: _____

Q1dii) Please chose which statement (or statements if more than one near miss was made) best describes the outcome of the near miss(es):

Near miss with potential for minor reversible patient harm	
Near miss with potential for minor irreversible patient harm	
Near miss with potential for major reversible patient harm	
Near miss with potential for major irreversible patient harm	

Q1e. Which of the following contributed, to any extent, to the adverse event(s) or near miss(es).

	Yes	No
System issue (e.g. computer fault)		
Degree of fatigue		
Lapse in concentration		
Lapse in judgement		
Lack of knowledge		
Degree of burnout		
Poor wellbeing		
Other		

If 'other' please give details: _____

Q2. Please indicate your agreement or disagreement about the following statements about your practice.

If you are a locum worker, please answer this referring to the practice where you work most often.

Think about your practice…	**Strongly Disagree**	**Disagree**	**Neither**	**Agree**	**Strongly Agree**
Generally, my practice **is not** as safe as it could be because of work related factors/conditions	1	2	3	4	5
Generally, my practice **is** safe	1	2	3	4	5

Q3. How supported do you feel within your practice/workplace?

(If you are a locum worker who does not have a main practice they work within, please answer this question by referring to how supported you feel in general, whether that be by a locum group or colleagues amongst the varying practices etc.)

Please circle one number

Not at all supported **Very supported**

0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Section 5: Coping mechanisms/strategies

How often do you use the following to help you cope with work stress?

Please tick one box for each strategy

	Never or not often (0)	**1**	**2**	**3**	**4**	**Regularly (5)**
Exercise						
Relaxation/calming hobbies (e.g. reading)						
Meditation						
Yoga						
Mindfulness						
Counselling						
Humour						
Ensure a strict work-life balance						
Schedule coffee or lunch breaks						
Rely on the support of colleagues						
Rely on the support of friends						
Rely on the support of family/partner						

Other: _____

Would you be open to trialling an intervention to improve wellbeing?

Yes/No/Maybe

Any additional comments: _____

Thank you for completing this survey! Please return this questionnaire along with the consent form via the stamped and addressed envelope you received with this pack.

If you wish to be emailed the results, please provide contact details here:

Your contact details will be stored securely and separately to your survey responses.

Please bear in mind it may take a few months to fully analyse the data.

If you don't mind being contacted about participating for future studies on this topic, please provide your email address here:

Thanks once again.

If you have become distressed as a result of this survey, please find information for relevant helplines below:

BMA Counselling & The Doctors Advisor Service
08459 200 169 (landline: 01455 254 189)
24 hours a day, 7 days a week

NHS Practitioner Health Programme
0203 049 4505

Doctors for Doctors
0845 920 0169

Doctors' Support Network
0844 395 3010
www.dsn.org.uk

BMA Stress Counselling Service
0845 920 0169

If you have any questions about this survey or research project, please contact the Primary Researcher, Louise Hall: **L.H.Hall13@leeds.ac.uk**
Furthermore, if you wish to withdraw your responses, you may do so up until the point of analysis (1 month post survey completion), just email Louise with your unique participant code requesting the withdrawal of your data.
For further information on this project, please check out this website:
wellgp.wordpress.com

C.2 Bivariate correlations between demographic, wellbeing, burnout, and patient safety variables

Variable	Age	Gender	Years as a GP	OLBI	OLBI: E	OLBI: D	GHQ	Quality of Life	PSI	AE	NM	Safe Practice
Age	-											
Gender	-.213**	-										
Years as a GP	.827***	.258***	-									
OLBI	-.072	.049	-.076	-								
OLBI: E	-.044	.087	-.061	.905***	-							
OLBI: D	-.087	-.004	-.077	.884***	.602***	-						
GHQ	-.071	.073	-.117	.574***	.511***	.516***	-					
Quality of Life	.035	-.031	.119	.538***	.516***	.445***	.518***	-				
PSI	.058	-.039	.049	-.094	-.110	-.056	-.175**	.132*	-			
Adverse Event	-.013	.044	.023	-.104	-.073	-.114	-.106	.110	.430***	-		
Near Miss	.034	-.042	.037	-.081	-.093	-.050	-.188**	.128	.876**	.127	-	
Safe Practice	-.004	.043	-.056	.287***	.313***	.196**	.196**	-.180**	-.094	-.034	-.048	-

Notes: OLBI: E = Exhaustion, OLBI: D = Disengagement, *sig. at $p < .05$, ** sig. at $p < .01$, *** sig. at $p < .001$, $n = 227$ for all variables.

C.3 Bivariate correlations between occupational, wellbeing, burnout, and patient safety variables

Variable	Support	Practice List Size	Admin Hours	Antisocial	Patients per day	Job Role	Patient Contact Hours	On Call	Extra Role
Age	-.055	-.061[1]	.112	.127	.017	-.319***	-.010	-.076[1]	.003[1]
Gender	-.055	-.022[1]	-.207**	-.128	-.134*	.172**	-.189**	-.041[1]	-.166[1]*
Years as a GP	.054	.001[1]	.070	.111	.069	-.340***	.008	-.065[1]	-.029[1]
OLBI	-.436***	.157[1]*	.267***	.176**	.238***	-.177**	.151*	.000[1]	-.060[1]
OLBI: E	-.371**	.187[1]**	.260***	.204**	.186**	-.153*	.126	.056[1]	-.035[1]
OLBI: D	-.411**	.077[1]	.216**	.106	.243***	-.164*	.145*	-.046[1]	-.051[1]
GHQ	-.332***	.090[1]	.305***	.178**	.157*	-.198**	.219**	.100[1]	-.052[1]
Quality of Life	.406***	-.064[1]	-.293***	-.211**	-.221**	.134*	-.284***	-.043[1]	-.121[1]
PSI	.048	.037[1]	-.121	-.096	-.070	.055	-.015	-.156[1]*	-.139[1]*
Adverse Event	.063	.112[1]	-.121	-.157*	-.054	.069	-.075	-.013[1]	-.053[1]
Near Miss	.080	.021[1]	-.107	-.088	-.006	.029	-.002	-.202[1]**	-.149[1]*
Safe Practice	-.055	.060[1]	.226**	.020	.052	-.073	.015	.032[1]	.009[1]

Notes: [1]Spearman Rho correlation, *sig. at $p < .05$, ** sig. at $p < .01$, *** sig. at $p < .001$, $n = 227$ for all variables.

Appendix D
Chapter 5 (Daily diary Study) Appendices

D.1 Level 1 descriptive statistics for same day analyses part 1.

Variable	Mean (s.d.)	Range
Safe Practice[a]	2.59 (0.98)	1 – 5
Exhaustion [b]	7.67 (2.09)	3 – 12
Disengagement [c]	6.97 (1.77)	3 – 12
Burnout Overall [d]	14.60 (3.40)	6 – 24
Positive Mood [c]	30.97 (10.98)	5 – 59
Happy[a]	5.80 (2.06)	0 – 10
Successful[f]	5.46 (2.13)	0 – 10
Satisfied[a]	5.26 (2.21)	0 – 10
Excited[a]	3.19 (2.49)	0 – 10
Capable[a]	6.05 (1.97)	0 – 10
Calm [b]	5.23 (2.31)	0 – 10
Negative Mood [d]	22.15 (17.23)	0 - 75
Sad [b]	2.53 (2.59)	0 – 10
Anxious[f]	3.53 (2.79)	0 – 10
Defeated [b]	2.48 (2.70)	0 – 10
Lonely[a]	2.05 (2.52)	0 – 10
Guilty[a]	1.85 (2.34)	0 – 10
Hopeless[f]	1.11.84 (2.44)	0 – 10
Irritable[f]	3.45 (2.98)	0 - 10
Stressed[a]	4.49 (2.90)	0 - 10
Stress [d]	3.87 (2.60)	0 – 10
Sleep onset latency (minutes)[a]	21.73 (24.96)	1 – 120
Sleep quality [d]	6.11 (2.53)	0 - 10
Sleep length (hours)[a]	6.72 (1.11)	3 – 9.5

Note: from data prior to inputting missing data, [a]*n* = 241, [b]*n* = 240, [c]*n* = 238, [d]*n* = 237, [e]*n* = 234, [f]*n* = 239

D.2 Level 1 descriptive statistics for same day analyses part 2.

Variable	Number (% of cases)	Number (% of cases)
Breaks[a]	None = 76 (31.5%)	One or more = 165 (68.5%)
Positive Interaction[a]	None = 106 (44.0%)	One or more = 135 (56.0%)
Negative Interaction[b]	None = 224 (92.9%)	One or more = 13 (5.4%)
PSI[a]	None = 201 (83.4%)	One or more = 40 (16.6%)
AE[a]	None = 229 (95.0%)	One or more = 12 (5.0%)
NM[a]	None = 207 (85.9%)	One or more = 34 (14.1%)
Take Work Home[a]	No = 154 (63.9%)	Yes = 87 (36.1%)

Note: from data prior to inputting missing data, *n* = 241, [b]*n* = 237, PSI = Adverse Event and/or Near Miss, AE = Adverse Event, *NM* = Near Miss,

D.3 Level 1 descriptive statistics for lagged analyses part 1.

Variable	Mean (s.d.)	Range
First day		
OLBI	14.09 (3.74)	6 - 24
Exhaustion	7.40 (2.19)	3 - 12
Disengagement	6.70 (1.93)	3 – 12
Positive Mood	33.23 (11.68)	5 – 59
Negative Mood	30.52 (16.93)	0 - 75
Morning stress	3.84 (2.61)	0 – 10
Next day		
Safe Practice	2.53 (0.96)	1 – 5
OLBI	14.04 (3.44)	6 - 22
Exhaustion	7.38 (2.07)	3 - 12
Disengagement	6.66 (1.79)	3 – 10
Positive Mood	33.33 (11.06)	6 – 59
Negative Mood	18.84 (15.55)	0 – 58
Morning stress	3.41 (2.52)	0 - 10

Note: from data-set with missing data dealt with, *n* = 128

D.4 Level 1 descriptive statistics for lagged analyses part 2.

Variable	Number (% of cases)	Number (% of cases)
First day		
Breaks	None = 40 (31.3%)	One or more = 88 (68.8%)
Positive Interaction	None = 56 (43.8%)	One or more = 72 (56.3%)
Negative Interaction	None = 128(96.1%)	One or more = 5 (3.9%)
Next day		
PSI	None = 108 (84.4%)	One or more = 20 (15.6%)
AE	None = 122 (95.3%)	One or more = 6 (4.7%)
NM	None = 112 (88.3%)	One or more = 15 (11.7%)

Note: from data after dealing with missing data, *n* = 128, PSI = Adverse Event and/or Near Miss, AE = Adverse Event, *NM* = Near Miss,

D.5 Level 2 descriptive statistics

Variable		Mean (s.d.)	Range
Age	*Full data*	44.40 (9.37)	28 - 66
	Lagged	44.98 (8.67)	28 - 61
Years in practice	*Full data*	14.09 (9.40)	0.25 - 38
	Lagged	14.80 (9.05)	1 - 38
Quality of Life	*Full data*	6.33 (1.77)	1 - 9
	Lagged	6.51 (1.52)	3 - 9
GHQ-12	*Full data*	6.48 (2.89)	0 - 11
	Lagged	6.12 (2.96)	0 – 11
PSS-4	*Full data*	7.03 (2.61)	0 - 12
	Lagged	6.56 (2.75)	0 – 11
OLBI	*Full data*	42.36 (7.31)	23 - 59
	Lagged	41.76 (7.80)	23 - 59
Exhaustion	*Full data*	22.50 (4.13)	13 - 32
	Lagged	22.02 (4.18)	13 - 32
Disengagement	*Full data*	19.86 (3.85)	10 - 27
	Lagged	19.73 (4.24)	10 - 27
Gender	*Full data*	Female 62.1%, Male 37.9%	
	Lagged	Female 58.5%, Male 41.5%	
Roles	*Full data*	Partner 77.6%, Locum 1.7% Salaried 19%, Other 1.7%	
	Lagged	Partner 80.5%, Locum 0% Salaried 17.1%, Other 2.4%	

Note: From dataset after dealing with missing data. Full data (for same day analyses) n = 58, Lagged analyses n = 41,