Are Theatre Practitioners being effectively engaged and utilised to support the agile adaptive capacity of healthcare organisations during major incident response? An inductive qualitative study.

Jennifer Klunder-Rosser

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School of Medicine and Population Health

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List of Abbreviations

AC – Adaptive Capacity

AP – Anaesthetic Practitioner

CCA – Civil Contingencies Act

CCU – Critical Care Unit

Covid – Covid-19 Pandemic

DH – Department of Health

ED – Emergency Department

EPRR – Emergency Preparedness Resilience and Response

HCP – Healthcare Professionals

HoC – House of Commons

MCI – Mass Casualty Incident

MDT – Multidisciplinary team

MTC – Major Trauma Centre

NHS – National Health Service

NWAS – North West Ambulance Service

OT – Operating Theatre

ODP – Operating Department Practitioner

PHE – Public Heath England

PPE – Personal Protective Equipment

RP – Recovery Practitioner

SP – Scrub Practitioner

TA – Thematic Analysis

TP – Theatre Practitioner

UK – United Kingdom

UoS – University of Sheffield

WHO – World Health Organisation

Terminology, Synonyms and Slang

Within healthcare, several terms are often used interchangeably to refer to the same thing. In this thesis, these types of terms commonly come up during the interview data. In addition, there is a shared, informal language amongst Theatre Practitioners that refers to the specific context of their working environment, certain departments or incidents. This type of informal, common language is also known as slang. To aid with understanding, these terms, their common synonyms, frequently referenced slang and terminology are collated below:

Department synonyms:

- Critical Care Unit – CCU, ITU, ICU, crit care
- Emergency Department – ED, A&E
- Operating Theatres – Theatres, OT, OR
- Recovery Unit – Recovery, PACU

Slang:

- Covid-19 Pandemic – Covid, Covid-19, the pandemic
- Gases – blood gases. A type of blood analysis.
- Lines – can refer to any type of intravascular device, such as an intravenous cannula or Hickmann line.
- Manchester Arena Bomb – Manchester Arena, the Arena Bomb, the Arena, the bomb, the bombings
- Meds – medications
- Nights – the night shift
- Obs – clinical observations, such as blood pressure and pulse rate.
- Proned - the prone position is where a patient is laid on their belly rather than their back. Colloquially, patients nursed in this position are referred to as being 'proned'.

- Proning – refers to the process of turning a patient into the prone position. Often done in teams of staff. If the patient is ventilated, this team can include an Anaesthetist and Anaesthetic practitioner to support the patients' airway, and other members of the multidisciplinary team to manually turn the patient.
- Team brief – huddle, group hug, the hug, the brief (see Terminology below)
- Turns – the process of repositioning ('turning') patients from one side to the other to reduce the risk of pressure injury
- Trachy – tracheostomy. A type of surgical procedure where an external hole in neck is made into the windpipe to insert a tube which assists with breathing.
- Vented – where patients breathing is supported by mechanical ventilation, usually involving intubation and attachment to a ventilator machine.

Terminology:

- **Clean ICU** – non-Covid CCU unit where 'routine' CCU patients were cared for
- **Coordinators** – Every shift, theatre departments have a coordinator who coordinates staffing, theatre utilisation and manages any immediate issues that arise across the department. They work in collaboration with a senior anaesthetist to manage flow of patients through the department. During major incidents, they would be the initial point of contact for all staff to plan moving patients to theatre.
- **IV** – Intravenous line
- **NHSP** – NHS Professionals, or 'the bank'. Temporary staffing solutions, like an external staffing agency, but run by the NHS.
- **Support worker** - non-registered member of the clinical team.
- **Team Brief** – part of the NatSIPPS 8 and WHO 5 steps for safer surgery. A huddle of all operating theatre staff for a specific theatre that occurs prior to surgery commencing. The plan for surgery, including any known medical issues, surgical issues, anaesthetic issues, equipment required, skills mix requirements etc are discussed in detail. Any high-risk hazards or patient specific concerns are highlighted here, such as the need for blood transfusions to be prepared, or emergency kit to have on standby. Theatre Practitioners can also raise any issues they have, such as lack of availability of kit. This is a routine and established part of operating theatre practice and is conducted even for emergency surgery.

Abstract

Background: Major incidents are increasing globally. A cornerstone of major incident response and recovery in healthcare organisations are Operating Theatres. Theatre Practitioners are healthcare professionals who work in Operating Theatres. The aim of this research project is to identify barriers and enabling factors in the effective utilisation of theatre practitioners' skills during Major Incident response, and how this impacts organisational adaptive capacity.

Systematic Review: A systematic review of the literature, registered with PROSPERO, identified 17 relevant research papers. Themes identified were; workforce flexibility and adaptability; knowledge and skills; communication; training and experience. From this, the research question and objectives were derived.

Methods: Semi-structured qualitative interviews and inductive thematic analysis were conducted to answer the research objectives with 22 participants from five different hospitals. Two cohorts of staff were interviewed; senior managers with workforce responsibilities; and frontline theatre practitioners. Interviewees were purposively sampled to have experience of either mass casualty incidents, such as the Manchester Arena Bomb, and/or Covid.

Findings: Three findings' chapters identify themes from the two cohorts. Several barriers to effective utilisation of theatre practitioner skills are identified, including a lack of organisational learning, organisational disconnect, and the influence of major incident response on staff wellbeing. Several enabling factors are also identified, including the potential significant of deploying staff to skill or task-based teams, and the utilisation of debrief as a protective and learning tool.

Conclusions: The role of theatre practitioner utilisation in organisational adaptive capacity is critically analysed in the context of the wider evidence base and findings of the research. The significance of the research findings for are highlighted. Particularly the perceived organisational disconnect and lack of organisational learning post-major incident and potentially negative consequences this may have for organisational

recovery and resilience is discussed. Recommendations are made which could improve overall major incident response by supporting better utilisation of staff skills and improved pastoral and wellbeing for healthcare professionals. The most significant and practical of these is the role skills-based teams could have in supporting organisational adaptive capacity.

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Declaration

This thesis has been submitted for the award of Doctor of Philosophy at the University of Sheffield. It has not been submitted to any other institution, or for the purpose of obtaining any other qualification.

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Klunder-Rosser, J. (2023) Theatre practitioners and organisational adaptive capacity in disaster response. *Journal of Perioperative Practice*. 33 (12), doi/10.1177/17504589231177833

Chapter 1: Introduction and Background

1.1 Thesis Introduction

Major incidents are increasing globally, largely due to terrorism and incidents secondary to climate change. The response to major incidents can be multi-organisational and multi-national, with healthcare organisations playing a central role due to associated injuries. It is vital any response is efficient and flexible to reduce patient mortality and morbidity and protect the wellbeing of staff responding to the event. This ability to be resilient and adaptable to maintain operations during major incident is known as organisational Adaptive Capacity [AC].

A cornerstone of major incident response and recovery in healthcare organisations are Operating Theatres [OT]. These are complex environments where large, multi-disciplinary teams carry out surgical and anaesthetic care. Theatre Practitioners [TP] are healthcare professionals who work in OT and can be Registered Nurses or Operating Department Practitioners. Due to the closed nature of OT, the role and skills of TP are often 'hidden' and poorly understood, even within the wider healthcare organisation. OT and TP are particularly important during major incidents associated with a high volume of injuries requiring urgent surgical treatment, as seen in Mass Casualty Incidents such as the Manchester Arena Bomb or natural major incidents such as earthquakes. However, TP may also be redeployed to other areas of the hospital to respond to other major incident types, such as the recent Covid pandemic.

Whilst TPs are a central requirement for increasing surgical capacity, the risks of burnout, poor work engagement and loss of experienced staff post-incident may undermine organisation's ability to recover. A core tenant of AC is for organisations to learn lessons from prior major incidents and implement learning to help improve responses for future incidents.

The aim of this research project is therefore to address the following research question and objectives:

Research Question

Are Theatre Practitioners being effectively engaged and utilised to support the agile adaptive capacity of healthcare organisations during major incident response?

Research Objectives

- To identify TP and senior managers experiences of major incidents and how they perceived workforce utilisation
- To explore TP's experiences of their employment during a major incident, and perceptions of the utilisation of their skill set
- To explore senior managers perspectives on TP workforce utilisation during major incidents, and how these impact upon departmental and organisational adaptive capacity
- To identify areas of learning and good practice to inform future major incident and workforce policies

The development of this research question was informed by a systematic review of the literature outlined in Chapter 2. A brief synopsis of each Chapter will now be introduced.

Chapter One explores to background to this topic in more detail, and introduces the key concepts and terminology utilised throughout this thesis. This chapter outlines why this is an important issue for healthcare providers to develop workforce utilisation during major incident response and improve organisational adaptive capacity. **Chapter Two** outlines the systematic review conducted to identify existing research in this area and subsequent key themes and concepts. The research question and objectives outlined above were identified from this review:

Chapter three discusses the methodology, methods and philosophical grounding for this research. This chapter outlines the researcher's positionality as an insider researcher. It also discusses pragmatism as the philosophical framing for the

study and explores why this is an important philosophical approach for realistic healthcare research which offers practical recommendations for potentially complex problems. Qualitative methodology and one-to-one, semi-structured interviews were utilised to gain a rich understanding of the experiences of TP and senior managers during major incidents. Inductive thematic analysis was used to establish a baseline of potential themes and key concepts for future research. The rationale and evidence base for the choices made are outlined, and sampling, recruitment, data collection and data analysis discussed in detail.

Chapters four, five and six outline the findings from the research. **Chapter four** discusses the analysis of the interviews with frontline TP. **Chapter five** presents the analysis of interviews with senior managers with workforce responsibilities. **Chapter six** depicts the analysis of both interview cohorts in relation to staff wellbeing, and the impact this has upon major incident response and organisational adaptive capacity.

Chapter seven presents a detailed critical discussion and triangulation of the findings from this research, and how these compares to the existing literature. In the final section, **Chapter eight**, conclusions are drawn, and the implications and recommendations for policy and practice are outlines. The appendix presents relevant associated documents, such as the interview schedules, ethical approval documents, and a list of abbreviations used throughout this document.

1.2 Background

1.2.1 Introduction

This background will introduce to key concepts of this research to give the reader a broad understanding of the theories, process and terminology used throughout this thesis. Major incidents will be defined and discussed in the context of healthcare organisations responses. Adaptive capacity theory will be introduced and discussed in context, detailing how this applies to and shapes this research project. The role of

surgery and operating theatres in major incident response will be discussed. The concepts of workforce and skill utilisation will be introduced, including practices like redeployment. Finally, the roles and responsibilities of theatre practitioners will be defined and their role in major incidents considered.

1.2.2 Major incidents

Major Incidents are defined as "an event or situation with a range of serious consequences which requires special arrangements to be implements by one or more emergency response agency" (JESIP, 2024). These incidents commonly affect multiple agencies, such as fire, police and ambulance services, hospital services and governmental organisations. In this thesis the term major incident will be used throughout to encompass the wide-ranging unplanned events which cause significant disruption specifically to individual healthcare organisations and systems. Examples include the SARS-CoV-2 pandemic [which will be referred to by its more common colloquial term "Covid" throughout this thesis] and the Manchester Arena Bomb.

To avoid confusion with routine clinical emergencies impacting individual patients only, such as cardiac arrest, the terms traumatic incident and emergency will not be utilised.

1.2.2.1 Major Incident response

Major incident response requires a wide range of services and interventions which vary in scope and content dependent upon the nature of the incident, including Governmental and Non-Governmental agencies such as the healthcare sector, Public Health, and Emergency Preparedness, Resilience and Response [EPRR] practitioners (Richmond et al., 2021, Makin, 2020). Healthcare plays a particularly significant role as major incidents generally lead to substantial and unpredictable number of people requiring medical intervention for illness or injury (Verheul and Dückers, 2020). Resultantly a priority for healthcare systems is to be resilient in major incidents.

Ensuring organisations have the organisational adaptive capacity and capability to flexibly respond to an unanticipated demand for provisions as well as maintaining routine operational services is of importance to all healthcare organisations (Wiig and O'Hara, 2021).

1.2.3 Adaptive Capacity and Organisational Resilience

Extreme events caused by factors such as nature-induced major incidents or terrorism are increasing, and public organisations are required to develop evolving responses to ensure organisational continuity and resilience in the face of uncertainty. The 2020 Covid pandemic led to the exposure of gaps in emergency preparedness globally, and led to an increasing focus upon the importance of resilience at organisational and system levels, particularly in terms of healthcare systems (Khalil et al., 2022). The term resilience will be utilised throughout this thesis and refers to organisational resilience as determined within adaptive capacity theory, rather than individual or psychological resilience unless explicitly stated. Healthcare systems are the primary focus of this research, and the term resilience will be discussed in that context unless explicitly stated otherwise.

Organisational resilience can be difficult to define as it does not refer to any one individual organisational feature, but a number of factors which provide the foundation for flexible response, such as strong leadership and a committed workforce (Lyng et al., 2022). It is an under-studied, though developing, topic in healthcare research. Khalil et al. (2022) conducted a scoping which looked at the emerging conceptualisation of hospital system resilience and identified the following four capacities of resilient hospitals: Absorptive; Adaptive; Transformative; Learning. They further identified six inter-linked components for hospital resilience (known as the 6S) which can enable or limit the ability of organisations to display the four capacities of resilience:

- Space – such as physical building space and environments
- Stuff – such as equipment, medical gases

- Staff – the workforce available to a healthcare facility
- Systems – such as preparedness planning, leadership and management, communication, logistics
- Strategies – for mitigating hazards and reducing vulnerabilities., such as emergency planning teams and processes
- Services – the services delivered by that healthcare organisation, such as surgery or emergency medicine

Iflaifel et al. (2020) and Khalil et al. (2022) outline how a gap between the 6S, namely Strategies and Services, can lead to work-as-imagined policies and processes rather than work-as-done. Work-as-imagined describes the assumptions made about how work is completed. Work-as-done describes how work is actually completed. During major incidents, work-as-imagined processes can lead to a maladaptive systemic response which can in turn undermine the ability of 6S components to adapt and respond effectively to an ongoing incident. Resilient organisations can consequently be described as those that can absorb the stress of a major incident while it is occurring, and can also swiftly return to their normal state once the incident is over (Wiig et al., 2020, Zhang et al., 2018). To allow for an agile and absorptive response, it is vital that organisations also continuously evolve and improve through organisational learning post-event to identify areas of potential risk and amend planning and policies accordingly (Bjurling-Sjöberg et al., 2021, Zhang et al., 2018).

Organisational adaptive capacity [AC] consequently refers to the ability of organisations, institutions, and populations to agilely and flexibly adapt to these unpredictable changes and ensure minimal disruption to services, though the exact definition and parameters of this are contested (Engle, 2011, Zhang et al., 2018, Rumsey et al., 2014, Khalil et al., 2022) (see Figure. 1 for stages of organisational major incident response). This can be challenging to achieve before a crisis occurs as theoretical attempts to develop a specific resilient response cannot imagine all the potential variables and challenges of a particular major incident type until that major incident occurs. Hollnagel (2017) identified this as the paradox of 'managing what is not there', and so the only way to ensure safety is improved is to study unsafe practice, ensure

lessons are learnt from major incidents that have occurred, and enable response systems to have degrees of flexibility to adapt as needed.

Zhang et al. (2018) theorise greatest adaptations occur when need overwhelms capacity. Examples of successful adaptations can be seen throughout the Covid pandemic, where traditional healthcare practices rapidly evolved to meet the needs of the population through surge staffing models [see Figure 2] and innovative ways of delivering care such as virtual clinics (Arabi et al., 2021, Keene et al., 2021, Knowlson and Torgerson, 2020). However, a conflict can exist between the adaptive needs of an organisation and the needs of frontline healthcare professionals [HCP]. Whilst organisations may need the workforce to be flexible and work across multiple specialities, evidence suggests for nurses particularly redeployment even under normal circumstances can be a damaging experience, increasing stress and burnout, and negatively impacting upon staff retention (Donnelly, 2014, Galura, 2020, Willis et al., 2021).

Of Khalil et al. (2022) 6S components, staff are identified as being the most important in organisational resilience, a finding echoed in more recent post-Covid research (Van Heel et al., 2024). However, Bjurling-Sjöberg et al. (2021) highlight how the need for organisational resilience had negative consequences for healthcare staff. HCP under significant strain during Covid reported symptoms such as post-traumatic stress disorder, depressive symptoms and disordered sleep, and medical errors and delayed patient care increased. Though healthcare systems initially responded flexibly to the crisis, the resilience and ability of organisations to recover post-Covid have been arguably undermined by poor staff wellbeing and experience, leading to a lack of engagement with redeployment strategies (Hartley et al., 2024). This has in turn led to poor retention of specialist HCP precisely when their skills are most needed. This can be seen most recently in recent industrial action by nursing, paramedic and medical unions in the UK. In 2022-24, healthcare unions such as the Royal College of Nursing, British Medical Association and Unison called industrial strike action across a range of[i] healthcare disciplines, including Nurses, Junior Doctors and Paramedics (Essex et al., 2023, BMA, 2024a, RCN, 2024). Though there were many reasons for these strikes, pay and working conditions were among the most prominent (Nuffield Trust, 2022). . These

events occurred during a crisis within the National Health Service [NHS] caused by increasing patient numbers, lack of available bed space, lack of investment in infrastructure and social care, and reduced staffing numbers. The perceived structural and systemic failings at governmental and healthcare organisation levels which affect quality of care have particularly been identified as a primary reasons for the most recent strikes affecting the UK (Essex et al., 2023). The long-term impact of Covid for staff wellbeing and retention is unknown, but it's possible a disconnect between managers and HCP may be undermining organisational major incident resilience and AC. This is especially true if experienced TP subsequently leave the organisation or profession because of their negative experiences, further depleting the healthcare service when the demand to increase post-pandemic surgical capacity through the Covid Elective Recovery Plan (RCSE, 2021) is at its highest.

To develop AC it is vital that organisations understand the effect of policies and responses upon staff and utilise any learning to improve HCP's experience in upcoming incidents. Zhang et al. (2018) and (Khalil et al., 2022) highlight that organisations can only identify vulnerabilities in their systems once they have been exposed to situations which will challenge them as outlined in Figure 1, but it is unclear if learning routinely takes place or is robustly integrated into policy planning. History suggests this learning from prior major incidents does not consistently occur, with similar multi-agency coordination and communication failures being identified after the 9/11 terrorist events in New York as were identified after Manchester Arena Bombing, albeit in extremely different circumstances (Saunders, 2022a). The impact of unlearnt lessons has serious implications for organisations ability to recovery from major incidents and prepare for any upcoming incidents.

Figure 1 Major Incident Cycle

1.2.4 Emergency Preparedness, Resilience and Response [EPRR]

Since 2017 the NHS in the UK has managed several significant major incidents including: The Manchester Arena bombing in May 2017, The Grenfell Tower fire in June 2017, and the Covid pandemic which has been ongoing in the UK since February 2020. Both Manchester and Grenfell were classified Mass Casualty Incidents [MCI], defined as "an incident (or series of incidents) causing casualties on a scale that is beyond the normal resources of the normal resources of the emergency and healthcare services ability to manage" (NHS England, 2020a p.6). Conversely Covid was an enduring pandemic with continuous outbreaks of infections globally since the disease was first identified in Wuhan, China in December 2019.

The nature and challenges for healthcare providers of these types of incidents are very different, and therefore the healthcare response to them differs. In an MCI healthcare service may see a sudden rapid increase in patient numbers often presenting with complex and catastrophic injuries, but the timeframe for new presentations is relatively brief. These types of incidents are most often associated with injuries, and so an increased requirement for surgical care in OT. In the outbreak of a pathogenic disease, case numbers may not initially occur as rapidly, dependent upon

the mode of transmission and incubation period, but can be sustained for much longer periods. These types of incidents are associated commonly with respiratory and medical care, rather than a surgical response.

These differences have varying impacts upon organisational AC, with Covid having long-reaching consequences upon surgical capacity, HCP wellbeing and retention due to length and intensity of response required in comparison with MCI. Case numbers illustrate this difference succinctly. As of 3rd November 2022 there were 23,977,637 cases of Covid and 196,241 deaths in the UK (WHO, 2022). As of December 2022 there were 7.2 million people awaiting elective procedures due to delayed routine care in the NHS during Covid response (BMA, 2022). In the UK, Covid cases are no longer being counted so more recent statistics on the scope of the pandemic are not possible to identify. In comparison 22 people died in the Manchester Arena bombing, with over a hundred further suffering physical injuries, and 160 people attending local hospitals in the immediate aftermath (Kerslake, 2018, Craigie et al., 2020). Under the Civil Contingencies Act (2004) and NHS Act (2006) in the UK, the NHS has a legal mandate to effectively plan, prepare and respond to emergency situations under the remit of the NHS EPRR Unit [see figure 1] (NHS England, 2015, Makin, 2020). However, all stages of the major incident cycle, especially recovery, may be undermined however if wide-ranging learning from prior incidents is either not undertaken, or not embedded into major incident response preparations.

1.2.4.1 Barriers to effective EPRR

Despite the established EPRR framework in the UK, there have been ongoing criticisms of the multi-agency preparedness and handling of the aforementioned major incidents, with clear learning being identified (Kerslake, 2018). Many of these lessons regarding communication, decision-making and integration of multi-agency services have been identified in the response to previous major incidents, particularly concerns about the NHS's preparedness for a MCI (Berridge, 2019, Dark et al., 2021, Gabbe et al., 2020, Saunders, 2022a). In addition, the UK Covid-19 Inquiry has suggested to current civil

EPRR systems in the UK are inadequate and overly complex, and need to be abolished (Hallett, 2024).

Whilst a core principle of the CCA (2004) and the NHS England (2017) Incident Response plan is to learn from incidents [see Fig 1], it is clear this did not always occur in the UK following on from previous pandemics such as Severe Acute Respiratory Syndrome and Ebola. The House of Commons (HoC, 2021) and UK Covid-19 Inquiry (Hallett, 2024) report into the UK Governments Covid response were critical of governmental learning from these incidents. Both reports stated some less-than-effective strategies utilised were due to an inflexible focus upon influenza as the next potential pandemic at the expense of all other pathogens in all pandemic planning exercises (Government, 2017, DH, 2011, PHE, 2017, PHE, 2019, Hallett, 2024). Rapid redeployment of HCP to Critical Care Unit's [CCU] was a necessity during Covid, and organisations would not have been able to respond to the crisis without it. However, insufficient organisational capacity to meet the demands for patient care has been recognised to be the single biggest challenge to staff wellbeing and resilience (Weyman, 2024). For redeployed staff, their experience was marred by poor organisation, communication and a lack utilisation of individual HCP skills. Whilst redeployment is well recognised to be a stressful experience, some factors raised by staff associated with a significant negative impact upon their health and wellbeing could be approached differently (Keene et al., 2021, McGlinchey et al., 2021, Walker and Gerakios, 2021, Hartley et al., 2024). To do this, it is vital that learning is identified from recent major incidents to improve future organisational AC and resilience. This may in turn improve healthcare systems recovery, and potentially reduce any negative health consequences for staff.

1.2.5 The Role of Surgery in Major incidents

MCI's such as the Manchester Arena Bomb require a substantial surgical response to deal with the associated injuries. Injuries are the tenth leading cause of death in the western world, are associated with significant morbidity and mortality and require highly specialised surgical care to improve patient outcomes (NCEPOD, 2007,

Credland, 2016, WHO, 2021). Due to the unpredictability and complexity of injuries and the consequent multifaceted care required, surgical trauma care is clinically demanding and requires input from a highly skilled and experienced Operating Theatre [OT] team.

The principle of timely access to safe and effective surgical care and appropriately skilled surgical teams is a key element in the reorganisation of trauma services in the UK and the development of Major Trauma Centres [MTC] and networks in 2012 (NICE, 2016a, NICE, 2016b, NCEPOD, 2007). Despite this, timely access to surgery is challenging even in the western world, and there are not always sufficient resources to address need. This is especially true during MCI when a large influx of patients may need care at the same time. An example of this is burns care in the aftermath of a Romanian MCI in 2015, where a nightclub fire resulted in 162 burns victims which overwhelmed local specialist care. This necessitated an international response and patient transfers to numerous countries for specialised care. Surgical response was identified as a significant bottleneck to patients receiving timely care, as OT lists were overbooked with insufficient staff available to increase capacity (Almeland et al., 2022).

1.2.5.1 Access to Surgery

Persistent concerns remain about timely OT access during an MCI (Meara et al., 2015). This is highlighted by recent Australian and European studies which identifying that sufficient OT capacity would not be available for 60-80% of severely injured patients in a significant MCI and that this poses a significant risk to timely major incident response (Gabbe et al., 2020, Almeland et al., 2022).

The requirement for OT availability is emphasised by the statistics around need after an MCI. In the weeks following the Manchester Arena bombing over 400 hours of OT time was required to deal with the resulting traumatic injuries, and one hospital alone utilised 139 hours of OT time in the following 10 days for major incident victims only, causing delays to routine care (Smith, 2017). 21 patients received damage control surgery on the night of the bomb, followed by a second larger wave of surgical procedures the following day (Dark et al., 2021). After the 2009 bush fires in Victoria,

Australia 17 patients required surgical intervention immediately following the fires, with 13 of those receiving surgery in the first 24 hours. Many patients required multiple surgical interventions and over 90 hours of theatre time was utilised in the first 3 weeks post-major incident, though the demand reduced significantly after 7 days (Cleland et al., 2011). To enable OT departments to rapidly provide the volume of surgical care needed in the aftermath of major incident, having sufficiently trained and experienced staff available to provide care is vital. There is also a need to increase surgical capacity post-major incident to work through the backlog of 'routine' procedures, delayed during major incident response. However a lack of TP has already been recognised as a significant barrier to post-Covid recovery, within recruitment and retention an ongoing concern (Snowden, 2021)

1.2.6 Theatre Practitioners and Major incidents

Within OT, a range of professions work across several non-medical roles. It is necessary to clarify terminology used to explain who is involved and the nuances in their skillsets to fully explore the differences in how they may be utilised for carrying major incident types. See table 1 for further details of roles and responsibilities in the OT.

1.2.6.1 Terminology

Both Registered Nurses [RN's] and Operating Department Practitioners [ODPs] can work in all non-medical OT roles and so for clarity in this thesis the terms Scrub Practitioner [SP], Anaesthetic Practitioner [AP] and Recovery Practitioner [RP] will be utilised when referring to specific theatre roles and can refer to either profession acting within those [See table 1]. The term Theatre Practitioner [TP] will encompass all roles and both professions. ODP's are healthcare professionals trained to degree level specifically within an OT environment, and they train in each of the three specialities of anaesthetics, scrub and recovery. RN's by contrast undertake more generic degree training encompassing both acute and community services, across a range of departments and specialisms. They can choose to specialise in OT practice post-

graduation, and usually specialise in one role and undertake further training post-qualifying, though some dual role in two or more different areas. The terms AP, SP, and RP refer to both types of registered professions, but explicitly excludes non-registered staff (such as healthcare support workers) and Nursing Associates (whos' practice within OT is supervised by an RN or ODP who retains full accountability).

Throughout this document much of the content will discuss nursing theory as there is a large body of nursing research, which was established as a profession in 1908. In contrast ODP's are a relatively new profession becoming regulated in the UK in 2004, and ODP-specific research is a developing but comparatively limited field at present. Therefore, in the context of the OT content, discussions of nursing theory will apply to both nurses and ODPs unless otherwise specified as their professional roles in this clinical environment are the same.

Table 1: Roles and responsibilities in the operating theatre

Specialism	Professions who undertake this role	Responsibilities
Anaesthetist	Doctor	Specialist doctors responsible for providing anaesthesia and anaesthetic care for patients undergoing surgery. Anaesthetists also work in other roles, including in CCU, resuscitation teams and pain management.
Anaesthetic Practitioner	RN, ODP	Works with the anaesthetist. Assists in all aspects of the planning, delivery and implementation of anaesthetic care. May also undertake roles outside of the theatre

		department, such as on the resuscitation team. Includes responsibilities for patient monitoring, infection control, medications
Surgeon	Doctor	Specialist doctors who perform surgical procedures to diagnose, treat and manage a range of surgical conditions.
Scrub Practitioner	RN, ODP, Nurse Associate*, Assistant Practitioner*	Works with the surgeon within the sterile surgical field. Assists in all aspects of the planning, delivery and implementation of surgical care in the operating theatre. Includes responsibilities for preparing operating theatre, all instrumentation, infection control, specimen management and medications.
Circulating Practitioner	RN, ODP, Nurse Associate*, Assistant Practitioner*, Support Worker*	Circulates in the operating theatre as part of the non-sterile surgical team. Responsibilities include patient transfer from wards to operating theatres, stocking theatres, anticipating the needs of the scrub practitioner, infection control, specimen

		management and record keeping
Recovery Practitioner	RN, ODP, Nurse Associate*, Assistant Practitioner*	Cares for patients in the immediate post-operative period. Includes extended roles such as airway management, advanced pain management, invasive patient monitoring and nurse-led discharge from the recovery suite.

*With some restrictions, under supervision of a registered practitioner

1.2.6.2 Operating Theatre Departments: Culture and Roles

OT are culturally unique departments which play a pivotal role in major incident management and response, particularly for MCI associated with a high volume of injuries requiring surgical management. They are an environment which requires intense cognitive and psychomotor work often under high pressure, in highly controlled environments reliant on an interdisciplinary team working (Gillespie et al., 2008). OT are distinctive from other clinical areas in that the multidisciplinary team [MDT] work in well-defined sub-teams that are highly intimate and interdependent upon each other to provide care (Espinoza et al., 2016, Callaghan, 2011). Examples of professionals working in these teams include medics (anaesthetists and surgeons), TP and radiographers. The emphasis on collaborative working for a single patient at a time, where no individual HCP can autonomously complete their role without the simultaneous participation of multiple other differing specialists, is the distinguishing cultural characteristic of the environment in comparison with other healthcare settings (James-Scotter et al., 2019a, Sacks et al., 2015).

OTs are one third of the triad of critical care services provide by acute hospitals and MTC's, along with the Emergency Department [ED] and Critical Care Units [CCU]. Most TP only work within OT environments and have very little interaction with patients, the public or the wider hospital. As a result, their roles are often misunderstood or

poorly recognised. A small but growing body of research does look at the skills of TP in relation to their day-to-day activities, but this field is only recently starting to develop. Though often discussed in the context of the wider MDT, there is growing interest in the competencies of TP particularly considering the Covid elective recovery plan which is looking to increase surgical capacity in the NHS to manage a significant surgical backlog post-pandemic (RCSE, 2021). However qualitative empirical research investigating the TP experience of, or utilisation of skillset during, major incident is a noticeable gap in the current evidence base.

1.2.6.3 Perception and skills of Theatre Practitioners

The OT environment is associated with high-stress and retention of TP has long been recognised as a significant barrier to increasing surgical capacity (Chen et al., 2009, James-Scotter et al., 2019a, Gillespie et al., 2008). Skills and competence of TP within the OT are highly specific to the environment and are not undertaken in any other clinical speciality. Examples of this include the management of biological specimens, surgical asepsis, management of surgical instrumentation, and risk management specific to the OT (for example managing to use of lasers, a range of medical gases, surgical sharps and increased surgical infection control precautions) (Korkiakangas et al., 2014, Mitchell and Flin, 2008, Vogelsang et al., 2020). Along with advanced psychomotor skills, TP also require superior emotional intelligence and hold the 'overall' view of the patient, but the specific characteristics are hard to unambiguously define. Without this fundamental understanding it can be challenging to adequately explain the role and value of TP to those unfamiliar with the specialism. Table 2 provides an overview of some of the OT specialism-specific skills, and how these compare to those of traditional RN's (for example those who work on wards) and CCU nurses. This list of skills is not complete or exhaustive but provides an example of commonly utilised skills in each of those areas. However, the worth of TP has often been found to be linked only to the value of surgeons and anaesthetists, and they are often perceived by those outside to OT to be doctors assistants rather than skilled and valuable HCP in their own right (Blomberg et al., 2015). The closed nature of OT, and difference in skills between 'traditional' nursing roles and TP specialisms, often means the hyper-specific

competencies of TP are poorly understood by those unfamiliar with the environment. This lack of understanding of TP's roles often means their skills are not consistently respected outside of their immediate environment, and so their importance to safe and effective surgery has been underestimated.

There is a great deal of cross over between the AP and RP roles, and some appropriately qualified staff work in both areas. TP in these roles often interact both with patients and inter-departmentally within the hospital, such as ED, and they are more visible member of the OT team due to this. These roles are easier to enumerate given their resemblance to general nursing competencies, with a distinctive transferable and recognisable skillset like those of CCU nurses [See Table 2] (Callaghan, 2011, Lee et al., 2020). SP is conspicuous in that it bears little resemblance to traditional nursing roles due to a lack of patient interaction and focus upon technical skills and is challenging to quantify and poorly understood outside of the surgical environment (Beydler, 2017, Espinoza et al., 2016, Korkiakangas et al., 2014). This can lead to a misunderstanding of what all TP do, but an especial lack of understanding of SP.

The lack of empirical research regarding TP skills and understanding of their role may somewhat be explained by a combination of factors. Namely, surgery and its role in public health being poorly understood, access to surgical care being largely missing from the global health discourse, and an overall lack of visibility of TP (Meara et al., 2015, APPG, 2016, Nursing Now, 2020, Crisp, 2018). Consequently, TP's may not always be utilised to greatest effect within healthcare organisations, but it is difficult to understand this is further without empirical research. It is possible that TP's transferrable skillset to other clinical areas is not well understood, and so in major incidents such as Covid, TP may not always have been deployed or utilised appropriately. This undermines organisational resilience at a time when it is most needed and learning how this may be improved in the future is key to improving organisational response and recovery (Griffiths, 2021, Keene et al., 2021).

Table 2: A Comparison of Theatre Practitioner skills vs Traditional Nursing and CCU skills

Anaesthetic Practitioner Skills	Scrub Practitioner Skills	Recovery Practitioner Skills	Traditional registered Nurse Skills	CCU Nurse Skills
Preparing and managing equipment for anaesthesia e.g. Anaesthetic machines, patient warming devices, rapid infusers, ventilatory circuits Assists with airway management, including: preparing equipment for, and assisting with intubation, providing manual airway support, preparing medications to support intubation and ventilation Preparing equipment for patient positioning in surgical field, such as traction	Maintains a safe perioperative environment through infection control and surgical asepsis Equipment management e.g. identifying, preparing and managing surgical instrumentation, diathermy, lasers, laparoscopic machines Accountable for checking all items, instruments and supplementary items (such as swabs and needles) in and out of the surgical field and providing assurance this is done	Airway management, including management of ventilators Medication Management Advanced medication management e.g. set up of opioid infusions Risk assessment and management of common post-anaesthetic emergencies e.g. major haemorrhage, incomplete reversal of muscle relaxation, loss of patient airway, laryngospasm	Patient assessment including vital sign monitoring, such as blood pressure, oxygen saturations, blood glucose, fluid balance Managing and assessing patients' activities of daily living and care planning appropriately e.g. mobility, nutrition Risk assessment and management, including: Falls, pressure areas, delirium, malnutrition. Medication management, including oral and intravenous medications	Airway management, including management of ventilators Advanced vital sign monitoring including: cardiac, neurological and renal monitoring, blood glucose, blood pressure, Advanced medication management e.g. set up of opioid infusions Risk Assessment e.g. identifying and reducing risk of CCU-induced delirium, falls, pressure areas, malnutrition

Anaesthetic Practitioner Skills	Scrub Practitioner Skills	Recovery Practitioner Skills	Traditional registered Nurse Skills	CCU Nurse Skills
Vital sign monitoring including blood gases, haemoglobin, blood pressure, neurological observations. Medication management, including set up of intravenous fluids, anaesthetic infusions, antibiotics Management of intraoperative blood products such as blood, FFP, and monitoring of the patient. Risk assessment of common anaesthetic emergencies e.g. can't intubate, can't ventilate, anaphylaxis	Maintaining sterility in the surgical field Specimen management and handling e.g. human tissue Risk management of hazardous materials and/or equipment such as formalin, x-ray/lasers, sharps (blades, sutures, needles) Preparing equipment for patient positioning in surgical field, such as prone position Advanced communication skills to manage overall flow of communication between circulating, surgical and anaesthetic teams	Advanced vital sign monitoring including: cardiac, neurological and renal monitoring, haemoglobin, blood gases Advanced pain management Tissue viability and maintenance of patients' pressure areas Management of postoperative blood products such as blood, FFP, and monitoring of the patient. Communication with patients and their families in the immediate post-anaesthetic period	Tissue viability and maintenance of patient's pressure areas Wound management, including knowledge of differing dressings types Patient discharge planning, including liaising with multidisciplinary team members such as medics, physiotherapists, social works, dieticians, occupational therapists and pharmacists.	Managing equipment such as monitoring devices, infusion pumps. Wound management, including knowledge of differing dressing types Co-ordinate care between multidisciplinary teams such as medics, physiotherapists, pharmacists. Communication with patients and their families

1.2.6.4 Theatre Practitioner Availability

A core component of a hospitals' major incident response is having a readily available and highly skilled OT team able to manage the wide-ranging nature and surgical complexity of injuries after major incident. Montán et al. (2022) simulated study of hospital capacity after MCI recognised that theoretical resource capacity may be undermined or overestimated if there is a lack of sufficiently competent staff. However, the need for MDT availability is not always recognised when policy decisions are made to increase surgical capacity. This has been demonstrated by policies such as the Covid Elective Recovery plan which offers suggestions for how the medical workforce can be increased to tackle to significant surgical backlog post-pandemic, but does not address the same for TP (Campbell, 2021, RCSE, 2021, Snowden, 2021). The need to increase the TP workforce considering ongoing staffing challenges has become the focus of much recent UK health and workforce discussion, but there are no quick fixes or easy answers. A lack of available TP is recognised to be a significant barrier to increasing surgical capacity post-Covid, but recruitment and retention is an enduring issue for healthcare services (Faccincani et al., 2018b, Cleland et al., 2011, Gorgone et al., 2016, Gillespie et al., 2010, Pupkiewicz et al., 2015, Snowden, 2021). A lack of acknowledgement from senior management, career development and a defined career pathway are particularly highlighted as key factors is TP leaving the profession, resulting in the loss of experienced staff so vital in major incident response and recovery (James-Scotter et al., 2019a).

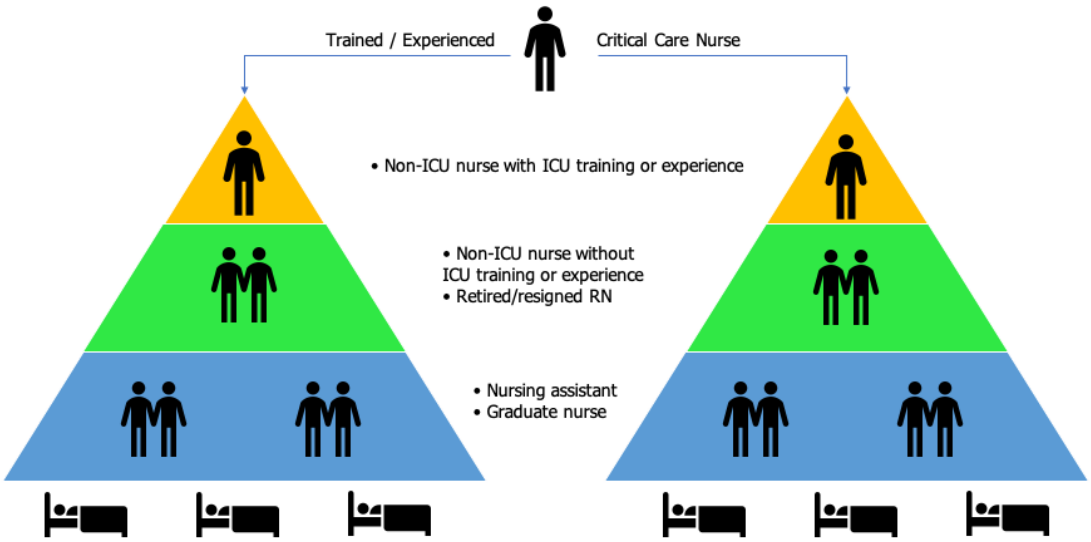
Little is understood currently about how major incident response impacts upon TP wellbeing or intentions to leave the profession, and without this knowledge it is challenging to know how experiences may be improved in future major incident response. There is a wealth of research looking at major incident preparedness in ED and CCU nurses, but a very limited number evaluating the same skills in TP (Sonneborn et al., 2018b). This is particularly highlighted by Faccincani et al. (2018b) Italian study on the major incident capabilities of hospitals. They state the minimum required of experience needed of all staff, including ED nurses, but state only that TP are required without requiring any experience from this speciality. To understand how organisations

can improve AC and resilience in major incidents whilst also protecting staff wellbeing, it is important to define who is involved in surgical care and understand their roles to gain insight into how to utilise these resources effectively.

1.2.7 Staff Utilisation and Redeployment

Given the extensive and long-lasting staffing crisis in the NHS it is vital to improve HCP's experiences of major incident wherever possible. Appropriately utilising staff to reduce the risk of burnout could be a key area of learning to improve organisational resilience and recovery. An adequately staffed clinical workforce who possess basic knowledge, skills and capabilities to respond promptly and nimbly is the ideal of major incident response, and redeploying the available workforce to pressurised areas is a vital component to allow hospitals to effectively provide care and manage patient flow in surge staffing models [see Figure 2] (Adams, 2012, Veenema et al., 2019). Quality and quantity of staff are independent variables in surge capacity, and an oft-neglected priority for major incident management is effectively utilising the competencies of staff rather than focusing upon increasing volume of staff alone (Faccincani et al., 2018b, Veenema, 2016). However, research of Covid redeployment strategies suggests senior managers with no clinical responsibilities often do not view nurses in particular as individuals with specialist skills and knowledge. They are instead viewed as interchangeable resources. Increasing numbers of staff alone was viewed in some quarters as successful redeployment, regardless of whether their skills were appropriate or being best utilised (Hartley et al., 2024)

Figure 2 – Surge Staffing Model for increasing Critical Care capacity



(Tamayo 2021)

The most recent major incident which discusses surge workforce in any detail is the Covid pandemic, where prolonged surge staffing has been required. The likely requirement for surge staffing in the event of a pandemic was identified in the Cygnus report (PHE 2016) but in practice numerous issues were identified, namely around:- time taken to recruit staff on 'emergency' contracts, communication, skill set of redeployed staff, supervision for deployed students, and sustainability of surge workforce (Tashkandi et al., 2021, Marks et al., 2021, Gupta et al., 2021, Hauck et al., 2021, Mchugh, 2010, Kennedy et al., 2022).

In the UK in January 2021 CCU capacity was increased by over 70% but this prolonged surge in response without a significant uptick in staffing numbers has had a knock-on effect on other services. This is particularly true for TP who were prioritised for redeployment to CCU, resulting reduction by 30% overall in surgical activity (Price et al., 2021, Melman et al., 2021, Ryder et al., 2021). This had a tangible impact upon hospitals ability to provide surgical services and capacity was reduced to provide emergency surgery only, having a negative impact upon patient mortality and morbidity across a range of surgical conditions such as hip fractures. Hall et al. (2021) international survey of 173 MTCs found that though 52% of units had no reduction in the

number of admissions of hip fractures during Covid, 63.7% reported worsened levels of care due to TP redeployment and lack of access to OT. 74 centres report a reduced access to OT of over 50%, and 84.4% reported reduced OT efficiency due to redeployment of staff and increased infection control procedures. As a result by the end of 2021 there are anticipated to be between 3-4 million patients awaiting surgery due to cancellations or delayed diagnosis due to Covid, and 7.2 million people waiting for elective care as of December 2022 (Price et al., 2021, Melman et al., 2021, BMA, 2022).

Despite this significant impact upon surgical services, research suggests redeployed TP were not always well utilised during Covid. Walker and Gerakios (2021) outline the frustration redeployed staff felt at their skill set not being used appropriately leading to feelings of boredom, underappreciation, and dissatisfaction with units often over-staffed. One American study found though that although 95% of hospitals cancelled elective surgical procedures to redeploy staff and increase CCU capacity, less than half of those CCU utilised the skill set of TP, or employed tiered staffing models (Harris and Coopersmith, 2021).

Areas of possible good practice have been identified though which could offer suggestions of organisational learning. Oakley et al. (2020) redeployed TP were to CCU in specialised MDT which maximised their skills and experiences. Examples include SPs deployed to venous/central access lines or tracheostomy teams, utilising their surgical and aseptic skills, and APs deployed to intubation teams. Intubation is a type of advanced airway management, where a tube is inserted into the airway of a patient to support mechanical ventilation. The tube is connected either to a bag which a healthcare professional compresses to push oxygen into the body, or a machine called a ventilator which undertakes this process automatically. Patients undergoing general anaesthetic in the OT, or under very heavy sedation in CCU, are commonly intubated and attached to a ventilator which 'takes over' the patients breathing while they are unable to manage this themselves. The Anaesthetist holds overall responsibility for this process and is the healthcare professional who undertakes intubation. However, they require assistance for the process and management and monitoring of the patient thereafter. Therefore, supporting and managing this process in a common skill of APs, [see Table 2]. A single study of one Hospitals Trusts approach to surge workforce is

difficult to generalise more widely, though Vera San Juan et al. (2021b), Kennedy et al. (2022) and Holthof and Luedi (2021) also support this method of task-based teams to make most use of staffs pre-existing skills. A pragmatic hypothesis is that in future major incidents this approach may go some way to addressing the barriers faced by deployed staff and allow greater exploitation of the available workforce when the resource is precious. This may also mitigate some risks of stress and burnout amongst staff. However, it is unclear if this practice of deploying TP to task or skill-specific team occurs consistently, or if this is an isolated approach.

1.2.7.1 Redeployment, Burnout and Retention

Burnout is recognised to be a state of physical, emotional and mental exhaustion which can be brought on by periods of prolonged or repeated stress (Mental Health UK, 2024, Reichl et al., 2014). Whilst burnout is linked to other psychological disorders, such as anxiety and depression, it is distinct from them in that it is it routinely linked specifically to the workplace. Occupational burnout can be considered a boundary issue, where organisational support for, and demands upon, individuals impact directly upon their of their relationship with their employer and their perceived level of exhaustion (Ilyas et al., 2023, Koutsimani et al., 2019, Lastovkova et al., 2018). . In comparison, anxiety is a protective response to a perceived threatening situation. This becomes problematic for a person's wellbeing when anxiety is prolonged or uncontrolled. Depressive disorders can be characterised by low mood and a loss of pleasure or interest in normal activities for prolonged periods of time (WHO, 2023). Psychological and sociological research has suggested that the terminology for the three disorders can, and has, been frequently confused. It can be difficult to distinguish between the conditions because there are many overlapping symptoms and common characteristics (Koutsimani et al., 2019). In chapters 4, 5, 6 and 7 of this thesis, participants use the terms anxiety, stress, depression and burnout to describe their feelings during major incident response. It is not within the remit of this research to diagnose psychological disorders, and so the participants own language rather than any clinical diagnosis has been used throughout to reflect their perception of their psychological wellbeing.

Nurses have been found to have a higher rate of moral distress and burnout that all other healthcare professions during the Covid pandemic, and the need to improve redeployment strategies to reduce this have been identified throughout the literature (Vindrola-Padros et al., 2020, Price et al., 2021). A burnt-out nursing workforce has an impact upon the recovery of services as exhausted and emotionally distressed staff are more likely to leave the profession or take time off for illness. 50% of nurses in America and one in ten nurses globally suffer from burnout directly linked to their occupation and organisational-level factors, such as reduced nurse-patient ratios and increased administration (Esmaeil et al., 2022, Jun et al., 2021). These factors are linked to high rates of occupational stress and burnout, associated with poorer patient morbidity and mortality and poor staff retention (Cimiotti et al., 2012, Melnyk et al., 2018, Sevdalis et al., 2012, Esmaeil et al., 2022, Jun et al., 2021). Though an increasing body of research has reviewed these factors in frontline staff, the psychological impact of major incident response upon the managers responsible for workforce utilisation and organisational resilience remains under researched (Hartley et al., 2024).

Stress, workload and shortage of staff and resources have been recognised a significant push factor for HCP considering leaving the profession (Weyman, 2024) Burnt-out staff are linked to poorer organisational outcomes due to lower organisational commitment, poorer productivity, increased absenteeism and poorer staff retention (Jun et al., 2021, Ilyas et al., 2023). The resultant higher staff turnover is extremely costly. A 17.6% nursing turnover rate is estimated to lead to a loss of $5-8 million per annum per hospitals, and $40 billion to the health care sector in the USA alone (NSI, 2022). Burnout and increased turnover are also linked to managerial practices, with Gormley (2011) particularly highlighting a disconnect between how managers perceive a work environment compared to how clinicians view it. Furthermore O'Brien-Pallas et al. (2006) demonstrated a lack of understanding by executives for what frontline clinicians ranked as important. This absence of insight in turn leads to working environments and initiatives which do not align with the values of the clinicians working in them and so turnover increases. However, evidence suggests this disparity is not a foregone conclusion. Nurses who have clearly defined roles, appropriate skill utilisation, synergistic communication with executive managers, and feel empowered

and supported by managers are at a lower occupational risk of burnout (Goh et al., 2016, Gormley, 2011, Jun et al., 2021, O'Brien-Pallas et al., 2006).

1.2.8 Summary

This chapter has introduced the key concepts, definitions and theories which are used throughout this thesis. An introduction to major incidents, the role of operating theatres and theatre practitioners has been given. The link between workforce utilisation and organisational adaptive capacity has been made. This background chapter gives context to the focus of this research project. In the next chapter, a systematic review will be conducted which will explore these ideas further in the published literature. Additionally, from this review, the research question and objectives for this project will be derived.

Chapter 2: Systematic Review

2.1 Introduction

This chapter will outline how a qualitative systematic review of the evidence was undertaken to map the current evidence base, themes and key concepts in relation to Theatre Practitioner utilisation during major incidents. The formulation of the search question will be outlined utilised a Perspective/Exposure/Outcome [PEO] framework, and the research objective defined. The search strategy will be discussed in detail, including details of database selection, key words, and inclusion and exclusion criteria. A PRISMA chart will outline how database searches led to the final number of papers being included, and a table of evidence will summarise the papers included in the review. A narrative synthesis will be conducted to identify key themes and findings from the research. The papers will be critically appraised, and their methodology critiqued. Finally, the themes from the review will be critically discussed.

2.2 Search Strategy

A qualitative systematic review of the literature has been undertaken to evaluate the available evidence on this subject. Qualitative systematic reviews have a role in explaining why certain approaches or interventions may not be effective from the perspectives of those involved (Lockwood, 2024). This is appropriate for this study, as effective skill utilisation and experienced of major incidents are subjective. A scoping review was undertaken to identify what is already known about TP utilisation, and further identify gaps in knowledge (Peters, 2020). Unlike a more traditional systematic review which has a tightly focused research question and holds critical appraisal of methodology as a core component, scoping reviews allow for exploration of more

broadly defined topics. From this the search question and objectives for a structured, qualitative systematic review were identified.

This systematic review has been registered with PROSPERO. Registration number: CRD42024572730 [See Appendix 1].

2.2.1 Search Question

To ensure systematic reviews are clearly focussed and allow for a logical inclusion and exclusion criteria to be developed, search questions must be tightly focussed. It is generally recommended to use a model to formulate the question to ensure questions are specific enough to develop a structures systematic review from. As this was a qualitative systematic review, the search question for this review was formed using a (P)erspective/(E)xposure /(O)utcome model.

Table 3: PEO Table

Population	Exposure	Outcome
Theatre Practitioners	Major Incidents	Effective skill utilisation

From this, the following search question was developed.

Are Theatre Practitioners skills utilised during major incidents?

2.2.2 Systematic Review Objectives

The following objectives of this review were identified. Due to the limited amount already known about this topic, the aim was kept broad so all kept concepts could be identified and mapped.

- To identify how and if theatre practitioners' skills are utilised during major incidents.
- To identify how theatre practitioners perceive their skills to be utilised.

2.2.3 Database selection

To ensure systematic rigour in the approach, the Joanna Briggs Institute [JBI] systematic review guidance was utilised to develop this qualitative systematic review (Lockwood, 2024, Poritt, 2014). Searches were conducted on five databases: Web of Science, SCOPUS, CINHAL, MEDLINE and PROQUEST, to identify existing research on the utilisation and major incident preparedness on TP. The University of Sheffield Database discovery pages were used to identify which databases were available as a student at the University. Databases were selected for their relevance to healthcare, Nursing, perioperative practice and major incident response. The Cochrane library, SCPOUS and EMBASE was originally selected as a search database, but all these databases returned few relevant studies, all of which were already identified in the final five databases selected for the systemic search. To minimise publication bias and ensure all pertinent data was identified, grey literature sources were also searched, including EThOS database for doctoral theses; Association for Perioperative Practice; Association of Perioperative Nurses; White Rose Thesis Online.

An initial structured scoping review was conducted utilising the Joanna Briggs Institute framework (Pollock et al., 2021) utilising these databases between December 2021 – June 2022. At confirmation review for the thesis, the review panel advised that despite the paucity of literature available, a systematic review would be appropriate. The systematic review was conducted from June-July 2024 utilising the Joanna briggs Institute framework.

2.2.4 Key words and synonyms

A combination of key words and synonyms were utilised during the searches as seen in tables 4 and 5. Words were combined using Boolean operators, and truncation used where appropriate.

Table 4: Keywords

Keyword	Synonyms
Operating Room	Operating Theatre OR Peri-operative
Nurs*	Healthcare Professional OR Practitioner OR Operating Department Practitioner
Disaster	Major Incident OR Emergency OR Pandemic OR Mass casualty incident OR Humanitarian
Utilisation	Surge workforce OR Redeployment OR deployment

Table 5: Database Keywords combinations

Database	**Keywords and Boolean operator combinations**
Web of Science	(Operating AND Room) OR (Operating AND Theatre) OR (Peri-operative) NOT (emergency AND department) (Nurs*) OR (Healthcare AND Professional) OR (Practitioner) OR (Operating AND Department AND Practitioner)

	(Disaster) OR (major AND incident) OR (emergency) OR (pandemic) OR (mass AND casualty AND incident) (Surge AND workforce) OR (Redeployment) OR (utilisation) OR (deployment)
Scopus	(Operating AND Room) OR (Operating AND Theatre) OR (Peri-operative) (Nurs*) OR (Healthcare AND Professional) OR (Practitioner) OR (Operating AND Department AND Practitioner) (Disaster) OR (major AND incident) OR (emergency) OR (pandemic) OR (mass AND casualty AND incident) (Surge AND workforce) OR (Redeployment) OR (utilisation) OR (deployment)
CINHAL	(MM "Operating Rooms/ED/MT/OG/ST/UT") OR (MH "Mass Casualty Incidents/ED/EP/PC/ST/UT") OR (MM "Operating Room Personnel/ED/AM/MA/MT/ST/UT") OR (MM "Perioperative Nursing/AM/ED/EV/MA/UT/OG") OR (MM "Multidisciplinary Care Team/ED/AM/MT/MA/UT") OR "((Operating AND Room) OR (Operating AND Theatre) OR (Peri-operative) (Nurs*) OR (Healthcare AND Professional) OR (Practitioner) OR (Operating AND Department AND Practitioner) (Disaster) OR (major AND incident) OR (emergency) OR (pandemic) OR (mass AND casualty AND incident) (Surge AND workforce) OR (Redeployment) OR (utilisation) OR (deployment)) AND ((Operating AND Room) OR (Operating AND Theatre) OR (Peri-operative) (Nurs*) OR (Healthcare AND Professional) OR (Practitioner) OR (Operating AND Department AND Practitioner)) AND ((Disaster) OR (major AND incident) OR (emergency) OR (pandemic) OR (mass AND casualty AND incident))"
Medline	(MM "Operating Rooms/ED/MT/OG/ST/UT") OR (MH "Mass Casualty Incidents/ED/EP/PC/ST/UT") OR (MM "Operating Room Personnel/ED/AM/MA/MT/ST/UT") OR (MM "Perioperative Nursing/AM/ED/EV/MA/UT/OG") OR (MM "Multidisciplinary Care Team/ED/AM/MT/MA/UT") OR "((Operating AND Room) OR (Operating AND Theatre) OR (Peri-operative) (Nurs*) OR (Healthcare AND Professional) OR (Practitioner) OR (Operating AND Department AND Practitioner) (Disaster) OR (major AND incident) OR (emergency) OR (pandemic) OR (mass AND casualty AND incident) (Surge AND workforce) OR (Redeployment) OR (utilisation) OR

	(deployment)) AND ((Operating AND Room) OR (Operating AND Theatre) OR (Peri-operative) (Nurs*) OR (Healthcare AND Professional) OR (Practitioner) OR (Operating AND Department AND Practitioner)) AND ((Disaster) OR (major AND incident) OR (emergency) OR (pandemic) OR (mass AND casualty AND incident))"
ProQuest	"Operating Room" OR "Operating Theatre" OR Peri-operative Nurs* OR Healthcare Professional" OR Practitioner OR "Operating Department Practitioner" AND NOT “emergency department” Disaster OR “major incident” OR emergency OR pandemic OR “mass casualty incident”

2.2.5 Inclusion and Exclusion criteria

Inclusion and exclusion criteria were developed to identify literature appropriate to the research objectives [see table 6]. As there is limited available literature, and this is a qualitative systematic review, no hierarchy of evidence has been utilised. All available evidence, regardless of methodological approach, has been included (Lockwood, 2024, Poritt, 2014). Papers identified from each search were screened by title for suitability, and then by abstract. During the initial literature search it became apparent there was little primary research available in this area and so papers were included even if methodological quality was weak. This is to ensure a thorough overview of the existing body of work and to allow all concepts to be mapped (Munn et al., 2018, Peters, 2020).

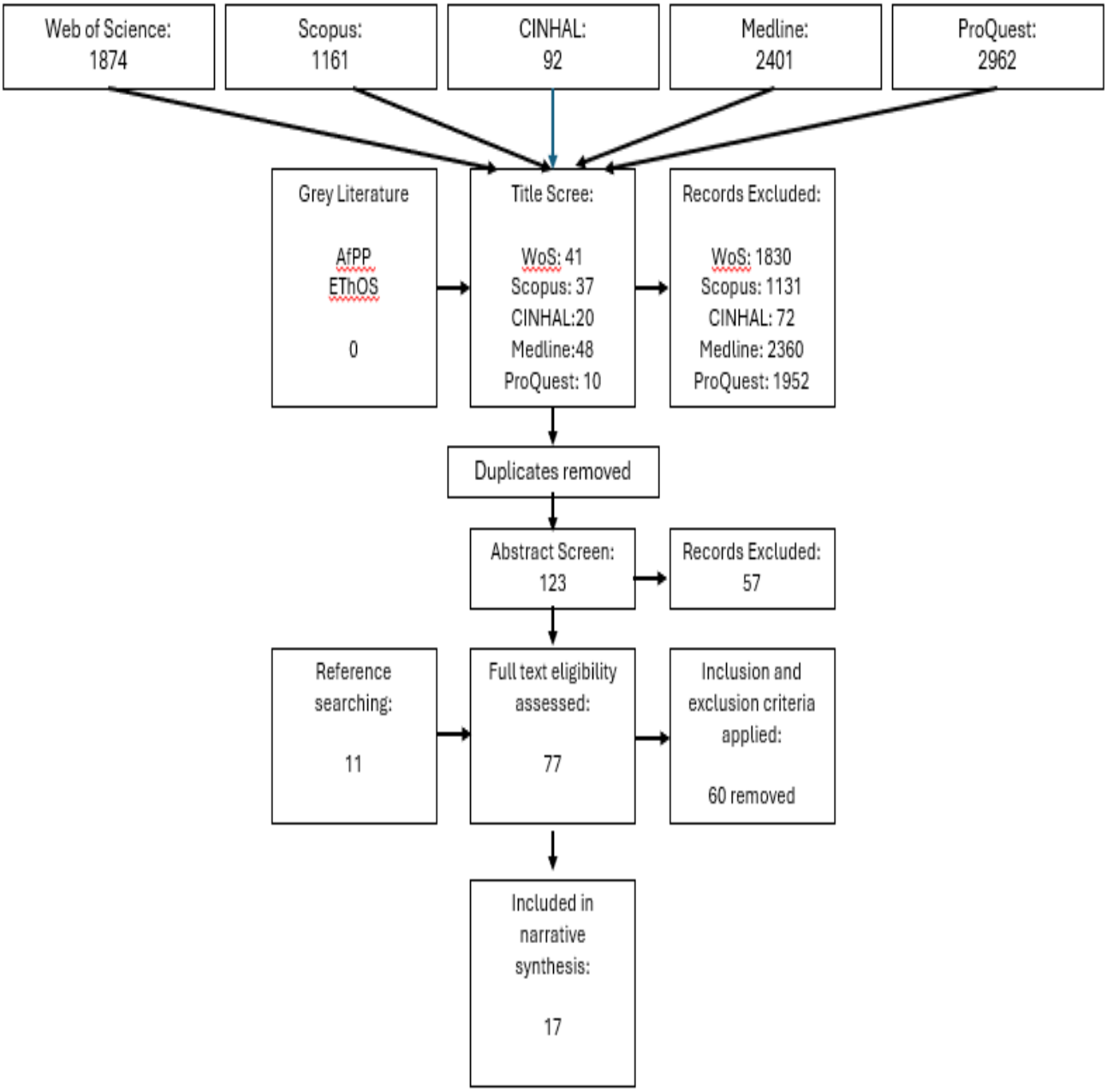
Table 6: Inclusion/Exclusion Criteria

Inclusion	Exclusion
Registered OT staff discussed in detail (Nurses or ODPs)	No OT staff mentioned, or in minimal detail (e.g., focus on CCU surge staffing with mention of OT staff redeployment but no details)
Focus on major incident response	Descriptions of previous major incidents with no/minimal/non-identifiable mention of OT staff deployment/utilization
Focus on OT staff utilisation, knowledge and/or skills in major incident response	Focus on routine surgical emergencies e.g., single RTA or DCS for a single patient
International literature	Protocols/guidelines/policies for surgery during a major incident
Written in English	Infection control/PPE/Standard operating procedures for surgery
Full Text available	Non-registered staff (such as support workers), medics (such as surgeons and anaesthetists), advanced practice clinicians working as part of the medical rota (such as Advanced Nurse Practitioners) and students
Published after the year 2000	Published before the year 2000
	Not written in English/Translation not available
	Full text not available or conference abstract only

2.2.6 Evidence inclusion

17 papers were identified that were suitable for this systematic review of the literature. Figure 3 presents a PRISMA flowchart for how papers were identified from each database.

Figure 3: PRISMA Flowchart



Appendix 2 presents a Table of Evidence, detailing the identified research paper, its' methods, methodological quality rating and key findings. Please refer to Appendix 2 for further details.

2.3 Summary of evidence

17 papers were identified and analysed, all except one of which published by authors from the UK, USA or Australia. The final paper was published in Iran. No research was found which looked at TP skill utilisation during major incidents, but several papers discuss experiences of major incident tangentially. The stark lack of primary research in this area is clearly demonstrated here with only four empirical research studies identified (Mitchell et al., 2014, Montgomery et al., 2021, Sonneborn et al., 2018a, Rostami et al., 2023), one educational evaluation with some primary data (Thomas, 2008), 11 reflective accounts of response to major incidents (Bradbury et al., 2005, Britton et al., 2020, Burnweit and Stylianos, 2011, Forgione, 2003, Hamlin, 2010, Hemingway and Ferguson, 2014, Hemingway and Silvestri, 2021, Macasieb, 2021, Stucky et al., 2022, Stucky et al., 2020, Owens et al., 2005), and 1 editorial (Stephens, 2020). Eight papers looked at major incident response to MCI following terrorist attacks or natural major incidents (Bradbury et al., 2005, Burnweit and Stylianos, 2011, Forgione, 2003, Hamlin, 2010, Hemingway and Ferguson, 2014, Stucky et al., 2022, Wenji et al., 2015, Owens et al., 2005, Thomas, 2008, Rostami et al., 2023), six papers looked at TP utilisations during the Covid pandemic (Britton et al., 2020, Hemingway and Silvestri, 2021, Macasieb, 2021, Montgomery et al., 2021, Stephens, 2020, Stucky et al., 2020) and three papers looked at pre-emptive major incident preparedness in the OT (Mitchell et al., 2014, Sonneborn et al., 2018a, Thomas, 2008). Four papers were identified through the reference lists of other papers (Hamlin, 2010, Stucky et al., 2022, Wenji et al., 2015, Owens et al., 2005, Thomas, 2008)

2.4 Quality Appraisal

Papers were critically appraised utilising either the appropriate JBI critical appraisal framework (Munn et al., 2014, Longwood, 2020, Moola, 2020, Aromataris E, 2020, McArthur, 2015) or McGill mixed-methods appraisal tool (Hong, 2018). The results of the critical appraisal can be seen in the Table 6. As there is a paucity of research on

this topic, all papers have been included in this study regardless of judgements on quality to ensure that all potential concepts and themes are identified from the available data, and can be explored further in the empirical research (Peters, 2020, Peterson et al., 2017).

Overall, the quality of the methodological quality of the papers was mixed [See Table 6]. Nevertheless, there are papers which add valuable insight into the experiences and utilisation of TP during a range of major incidents. Most of the evidence included are narrative or descriptive accounts of an individuals' experience. Many of these were of high quality for their method, in particular those of Forgione (2003), Hemingway and Ferguson (2014) and Stucky et al. (2022) who demonstrated high author credibility and congruence between their objectives, reflections and conclusions. Other narrative papers were valuable for providing context of the environments and roles TP may be utilised in, there is limited degree of methodological rigour or objective assessment in these accounts, particular those of Stephens (2020) and Macasieb (2021). Both are highly subjective accounts presented limited detail or critique, increasing the risk of researcher and presentation bias.

There is some empirical research in this systematic review, and this is valuable due to the lack of it. However, the robustness of the research is often questionable. Rostami et al. (2023) conduct ethically approved qualitative interviews, and identified a cohort of staff who could answer their primary research question. However, some philosophical and methodological detail was missing, and details of the study design were minimal. The philosophical grounding for the research was not clarified, and so the epistemological framing for the study and subsequent rationale for methodological choices were unclear. Although the authors stated their use of a qualitative approach with content analysis, no further detail of how this was conducted, or justification for this approach was given. Finally, the research aims and objectives were not clearly specified and so it is challenging to assess if the interview schedule promoted congruence. Similar flaws were found in Mitchell et al. (2014) mixed-methods study, and Thomas (2008) interventional study. Insufficient methodological details were presented, and Thomas (2008) work was not presented in a recognisable research format. The lack of methodological rigour means it is difficult to ascertain how some of the conclusions of the papers have been reached.

Burnweit and Stylianos (2011) presented a confused paper. Sections were headed as methods and results, though no methods were described, and no results presented. This was a narrative paper, presented as empirical research. A questionnaire was mentioned, but no detail was included about this. Despite the flaws in methods and lack of rigour, all the papers provide valuable context, and in Rostami et al. (2023) case valuable empirical data. However, none are high-quality evidence, and likely would not be reproduceable based upon the information provided. By comparison, Montgomery et al. (2021) and Sonneborn et al. (2018a) however high quality research studies, with clearly defined methodologies and congruence between aims, methods and conclusions.

Several articles present narrative reviews. Whilst no empirical data is presented detailed, quality narrative accounts are provided for the response to the Boston bombings (Hemingway and Ferguson, 2014), Covid pandemic (Hemingway and Silvestri, 2021, Britton et al., 2020) and US military response to the Afghan evacuations (Stucky et al., 2022). These are all strong pieces of narrative work, which clearly describe overview of OT response and outline well justified, thorough conclusions. Though no empirical evidence was collected, and so no new primary findings are identified, all papers are of high quality for narrative reviews. Though not of the same high quality, four narrative papers are also present good detail regarding 9/11 terror attack (Forgione, 2003), 7/7 London bombings (Bradbury et al., 2005), humanitarian response (Hamlin, 2010) and Covid redeployment (Stephens, 2020). These papers are brief in comparison, and do not draw supported conclusions. However, they provide a clear overview and context of response by authors who were present and engaged in the OT response. By comparison, the accounts of Macasieb (2021), Stephens (2020) are brief and subjective, with limited detail and conclusions which are vague and lack detail or application.

2.5 Themes and Sub-Themes

Due to the disparity in the methodologies of the researched papers identified in this review, a thematic approach to evidence synthesis was utilised as recommended by

the Joanna Briggs Institute (Lockwood, 2024). The following four key themes and sub-themes were identified from the literature:

1. Workforce flexibility and adaptability
    - Mass Casualty Incidents
    - Covid

2. Knowledge and Skills
    - Mass Casualty Incidents
    - Covid

3. Communication
4. Training and Experience
    - Mass Casualty Incident
    - Covid

How these themes are identified and represented in each paper is summarised in table 7. They will then be discussed in detail.

Table 7: Concept Mapping

	Flexibility and adaptability	Communication	Knowledge and Skills	Training and experience
Bradbury et al. (2005)		X	X	X
Britton et al. (2020)	X		X	X
Burnweit et al. (2011)	X			
Forgione et al. (2003)	X			X
Hamlin (2010)	X		X	
Hemmingway et al. (2014)	X	X	X	
Hemmingway et al. (2021)				X
Macasieb and Duerson (2021)		X		X
Mitchell et al. (2014)	X		X	X
Montgomery et al. (2021)	X		X	X
Owens et al. (2005)	X	X		X
Rostami et al. (2023)	X	X	X	X
Sonneborne et al. (2018)	X	X	X	X
Stephens (2020)	X		X	
Stucky et al (2020)	X	X		X
Stucky et al. (2022)	X	X	X	X
Thomas (2008)			X	X

2.5.1 Workforce flexibility and adaptability

A significant theme throughout the literature was the need for flexibility and adaptability in the workforce to meet the unpredictable needs of a major incident. Needs, expectations and TP confidence differed between MCI and pandemics, suggesting some learning regarding how and where TP are used could be identified.

2.5.1.1 Mass Casualty Incidents

Significant innovation in practice was demonstrated by a number of papers in this study who responded either to natural disasters (Burnweit and Stylianos, 2011, Hamlin, 2010, Owens et al., 2005, Rostami et al., 2023) or at the site of terrorist attacks (Forgione, 2003). The speed and success of this innovation varies but opens an interesting discussion about potential learning which could be embraced after a major incident to inform normal work, and if these learning opportunities are being harnessed within the NHS to improve workforce flexibility and organisational resilience.

Forgione (2003) describes the actions of a specialised National Disaster Medical System [NDMS] team during the 9/11 terrorist attacks in New York. The highly specialised, MDT based in Boston were trained in MCI management specifically to be deployed to major incident sites. However, the authors describe the substantial adaptations teams had to make to adjust from anticipated clinical need to the reality. Instead of being deployed to local hospitals, low survival rate of victims at Ground Zero meant limited patient transfers were undertaken to hospitals. Deployed teams were instead needed at Ground Zero in rapidly erected field hospitals to deliver immediate clinical care/triage and emergency surgery, such as limb amputations, and significant changes to normal practice were required for this. These challenges were mirrored in Hamlin (2010) account of a Australian perioperative teams deployment to Indonesia in the aftermath of the Indian Ocean Tsunami, Owens et al. (2005) account of a IMSuRT-E (part of NDMS) response to the 2003 Iranian earthquake in Bam and Burnweit and Stylianos (2011) account of a field hospital in Haiti post-2011 earthquake.

Innovation was not just limited to austere environments. Stucky et al. (2022) outline how even within a large American military medical facility and designated MTC in Germany, not enough surgical equipment was available to manage to influx of polytrauma patients in the aftermath of the Kabul Airport terrorist attacks. This necessitated a new multi-disciplinary and multi-organisational approach to planning and organising emergency surgery. Similarly, Rostami et al. (2023) qualitative study of TP experience in response to the 2017 Kermanshah earthquake identified how TP worked across multiple departments to support triage and patient flow through their respective organisations. As stressed by Owens et al. (2005), it is impossible to plan for all eventualities in major incident response due to the sheer volume of changeable variables. Innovation and adaptability will always be required, however, to ensure best practice and standard operating procedures evolve along with frontline advancements it is important to ensure appropriate lessons are learnt from incidents

All these accounts are descriptions of a response, which gives insight into challenges faced in varying major incident types. However, there is no data collected on how any potential learning or resolutions have informed future practice or led to adaptations in standard operating procedures. Without this it is difficult to assess if any learning was identified from these situations, and what long-term impact these lessons could have on upcoming events or routine care. In addition, there is very little discussion or focus upon how TP themselves were utilised, reflecting the organisational and structural focus of much major incident management research and policy. In perioperative major incident research this lack of longitudinal data collection, or transparent dissemination practices suggests many potentially impactful lessons from major incident response are not currently being learnt or harnessed to improve the TP experience.

2.5.1.2 Covid

Adaptability of a different nature was required for the Covid pandemic, where several papers discuss the redeployment of TP to CCU during the pandemic. Cross-training of nurses to have transferable skills to a variety of settings is not a new concept and is crucial to organisations ability to increase capacity or flex staffing. However in OT this

cross-discipline training is usually restricted to inter-disciplinary OT skills e.g. SP with skills in multiple surgical specialities, not inter-departmental skills such as surgical to medical ward training (Hemingway and Silvestri, 2021).

Britton et al. (2020) look at the response in a UK OT department, where TP, particularly AP and RP, were prioritised for redeployment to CCU's under traditional surge staffing models [see figure 2] due to their pre-existing anaesthetic skills. This study focussed upon organisational management of resources, and there is no discussion or feedback from the staff regarding their experiences during redeployment. This organisational focus is reflected in Macasieb (2021) and Stucky et al. (2020) work, understandably suggesting the initial focus was upon how establishments can surge staff to support AC in the face of overwhelming patient admissions. However, this organisational approach means that the clinical realities faced by individual staff have not been well investigated to ascertain how these impact upon organisational resilience. There is need for a focus upon staff experiences is highlighted by Montgomery et al. (2021) who found the planned organisational response was very different to the reality of the response experienced by clinicians. One TP interviewed highlighted they were sent to CCU, and it was expected they knew how to work a ventilator and completed clinical observation paperwork. In reality, they did not have these skills, but this was not initially identified. It was only after they had started caring for patients that it was identified training was required to adapt TP skillsets for CCU. Some TP in the study felt poorly prepared for redeployment, and this had a negative impact upon their wellbeing and motivation. Hemingway and Silvestri (2021) also found TP were under supported or inappropriately prepared for redeployment due to a lack of understanding of their roles, leading to increased risk of stress, frustration and potential burnout. Despite this lack of preparation, one TP stated they found the experience as a whole positive, identifying enhanced multidisciplinary teamwork as a particularly affirming experience (Montgomery et al., 2021). Other members of the MDT in this study also identified the compelling teamwork mindset in CCU throughout the pandemic as being beneficial to their mental health. This insinuates strong collaborative teams are a potential protective factor in major incidents, a finding echoed elsewhere the literature (Radford, 2021). Building upon this finding could positively influence future major incident practices.

There are further potentially encouraging findings in the evidence base which offer suggestions for future practice. Macasieb (2021) anecdotally suggest that exposure to CCU care improved TP's perceptions of their basic nursing skills, a constructive finding which could be a valuable insight for future major incident planning and cannot easily be dismissed. Hamlin (2010) also offer suggestions for future practice. They studied TP acting outside of their normal scope of practice in major incident response, but still working within their usual clinical environment of the OT. TP felt confident and competent adapting and extending their skills, suggesting deployment and task-shifting is not always a negative experience. This suggests that a skill or tasked-based redeployment may be more effective than a blanket deployment of a staff group, especially if established teams can provide psychosocial support to enhance staff wellbeing, but this needs further investigation.

Unfortunately though the structural and organisational focus of much of the research does not assess the vulnerabilities raised by Montgomery et al. (2021) work, or consistently identify lessons learned for the future. Without research evaluating the efficacy of redeployment, or utilisation of TP skillsets to identify areas of good and poor practice, it is challenging to identify potential innovations for future major incident response. Zhang et al. (2018) pinpoint these weaknesses as a vital aspect of developing future resilience within organisations, but this does not appear to be consistently occurring in OT. The current lack of research exploring this makes it difficult to gain greater understanding of why the way response was view by organisations vs by clinicians was so different, increasing the risk that positive practices may not be more widely understood or adopted in future major incidents.

2.5.2 Knowledge and skills

Knowledge and skills of TP were discussed in relation to two separate incident types: MCI's and Covid.

2.5.2.1 Mass Casualty Incidents

Few papers identified any specific major incident management training or skills-based teaching for TP's. Bradbury et al. (2005) mention that OT teams rehearsed major incident planning in response to the 7/7 London bombings in 2005, but also alluded to the severity and nature of injuries being a significant test of clinical skill and experience. Indeed, a number of papers mention that TP's had no prior experience of war-zone type injuries such as blast injuries associated with events such as the Manchester and Boston bombings and so any prior planning did not prepare clinical staff for the realities of what they faced (Bradbury et al., 2005, Hemingway and Ferguson, 2014, Rostami et al., 2023). This lack of preparedness is somewhat predicted in AC theory with Zhang et al. (2018), Hollnagel (2017), and Anderson et al. (2020b) discussing the inability to prepare for the unknown. Only 19.9 % of TP in one Australian survey had any prior major incident experience, and general major incident preparedness knowledge was rated to be poor (Sonneborn et al., 2018a). Similarly, a small-scale survey in Thomas (2008) educational evaluation of TP bioterrorist knowledge identified 57% of staff had never received bioterrorism training. TP in Rostami et al. (2023) study identified training regarding roles and responsibilities to be particularly important after witnessing the confusion and poor organisation of earthquake response but cited the lack of available opportunities. Participants in this study specifically identified that their experience and learning from the 2017 earthquake had not been capitalised on to be passed on to future generations, and so valuable empirical knowledge on how to deal with major incidents had been lost.

Only two papers discuss a proactive attempt to improve and develop major incident skills and knowledge. Mitchell et al. (2014) evaluated of a partnership between an acute and tertiary hospital in Australia. They focussed upon rotating TP across the hospitals to develop their clinical skills, cultural and organisational awareness of differing clinical sites in the event of redeployment during major incident. TP reported they felt the partnership was effective, but no follow up evaluation has occurred post-major incident to know if this theoretical preparedness directly translated to real-time readiness. However, this method in intra-organisational rotation could offer a solution for how to improve flexibility and resilience in the TP workplace in a controlled way and

may better prepare staff for future redeployments. This approach could increase surgical capacity after major incident, and so improve organisational resilience, if staff from other local hospitals could be easily and swiftly deployed into MTC's during a major incident.

Although the papers in this systematic review stress the need for further major incident education for TP to improve both skills and preparedness, without empirical research evaluating the long-term efficacy of existing education packages it is challenging to identify what direction this should take, or what approaches may be effective. There is a need for quality prospective cohort studies in this area to collect meaningful data which could offer.

2.5.2.2 Covid

During the Covid pandemic one paper highlight how TP's were specifically re-redeployed to specialised skills-based teams utilising their existing skills base (Britton et al., 2020). This reflects specialised teams assembled based upon clinicians' skills elsewhere in the literature (Marks et al., 2021, Arabi et al., 2021, Oakley et al., 2020). None of these papers however look at if being deployed to specialised teams improved the experience of redeployment for TPs, so it is not possible to know if this was a successful approach from a frontline staff perspective. It is also not known if this was a common or isolated approach to TP redeployment, and so it is difficult to say with any certainty if this method could improve redeployment in future major incidents. It is possible though this approach could go some way to overcoming challenges highlighted by Walker and Gerakios (2021) and Vindrola-Padros et al. (2020) where redeployed staff became frustrated by the lack of utilisation or awareness of their skillset, or by Montgomery et al. (2021) study where TP's felt overwhelmed and unprepared for deployment. With the potentially protective element of team-working being also identified in the literature (Montgomery et al., 2021, Radford, 2021), this offers an opportunity for learning from the pandemic, and suggests an avenue for research which could gain a greater understanding of different organisational approaches to redeployment and their impacts.

2.5.3 Communication

Communication challenges were a common theme across all papers, both organisationally, inter- and intra-departmentally. Both Bradbury et al. (2005) and Hemingway and Ferguson (2014) discuss how anticipated communications (such as the use of mobile phones) were not immediately effective in the aftermath of the London and Boston bombings, due to lack of signal, or police cutting network connectivity. In both situations a 'runner' between ED and OT to identify anticipated surgical workload to allow for OT management of resources. Stucky et al. (2022) also describe how conflicting information from multiple different sources made planning for use of surgical resources challenging.

TP co-ordinators were an instrumental solution in a number of studies to manage and allocate resources (Stucky et al., 2022, Bradbury et al., 2005, Hemingway and Ferguson, 2014). Hemingway and Ferguson (2014) identified several practical challenges with this approach, namely that staff found it difficult to identify who was acting in which role and the volume of staff 'hanging round' wanting to help hindered the co-ordinators efficacy. Rostami et al. (2023) also recognised a lack of clarity regarding roles and responsibilities to be a hinderance to efficient and effective disaster response, particularly highlighting the confusion caused by staff being unaware of the expectations of them. Altruistic clinical volunteerism, where staff respond to a crisis unprompted (for example by attending their organisation after an MCI without being requested to do so), in major incident response was a common theme across the literature, identified as unintentionally hindering leadership and communication [See Chapters 4 and 5]. This spontaneous volunteerism is predicted in Sonneborn et al. (2018a) study. They found civilian TP were often unsure of appropriate major incident policies but stated they would report to their hospital to help regardless of being called or notified of the need. This unintended consequences of need to respond in times of crisis is highlighted in Hemingway and Ferguson (2014) and Burnweit and Stylianos (2011) reflective accounts of major incidents where this spontaneous volunteerism overwhelmed need, making coordination of resources more challenging rather than less.

Research into the Covid pandemic and redeployment of staff suggests this is a problematic during any major incident (Montgomery et al., 2021, Walker and Gerakios, 2021). Evidence is starting to emerge which suggests experiences of redeployment during Covid has improved TP's capabilities in complex major incident response where surgical patients may also have communicable disease (Stucky et al., 2022). However, there is limited evidence to support this more generally. The pandemic has unwittingly offered a unique opportunity to better understand barriers and enablers to staff flexibility within healthcare organisations. To understand how this could be harnessed without sacrificing staff wellbeing or retention significant empirical research is needed.

2.5.4 Training and Experience

The literature in this review clearly links the ability of TP to flexibly and competently respond to varying major incident types to underpinning training and education. There is a stark difference between training availability for a surgical emergency such as an MCI vs a medical emergency such as a pandemic.

2.5.4.1 Mass Casualty Incidents

Sonneborn et al. (2018a) cross-sectional study, Rostami et al. (2023) qualitative study and Thomas (2008) educational evaluation suggest there is a need for pre-emptive major incident education for TP. Though common amongst active military personnel (Stucky et al., 2022), Sonneborn et al. (2018a) and Rostami et al. (2023) found general major incident knowledge amongst TP to be poor despite an awareness of major incident policy, and highlighted the need for practical training. Additionally Stucky et al. (2022) suggested that even though their military frontline staff did receive specialist major trauma training, lessons were still learnt from their experiences with the Kabul evacuations. They particularly note that whilst their existing training package focuses upon both organisational and clinical skills, this is for 'routine' military traumas and not complex humanitarian responses.

Sonneborn et al. (2018a) furthermore suggest the major incident preparedness of many civilian OT's has decreased rather than increased since the 9/11 terror attacks. As suggested in Bradbury et al. (2005), Forgione (2003) and Hemingway and Ferguson (2014) it is challenging for any TP to know how to respond to a major incident when they have not experienced one. As major incidents are by nature unpredictable there is no one way of guaranteeing all TP will have the experience to respond to effectively. This is compounded by a lack of quality empirical research data evaluating the efficacy of preparations that do exist. This inability to adequately plan for the response to an event there has been no experience of is a recognised difficulty in emergency preparedness, and identifying and learning from this vulnerability in organisation response in key to improving overall resilience (Engle, 2011, Hollnagel, 2017, Mortreux and Barnett, 2017). Targeted training and simulation may go some way to mitigating these challenges, and equipping TP with the required skills, confidence and resilience to improve their experience of major incident response.

2.5.4.2 Covid

During the Covid pandemic Britton et al. (2020) describe the training package required to allow TP to develop the CCU and ward-nursing skills required, including medicines administration and documentation. Similar just-in-time initiatives were implemented by Hemingway and Silvestri (2021), Macasieb (2021), Montgomery et al. (2021) and Stucky et al. (2020), though content of training curricula varied dependent upon specific departments. Just-in-time training is a pragmatic approach to unanticipated major incident, though Veenema (2016) put a strong argument forwards for this 'emergency' training being a result of a lack of nurse engagement and representation with major incident preparedness policies. Indeed as Stucky et al. (2022), Mitchell et al. (2014) Sonneborn et al. (2018a) identified there are some generic major incident skills which can be transferred to any major incident type, though it is unclear if staff in any study other than these and Forgione (2003) and Owens et al. (2005) have received this type of training.

Stucky et al. (2020) and Stephens (2020) especially stress the transferability of TP skills to traditional nursing roles, suggesting potentially seamless staff redeployments. However, both papers are brief reflective accounts of an individual's perspective. How TP viewed their preparedness for redeployment, the efficacy of training packages, and the impact upon staff experience and wellbeing is unclear and not discussed in these papers. Indeed, a substantial volume of literature suggests frontline staff generally were not always well prepared for redeployment into CCU units and a lack of appropriate training is a recurring theme. It is not clear how training or preparation impacted upon the wider TP professions, or how this may have negatively or positively impacted upon their experiences or redeployment. It is also unclear if there was a difference between how nurses or ODPs felt prepared for redeployment given their differing undergraduate training, or if AP, RP and SP felt differently prepared given their differing clinical experiences. Exploring these nuances in greater detail would add valuable insight into both how staff are utilised, and how they perceive themselves to be utilised. This may in turn offer suggestions for improving redeployment and organisational AC in future.

2.6 Discussion

This systematic review highlights several potential areas of development for future major incident response. The most significant findings regard the adaptability of the existing TP workforce to major incident, and training needs to improve both experience of, and response to, a major incident. However, it is clear there are also several unanswered questions regarding the utilisation of TP skills and knowledge, and their experiences of major incident response that requires further investigation through quality empirical research to fully understand the complexities and nuances of TP utilisation.

The ability of healthcare organisations to nimbly adapt to major incidents and ensure a resilient response and minimal organisational disruption relies upon sufficient resources. Major incident response often relies upon HCP working flexibly for prolonged periods of time to respond to clinical need and ensure patient care is not compromised, but the result of this type of work can be to the detriment of HCP

wellbeing. This is turn can impact upon clinical performance, engagement and retention at a time when healthcare services cannot afford to lose staff. TP particularly are a scare specialism who's skills are in demand to increase post-pandemic surgical capacity and aid organisational recovery (Cumpsty-Fowler and Saletnik, 2021, Esmaeil et al., 2022, Heinzelman, 2013, James-Scotter et al., 2019b). Madara et al. (2021) outline how to ensure future clinical capacity, and so organisational resilience, significant investment and political will is required to address the global systemic clinical workforce challenges and address the needs of HCP suffering burnout by years of Covid response. Though the UK are starting to look at workforce development for TP in response to the extensive surgical backlog post-Covid (Snowden, 2021, Committee, 2020, Kings Fund, 2021), the solutions to this complex issue are neither quick nor easy.

No research currently looks how major incidents and skill utilisation have affected TP utilisation or wellbeing. What research that does exist looking at nurses generically adds weight to the argument that research into TP experiences should be prioritised to gain a greater understanding of their experiences with a view to improving retention and work-engagement, and therefore organisational resilience. In multiple recent studies of redeployment to CCU during the Covid pandemic, a high risk of frustration, psychological distress and burnout is identified by nurses, with a number intending to leave the profession (Kennedy et al., 2022, Denning et al., 2021, Kakemam et al., 2021, Keene et al., 2021, Bisesti et al., 2021, Walker and Gerakios, 2021, Vindrola-Padros et al., 2020, Veerapen and Mckeown, 2021). It is possible this is worse for TP whose skills were possibly already poorly understood, and the existing evidence suggests they were underprepared for, and inconsistently utilised, during redeployment. Conversely, the positive experiences of some staff, particularly with the protective element of enhanced team-work practice, offer some encouraging possibilities for improving staff experience (Montgomery et al., 2021). However, with very limited research suggesting this it is possible there have been more positive experiences that have not been identified or explored in detail which could provide a template for future best practice.

Poor experiences of deployment for staff increases the risk of poor health outcomes and retention of skilled staff. The impact of reduced staffing upon an organisations to respond flexibly to major incident is not a new challenge, nor is it

restricted to any one geographic area (Kaji et al., 2008, Mchugh, 2010, Rumsey et al., 2014). Nurse staffing and retention concerns are the weakest link in major incident preparedness policies, and many hospitals do not have sufficient nursing capacity to enable effective surge staffing procedures (Aiken et al., 2011, Aiken et al., 2001, Aiken et al., 2013, Ball et al., 2018). Furthermore Phillips et al. (2022) found the impact of surge staffing [see figure 2] during Covid has actively disincentivised nurses from being willing to redeploy in future major incidents. It can be assumed that these findings apply to all TP due to similarities in job roles in OT, though this has not yet been tested and needs further investigation.

This negative outcome of a mismatch between an TP's skills and the job they are doing in not unexpected, given a body of economic and sociological research linking skills mismatch to decreased job satisfaction and work-life conflict (Shevchuk et al., 2019). However, deployment does not need to be a negative experience if staffs' skills are utilised appropriately, and developing a body of empirical research evaluating TP's experiences of major incident could have significant lessons for organisational major incident workforce planning. TP who felt confident adapting their practice to outside of their usual clinical specialism utilised their skills to improve overall clinical efficacy. As suggested by Shevchuk et al. (2019), matching skills to job role is a potentially more effective way of improving HCP job satisfaction experience of redeployment. It is unclear however if this happened consistently for TP during any major incident. Understanding, and then redefining the expectations of adaptability and flexibility in staff to consider their existing experience and skill set may go some way to offsetting potentially harmful side effects of major incident response upon TP.

Supporting and retaining existing staff is a priority for healthcare organisations globally (Peleg, 2009), and yet this is an aspect of resilience and major incident planning often not taken into account in AC theory. Montgomery et al. (2021) highlight the important of taking frontline staffs experiences into account in future major incident planning, especially as Willis et al. (2021) cite frontline HCP frustration at senior managers ignoring their concerns or not understanding the 'reality-gap' between clinical realities and the organisations' planning. This is unsurprising given a recurring theme throughout the wider literature is a disconnect between organisational resilience

planning and the clinical realities facing frontline staff. This at times leads to policies and procedures which reflect work-as-imagined, rather than work-as-done.

Despite this there is very little primary research looking at TP's knowledge or skills in major incident, or their experiences of involvement in incidents. It is plausible that resources may be under-utilised by not exploiting clinicians existing skillsets and by ineffective communication and lack of clear clinical management structures during a major incident (Burnweit and Stylianos, 2011, Forgione, 2003, Hemingway and Ferguson, 2014, Montgomery et al., 2021, Vera San Juan et al., 2021a, Vindrola-Padros et al., 2020, Walker and Gerakios, 2021, Phillips et al., 2022). A lack of understanding of TP's skills may mean staff are underprepared for deployment, or ineffectively utilised, and this can have a significant impact upon staff wellbeing.

2.7 Gap in the Research:

Much of the current literature regarding major incident management and clinical workforce focuses either on existing gaps in staffing, the need for surge staffing during a major incident, or the preparedness of ED and CCU staff for major incidents. There is little focusing upon the preparedness of TP for major incidents and a scoping review of the literature identified no contemporary empirical research looking at the successful deployment or utilisation of TP during a major incident.

TPs are a particularly scare and poorly understood resource and yet there is very limited research looking at their experience of, knowledge of, or utilisation during major incidents. While TP's are highly skilled and specialised with a unique knowledge base, such as principles of sterility, patient positioning, and advance communication and situational awareness skills, these skills are not always recognised outside the OT environment or appropriately harnessed in major incident response (Hemingway and Silvestri, 2021). There is no currently available primary literature looking at TP's experiences of major incident, deployment and skill set utilisation after an incident and the PhD will address this gap.

2.8 Research Question

Are Theatre Practitioners being effectively engaged and utilised to support the agile adaptive capacity of healthcare organisations during major incident response?

2.8.1 Research Objectives

- To identify TP and senior managers experiences of major incidents and how they perceived workforce utilisation
- To explore TP's experiences of their employment during a major incident, and perceptions of the utilisation of their skill set
- To explore senior managers perspectives on TP workforce utilisation during major incidents, and how these impact upon departmental and organisational adaptive capacity
- To identify areas of learning and good practice to inform future major incident and workforce policies

2.9 Summary

This chapter has presented the methodology utilised to undertake this systematic review. The methods used to analyse the research papers have been described, and the data extraction presented. Themes have been identified from the literature and discussed in detail. The quality of the literature has also been appraised, and a gap in the research identified. From this systematic review, a clear, structured research question has been developed. The objectives for the research have been outlined. In the next chapter, the methodology used to answer this research question will be discussed.

Chapter 3: Methodology

3.1 Introduction

This chapter will outline the methodology for this research project, exploring the rationale for the decisions made. The philosophical and epistemological framework will be outlined, and the pragmatist philosophical framework underpinning the research explored. Ethical considerations will be discussed in detail, along with methods of consent and data governance. The process for selecting and recruiting participants, data collection and analysis will also be outlined. Tables outline the characteristics of the participants recruited to this study. A section on reflexivity and the insider researcher is included. This section will address how the potential of bias due to the researchers own experience of the clinical environment and studied phenomena was minimised.

3.2 Pragmatism as a philosophical framework

Braun and Clarke (2019) clarify that the philosophical assumptions underpinning the research must be both considered and transparent. This research study is based in the pragmatist paradigm, a value-based consequence-focussed epistemology. This allows research to be designed and undertaken because it is suited to addressing the research question, rather than selecting a specific method because ideologically it fits with a specified philosophical framework (Anastas, 2012, Goldenberg, 2009, Hothersall, 2019).

John Dewey is one of the most prominent and influential proponents of the pragmatism, and a critic of traditional philosophical frameworks. He argues that science and philosophy cannot be separated from the cultural context one is studying, truth is based in context, and traditional ontologies and epistemologies based in absolutism or relativism's unconditional views of reality can be reductive in their lack of

recognition of this (Hickman et al., 2009, Holmwood, 2014, Dewey and Deen, 2012, Dewey, 1991). A central tenant of this philosophy is that there is no one absolute version of reality or epistemological certainty, information can be objective and subjective, principles of absolutism and relativism are valuable, and can both be correct or incorrect depending upon circumstances surrounding any variable being studied. This study aligns with John Dewey's branch of pragmatism and argues that this is a significant and appropriate framework for major incident research as it allows both subjective and objective realities to be equally valuable, though the influence of differing realities on a specific environment may vary depending upon the context being studied.

Pragmatism is becoming more established in clinical research as it proports the researcher should adopt methods which 'work' to find answers to the research questions as opposed to becoming too tied to specific philosophical frameworks and their associated methodologies (Kaushik and Walsh, 2019, Kelly and Cordeiro, 2020). Though historically criticised for its focus on the useful and practical rather than philosophical purity, this emphasis on functional, integrative methodology where knowledge is closely entwined with practice is precisely what makes pragmatism so well suited to this study. Both philosophically and logically pragmatism is appropriate for a specialism where individual actions and decisions take place within the context of a large inter-dependent MDT and a wider complex environment. As Kelly and Cordeiro (2020) argue in their research looking at organisational processes, this approach allows the recognition that individuals can experience organisational structures differently within the same environment and profession. Goldenberg (2009) further discuss how pragmatism therefore allows a focus upon empirical research with consequence rather than habitual thinking. Consequently, the paradigm is becoming more accepted in contemporary healthcare research as it allows the researcher to consider all methodological approaches and ideas and decide what is most useful in achieving clinical benefit (Anastas, 2012, Hothersall, 2019).

In emergency preparedness research, taking a practical approach to understanding how current processes allow TP to be effectively utilised during a major incident supports the finding of workable solutions to any issues identified. This helps

ensure that any findings have a tangible real-world impact. In healthcare research, this is arguably more important than a philosophically 'pure' research design. Pragmatist epistemology values inductive knowledge equally with deductive (Anastas, 2012), and this is especially pertinent in this research as so little is known about the experience of TP during major incident that data collection and analysis is by necessity be inductive. The methods selected in this research study have been chosen because they are a sound and practical way of investigating a complex topic in detail without making assumptions about what may be found, and whilst also accepting this will not be absolute knowledge of peri-operative major incident response. The epistemological framing for this research is realistic problem solving for a real-world clinical environment, supported by a robust pragmatist model to allow for better consequences of empirical research (Hothersall, 2019).

3.3 Methodology

In this study an inductive qualitative standpoint has been taken as it is deemed to be the best way to map currently unknown concepts and gain a rich understanding of TP's experiences during major incidents, but within the context of objective realities (Dewey, 1991, Hickman et al., 2009). There is an underlying argument, based in Dewey's work, that the subjective experience is intrinsically linked to the objective reality of major incident response, and these cannot necessarily be separated from each other. Inductive qualitative research is of benefit to understanding these complexities. It's rich details helps our understanding of communities such as OT, and the cultural and organisational nuance which may impact upon major incident response (Longwood, 2020). Whilst phenomenology particularly is a popular methodology in nursing research, the philosophical standpoint can provide an overly simplistic view of reality and so is unsuited to frame this research. Processes such as bracketing, the separating a phenomenon from the world to study it, would be contradictory. It would assume that TPs experiences of major incident response is based purely upon their subjective

experience risks, ignoring many objective realities of major incident response. Similarly the inverse of this argument is also true, and objective variables alone cannot account for how individual clinicians may subjectively experience a major incident and how this may impact upon their ability to work to a high clinical standard as may be assumed in positivist philosophy (Green, 2014, Padgett, 2012).

3.3.1 Patient and Public Involvement

This project has benefitted from patient and public involvement. This was difficult in this study as OT are a 'closed' environment, and the research looks at staff skill utilisation rather than patient care. However, the proposal was presented to the Sheffield Emergency Care Research forum in March 2022 [see Appendix 8]. They provided verbal feedback on the day and gave insight into their perceptions of the research. Though the group could not give feedback on the specific of the research project given it did not look directly at patients, their care, or interventions for their care, they did give feedback on the research presentation. They found the project to be a worthwhile and positive contribution to the field which would benefit patients indirectly. Presenting to the group was particularly helpful in considering how the project could be explained to a lay audience, and so how the research could be disseminated for maximum impact.

3.4 Methods

An inductive qualitative design utilising thematic analysis [TA] was employed in this study to produce a critical discourse which reflects the complexity of the clinical environment TP work in. This helped ensure pragmatic, workable solutions and suggestions for future research were identified. Initially, a mixed-methods approach was planned for the study. Mixed-methods approaches can be defined as an integration of qualitative and quantitative data can add to the richness, comprehension

and meaning of research findings (Pinto-Llorente et al., 2021, Andrew, 2009). The initial approach planned was an exploratory, sequential design, conducting a smaller number of qualitative interviews followed by a questionnaire, whose development would be informed by the data analysis of the interviews (Plano Clark, 2019). This could increase generalisability of the findings by testing any hypothesis generated by the qualitative interviews in a broader, quantitative arm of the study. However, it became clear during the development of the research that this was not a realistic approach, and the barriers to implementing this meaningfully may undermine the quality of the overall project. Particularly, ensuring the questionnaire was publicised and available to the target audience became increasingly problematic. Various national organisations, such as the Royal College of Nursing, College of Operating Practitioners, and NHS organisations who have experienced events such as Mass Casualty Incidents, were approached to see if they would share the questionnaire with their members. These organisations stated this was not possible. Additionally, the inclusion and exclusion criteria [See section 3.5] for this research was highly specific regarding participant experience. Targeting the questionnaire at those staff with the correct experience was possible through questionnaire design but challenging to operationalise. While Plano Clark (2019) outline how mixed methods approaches can be an excellent way of approaching complex research questions, they highlight that the implementation of this can also be difficult in practice. For a single, self-funded researcher undertaking a PhD study part-time, this became increasingly unrealistic to achieve within the financial constraints and timeframe of the PhD programme. It became clear when developing the methods for the study that attempting to include a quantitative arm of data collection could undermine the quality and richness of the qualitative approach,

A single-method, qualitative approach was therefore selected as the most pragmatic way to answer the research question and objectives meaningfully. Inductive qualitative methods are a robust method for exploring nuance and changeable phenomenon, providing a rich dataset for 'how' or 'why' a situation occurs rather than trying to establish a causative link (Padgett, 2012, Pinto-Llorente et al., 2021, Anastas, 2012). Additionally Todres et al. (2009) argue qualitative research is an important method with which to humanise healthcare. Though they discuss this in terms of

objectification of patients and how they fit within diagnostic systems of care, this argument could also be applied to healthcare professionals. Healthcare staff can often be viewed as a homogenous collective, passive to the needs of an organisation, rather than complex individuals with personal agency. This concept is pertinent to this research to illuminate how TP perceived the utilisation of their individual skills within a complex organisational response so lessons can be learnt for future major incident response. In addition, adaptive capacity [AC] research has suggested that adaptation in high-stress environments does not always need to be a negative experience. Positive experiences can also occur with can inform future practice (Huppatz et al., 2022). This inductive approach aimed to uncover positive, negative and neutral experiences.

3.4.1 Data Collection

The systematic review [See Chapter Two] for the study identified little pre-existing literature looking specifically at Theatre Practitioners skill-set utilisation in major incidents. To ensure the research objectives of this study were answered, it was consequently for this exploratory study to gain a rich understanding of the experiences of participants which could then inform future research. Therefore, in-depth semi-structured qualitative interviews were conducted with two different staff groups to give a holistic overview of major incident workforce planning and allow a rich and nuanced understand of the experiences of a closed clinical environment. The two cohorts were:

- Cohort A: Theatre Practitioners (professional grades 5 -6) working on the clinical frontline

- Cohort B: Senior managers (professional grades 8a – 9) who has responsibility for OT, major incident or workforce planning during major incidents.

Interviews allow participants to give a detailed account of their experiences, guided by the interviewer by using specific prompts or questions to allow the researched area to be fully explored (Green, 2014) [see Appendix 3: Pilot Interview Guides for Cohorts A and B]. Though there is an argument interviews are an over-used methodology in healthcare research, other methods such as observation and case studies are not appropriate in this study. Due to the unpredictability of major incidents, it would not have been possible to know when or where such an incident may occur to prospectively study it (Padgett, 2012, Green, 2014). The aim of interviews is to develop methodology which allows for findings to be externally valid to situations similar to that being investigated (Cober and Adams, 2020). In the context of this inductive research this is particularly important as so little is known about the topic, and there is an extremely limited existing evidence base.

Participants were given the option of face-to-face or online interviews, depending upon their preference and geographical location. Most participants requested face-to-face interviews. These were conducted in the researchers' office on NHS premises. Participants were offered the opportunity to meet off-site, or in a location outside of the OT department, but all declined. Eight interviews were conducted via GoogleMeets with those who were in different geographical regions to the researcher. As so little available research looks at the experiences of TP in major incidents, this grounding, inductive qualitative work is needed to identify key concepts and develop future research (Padgett, 2012).

3.5 Sampling

To develop a rigorous sampling technique, Curtis et al. (2000) well established framework for sampling has been utilised in this study. This research study aimed to identify findings which were transferable and contextualised, but did not aim for generalisability (Ranney et al., 2015). Purposive sampling was utilised to identify frontline TP and managers with the appropriate experience to answer the research questions. To ensure internal validity within the study and allow for potential

transferability of findings, it was vital that the population sampled have the correct experience and qualifications to be able to meaningfully answer the research question (Curtis et al., 2000). It was important to ensure any participant had meaningful experience of working through either Covid, and/or MCI such as the Manchester Arena Bomb. Though other sampling methods, such as random sampling, may reduce risk of bias in research they are not appropriate to this study due to the highly specific population of interest (Padgett, 2012). The inclusion and exclusion criteria for this study is described below.

Table 8: Inclusion/Exclusion criteria Cohort A: Theatre Practitioners

Inclusion Criteria	Exclusion Criteria
Registered nurses and operating department practitioners (grades 5 – 8) working in operating as a registered professional during at least one major incident type (e.g. Covid-19, terrorist attacks).	Non-registered clinical staff (such as nursing associates, support workers, students or administrative staff).
Registered theatre practitioners working within the NHS, including military personnel if they worked in/deployed too an NHS Trust during a major incident	Medical practitioners (such as surgeons, anaesthetists or physicians' associates)
Registered theatre practitioners working in scrub, anaesthetic or recovery specialties.	Other associated healthcare disciplines (such as radiography or infection control teams)
Registered theatre practitioners working within acute hospitals with emergency surgery capabilities	Staff working in operating theatres in a non-registered clinical capacity during major incidents (such as newly qualified nurses/ODPs who were students or support workers during major incident).
Registered theatre practitioners working in acute/emergency operating theatre departments and/or Major Trauma Centres.	Theatre practitioners not involved in any major incident response in the department (such as newly qualified staff, or recently employed staff)
	Theatre practitioners working solely in non-acute operating theatres (such as elective surgery hubs, day case units).
	Theatre practitioners working in hospitals with no emergency surgery provision (such as private hospitals or specialist elective hospitals).

Table 9: Inclusion/Exclusion criteria Group B: Senior Managers

Inclusion Criteria	Exclusion Criteria
Senior managers (grades 8a – 9 or Consultant) who have direct managerial responsibilities for OT, major incident planning or workforce planning	Senior managers who have no responsibilities for OT, major incident planning or workforce planning
Clinical or non-clinical management	Middle managers below grade 8a
Managers who work in Major Trauma or Trauma Hospitals only	Managers who work in community services, non-acute hospitals or mental health units
Managers with experience of major incidents at a senior level (working at grade 8a or above)	Managers with no experience of major incident response, or experience at a more junior level (grade 7 and below)
	Managers in non-NHS hospital Trusts

3.5.1 Sample size

It is challenging in qualitative research to exactly define a specific sample size before the research commences, and it is recognised the aim of interviews is data saturation rather than a rigidly adhered to number of participants (Ranney et al., 2015). What constitutes a robust sample size in qualitative research is an ongoing debate which creates practical uncertainty when attempting to justify why sample sizes have been selected or accepted (Cober and Adams, 2020, Vasileiou et al., 2018). This study was conducted by a single researcher, undertaking qualitative methodology, methods and analysis for the first time. Although no specific time-limit was set, it was predicted each interview could take up to an hour. This would allow participants time and space to discuss their experiences in detail, without time constraints. However, this would also potentially generate a substantial volume of data. As the PhD project was self-funded, all interview transcription would be undertaken by the researcher. In addition, the

content of the interviews had the potential to be distressing and emotionally demanding for both the participants and researcher given the traumatic nature of major incidents such as Covid and the Manchester Arena Bomb. This created a risk of secondary distress in the researcher, particularly as they have been involved in the response and/or recovery to both events (Kumar and Cavallaro, 2018, Orr et al., 2021). It was therefore important for the researcher to protect the integrity of the research process by safeguarding their own wellbeing and avoiding becoming overwhelmed by ensuring sufficient time within the data collection process for reflexivity and pastoral support if required (Kumar and Cavallaro, 2018). This meant that a very large sample size would be impractical, and unrealistic to achieve within the time constraints of a PhD programme. As a result, the priority to ensure accurate transcription, methodological quality and robust conclusions was to maintain a manageable data set which would allow for a rich and detailed analysis. A large sample size may have made this more challenging, undermining the quality of the analysis.

The initial target for recruitment prior to research commencing was 10-14 registered TP and 4-6 senior managers. However, there was greater recruitment to each category, as seen in table 10. Although it would have been possible to recruit further, the volume of data may have become unmanageable for a single researcher. In addition, data and coding saturation was met with the recruited participants. This sample was sufficient to gain a rich, contextualised and broad range of experiences though in practice, whilst also remaining realistic for a single researcher to analyse (Ranney et al., 2015). Efforts were made to ensure adequate representation from each OT specialism, including senior management, within the sample to gain a rich understanding of the nuanced experienced by each discipline. Increased sample sizes of frontline staff are indicative of staffing models in clinical practice, with smaller numbers of senior managers in roles pertaining to OT workforce being available.

Table 10: Specific Specialism Sampling

Specialism	Sample Number
Senior Management (grades 8a –9)	10
Scrub (grades 5-6)	3
Anaesthetic (grades 5-6)	5
Recovery (grades 5-6)	4

3.5.2 Recruitment

Recruitment started in March 2023 and concluded in September 2023. All interviews were conducted within this timeframe. Recruitment occurred in the following ways:

- The study was publicised informally, through team briefings, audit days and word of mouth support. This was the most effective source of recruitment, and most frontline participants were recruited through informal conversations about the research.
- Snowball sampling, where participants suggested colleagues who had the correct experience and may be interested.
- Potential participants were emailed to their NHS email address with study details inviting them to participate.

These methods were sufficient to recruit 22 participants. A further two participants were initially recruited, but due to illness or clinical workload were unable to attend their interviews and so are not part of the final dataset.

Initially TP and senior managers from a Major Trauma Centre in Greater Manchester were contacted for interview as the region has had experience of two recent major incidents; The Manchester Arena Bomb and Covid. To increase transferability of findings, snowball sampling also occurred to broaden the geographical location of participants and encapsulate a broader range of experiences. Through this method, additional participants were recruited from the Midlands and Merseyside.

Despite numerous efforts to contact potential participants from Greater London, an area which has also recently experienced Mass Casualty Incidents, no participants from this region were recruited. Though social media recruitment was initially planned, this was not necessary as sufficient recruitment occurred without this media.

Recruitment exceeded expectations in all specialisms, except one. SP with the required experience of Covid or MCI were the most challenging category to recruit to due to high staff turnover. As a result, a smaller number of SP were recruited despite numerous efforts to increase numbers from several different healthcare organisations.

The characteristics of the frontline staff participants were as follows:

- 12 interviews were conducted with frontline staff from two different hospitals in Greater Manchester and Merseyside.
- 4 of the interviewees were ODPs, and 8 were Nurses
- 5 interviews were with band 5 staff, and 7 were with band 6 staff
- 5 were AP, 3 SP and 4 RP.

The characteristics of the recruited participants for the senior manager cohort were as follows:

- 10 Managers were interviewed from 6 different Hospitals across 3 different Healthcare trusts in England: Greater Manchester, Birmingham and Coventry.
- 3 interviewees were Medical Consultant with workforce or EPRR responsibilities, 6 were Nurses ranging from Director of Nursing to EPRR lead, and the remaining interviewee was an ODP acting in the position of senior Theatre leadership.
- Given the seniority of staff involved, no specific detail will be given about job titles or locations to avoid the identification of participants.

A complete breakdown of the participants recruited can be seen in the table 11

Table 11: Participant characteristics.

	Interviews	All Participants	Participants by profession	Location	Participants ID
Case A	12	5 Anaesthetic Practitioners [AP] 3 Scrub Practitioners [SP] 4 Recovery Practitioners [RP]	Operating Department Practitioner	Greater Manchester	AP1
			Registered Nurse	Greater Manchester	AP2
			Operating Department Practitioner	Greater Manchester	AP3
			Operating Department Practitioner	Greater Manchester	AP4
			Operating Department Practitioner	Merseyside	AP5
			Registered Nurse	Greater Manchester	SP1
			Registered Nurse	Greater Manchester	SP2
			Registered Nurse	Greater Manchester	SP3
			Registered Nurse	Greater Manchester	RP1
			Registered Nurse	Greater Manchester	RP2
			Registered Nurse	Greater Manchester	RP3
			Registered Nurse	Greater Manchester	RP4
Case B	10	2 Departmental [Theatres or CCU] Senior Manager	Divisional Director	Greater Manchester	SM1
			Divisional Director	Greater Manchester	SM2
			Departmental Senior Manager	Greater Manchester	SM3

		5 Divisional Directors 1 x Directors of Nursing 3 x Consultant Anaesthetist	Divisional Director	Greater Manchester	SM4
			Divisional Director	Greater Manchester	SM5
			Director of Nursing	Greater Manchester	SM6
			Consultant Anaesthetist	Midlands	SM7
			Consultant Anaesthetist	Midlands	SM8
			Consultant Anaesthetist	Midlands	SM9
			Departmental Senior Manager	Midlands	SM10

The major incident experience of each participant is summarised in the table below:

Table 12: Participant major incident experience:

	Participant ID	Major Incident Experience
Case A	AP1	Manchester Arena Bomb Covid
	AP2	Manchester Arena Bomb Covid
	AP3	Manchester Arena Bomb Covid
	AP4	Manchester Arena Bomb Covid

	AP5	Covid Military deployments
	SP1	Manchester Arena Bomb Covid
	SP2	Manchester Arena Bomb Covid
	SP3	Manchester Arena Bomb Covid Manchester IRA Bomb
	RP1	Covid
	RP2	Covid
	RP3	Covid
	RP4	Manchester Arena Bomb Covid

	Participant ID	Major Incident Experience
Case B	SM1	Manchester IRA bomb Manchester Arena Bomb Covid
	SM2	Covid
	SM3	Manchester Arena Bomb Covid

	SM4	Manchester Arena Bomb Covid
	SM5	Manchester Arena Bomb Covid
	SM6	Manchester Arena Bomb Covid
	SM7	Covid
	SM8	Covid
	SM9	Covid
	SM10	Covid

3.6 Pilot Interviews

A risk with qualitative interviews is that an pre-determined interview guide can introduce bias by becoming overly focussed to the interviews unwitting preconceptions, and so threaten the validity of findings by missing out on potential key concepts (Ranney et al., 2015). Although this research study was inductive rather than deductive, there was still a risk assumptions or generalisations may have been made in the research questions. To avoid this, inductive interviewing in pilot interviews was conducted utilising broad open- ended questions to allow the generated data to refine the interview guide and minimise bias.

An initial interview guide was devised from the systematic review. Two pilot interviews were conducted. One with a participant from Group A, and one with participants from Group B [See Appendix 3 For interview guides.] The pilot interviews were discussed with my supervisors, and some changes to language were made to

clarify the aims of the questions. In addition, two questions were added from data from the pilot interviews pertaining to learning and debriefing. Once these amendments were made, the interview guides were confirmed and utilised for the rest of the interviews.

3.7 Data Analysis

Reflective thematic analysis [TA] (Braun and Clarke, 2006, Braun and Clarke, 2019) was utilised as the framework for data analysis in this study. This was appropriate for this study as it allows a detailed and nuanced analysis of latent and manifest content to identify key themes which can be applied in context to the studies clinical setting (Vaismoradi et al., 2013, Braun and Clarke, 2021b). TA is a flexible analytical method which Braun and Clarke (2006) argue is not tied to any one epistemological framework, and so allows for the development of a rich, contextualised analysis regardless of philosophical grounding. This is particularly well suited to the pragmatist framing of this research study. The approach allows key findings and concepts of the research to be identified by their importance to the study setting and research question rather than by prevalence alone, even if they are not easily quantifiable. This reflects the reality of an often-complex clinical environment (Braun and Clarke, 2006, Braun and Clarke, 2014, Braun and Clarke, 2021b, Braun et al., 2022).

All interviews were conducted by the researcher. Recorded interview data files were then saved to the University of Sheffield's X: drive, and the audio files were transcribed by the researcher. The first stage of data analysis was conducted during transcription, with generalised themes being identified. This allowed for deep immersion in the data, a key characteristic of reflexive TA (Braun and Clarke, 2019, Braun and Clarke, 2021a). The anonymised transcripts were then uploaded into an NVIVO qualitative database and analysed using this software to produce robust and detailed findings. This process is described below. As there is a paucity of literature in this area was not possible to deduce findings to compare against pre-existing theory, or

to frame the findings with a hypothesis, and therefore an inductive approach to analysis was be taken (Braun and Clarke, 2006).

The focus of this research project was to look at TP skill utilisation is any type of major incident. Although Covid and the Manchester Arena Bomb were selected as initial examples of incidents that participants may have been involved with given the geographical location the researcher had primary access too, the aims of the research were to include participants with any experience of MCI or Covid. For example, although unsuccessful, attempts were made to recruit participants from other areas affected by recent MCI's such as London. Additionally, as so little pre-existing literature looked at the topic, it was not clear if skill utilisation was considered in the deployment of TP in major incidents regardless of incident type. It was also unclear if there was a difference in how specific TP specialisms, such as RP and SP, or Nurses and ODP's, were utilised. To explore this further and identify generic themes regarding skill utilisation, data analysis was conducted by cohort and professional group, and not by case study of the incidents themselves, or by the response of a specific NHS Trust. To identify themes, inductive coding was utilised as allowed for the data to be explored without pre-conceptions and so codes appear from the narratives themselves (Ranney et al., 2015). Inter-rater reliability through multiple coders is contraindicated in thematic analysis as this tends to be an approach based in deductive analysis, making this a more suitable approach for an individual PhD project (Braun and Clarke, 2021b). Whilst there are ongoing arguments that TA is not a rigorous method of analysis due to its lack of clear concise guidelines for coding in comparison with positivist or deductive methods, this is strength of this method in the context of this inductive research. The aim of this type of analysis was to identify findings firmly grounded in the data to provide a rich description of the whole dataset to investigate the reality of TP and managers experiences of major incidents. It was not to analyse specific key points or data in relation to a pre-determined hypothesis.

3.7.1 Stages of TA

The stages of TA were conducted as follows:

1. Familiarisation with the dataset – All interviews and transcription were conducted by the PhD student between April-December 2023. This allowed for a rich understanding of the dataset. The first stage of data analysis was conducted immediately after each interview. A reflective journal was kept by the author, where general impressions after each interview were recorded. During transcription, further initial reflections were recorded, along with key words and first impressions of the data.

2. Coding – codes were developed from the analysis that identified important features of the dataset, and helped answer the research aims and objectives. These codes were generated from the key words and impressions from the data identified in stage one. The initial coding stage generated 25 codes and 45 sub-codes. Many of these sub-codes were links to similar open codes (such as skills analysis) but broken down into very specific components (such as transferable skills, and self-identified skills). The were recorded in NVIVO, and general impressions and developing theories were documented in the author's reflective journal. These developing theories then informed the refinement of the initial coding to better reflect how the data answered the research objectives. It became apparent that many of the initial codes were too restrictive or did not help inform the aims of the research. An example of this was coding related to policy. Whilst this was raised in the interview data, any discussions related to this were superficial at best, and did not aid understanding of the data or help answer the research objectives. As a result, this code was removed. Sub-codes were then realigned and significantly reduced to develop a more coherent narrative and fit into the newly defined codes. For example, all sub-codes

related to skills were assessed for how they helped identify barriers and enablers in workforce utilisation. Those that were repetitive, or did not help answer these questions were removed. In the final analysis this resulted in 14 codes and 5 sub-codes.

3. Generating initial themes – From the codes and general impressions of the data, the researcher developed themes. These initial impressions and these were continually reflected upon as analysis continued. This was particularly important to challenge the researcher in identifying what was truly in the data, and not what they 'remembered' being the data [see section 3.12 Reflexivity and Insider Research]. They discussed with the supervisory team to assess their viability and ability to develop a narrative answer from the data. From these discussions and reflections upon the data it became apparent that whilst wellbeing was a distinct theme from both cohort's interview data, a stronger critique was produced by analysing wellbeing codes collectively rather than separately [see chapter six]. Codes generated from the collective analysis of both cohorts' data relating to wellbeing then allowed for a richer, more nuanced reflection of the data which better answered the research question.

4. Developing and reviewing themes – themes were continually reviewed as analysis developed and data was re-read to challenge any underlying assumptions and ensure the researcher was conducting subjective analysis. Reflexivity was embedded to ensure the researchers own experiences were not influencing theme development, and an inductive narrative was emerging for the dataset and not from a pre-existing set of assumptions. Seven initial themes were identified, and originally leadership and organisation were their own distinct themes. However, it became clear upon reflection and when trying to develop a coherent narrative that answered the research objectives that these two distinct themes were inextricably linked. The codes associated with these separate themes were being repeated, and the narrative was becoming confused and repetitive. By bringing the themes together [see chapters four and five], a

much more detailed and meaningful analysis was possible that better reflected the content of the interviews.

5. Refining, defining and naming themes – Final themes were defined, and a clear analytical narrative developed. Data was constantly re-checked to ensure a true depiction was being displayed, and analysis was subjective and not objective [See section 3.12]. At this point, the researcher was confident the identified themes accurately reflected the experiences of frontline TP and senior managers and depicted a true representation of the data.

6. Writing up – A clear narrative was developed using key extracts from the data to support how the data related to the aims and objectives of the research. Frequent supervisions with supervisors provided feedback and support to ensure the analysis was of a high quality, and the aims and objectives of the research addressed.

3.8 Consent

Informed consent was obtained from interviewees in advance of their agreed interview date [See Appendix 4: Consent Form and Appendix 5: Participant Information Sheet]. Consent forms and participant information sheets were emailed to them before any scheduled interview, and the written consent was confirmed prior to any interview commencing. The researchers contact details were made available for follow up questions. This consent was checked on the day of the interview to ensure participants had no further questions, are were still happy to continue. The researcher also checked they were aware of their right to withdraw from the process up until the time of data analysis, and have their data collected discarded (Green, 2014, Padgett, 2012). All participants were given the opportunity to ask any questions they may have prior to the interviews being conducted. At the end of each interview, participants were again given the opportunity to ask any questions. Consenting for all participants was uneventful, and copies of the consent forms are available on the University of Sheffield x: drive.

3.9 Specific Ethical Considerations

Researchers have a responsibility to ensure non maleficence and beneficence in their research, and this is especially true when conducting detailed interviews which may have emotional consequences (Green, 2014). As there is already a recognised risk of psychological distress and moral injury to healthcare professionals in the aftermath of the Covid pandemic, it is possible talking about their experiences during recent major incidents may cause unanticipated distress. As the researcher is a registered nurse, a clear distinction was made to interviewees that the researcher was not there in a clinical capacity, but a research capacity only. To protect interviewee confidentiality any support needs would be addressed by Occupational Health and not the researcher (Padgett, 2012). Some participants did become upset during their interviews, particularly when relaying experiences they had found distressing. In these circumstances, interviewees were offered the opportunity to stop, though none wanted too. At the end of each interview, the researcher checked if the participant wanted a referral to their line manager and Occupational Health department for additional support.

It is possible clinical staff may have felt pressured to participate in the study as the researcher is known to them. Whilst Green (2014) and Padgett (2012) suggests talking about potentially distressing circumstances can be a cathartic experience, it is essential to ensure autonomy is maintained and no participant felt coerced into contributing. On all literature and during all conversations pertaining to the project it was made clear participation is voluntary, there were no consequences for not participating, and the interviewee could withdraw consent at any time up until the point of data publication.

In addition, it is recognised that under major incident circumstances clinical staff may act outside of their normal roles and competencies, and so may disclose undertaking practices not normally within their professional capacity, or which led to unintended patient harm. This is especially true during the Covid pandemic where increased patient mortality has been linked to increased clinical workload, clinical staff

working outside their normal professional competence and reduced nurse-patient ratios (Buijs et al., 2021, Kadri et al., 2021). As clinical staff were working under emergency standards (NMC, 2020a, NMC, 2020b, PSA, 2021) and exceptional circumstances at this time it would be inappropriate for the researcher to comment or intervene on any actions of this nature disclosed (Padgett, 2012). To ensure interviewees felt able to discuss their experiences, it was made clear the interviews were confidential and identifying data or comments would not be made available to anyone outside of the researcher and their direct supervisory team. Although the researchers' supervisors were available to discuss any specific concerns with, this was not necessary.

3.10 Confidentiality and Data Protection

Interviews were recorded for transcription and stored on the University of Sheffield [UoS] X drive in password protected folders, in accordance with UoS data protection policies (University of Sheffield, n.d.). Only the researcher and supervisory team had access to these folders, or to the participants personal details. Interview data was anonymised, and each participant given an identifier e.g. TP1. Personal data was stored in a separate, password protected folder. Online interviews were conducted through the UoS approved and secure medium of GoogleMeets, and only audio data recorded. No identifying details will be made public in any reports or publications.

3.11 Ethical Approval

Ethical approval has been received the UoS Ethics committee [see Appendix 6]. Approval from the NHS Research Ethics committee was not required, but NHS HRA study approval has been granted [see Appendix 7]. Finally, the NHS Trust where data collection took place granted approval for the study, and the study was registered with them. An NHS research passport was not required as the researcher is a full time NHS

employee. The NHS Research services also did not require a gatekeeper as the researcher was an employee of the Trust (Green, 2014). All research reporting was conducted in line with NHS and University of Sheffield policies and protocols.

3.12 Reflexivity and Insider Research

n.b. as is accepted in reflective writing, this section is written in the first person

This section will outline how my positionality and experience as an insider researcher developed this research. It will also outline how I embedded critical reflexivity throughout the research process, and how this practice influenced and developed both the research, and me as a research practitioner.

3.12.1 Researcher positionality and insider research

Insider research is described as a process through which the researcher conducts their research on a community they share characteristics with, or within an organisation they work in (Yvonne Bulk and Collins, 2023, Brannick and Coghlan, 2007). Historically, insider research has been seen as problematic, particularly within qualitative research as researchers were perceived to have too substantial an emotional investment in the research area (Alvesson, 2003). However, this view has now shifted, with Brannick and Coghlan (2007) arguing insiders have insight into a setting not available to an outsider. Providing reflexive awareness is embedded throughout the research process, this should be an asset rather than an impediment to quality research.

In my professional role, I am the education lead for perioperative care in a large, tertiary major trauma centre. My clinical background is as a scrub nurse in trauma and emergency surgery. I also undertake senior shift leader responsibilities within my department, and I have experience of major incidents both as a scrub nurse, and in my

shift-leader role. In addition, though I worked as a lecturer in Adult Nursing during the first two waves of Covid, I also deployed to CCU during the first wave of Covid, and the vaccination hub for the subsequent waves. Though my inspiration for my research project was in no doubt due to my professional experiences, it is also likely they influenced my thoughts for what the outcomes would be. To minimise risk of researcher bias, critical reflexivity was embedded throughout my research.

There were several benefits to being an insider researcher in this study. My experiences of major incident response allow me a nuanced and unique understanding of the clinical context within which major incident response occurs. This informed and shaped the research question. In addition, I was afforded both access to participants and to NHS premises that might not be possible for an outsider. Several participants spoke to me because they already knew me, or because I was contacting them from within an NHS organisation. As I knew the department and organisation my initial data was collected in, I knew who to approach due to their prior experience. Finally, being an insider allowed me to have a common language and culture with participants, and they did not feel the need to filter observation or humour through a fear I would misunderstand. This was particularly true of someone of the darker humour common amongst theatre practitioners, especially those who worked in emergency surgery. This supported an empathetic relationship during interviews.

However, to some extent I was also an outsider in this research context. My clinical background as a scrub practitioner meant for the experiences of scrub staff in this study were more familiar to me. However, I have never worked in an anaesthetic or recovery role, or as a senior manager role (8a and above) within the NHS, and so did not have shared experience with those participants. My experience of major incidents also varied from the participants. Though I have worked though several major incidents, I was not present on the night of the Manchester Arena Bomb. Again, though I deployed to CCU during Covid, I volunteered to do this from outside the organisation and was not redeployed from within. This duality of being both an insider and an outsider is well explained by Van Mol (2014). They argue that there is no one definition of “insiderness”, rather than researchers exist on a dynamic continuum with outsider and insider influences become more or less marked at different points of the research process.

A risk with insider research is that the researcher is overly subjective, does not have distance from the research subject, and so is not sufficiently critical (Alvesson, 2003, Brannick and Coghlan, 2007). Whilst subjectivity is an accepted part of the qualitative research process, unlike the strict objectivity strived for in quantitative research, efforts must still be made to minimise bias throughout the research process (Green and Thorogood 2014). To ensure the risk was minimised in this research study, I embedded critical reflexivity throughout the research process.

3.12.2 Reflexivity

Reflexivity is a vital aspect of any qualitative research methodology and allows recognition that the researcher is part of the research process, and that this can lead to potential bias. Braun and Clarke (2019) speak powerfully on the importance of frank and transparent reflexivity in qualitative research, particularly in TA, to both inform the data analysis and to ensure any underlying assumptions are clearly articulated and challenged. However, this becomes more important during insider research. Subjective assumptions can be made at any point during project development, data collection, or analysis that area based upon the researchers own experience, and not based upon the data itself (Van Mol, 2014). My personal experiences of workforce planning during multiple major incidents both as a TP, and as a manager within the OT department, have given me a clear opinion of policies developed and implemented at this time. Nevertheless, this could also have meant my personal thoughts, perceptions, experiences and motivations could bias the research.

To ensure a rigorous research study, I embedded honest, critical reflexivity throughout the research process to allow me to critically appraise my role in the research process and any influence my assumptions could have over the research participants, data or analysis. I kept a research journal throughout the research journey, and this was particularly useful during data collection and analysis. I wrote my impressions of each interview within 24 hours, and then reflected upon this in the following days and weeks. This helped me to review my interview style and consider my

use of language and approach to the interviews. In addition, my transcripts, analysis and findings were discussed with my supervisors so my viewpoints could be critically challenged, and assumptions confronted.

I also sought additional informal peer support from colleagues and friends who had undertaken qualitative PhD, and this was particularly helpful in challenging some of my assumptions. A senior work colleague who has just completed their qualitative PhD within operating theatres was particularly helpful during this process, as they continually pushed me to consider if my thoughts and perceptions were an honest reflection of the data. These types of informal, mentoring discussions continually challenged me and my perceptions and were an invaluable source of constructive criticism. They challenged me to continually identify my own thoughts and emotions so I could separate them from the research process.

However, honest reflexivity became more challenging than initially anticipated during some aspects of my research. An example of when this became extremely important is when, when writing up my discussion chapter, I dealt with two internal major incidents in a week as shift leader in my professional role. Many of the themes I had identified in my research were immediately apparent in the incident response, but this also meant my own experiences of those incidents started to shape how I thought about my discussion. I was viewing the data through the lens of my own recent experience, rather than examining what was there. After one discussion with my supervisors, I identified I needed to take a break from writing up and return to the raw data to ensure I was analysing what was there, and not just what I 'remembered' being there. This was something I had to continually remind myself to do, and during write up I started to structure in breaks at specific points to step away from the data and push myself to challenge my own interpretations.

Although reflexivity is an approach I am trained in and familiar with from my undergraduate training and revalidations with the Nursing and Midwifery Council, this PhD pushed me to consider this is a different way. I was challenged to identify my unconscious bias, especially during data analysis. As a result, I became more able to identify and challenge my own thoughts, feeling and perception. Though this was not easy, it has made me a stronger research practitioner.

3.13 Summary

This chapter has outlined the qualitative methodology utilised in this research project. Pragmatism has been introduced as the philosophical framework for the research, and semi-structured qualitative interviews clarified as the method of data collection. Inductive thematic analysis has been presented as the tool use to analyse the dataset and draw conclusions. The sampling strategy has also been discussed. The rationale for these choices has been considered in detail. The authors positionality and reflexivity has been debated, particularly regarding their role as an insider researcher. The ethical approaches and permissions, and data protection processes have also been explored. In the next three chapter, the results of the data analysis and finding of the study will be introduced.

Chapter 4: Frontline Theatre Practitioner Findings

4.1 Introduction

This is the first findings chapter and will outline the findings of the qualitative interviews conducted with 12 frontline theatre practitioners [TP]. The data has been inductively thematically analysed, and the chapter will introduce the three overarching themes identified: Organisation; Skill Utilisation; and protective Factors. Quoted extracts from the data will support and underpin the rationale for each theme. For further definitions of some of the synonyms, slang and terminology used in the data excerpts, please see pages 3-5. Each theme, code and sub-code will be discussed in detail.

4.2 Findings

The first cohort of interviews were conducted with frontline TP who had experience of working clinically during major incidents, particularly but not limited to the Manchester Arena Bomb and Covid pandemic [see section 3.5.2 for more detail on participant characteristics]. The aim of these interviews was to address the following objectives:

- To identify TP and senior managers experiences of major incidents and how they perceived workforce utilisation
- To explore TP's experiences of their employment during a major incident, and perceptions of the utilisation of their skill set
- To identify areas of learning and good practice to inform future major incident and workforce policies

Three overarching themes were found, with six sub-themes and one sub-code.

Table 13: Themes – Frontline practitioners

Themes	**Sub-Theme**	**Sub-theme description**	**Sub-Themes**	**Sub-theme description**
Organisational factors that influenced Theatre Practitioner utilisation	Leadership and Communication	*How leadership and communication influenced frontline practitioner utilisation*		
	Learning	*Potential areas for organisational learning identified by frontline TP and if they were perceived to be identified by the wider organisation*	Debrief and psychological support	*How the perception of debriefing and availability of psychological support influenced TP's utilisation*
Experiences of the skill utilisation of Theatre Practitioners during incident response	Skills Analysis	*TP perceptions of the presence and efficacy of skills analysis*		
	Redeployment	*TP perceptions of their experiences of redeployment and the impact this had upon their skill utilisation*		

Protective Factors for Theatre Practitioners during incident response	Skills, attitude, and experience	*TP perceptions of how pre-existing experiences, attitudes and skills had a protective impact during incident response*		
	Teamwork	*TP perceptions of how teamwork, or the absence of teamwork, influenced their experiences during incident response*		

A dominant theme was Staff Wellbeing. However, whilst this theme does not directly answer the research question, it does add context to how staff are utilised and some of the barriers and enablers to this during major incidents. This theme is discussed in chapter 6.

4.2.1 Organisational factors that influenced Theatre Practitioner utilisation

During major incident response, interlinking departments within hospitals often need to work together in new ways, with frontline staff required to adapt their working practices or locations. These changes can occur rapidly, and often with staff under significant pressure to provide a rapidly upscaled clinical service. How the organisation of these workforce and resource changes are approached can have a subsequent effect upon how well TP felt they were able to effectually complete their work and make any

necessary adaptations. Any disconnect between the layers of management, or different departments, affects staff's ability to understand the expectations of them, and their undertake both simple and complex tasks. An example of this is from AP2. During Covid they were a supertrainer [someone who trains other staff to disseminate a particular method or approach] for the donning and doffing of Personal Protective Equipment [PPE], with responsibility for providing training to the rest of the OT department. Donning and doffing is a relatively simple task, but in an example of work-as-imagined vs work-as-done AP2 describes significant confusion regarding what levels of should be worn PPE during Covid:

"I remember becoming a supertrainer for donning and doffing, and actually I even found the stuff that was going on from the Trust was very different to what we was actually doing here [OT]. And just the level of uncertainty about PPE, and understanding what we should wear." [AP2 – Covid]

This made a simple task more complex by influencing frontline staffs understanding of what PPE they should be wearing, as different departments within the same hospital were undertaking different practices. For staff who worked across departments, this then added another level of complexity, and caused unnecessary tensions between colleagues from other areas, making their task more difficult. This is described by AP1, where AP's going into ED to intubate patients as part of Covid intubation teams were wearing a different level of PPE to ED staff:

"A&E was difficult. I don't think they had the same understanding, I felt like we started really early with the [PPE] training because we had days and days of training and practicing and preparing for it. My friend worked in A&E and they didn't get the same, and that didn't help then our relationship with A&E. And I think the understanding of Covid as well it wasn't passed down. So whereas ICU I think were similar to us and we

worked together really well, and really supportive, A&E was quite different." [AP1 – Covid]

Whilst PPE is an example of a simple process that was unclear yet caused significant issues to frontline staff, organisation of the workforce was much more complex with varying different factors. Any uncertainty or inconsistency in workforce organisation then had a proportionally larger influence upon the complexity of the task, and frontline staff's ability to understand what was expected of them. Consequently, the organisation and utilisation of staff then directly influenced the hospital's adaptive capacity via their ability to have a continually available, skilled workforce. As explained by AP3, this had an impact even for short-term events such as the Manchester Arena Bomb:

"For the bombings I don't think they had any, at the time when they made the calls [to bring staff in to work], I don't think they had any thought in their head who they was ringing, I think they were trying to get as many staff in as possible. But then I think that kind of caught them a bit the day after, because they had a lot of people in during the night that probably wasn't necessarily needed, but they couldn't come in the next day because of safety reasons. After that, that's when they struggled with staffing because people were burnt out." [AP3 – Manchester Arena Bomb]

Covid by comparison was a major incident that continued to affect workforce utilisation for 18 months in acute hospitals, through a minimum of three waves of infection. Due to the length of response time, lack of planning around **how** individual staff would be utilised led to proportionally greater under-utilised resources at times compared with the Arena bomb. Many TP redeployed to CCU describe a chaotic process by which nobody knew which staff were expected, where they would be working, or what they would be doing. For some TP, this led to an increasing sense of frustration, as is palpable in RP1's description of how their deployment was organised:

"CCU were confused themselves. You'd come in and they would not even have a shift leader. And then they would have to phone another pod to say oh we've got such and such a person, what can she do? It felt like it was organised chaos at times, like your shafted from one place to another like 'oh yeah you're not here today,' but then I'm on the board, so where do you want me to go? So you spend half an hour trying to find out where they want you to be, and then when you get there you've missed your spot to go into the [Covid pod] because you usually go in for 3 hours, so if you miss your spot someone takes it, and then it just becomes, the whole thing is just like chaos. 'Cause, if you don't get it right first thing in the morning…if it's not organised everything just fell by the wayside." [RP1 – Covid]

This lack of organisation during Covid continued certainly throughout the first wave, and to a lesser extent into the second and third waves and increased the complexity of an already complex task. The process for identifying and moving staff was convoluted and obscure to many on the front line. TP would often find out on the day which department or clinical area they were working in, and this would change daily with no structured rotation or allocation of staff. This would result in staff reporting to the wrong area or wasting significant periods of time trying to find out where they should be. As a result, despite redeployment aiming to increase the available workforce, poor planning often meant that the redeployed workforce was not where it should be at the correct times. In turn, TP then became annoyed by the frequent changes and the lack of consistency. Departments did try to put processes to minimise confusion and increase forward-planning. However, as RP4 describes, even for OT and CCU to directly communicate and plan how they would share their staff to support CCU but also maintain emergency surgical services, was challenging:

"We would certainly meet at least twice weekly. Just looking what they [CCU] needed, what we [OT] needed. Obviously, sickness was a huge thing. They had staff going off

sick. We have staff going off sick, so their requirements was changing, our support that we could offer was changing." [RP4 – Covid]

There are a range of factors which impacted upon the organisation of major incident response, but leadership and communication were especially important.

4.2.1.1 Leadership and Communication

The quality and consistency of leadership and communication during major incidents unsurprisingly had a substantial influence upon TP's experiences of major incidents. The perceived visibility and engagement of leadership affected frontline TP's trust in their decision making, and impacted how TP viewed their experiences and their willingness to continue acting outside of their normal sphere of competence. During the Manchester Arena Bomb, TP identified OT leadership as being on site very quickly, reported by RP4 as being present within 20 minutes of the formal notification of the incident occurring, and were perceived to be highly visible throughout the event. OT managers were also identified as being accessible throughout the incident response and were the primary point of communication and direction for front-line staff. The management team knew the service and staff well, and understood clearly what was or was not possible, and how to enact this. As RP4 demonstrates, staff in turn displayed a high level of trust in the leadership during this event:

"So that the arena situation was managed really well, because obviously we had our own leadership team that came in. And I think that was the key to the arena is that, that our own management team were present and they know our area and what to do, and the processes, and the staff to some extent as well. So that worked really well." [RP4 – Manchester Arena Bomb]

However, this is a marked contrast to Covid, where trust and confidence in all levels of leadership was undermined by a lack of consistent communication and visibility. This was an immensely challenging period, with both frontline staff and managers try to keep up with a rapidly evolving situation. Many TP such as SP1 understood how challenging it must have been for senior managers to keep up to date in the circumstances, and so tried to be accommodating.

"The managers did try and keep us updated, but it got to the point where you couldn't keep up because it was like every single day it was changing, the protocols, and what we could do in the theatres, and what we were wearing, and all that sort of thing." [SP1 – Covid]

However, this lack of clear, consistent messaging and leadership bred at best confusion amongst frontline staff about what they were meant to be doing, and at worst frustration and distrust. Communication is perhaps the most significant challenge for leaders to maintain trust and confidence with the frontline. All participants in this research identified the availability of clear, consistent and timely communication as having a direct impact upon their ability to do their job effectively. This is well summarised by SP2, describing how poor communication led to them being unsure what directives to follow:

"Covid was quite confusing because everybody kept giving us different directives. So we had our Clinical Director that had one set of directives, and then kept changing his mind about what directives we should actually be using. I think initially, nobody knew exactly what they were doing, and as we got further into it, they had one set of pathways that they kept altering, but they had a pathway. And it wasn't always very clear who we were supposed to be taking direction from. Well, whoever was shouting the loudest at times." [SP2 – Covid]

The perceived chaotic organisation of workforce and lack of transparent decision making then created an environment of uncertainty. Even though many staff were initially understanding, RP1 outlines how decision-making from senior managers started to be questioned when the rationale was not clear, or well communicated.

"Because nobody knew. It felt like there was no captain within the ship. You turn up to work and nobody knew! Even the government didn't know what the hell they were doing. Someone needed to take charge of the situation and say this is what we're doing, we're sticking by this. It just felt like decisions were made on the fly, and... some of the decisions that were made were just like, really??" [RP1 – Covid]

For some staff, there was a perception that managers were not being honest with the frontline. This may have been due to managers being uncertain themselves, trying to reduce misinformation, or protect staff from potential stressful situations, but for some this fuelled distrust:

"I think with Covid, that was a lot more of an unknown and there was a lot more going on behind the scenes that wasn't communicated to staff. I think we could have had more time to plan, we'd have had more time to warn staff and get staff trained up. I don't know whether that was they were trying to keep it from staff to not scare them, or they just didn't know enough about it, but for something like that and how big it ended up being, the first initially moment they knew, I think that needed to be told to the staff straight away." [AP3]

In all major incidents, frontline staff generally displayed a high level of willingness to work differently. However, the erosion of trust seen during Covid led to a disconnect between leaders and frontline staff that was not displayed during the Arena bomb response. This in turn caused frustration, with some TP to be less willing to do what was

asked of them as the pandemic went on. Some frontline staff started to question why they were being asked to undertake certain tasks or experiences when the managers didn't fully understand what they were going through. This dissatisfaction is concisely described by AP3:

"I feel like managers and people in senior positions, unless they were doing it, didn't fully appreciate it, and didn't check on people as much as they should have done. At those very beginning stages we were very much, this is what you're going to do, off you go and do it. And it was really hard, really, really hard." [AP 3 – Covid]

4.2.1.2 Learning

All participants identified areas of learning from their major incident experiences. Some of this was on an individual basis, and demonstrated how involvement in major incident can impact upon individuals' psychological safety and resilience – be that positive or negative. For example, AP1, a multi-skilled ODP with experience of working across multiple departments, explained how working during Covid improved their self-confidence:

"Covid made me a lot more confident in voicing my opinion. Like if I don't agree with something, I'm more comfortable to go to a different environment like CCU and say actually, this is how I do it, and you know I know what I'm doing. In A&E I'm a lot more confident in speaking up, even with the trainees I'm a lot more confident saying you know, I think actually you need to get your Consultant in or you need to do this, and so it has made me more confident in my job." [AP1 – Covid]

Other participants identified how opportunities for learning were not taken. For example, identifying where under the pressure of responding to a stressful incident, normal safety practices were not undertaken. AP3 outlines how during the Manchester Arena Bomb, the Team briefs conducted at the start of a surgical procedure did not occur. These briefs are an international standard, and a well-established, routine part of OT work. They occur even in emergency surgery, and are arguably more important under these circumstances, to ensure staff have prepared for the correct procedure, and any additions such as blood transfusions are organised. These omissions offered valuable learning opportunities, particularly for realistic training that helps staff prepare for the pressures of working under extreme circumstances, whilst also protecting patient safety.

"I don't think we did Team Briefs. Thinking back now, I don't actually think we did Team Briefs. Because of the urgency of it, I think somebody said to me basically on the shrapnel there was some sort of acid or something on them that was burning the patients' so they needed to get them in quick. We definitely didn't do team briefs. Which is quite shocking really isn't it?" [AP3 – Manchester Arena Bomb]

Learning was also identified from major incidents that participants felt could, or should, be embedded in future incident response. This included examples where either patient care, organisation or staff experience could be improved – often with simple interventions. Much of this learning was progressive and many TP were keen to state how their experiences could positively influence future workforce strategy during incident response. RP3 for example outlines how a change is practice for redeployment during Covid between waves one and two led to an improved experience for staff:

"By the second wave they were looking for volunteers. And they worked with teams. And I think they went for about 6-8 weeks. They were specific areas that they could work in, whether it be clean or Covid or none Covid ICU. So, they had their system, and I think that seemed to have worked better for them." [RP3 – Covid].

However, not all TP felt learning had been identified more widely or had been embedded into learning resources or organisational learning. For example, some frontline TP did not feel they received sufficient training in major incident response, and this was needed.

"We should be drilling for major incidents, whether it's a bomb, or a pandemic, or a fire. I think it should become part of what we do, we should almost do like reaction training for that, and how you deal with that, whether you're thinking about that from an anaesthetic point of view, a co-ordinator point of view where its actually very different when you're co-ordinating the floor. There's so many things that we just expect staff to know and I think that in itself would be a crisis and an emergency if we lost oxygen supply, but how many co-ordinators would know what to do with any of that?" [AP2]

The most common areas for learning however were focussed on one key areas; debrief, and psychological support.

4.2.1.3 *Debrief and psychological support*

Frontline TP consistently highlighted that debriefing after major incidents was important for staff learning and psychological wellbeing. Though some staff did not want, or feel the need, to engage in debrief, the majority wanted the opportunity. Nevertheless, TP stated they do not routinely get offered this opportunity, and this is not embedded in the OT departments. For those TP who had had any debrief after traumatic events, this tended to be at the behest of other departments where this practice is embedded, largely ED and CCU. This lack of debrief was felt to negatively impact upon staff, particularly those who are prone to worry and anxiety, such as AP3:

"I know we're bad a debriefs here, we always have been, but I really do feel that it needs to be pushed more. I used to go home with a lot of unanswered questions, and that played on my mind. And I'm an overthinker anyways, I'm a worrier, so me going home thinking, why did they do that, or should I have done this, should I have done that, does take its toll on you." [AP3]

There is a lack of resolution for some staff, particularly when they have cared for patients in traumatic circumstances. For many healthcare staff, knowing they have done a good job to give patients a positive outcome, or that all possible care has been provided to a patient, is a key motivator for working in their profession. However, TP often do not know how patients recover once they have left their care, and so do not get the sense of reward staff in other areas may get. This can impact upon motivation and engagement with their work. AP5 describes this, outlining how a lack of feedback on patient outcomes or team performance can be linked to staff feeling a lack of reward in their job:

"You do your job, you've dealt with something, you responded to an incident and then you get nothing.... it's difficult as a theatre member of staff because very rarely do we know the outcome of what we've dealt with. I get why, because we're just a cog in the in the big machine, but you need some sense of reward for busting your gut to get that level of work done and to achieve that, it would just be nice sometimes for people to do a debrief." [AP5]

In turn, this can lead to staff such as AP4 second guessing their actions, or carrying uncertainty about whether they acted appropriately:

"I don't know to this day whether I did the right thing. I just kind of winged it." [AP4 – Manchester Arena Bomb]

As well as identifying the need to debrief incidents, multiple interviewees emphasised the need for proactive psychological support to be readily available to all staff in the event of a major incident. Though not all staff felt they personally required it, many TP identified that psychological support wasn't available after the Arena bomb. Several TP still vocalised tangible distress and anxiety about the event but stated that they have never received any psychological support for. In turn, this linked to their perceptions of how well their organisation cared for them as individuals [See section 1.2.7.1]. For AP3 there is a visceral sense of betrayal and frustration that staff were not better cared for in the aftermath of the bomb.

"From the arena bombing I don't really feel like anything after that was ever done. And there should have been, because that was massive. Absolutely huge. And it affected a lot of people. Staff, patients it was, you know it was huge. Especially for this hospital because we received quite a lot of the patients." [AP3]

They also acknowledge that staff wellbeing is often perceived to be the last priority when there are patients in need of care:

I think from a wellbeing point of view, that would be better [now]. But again, that also relies upon how busy it actually gets. Because when you're, when you've got clinically sick patients, wellbeing gets put on the backburner and it's the last thing that they think about, so it's tricky." [AP 3 – Manchester Arena Bomb].

Though there was greater recognition of the need for psychological support during Covid, and interviewees such as AP2 felt this was a positive change:

"I think we've learnt loads from the pandemic, and that's where a lot of the wellbeing support, that's come of the back of that and actually knowing that you can't always segregate that. And I'd like to think that if we ever have to go through a bombing, a pandemic, or anything like that again maybe it would be at the top and we would think of that". [AP2]

However, AP3 points out, this wasn't always well done, available or proactive. Indeed, there was a significant difference between what Trusts stated intention and support, and the reality of what as available:

"They did put posters on the changing room doors, you know your take home checklist where you think about 3 things in the day that you've done well, but it wasn't enough. It wasn't enough for staff; they needed more support." [AP3 - Covid]

There was no mandate staff had to engage with it and staff did not perceive it to be consistently available to all. Some TP felt that staff wellbeing was not realistically a priority for the organisation. For it to be, greater psychological support would need to be available and any increase in diagnosis amongst staff would need to be managed via occupational health (such as work-related stress) which could have increased staff absence. Realistically, there were not sufficient workforce resources to enable an increase in staff sickness, and so there is a sense amongst many interviewees that staff wellbeing could not actually be a priority. The impact of this upon staff retention and absence rates may be significant [see section 1.2.7.1], and as AP3 points out, this is a delicate balance for organisations:

"With Covid I think they were better at checking on people, and making sure staff weren't burnt out. But again, they had to be very careful because they didn't want staff to go off because they didn't have the staff to cover it, which was really bad but unfortunately was the nature of what happened." [AP3 – Covid]

There are no easy answers in these circumstances, but in the absence of readily available psychological support, debriefing staff may be a cost-effective way to reduce some anxiety.

4.2.2 Experiences of the Skill Utilisation of Theatre Practitioners during incident response

To ensure a safe and effective major incident response, it is imperative that healthcare organisations make efficient use of the workforce they have available. Some staff perceived themselves to be able to utilise their skills well. This is particularly true during the Manchester Arena Bomb, where staff felt confident applying their skills to the situation, particularly as this was a surgical emergency. During Covid however, there are significant inconsistencies with how well TP's skills were utilised, or if individuals' skills were considered. Some TP's skills were not well understood outside of the OT environment, particularly SP, and little consideration appears to have been given for how their specialist skills could have been utilised to the benefit of the response [see Table 2]. RP4 identifies the disparity between the differing sub-specialisms utilisation, and the missed opportunities for greater employment of specialist staff:

"*From a recovery point of view, and anaesthetics, I felt like we used those staff massively. We utilised those skills and those staff groups excellently initially. I don't feel it the same with scrub staff. The scrub staff have transferable skills, and they weren't used. I think the Covid pods in critical care was so short staffed that we weren't turning patients because we didn't have staff. We weren't washing patients because we didn't have staff. We could have utilised those theatre scrub staff a hell of a lot better than we did. I don't think we utilised that staff group enough."* [RP4 – Covid]

Conversely, even within the same Trust, there is a discrepancy between how staff perceive skill utilisation to occur. This led some staff to feel resentful of their colleagues, or of how they perceived themselves to be treated differently. SP1 did not feel their skills were utilised, and felt they were frequently asked to work outside of their sphere of competence, as scrub skills are generally very different to traditional 'nursing' skills:

"We were just under the impression that we were just an extra pair of hands and not sort of a staff member. So, I sort of go and I say 'I'm just sort of a support worker', I've not been on a ward for 7 or 8 years since I did my training, so I wouldn't be in a capacity to do a drug round. I could do observations, I'd be able to do that, because that's what we ended up doing on ICU, and documenting them, but sort of anything further than that. We're just limited really." [SP1 – Covid]

RP1 views this differently. Despite RP generally having more transferrable skills to CCU [see Table 2] and undertaking a clinical role which more closely aligns with traditional nursing, they viewed the resultant expectation of their skill-level negatively. They also felt like the scrub teams had an easier experience:

"The scrub staff got it easy I think because they were just like, oh well you don't do meds, you don't do anything. They were assigned mostly the proning positions. So, they would go in and they would do obviously the pronings and stuff, and while recovery staff were expected to look after the patients, sort of interpret the numbers on the systems and stuff like that, run gases and everything else so we felt like we were shafted a bit." [RP1 – Covid]

Whether this disparity is accurate or not, this increased tension may lead to staff such as RP1 being less engaged in their work due to perceived unfairness in workload allocations. It is difficult to understand how this could be avoided in future, as neither

staff group felt they were fairly treated, but for very different reasons. To some extent, there will always be some staff who resent being asked to work outside of their specialism. There are examples however where staff's skills were exploited well, particularly for those deployed to skills-based teams. All AP in this study were deployed to specific intubation teams or were working in theatres managing their normal emergency caseload. No AP were deployed to CCU, and staff such as AP1 perceived themselves to be utilising their skills well [See table 2]:

"I was put on the intubation team because I work nights and I'm comfortable with difficult intubation and stuff like that, like I'm comfortable with the Consultants which is fair enough." [AP1 – Covid]

For AP, even though they were witnessing distressing situations which had a psychological impact, they did not express the same frustration and resentment as RP and SP deployed to CCU. They generally felt confident in their abilities to do the job asked of them because they were applying their skills they used every day in their professional lives. They did not need to learn new skills or adapt to working with new colleagues. As a result, they perceived their skill utilisation more positively.

4.2.2.1 Skills analysis

One way of understanding a TP's individual skills set is to undertake a skills analysis, a potentially useful tool for redeployment. This would theoretically allow transferable skills to be identified, and staff to be allocated to clinical areas most suited, particularly. In turn this would reduce cognitive load of staff and allow them to apply their pre-existing skills to a new environment, so improving patient safety and staff experience. However, there is significant inconsistency amongst staff regarding whether this took place during the Covid pandemic. For the majority, a skills analysis was not conducted, as summarised by AP2 when asked if they had one:

"No. I think that that happened on the day shift? Lots of things happened on the day shift that the night staff got absolutely no exposure too, even though we dealt with it every single day. Yeah, no, no skills assessment." [AP2 – Covid]

Alternatively, even if staff self-identified they had appropriate skills to work in a specific area, they were not necessarily utilised there. AP1, a practitioner with CCU, recovery and anaesthetic experience, proactively volunteered to be redeployed to CCU during Covid as they knew they had the appropriate skills. They were not redeployed, and were under-employed in the role they were kept in:

"I said look I'm happy to go [to CCU], I've got quite extensive experience so actually I'm quite happy, but they wanted to keep me on the intubation team, but then on nights, it wasn't really as busy as we originally [thought]. I felt a bit like with being ICU I could have just done everything. I did ask and I did offer quite a few times and got knocked back, which I'm sure they had their reasons for, but I don't feel like your skills were really taken into account." [AP1 - Covid]

Skills analysis is not a perfect tool, and the design and methodology behind skills analysis tools can vary widely, impacting real-world transferability. However, it's utilisation may have helped identify more appropriate areas for TP to be deployed too. A blanket redeployment to CCU, as occurred for RP and SP in this study, did not necessarily capitalise on pre-existing skills those staff had. Indeed, a blanket deployment to intubation teams also did not then allow for staff with prior CCU experience to be identified. To maximise the potential of the workforce, how and if skills analysis is applied may need to be reconsidered.

4.2.2.2 Redeployment

During the Covid pandemic, TP were prioritised for redeployment to CCU due to the reduced surgical workload and their perceived transferable skill set. However, TP's experiences of redeployment varied significantly. Work-as-imagined [see section 1.2.3] suggested this was a successful process as staffing numbers were increased, but work-as-done suggests there was room for improvement. RP and SP largely were asked to go to CCU, whereas AP were deployed to skill-specific intubation teams. The experiences of redeployment RP and SP were described as stressful and disorganised, and for many, there appeared to be no consideration of what they would be doing once they got to CCU. Skills utilisation as a result was inconsistent. For many staff, their experience of redeployment organisation and the lack of support received once they had been deployed created anxiety, stress, and a reduced willingness to be deployed - even in staff who were happy and willing to go initially. However, it is clear practitioners' skills were not always identified or well utilised.

"I don't know if theatres were like 'oh yeah we've got staff 'nurses and support workers we can provide for you' and then maybe it wasn't really communicated across what our job description could be over there. We were just we're like extra hands 'cause everyone's over in the PPE and then people were getting Covid, and they were off and burnout and stress but maybe it was miscommunicated somewhere because ICU thought we were coming to do sort of a nurse role." [SP1 – Covid]

In addition, some TP found support during redeployment to be minimal or non-existent, and this was stressful even for those with prior CCU experience. Particularly the organisational plan that redeployed staff would act in a support capacity in a team nursing model nurse [see Figure 2] did not occur. TP were routinely taking multiple ventilated patients without support, often because CCU workforces were hugely

depleted and skilled support was not available. As outline by RP4, even for those with extensive prior CCU experience found this stressful:

"Very out of my depth. 10 years ago, I did critical care. And then to go over there and there was no support and supernumerary, and you know somebody there to help you. It was very minimal staffing. Support that was there was great. There just wasn't much of it." [RP4 – Covid]

There is also variation in TP's accounts of the expectation of their skill level and responsibility they would take for patients during redeployment to CCU. For RP there was an expectation they would be able to take on many of the roles of CCU nurses. Though there are many transferable skillsnot all RP were CCU-trained or able to undertake all the roles of CCU staff, and this was not always understood. For staff such as RP1, this led to a palpable sense of resentment and distress:

"There was a bit of upskilling but there was a level of, like they thought you knew some of the things. Like some of the nurses, some of them were not nice, some of the ICU nurses were like why the hell are you asking me that? Because I'm not an ICU nurse. You've had like a year and a half to do your ICU qualification, I've not, I've just been thrown in here, and I'm expected to know stuff which I do not know." [RP1 – Covid]

SP in comparison found their hyper-specialised skill set was not well understood. Although staff were theoretically supernumerary and acting in support roles for CCU staff, this was not the reality for many. Whilst some staff felt confident setting boundaries with what they were confident doing, some felt pressurised to take on more extensive roles that they felt skilled or competent to do. This at times also led to tensions, where CCU expected TP to be able to take on clinical tasks they were not able to do:

"So, I learnt like how to do blood gases, did obs, documenting them, but then still wanted us to do more and more. I think early 2021 when it was like the second wave? They were like trying to push them [SP] to like have you know one or two patients each shift." [SP1 – Covid]

However, TP who were more experienced or multiskilled were generally less phased by the expectations of them. RP3 particularly demonstrated a relaxed response to redeployment. They only started in Recovery days into the Covid pandemic after transferring from a ward, so it is possible the transition was not as overwhelming for them as they were not yet established in OT:

"So, they sort of said everybody, particularly nurses, even if, no matter where you're from, we've all got good basic skills that we can do patient care. If you go in and you do patient care, you help wash or turns, give mouth care or you write down the obs. That's all helpful. We would be supporting the ICU nurses to be able to take on more patients like doing that kind of work, and then if they needed to do the stuff that they understood a bit more they could, which was fine." [RP3 – Covid]

Redeployment was necessary during Covid, and would be necessary again in a future pandemic, but the organisation and experience offers an easy opportunity for improvement. TP is this study became more unwilling to deploy to CCU because of how badly this was organised. Addressing this in future could help improve staff morale and their willingness to continue deploying.

4.2.3 Protective factors for Theatre Practitioners during incident response

Despite the distressing circumstances TP worked in during major incidents, several protective factors were discussed which had a major impact upon TP's skill utilisation, clinical efficiency and overall wellbeing. For example, RP3 describes how they had some sense of normality and structure to their days, and they were able to leave the house and meet people in person despite the lockdowns:

"One of the positive things is that life was relatively normal. I was still coming in and going to work. I wasn't stuck at home, and I was being distracted from what was going on by what was in front of me at that time. I wasn't sat at home watching the news, not knowing what was going on and life shutdown. That was actually one of the most positive thing. You know, we were still working. There was no risk of our jobs and actually because you were in busy doing stuff, you were tired. So you actually slept." [RP3 – Covid]

Most TP's identified positive factors in their experiences and identified multiple aspects of their experience they were proud of. This impacted their morale and willingness to continue to respond and work outside of their normal environment and sphere of competency.

"So, when I look back at the pandemic a lot of its blurry, but then I had some good memories as well. You know like the support around me from my colleagues was massive and you how, efficient and smooth things worked. It was like a drill you just knew, and it was just precision, and it was brilliant that everybody, like they communicated but it wasn't through words, because everybody knew what part they had to play, and it just got done." [AP2 – Covid]

4.2.3.1 Skills, attitude, and experience

The pre-existing experiences and skills of TP impacted how flexible they were able and willing to be during major incident response, and their resilience in response. Perhaps predictably, staff with a long clinical career and/or prior experience of major incidents were more resilient in being asked to work differently. This may be due to staff with significant clinical experience having greater psychological safety in comparison with more junior colleagues, increasing their confidence working flexibly. SP3, a Nurse with over 40 years' experience, characterises this resilience well:

"I didn't find it [Covid] terrible. And I mean, in the course of a really, really long career, I've looked after people with active TB, I didn't get TB. I've looked after people with full blown AIDS. I didn't get AIDS. And so I thought the chances were pretty good that I wasn't going to get Covid." [SP3 – Covid]

Similarly, staff who had prior experience of working across different departments demonstrated the same ability to adjust more rapidly to working in unusual environments. This improved perceived clinical efficiency and resilience. Particularly for staff who were utilising their specific skill set, their experiences of major incidents were more positive. This confidence in their ability to adapt to their circumstances is displayed by SP2, a scrub practitioner with over 20 years of experience across several hospital Trusts. Their varied experience allowed them to apply their skills effectively, despite never having been involved in a major incident before:

"So, during the Arena bomb, because I have mixed skills, they could kind of just throw me at anything. So that was very helpful. Because if you had someone that needs an open abdomen, a tibia fracture and a head, I didn't have a problem with doing all of those three, but not necessarily everybody has the same confidence in their skills." [SP2 – Manchester Arena Bomb]

The attitudes of staff regarding what was being asked of them during major incidents impacted upon how the organisation was able to utilise them. Every participant discussed their willingness to respond to the incidents, regardless of how far out of their scope of clinical practice or usual environment they were being asked to work. TP understood the extreme circumstances and were willing to work flexibly to maintain clinical care and meet the service demand, and many staff such as AP4 viewed this very positively.

"Covid was almost like a gradual thing, and we knew that we had to be very flexible. Everyone was willing to do that, as far as I could see. I don't think there was any kind of voice of people saying I'm not doing that. Everyone was very willing to say, I will go wherever you need me to go to help the situation. I thought it was a really positive show about how committed everyone was and how flexible everyone was. I thought it was absolutely fantastic." [AP4 – Covid]

How they then perceived their experience of what they were asked to do was the most significant barrier to staff willingness to continue to respond [See chapter 6].

4.2.3.2 Teamwork

Healthcare is a team sport, and most staff who work in health are used to working in teams of varying sizes. This is especially true in OT, where TP work in small, interconnected teams which cannot function without each other. Perhaps it is then unsurprising that all interviewees identified the importance and impact of teamwork upon their ability to work well during major incidents. This is best summarised by AP5, a participant who with civilian and military experience, who offered this advice for major incident response:

"The sooner that you can put teams together that work well together, the better. And I know that that's sometimes quite difficult, but that's what made my life easier through Covid. That's what made my life easier through being deployed overseas in war zones." [AP5]

Teamwork was also identified as being key to TP's overall wellbeing and perception of events. All staff identified their colleagues and teammates as being their primary sources of support throughout each major incident, and expressed pride in the way their teams had responded. Interviewees who worked in established teams identified this as being the most important factor in their ability to process and manage the stressful and upsetting situations they were working in. This is emphasised by AP5, who described how support from their peers provided emotional support during the Covid pandemic:

"I look back at it and some of it is a haze because I was just running on fumes. And the only thing that got me through that was just the level of teamwork that we had on nights. Because nights is such a small team. You're kind of at the front of the action....you'd take 3, 4, 5 patients to ICU, 5 showers, 5 changes, 5 intubations, 5 lots of being absolutely exhausted, you had your colleagues around you that you know I could kind of sound off on, and I really think that had I not have had that emotional support, it would have been very, very difficult." [AP2 – Covid]

By comparison, staff who did not work in an established team identified the lack of team identify as being a significant stressor and viewed their experiences more negatively. This increased their cognitive load and reduced clinical efficiency, particularly as they had to re-evaluate the skills of their colleagues daily. These challenges are succinctly illustrated by RP3:

"[In] ICU, the hardest thing was because of how disorganised, it was, you never in the same place twice. You're never with the same staff twice. They didn't know what you could do and vice versa. So sometimes support was a bit, not so good…I think the thing you missed is the kind of teamwork and you get if you're in an environment and was none." [RP3 – Covid]

This lack of a stable team structure undermined TP's wellbeing, and so likely also impacted upon their psychological safety. The contrast between staff who worked in established teams and those who did not in terms of the support they felt they received is significant. Whilst there are huge amounts of uncertainty for staff and organisations during incident response, this is one area which could be controlled for the benefit of TP.

4.3 Summary

This chapter has explored the inductive thematic analysis of the interviews with Cohort A – Frontline theatre practitioners. The key themes identified in the analysis have been introduced, and excerpts from the data used to illuminate and provide context to the analysis. TP discussed several positive and negative experiences from major incident response. The perceived impact of organisational response and skill utilisation upon major incident response has been discussed. In addition, several protective factors have been identified. In the next chapter, the inductive thematic analysis of Cohort B's interviews will be presented.

Chapter 5: Senior Managers Findings

5.1 Introduction

This is the second findings chapter and will outline the findings of the qualitative interviews conducted with 10 senior managers with workforce or EPRR responsibilities. The data has been inductively thematically analysed, and the chapter will introduce the two overarching themes identified: Leadership and Organisation; Workforce Utilisation; Quoted extracts from the data will support and underpin the rationale for each theme. For further definitions of some of the synonyms, slang and terminology used in the data excerpts, please see 'Terminology, Synonyms and Slang' on pages 3-4. Each theme, code and sub-code will be discussed in detail.

5.2 Findings

The second cohort of interviews were conducted with managers from within the healthcare sector who had roles in workforce organisation and utilisation during major incidents, particularly those who made decisions about the utilisation of TP. The aims of these interviews were to help answer the following objectives of this research project:

- To identify TP and senior managers experiences of major incidents and how they perceived workforce utilisation
- To explore senior managers perspectives on TP workforce utilisation during major incidents, and how these impact upon departmental and organisational adaptive capacity

- To identify areas of learning and good practice to inform future major incident and workforce policies

Two overarching themes were identified, with four sub-themes and one sub-code:

Table 14: Themes – Senior Managers

Themes	Sub-themes	Sub-theme description	Sub-Themes	Sub-theme description
The impact of leadership and organisation upon senior managers during incident response	Communication	*How effective senior managers perceived communication within their organisations to be, and the impact this had upon their ability to undertake their roles*	Organisational disconnect	*The perception of how disconnected organisations impacted upon effective leadership and communication during incident response.*
	Learning	*How and if managers perceive they and their organisations to have identified and implemented learning from major incidents*		
Senior managers perceptions of Workforce utilisation strategies	Skill Analysis	*The experience and efficacy of undertaking skills analysis for frontline staff during major*		

		incidents, and how/if this influence service delivery and redeployment strategies		
	Innovation and Team structure	*Innovation identified by senior managers which were deemed to be effective and/or important in incident response*		

An additional theme was identified in this research, wellbeing. Wellbeing does not directly address the research objectives of this project and was not an aim of this research. However, it was a consistent theme throughout every interview and was found to have a powerful impact upon the utilisation of staff in major incidents, and subsequent adaptive capacity of organisations. This theme is discussed in chapter 6: Findings – Wellbeing.

5.2.1 The impact of Leadership and Organisation upon senior managers during incident response

Hospitals are large, complex organisations with multi-layered management structures, and distinct, inter-connecting departments and clinical services. The organisation of hospital services and management structures impacted directly and indirectly upon the ability of managers to utilise staff effectively during the major incidents experienced in this study. More importantly, it also impacted managers understanding of **how** to

utilise staff effectively. Unprecedented major incidents are immensely challenging to manage due to the speed with which events occur and the size of organisations responding. However, a disconnect between differing levels of management and the frontline became apparent throughout the interviews, which likely made a streamlined and effective response more difficult. SM8, a Consultant Anaesthetist with EPRR responsibilities in a large major trauma hospital, clarifies this. They explain the difficulties they had convincing their executive management of the urgency of planning required in the early days of the Covid-19 pandemic [Covid]:

"When you speak to some of the directors and managers post event, they were starting to get things organised back in March. But actually, we [clinicians] would think about things back at the February. There was definitely a disconnect between what we probably would have done and how we would have leveraged things and changed things around in the early days. They were still very much bumbling along slightly longer lines of, well it should be alright, we'll see what happens." [SM8 – Covid]

Clinicians in their organisation were aware of the clinical challenges of the upcoming pandemic earlier than the executive managers and were putting plans in place much earlier. However, individual departmental planning does not allow for these plans to be enacted organisation-wide, particularly when executive management and clinical management do not have clear communication channels. Indeed, at times, the multi-layered organisation of the hospitals actively prevented quick decision making from occurring. SM8 go on further to explain the extent of this disconnect between managerial levels in their experience:

"There seemed to be a disconnect between us as a Critical Care team, and the Exec team in the earlier weeks. There's definitely a disconnect at a number of levels, both within the EPR[R] system and then within all the different silos of medicine and within the different trusts. And between different specialties". [SM8 – Covid]

Particularly, there appear to be gaps in the consistent planning for utilisation of capacity and workforce. Although all Trusts in this study had major incident plans, they were not always actively utilised. They also did not always consider the practical realities of how frontline workforce is organised, or how this would be enacted. Particularly, executive level planning did not consistently filter down to frontline response. As SM1 outlines, frontline staff are often not involved in major incident planning or exercises, and so there is a reliance upon clinical staff 'knowing' what to do, rather than being trained to respond:

"You think now 'god what would I do in those instances [major incidents]?', and so like you're thinking well what's the theatre teams place we're never involved in any of those preparedness type meetings, but everybody just seems to know what to do. "[SM1 – Manchester Arena Bomb]

Despite all hospital Trusts having EPRR services and planning, SM3 further suggests that this preparation doesn't reach frontline staff. Indeed, they do not believe preparation occurs at departmental level, and in their experience, they do not think it is possible to prepare staff:

"I think everyone did what they thought was the right thing, but we don't prepare for Major incidents. You just do what you do on a daily basis, just a bit quicker and a little bit more hectically. You know whether that's the right thing to do, or the wrong thing to do because it's like, how can you prepare for, you know, a major incident could be anything from a 35 people bus crash to two people being stabbed in Manchester City centre so it could be could be anything from there while in between and it's hard to train people to do that, I think." [SM3]

This highlights a disparity between EPRR planning at Executive and organisational level and at departmental level. It also highlights the disparity between the attitudes of differing managers towards to ability to better prepare staff. At organisational level, despite EPRR planning for major incidents, this is not always enacted as envisaged. Particularly, the multi-layered management of the NHS in its entirety, and individual hospitals trusts makes speedy, effective decision-making challenging even in normal times.

5.2.1.1 Communication

Communication was consistently highlighted as a challenge throughout major incidents, particularly regarding ensuring staff utilisation occurred smoothly. Communication problems varied from receiving clear and consistent messaging from executive management, disseminating that information to the right people in a timely manner, and managing multi-departmental communications. However, every manager's interview characterised communication as being their single biggest challenge in enacting major incident response.

This communication initially can be as simple as confirming an event has occurred, and the correct strategic response being activated. As SM4 explains, after the Manchester Arena bomb, casualties were already arriving at local hospital sites before paramedics had attended the incident. EPRR procedures mandate a major incident should be activated by the Ambulance or Police Service, but in this instance that process was slower than the events occurring. The hospital response had already begun before the official major incident response was enacted:

"So, I got a call very, very early from our switchboard, something was going on. And although we had not had a formal major incident activate, I had already had sort of confirmation there'd been an explosion at the arena. As I arrived, the first two casualties from the arena arrived at any health care setting. So that was within 14 min,

the first two people arrived. One was in a taxi, and one was in the back of a police car. And they were P1 casualties. Obviously when you read the Kerslake report, I think the paramedics hadn't even got in there. These were people that were carried out." [SM4 – Manchester Arena Bomb]

Formal major incident plans also do not always account for modern technology. Whilst established channels for management and communication such as Gold and Silver strategic commands, are the gold standard of EPRR planning, policies do not always have systems in place to manage informal channels such as WhatsApp groups and social media. These informal channels tend to be quicker and more responsive than formal routes but are also prone to gossip and misinformation. They can additionally create confusion, with multiple messages coming from numerous different sources – more swiftly than the official channels. SM3 outlines how formal major incident activation in Greater Manchester occurred approximately 45 minutes after frontline staff were already informed of the event through informal channels. This meant frontline staff were already putting preparations in place without any guidance from senior executives, as the formal gold and silver commands were not yet activated:

"NWAS hadn't enacted [a] major incident. The ambulance crews that have come in and said 'Ohh, have you heard what's happened?' So that's how we as the Major Trauma Hospital for Greater Manchester heard about the arena attack. It was through ambulance crews, who had been on the radio to each other talking about what was going on. It wasn't through the official channel of NWAS escalating and stuff. That came. But A&E were aware of what was going on far before the exec of the hospital was told." [SM3 – Manchester Arena Bomb]

These barriers to clear communication led to confusion between differing staff groups who were unsure what was happening and what their response should be, making staff utilisation more difficult to enact. During the Manchester Arena bomb, this led to an

overload of staffing in OT and several unconfirmed rumours being shared, including reports of rogue shooters at local hospitals; shrapnel being covered in acid; and unexploded bombs at regional hospitals. These rumours were untrue, but the misinformation spread much more quickly than the fact due to the delays in formal communication channels. Frontline staff as a result were responding to unconfirmed threats at times, rather than fact.

During Covid, these challenges were compounded by a much longer response timeframe, and frequent, short notice changes in practices and policies that were often not well communicated. This occurred at every level, from national, regional and local. To some extent, this confusion and changes in practice are unavoidable when dealing with a novel disease spreading rapidly – no-one knew enough about it, and so practices changed as more information became apparent. However, the inconsistencies and lack of clear messaging led to an erosion of Trust between the frontline and management:

"I think if I'm being totally honest, the actual communication was really difficult and I think it was difficult for us as senior leaders, but it was difficult for the clinical teams as well. I got to a point where, you know, do the clinical teams actually trust us and believe in what we're saying because we were one minute saying run to the left and then the next minute a couple of hours later, we [were] saying run to the right." [SM6 – Covid]

5.2.1.1.1 Organisational Disconnect

It is clear there is a disconnect between differing management levels and departments that made major incidents response and recovery more complicated. This is perhaps predictable and to a certain extent to be expected in organisations as large and complex as NHS Trusts, but the impact this had upon organisations adaptive capacity can't be underestimated. During Covid in particular, this was partly due to communication, and partly due to the unwieldy management structures in place. Decisions on whose

responsibility it was to disseminate clear communications through the various channels were not always made, or well understood by those involved in senior positions. Messaging between departments was not always clear as a result. As SM5 explains, this led not only to communication failures, but a lack of understanding from some senior managers that there was even a problem:

"So particularly through Covid, obviously you go into that command-and-control structure. The longer it went on that got very, very frustrated. Sometimes when you're in that command-and-control setting, decisions are made at a high level, and then maybe not always cascaded as quickly as the control centre think they're being cascaded. Often, it's not really decided who's cascading that decision. And then there's almost an expectation that the staff working on the frontline are aware of that decision, whatever that decision might be. Actually, it's never gone any further than that control room". *[SM5 – Covid]*

This directly impacted upon the information frontline staff were getting, and so added to the confusion and chaos of the response. Additionally, departments and their subsequent management teams often had differing challenges and pressures. This made identifying and delivering corporate objectives exceptionally challenging, especially when the competing pressures were not well communicated or understood. An example of this is a lack of understanding of very senior corporate management of what skilled workforce was available, and how this impacted upon ability to deliver services, as described by SM1:

"We come out of Covid to go into business as usual, and I'm constantly being told 'why are you [Theatres] not up to this level of delivery?' And you think.....because you're nowhere near, you can't open all those theatres well there's not enough staff. So, I had to sit down and spell it out. This was you staff pre-Covid, this was your NHSP and your

agency usage as well pre-Covid, and that was covering what we were saying business as usual. We didn't have the right workforce" [SM1 – Covid-19]

Executive management did not have a clear grasp of the individual challenges facing the clinical departments, or the impact this had upon service delivery. As a result, whilst organisational planning was being put in place to enact the Covid elective recovery plan, many of these plans were always going to be unachievable for the individual departments. Individual silos of people as a result were working exceptionally hard under extreme pressure to improve service delivery, but not always cohesively aligning plans to the reality. This is an example of policies and processes based upon work-as-imagined, not work-as-done [Section 1.2.3].

5.2.1.2 Learning

Learning from major incidents was identified by all senior managers on individual, departmental and organisational levels. Many of the insights provided were valuable and could potentially be explored in greater detail with a boarder set of participants to offer innovative and pragmatic solutions to some of the challenges of major incident response. They could also offer some suggestions for how the workforce are understood and utilised during normal times, particularly when recruitment and retention within NHS services are known to be problematic. However, a particular challenge to cohesive inter- or intra- organisational learning is the pressures of operational recovery, meaning a lack of time or priority for learning, and the absence of a single local or national leadership to co-ordinate multi-organisational learning. As a result, some individual departments, hospitals or regions had very successful innovations, but these have never been shared more widely. In addition, operational pressures to recover from major incidents may mean that even for the areas with innovative solutions, being able to implement them consistently is often an operational

impossibility. As SM9 explains, many CCU and OT departments wanted TP to maintain their CCU skills post-Covid to enhance workforce flexibility between the two departments. This would be particularly useful when bed pressures mean CCU patients are kept in Recovery units for much longer than they should be, or CCU units are short-staffed. Maintaining TP's CCU skills would improve TP confidence caring for those patients, and so also improve patient safety. However, as SM9 outlines, this has been near impossible to achieve even when departments proactively wanted to implement it:

"So, maintaining these [critical care] skills for a certain number of [Theatre] staff would be beneficial and worthwhile. We haven't managed to because of the workforce. You know the day-to-day operational commitments and barely being able to get a full staff to do the work that's happening today." [SM9 - Covid]

Although many managers identified learning within their own departments or teams, if this learning is ever shared on a wider level is unclear, and so potential good practice may not be identified. SM7 illustrates the challenges of trying to share practices across organisations. Indeed, their Trust took a different approach to organising skills-based teams in CCU that was not seen in other Trusts within this study, but it is not possible to know how wide-spread this practice may have been nationally due to a lack of published information. Although the NHS is theoretically a learning organisation, they particularly highlighting the lack of any central NHS focus on identifying and sharing learned practices from the pandemic:

"The NHS is such a massive and huge organisation with so many different things that are important, that it's the ones that shout loudest. And there's so many things going on at the moment that the idea that pandemic planning and that exchange of ideas is a voice that particularly needs to be heard, won't be heard unless there's somebody who is a lightning rod who says, this is where you come for your ideas. I don't think it can even happen in a piecemeal way." [SM7 – Covid]

SM2 also reflected upon these potential lost opportunities. They were directly involved in workforce planning during the Covid pandemic and made decisions about what staff groups to deploy to which areas. However, they admit it did not occur to them at the time to consider what redeployed staff would actually do when they got to CCU. They found the idea of skills-based teams to be a valuable consideration that in hindsight would have improved their workforce utilisation, but lamented that this learning from other organisations has not been shared more widely:

"It would be really interesting to know how different organisations did look at that [skills-based teams], and what that redeployment [to CCU] looked at. I think that that's a real opportunity to put that into future planning, something like that would make a bigger difference than the work that we did. The assessment of the skills matrix, that gave us a richness of what our workforce were able to do, didn't necessarily marry. So that person can go to critical care, or that person can go to neuro high dependency, or this person can go to ED....it didn't go into, but what would they do there?" [SM2 – Covid]

They went further to explain that the changes needed to implement learning on a wider scale is unlikely:

"Massive, major organisational change [is needed] that probably won't be seen in our lifetime. For all the wrong reasons, not the right ones." [SM2].

SM10 also bluntly outlines the reasons for this within their own organisation, largely that learning is not a priority when faced with operational pressures:

"We're just not as an organisation, we're not very good [at debriefing]... it feels like the pace of change is so fast and you know Covid has gone. It's happened, it's gone. We've

moved on and I'm not saying this is the right thing to have done, but this is what has happened." [SM10 – Covid]

Shared learning from different organisations response to major incidents could, and has, had an impact upon the efficiency of other organisations plans and responses. Nonetheless a stark finding of this research is how little consistent inter-organisational learning is perceived to occur post-incident. Though SM7 felt there was a positive national learning culture during Covid, even senior managers such as SM8 actively involved in major incident planning emphasised that this does not always occur in a structured or cohesive way. In fact, as SM8 outlines, it often rarely occurs at all. They expressly identified that little learning has been made available national regarding the hospital response to the Manchester Arena Bomb, outside of formal inquiries. This is a potentially impediment to improving national and international incident response, and increases the risk of policies and practices being based upon work-as-imagined:

"There is lots of activity at the clinical level and I suspect lots of activity at the EPRR level. But the two don't sort of meet. The EPRR system is slightly poorly designed because given the size of its resourcing, it's things like self-declarations and all the inspection processes that we used to have, just don't exist anymore. There's no real sharing of plans, processes, systems, learning across anything. And that's both across national and international level…. The lack of sharing is hilarious." SM8

Covid highlighted on an international level the extreme pressure healthcare organisations are put under when there is insufficient workforce to deliver patient care, in ways that have not been as clear during shorter term incidents such as the Manchester Arena bomb. Better utilisation of skills and a scare workforce may improve patient outcomes and staff retention, but SM2 shared the concerns about lack of structured or cohesive national learning. Despite their senior position and leadership role in workforce utilisation, they have never been asked about what did or did not work during Covid, even at organisational level. However, many managers would have been

willing to engage in learning to improve future practices, and could see the value in potential shared practice:

"I don't know if there has been any national learning or sharing of how people did things. Or even what worked for staff and what didn't work for staff. And actually, I think that would be a really interesting piece to do, to be able to understand how staff were utilised." [SM2 – Covid]

Increasing shared learning was something all managers felt would be valuable and useful for their own organisations.

5.2.2 Senior managers perceptions of workforce Utilisation strategies

During any major incident, a significant challenge for healthcare managers is having the right staff, with the right skills, in the right place, in the right numbers to provide appropriately skilled patient care and maintain operational capacity. As major incidents occur with little to no notice, this can be difficult to achieve and is realistically not going to be consistently achieved. In the event of not having the right number of people with the right specialist skills, difficult decisions must be made that may directly affect patient safety and staff wellbeing. During Covid, TP were often prioritised for redeployment to CCU as the almost entire shutdown of elective surgical services meant there was a large pool of staff available. What redeployed staff would be doing in CCU was also not consistently considered prior to redeployment, and for many TP their specific skills were not always considered or utilised as SM10 describes:

"It was a really difficult time really because theatre staff especially were probably moved around more than any other staff group, without you know, people say, 'oh, whether you're not gonna be doing the theatre work as much. So, these are staff that are

available' but equally there's a lot of difference between a scrub nurse and even a ward nurse." [SM 10 – Covid]

This may be in large part due to the speed and scale at which redeployment occurred, and the lack of experience most managers had in facilitating such a rapid and substantial change in workforce. SM10 goes further, highlighting the impact of having insufficiently skilled staff redeploying into CCU in large numbers. Redeployed staff in their Trust were provided with three days training to become a CCU nurse. In context, this training usually takes 2-3 years. So, despite best planning during the first wave of Covid particularly, high acuity patients were receiving care from staff not sufficiently skilled to deliver it:

"The other staff that actually supported in bed spaces were [pause] were not trained in the early days, 'cause as I say it took us a little while to get to grips with that. And even when they had the training, which was three days. Three days to become an ITU nurse." [SM10 – Covid]

Consequently, some CCU's reported large volumes of staff being deployed without clear role allocation or direction, which at times hindered rather than helped CCU staff. SM2 summarises the challenges of mass redeployment, where staff were not given specific tasks to complete, allocated to specific teams, or well prepared. This led to a significant waste of skilled resources when it could least be afforded, resulting in frustration amongst staff. Additionally, this meant the workforce was not available in OT to maintain more substantial surgical capacity:

"How [redeployment] was then organised within critical care did cause some challenges. So I had a lot of specialist nurses from the area that I worked in that went to work in critical care, and I think that you know, the feedback from them was that….there were lots of people. They weren't well directed, they didn't feel part of the team. It was

often really difficult for them to compete a shift because of some of those issues, they didn't feel welcome and didn't feel wanted." [SM2 – Covid]

Managing a large influx of non-specialised staff into a highly specialised clinical area is always going to be difficult, and tensions between staff groups are likely. However, it is worth considering there are different approaches to structuring this. An alternative approach is to utilise the existing skills of available staff and consider how they will be used for the duration of the event response and recovery, not just the initial response. Nevertheless, this is not always considered in major incident planning on an individual staff member level, and in the event of rapid escalation of patient need, is extremely challenging to do in the immediate response phase. In contrast, during the Manchester Arena Bomb response, SM3 describes how the opposite was true on the night of the bomb itself. A combination of frontline staff having to make decisions about which staff to call in without senior oversight, and spontaneous volunteerism [see section 2.5.3], theatres was overstaffed in the immediate aftermath. However, this had a knock-on effect in the following days, when the same staff were no longer available:

"[Theatres] had lots of nurses that have come in that were sat around not doing anything cause no patients arrived in theatres for ages. The decision was made to call lots of staff in. In hindsight, with the bomb particularly, what we found is that it wasn't hours 0- 12 where theatres was busy, it was 12 to 100 which was the manic ones. So, what we did is called all the staff in, which then compromised us the following day, which was when we was busy from a theatre perspective." [SM3 – Manchester Area Bomb]

Although the challenges are very different, the lack of planning for what staff called in would actually be doing when they got to the department led to a waste of valuable resources. Policies appeared to be based upon work-as-imagined, but the learning required to adapt them to work-as-done was not always completed.

5.2.2.1 *Skills Analysis*

Individual skills analysis is a tool to ensure individuals capabilities are maximised during redeployment. However, as a further example work-as-imagined rather than work-as-done, if this occurred and how this was approached differed significantly between organisations and departments with mixed levels of success. If it did occur, the quality and application of the skills analysis varied widely. Managers within the same organisations having hugely different perceptions of how effective redeployment was, if the skills analysis took place, and how successful it was if it did. This inconsistency is demonstrated by SM4, an executive manager with EPRR responsibilities, perception of events:

"In our command centres, our silver command centres of each hospital, we would have a staff allocation officer that would look at skill sets and movement of staff. And it's almost like playing a game of chess. Now we did that in wave one and we got a lot of interest off NHS England in how we were doing that because we could reallocate specialist skills to specialist areas." [SM4 – Covid]

…contrasted by two senior managers who had direct responsibility for redeploying staff in the same organisation, SM1:

"It came and went very quickly. So, what we needed to do, in the end, it wasn't a case of just going through a checklist and going who's got the next best skills, it was just people going up [to CCU] to be able to… because you can do basic nursing care can't we?" [SM1 – Covid]

…and SM2, who used the skills matrix but didn't feel it was effective on reflection:

"And we had used the skills matrix, and therefore we knew where we were going to utilise peoples' skills. We certainly didn't pinpoint specific skills, but we did identify, if you've got a theatre background or a critical care background not working in critical care, that was probably the best place for you to go to and to work. And critical care, it's very specific, it's different. People didn't feel particularly welcomed into it, and that maybe on reflection, that may well be that their skills weren't well matched, or indeed there were just too many staff. It certainly did feel to me like the skills mapping exercise, though it had been done, didn't necessarily translate into practice. "[SM2 – Covid]

However, even the assumption that staff with an OT background are best suited to CCU does not consistently translate into practice. Though there is some similarity between CCU and recovery, many OT staff have never worked in a 'nursing' capacity or on a ward before. This assumption about OT nurses having basic nursing skills did not account for the changing OT workforce over the past few decades, with increasing numbers of ODP workforce who do not undertake basic nurse training. As explained by SM10, the basic assumption about their underlying fundamental skills is potentially flawed, particularly for ODP's who have never worked outside of OT:

"That was extremely challenging because the theatre staff were extremely anxious because they didn't feel that they had the necessary training, experience, knowledge. And that varied from person, from the people who might have had experience of working on the wards before. Some of them are AHP [Allied Health Professionals such as ODP's] backgrounds, may never have worked as a nurse. By far not as many [TP] that are from a nursing background as many maybe 10 years ago." [SM10 – Covid]

In practice, the reality for many managers, particularly within the first wave of Covid, was that skills analysis was crude at best due to speed and scale at which the pandemic unfolded. The rapid escalation in patients requiring specialist care, with insufficient trained staff to provide it, necessitated the rapid movement of staff, even if

they only had a tangential clinical skillset. For many departments, it was about increasing numbers of staff, regardless of whether this was the best use of their skills:

"The first wave was about and 'Alice Jones…. you work in endoscopy alright, OK. So, you can go straight into critical care and be the support.' 'Oh, you working out-patients right? OK. So, we'll put you straight into the three-day [CCU] course'." [SM11 – Covid]

However, when skills analysis was used to consider specifically what individual staff would be doing during their deployment, through allocation to task-based or skills-based team, clinical effectiveness was deemed to have improved. SM10 concisely summarises why this approach was so effective in their organisation:

"It was very effective [skills analysis then deploying to skills-based teams]. It was very effective because we had, we utilised people in the roles that they were most effective in." [SM10 – Covid]

This approach does was not consistent across the organisations in this research but does appear to have been effective when utilised. It is unclear however if there has been any organisational learning regarding what did, and did not work, in the application of skills analysis during the pandemic. Given the likelihood of future pandemics, this piece of work could be valuable to the adaptive capacity of individual hospitals.

5.2.2.2 Innovation and Team Structure

How, and, if teams of staff were established impacted upon the efficacy of response, and some managers described how innovative practices around the establishment of teams in particularly improved their ability to utilise the available workforce. Creating

teams, be that skills or task based or more generic nursing care teams, was found to improve clinical standards, reported staff satisfaction with their role, and reduced inefficiencies. SM8 describes how this skills-based allocation naturally occurred within the CCU department during Covid, and the positive impact this had:

"So, the first team to start up was the intubation team. Then the [vascular access] lines team would come in. And the proning team, again was a combination of our anaesthetic CCP's [Critical Care Practitioners] who led on most of that, who were, are obviously airway trained and could do lots of that. But again, you definitely saw the difference between when a proning team did it planned or as an emergency, and when you saw it as an ad hoc team, put it together, it was not as good. Then the trachy [tracheotomies] team came a little bit later." [SM8 – Covid]

SM10 works in the same organisation and goes on to describe how effective this approach was within a team-nursing structure. Not only did this reduce cognitive load for redeployed staff, but it allowed them to have specific tasks to compete which they could become familiar with, and expert at. This in turn allowed trained CCU staff to concentrate upon providing the highly skilled care only they were trained to deliver, removing more generic tasks from them that could be completed by another practitioner. Though this is theoretically the aim of all team-nursing approaches, SM10's organisation was one of the only ones that broke this down into existing skill-based teams:

"We put together airway teams, we put together IV teams, repositioning, proning teams, so we actually put those together fairly quickly because again, you know you had as a registered nurse in critical care you might have four patients which wasn't unusual in the peak of it. So, for those four patients, you needed to take away that need for you, for you as the nurse to reposition, to do the IV's to, to replenish the syringes, to manage the

airway, you know, to, to look at the ventilator. It actually really helped support. So those teams were amazing." [SM10 – Covid]

This was not a consistent approach in other organisations, and as SM2 reflects, this approach did not occur to them in workforce planning during the pandemic. However, they outline the value they think this approach could have in the future, particularly regarding improving the psychological safety or redeployed staff and improving skill utilisation. This in turn could improve individuals staff members experience of redeployment:

"In terms of, of linking people to specialist teams I think that would have been a very useful tool at the time, or a useful planning mechanism at the time, so probably would have made people feel more secure in the roles that they were going into and doing. I'm harping back to it because I think it's just great, not really occurred to me to think about teams in that way. So absolutely matching specialisms and skills, but not matching in that specific way, that maybe would enhance the individuals experience in such circumstances." [SM2 – Covid]

If this has been, or would be, embedded into organisational learning in the event of future pandemics is unclear, however. Not all managers with workforce responsibilities feel they could do anything differently, and it is not clear if learning from other organisations approaches has ever been shared at a national level. At present, no national learning has occurred which has led to a meaningful change in policy for staff redeployment, or educational intervention for senior managers of different strategies. For managers such as SM1, this means they would take the same approach to redeployment again, even if there may be more innovative ways of talking the skills deficit:

"If it's something that came as fast and hard as Covid I'd probably say we had to do the same thing again, because there wasn't much thinking time." [SM1]

This problem is concisely summarised by SM11, a senior manager in CCU:

"We did have a huge amount of workforce that we could utilise [in CCU], but again, how do we do that? We had no training. It's a specialist area, so how do you get people to come in? The closest people were Theatres you know, they wore scrubs, so therefore they could support" [SM11 – Covid]

5.3 Summary

This chapter has explored the inductive thematic analysis of the interviews with Cohort B – senior managers. The key themes identified in the analysis have been introduced, and excerpts from the data used to illuminate and provide context to the analysis. Managers discussed several positive and negative experiences from major incident response. Teamwork and skills-based teams were particularly identified as being a positive, and potentially protective, innovation. However, an organisational disconnect and lack of structured learning were identified as particular barriers to organisational recovery and workforce utilisation. In the next chapter, the inductive thematic analysis of both cohorts' interviews pertaining to workforce wellbeing will be outlined.

Chapter 6: Findings – Workforce Wellbeing

6.1 Introduction

An unforeseen theme in this research is the impact of staff wellbeing upon the organisations ability to effectively utilise staff respond to, and recover from, major incidents. The inductive methodology and analysis in this research project however allowed for the identification and development of this theme. This chapter will discuss the theme of workforce wellbeing in detail, utilising direct quotes from the data to illustrate key points. Both frontline Theatre Practitioners [TP] and senior managers experiences are inductively analysed and discussed together, and excerpts from the data will be presented to offer context and detail to the analysis.

6.2 Findings

Neither cohort of interviewees were directly asked about the psychological impact upon themselves of their staff groups, but every participant discussed this in detail. During data collection, it became apparent that this was a prominent theme due to the frequency with which it was mentioned, and the often emotional and distressed responses of some of the participants. Terms such as burnout and exhaustion were mentioned repeatedly. The aim of inductive research is to identify patterns and themes within the data and conclude meaning from this. Throughout the data analysis, it became clear that the wellbeing of the workforce has a significant impact upon not only individual TP and their ability to utilise their skills effectively, but also more broadly upon the organisations ability to respond and recover to a major incident. This is particularly pertinent for organisational resilience as this can have a significant influence upon staff retention and organisational recovery [see sections 1.2.3 and 1.2.7.1]. Though anticipated wellbeing and psychological distress would potentially impact upon staff during major incidents, what was unexpected was how many opportunities there are for improvement. This subsequently has potentially significant implications for organisational learning. It became apparent both during data collection and data

analysis that this theme could not easily be separated from this research' objective of ascertaining effective utilisation of TP, and so could not be ignored.

This chapter discusses one theme, four sub-themes and three sub-codes.

Table 15: Themes – workforce wellbeing

Theme	Sub-Themes	Sub-Theme Description	Sub-Themes	Sub-Theme Description
The influence of wellbeing upon workforce during major incident response and recovery	Psychological impact	*The psychological impact of incident response upon both front line TP and senior managers, and how this influenced their wellbeing and ability in work.*	Staff turnover	*The impact of staff wellbeing upon perceived retention*
	Autonomy	*How the loss of professional autonomy, for example choice of workplace, influenced frontline practitioners and their psychological wellbeing.*		

	Experience of events	*How healthcare professionals experienced events during incident response, and how these experiences in turn influence their overall wellbeing.*	Length of response time and lack of recovery period	*The perceived influence of incident response time upon staff wellbeing, and ability to emotionally recover from events*
			Home-life impact	*The influence of the demands of incident response upon participants home-life, and how this then affected their wellbeing*
	Teamwork and skills utilisation	*How teamwork, or its absence, influenced healthcare professionals' wellbeing and their ability to continue working and applying their skills under pressurised circumstances*		

6.2.1 The influence of workforce wellbeing upon major incident response and recovery

The perceived wellbeing of the workforce has important consequences for how and where staff are utilised. Staff who felt exhausted, anxious or burnout were less likely to undertake overtime shifts, particularly a problem for OT departments after wave 1 of Covid. At this point, surgical capacity needed to increase, but there was less available workforce to facilitate this [see section 1.2.7.1]. Staffs' experiences during major incidents also influenced wellbeing. Staff who found deployment to CCU during Covid distressing or frustrating were less likely to volunteer to go back in future waves. Although senior managers identified psychological support for staff being an organisational priority after Covid particularly, it is also clear the support services are not consistently available, or well used. Though proactive support would be ideal, SM11 highlights how a lack of resources makes this impossible:

"What did come out of the pandemic was, or what that major incident was pastoral support, so wellbeing support. I don't think we had that before [Covid]. But even now that the access to that wellbeing support isn't as good as it maybe it should be, but that it takes a lot of investment which means money and of course the NHS is a little bit more strapped than that." [SM11 – Covid]

The need to deliver a safe and effective service often meant staff wellbeing was not realistically a priority. Both senior managers and frontline TP were by necessity working under immense workloads for prolonged periods of time, to the detriment of their own wellbeing. For many staff, what was needed for their wellbeing was a reduction in workload, time off work, or working under less pressurised circumstances. Frontline TP all disclosed how profoundly major incidents have affected them. This was not always a negative association, with many positive aspects being identified. The improvement in organisational focus on staff wellbeing was often positively viewed, and teamworking

particularly being identified as a source of pastoral support and pride. It was evident though this was an emotive subject for many, with anger, frustration and anxiety palpable from some participants who did not feel their welfare had always been well supported or did not feel it been a genuine priority.

"And....mental health support. Again, no. Yes, there is posters on the wall. That's asking people to reach out if they need here, or rather than coming round than asking people, did they need it." [AP5 – Covid]

However, providing staff with this was not an operational possibility. SM1 particularly highlights the dissonance between organisations recognising the need to support staff, but not being able to risk them going off sick with stress or anxiety. Realistically, this meant staff wellbeing couldn't be a priority as the pressure to deliver patient care did not allow it to be. This in turn influenced some staffs' perceptions of their organisation, and their commitment to it [see section 1,2.7.1].

"I had my holiday, my rest time, and then didn't get any time off I think for like 3 months, and that was difficult. At the time one of the DDNS [Divisional Director of Nursing] has just left her position and there was only 2 of us, there's 5 of us now, absolutely was just none stop. So, we'd be in work at sort of 6, quarter past 6, really good camaraderie, and then we were still here at 8, half past 8 at night you know, trying to make sure that all the zoning was right, you've got the right PPE for the wards, pathways for the patients were correct." [SM1 – Covid]

Many, but not all, frontline participants disclosed incidents that still provoke a strong emotional response from both the Manchester Arena Bomb and Covid. Nevertheless, they were pragmatic about this being a reality for healthcare staff, though the need for a more robust approach to staff pastoral support is clear.

"The clinical practice was hard, don't get me wrong, but it's the nature of the job.... you've got to do that. It's what you're employed for. But I feel like the bigger picture was the negative side, and it's had a negative impact on a lot of staff. A lot of staff are burnt out, a lot of staff are extremely tired some staff left because, and even left the profession because they didn't want to do it anymore." [AP3 – Covid]

Not only was the health and wellbeing of staff a risk, but this in turn impacted upon the availability of workforce. Several senior managers identified the subsequent influence of staff wellbeing over their willingness to deploy, recruitment and retention, with workforce attrition being a sizeable challenge after Covid:

"I think morale is particularly low at the moment. Now whether with any incident like that, moral would be low afterwards... But morale seems lower now than it what it was when we were also pulling together at the start of Covid. After something like that to try and maintain commit, you know commitment and morale." [SM10 – post-Covid]

There is undoubtably an extremely difficult balance between maintaining staff wellbeing, and being able to deliver the service as needed. There are no quick or easy answers, but even though wellbeing services have been launched in many Trusts, the reality of these often did not deliver what staff needed. Finding more sustainable and pragmatic ways to improve staff morale and wellbeing may help maintain the available workforce during major incident response.

6.2.1.1 Psychological impact

There was a distinct psychological impact of responding to major incidents for several respondents. Some participants did not feel there had been any adverse impact upon them, while others detailed incidents as having a powerful impact upon their

psychological health. This was not always during the immediate response phase, where staff were often too busy to consider the impact of the event. However, some respondents such as AP3 and SP2 mentioned they did not realise how affected they had been until well after the event had finished and they had time to reflect and think about their experiences.

"Healthcare professionals are expected just to get on with it and just in not affect them. And the bomb has massively affected me, and you know even though I only worked a short snippet of Covid that will, you know you'll never forget something like that, and I think that bit was probably unappreciated at the time. It was the afterwards." [AP3 – Manchester Arena Bomb]

"They did offer [debrief] here, along with psychological support should you want too……because most of us just kept ploughing forward and until you stopped you didn't realise quite how, in not a good place you were." [SP2 – Covid]

Beyond generalised anxiety and stress, participants discussed the longer-term consequences of burnout and hypervigilance in frontline TP who had responded to major incidents. These consequences were identified for short-term events such as the Manchester Arena bomb, and longer-term response as during Covid. However, there was a nuanced distinction between the two events; hypervigilance largely associated with the Arena bomb:

"After the Manchester arena bombing, like a week later, I got a call saying someone had ploughed a car into a load of people at the Trafford Centre, and I was like, 'its 12 o clock at night, there's not going to be a crowd of people at the Trafford Centre.' It was like a Tuesday, and we were set up for nothing and all and we were ready to go, and I think it was because of what had happened the week before it was that knee-jerk reaction. Everyone kind of felt like they were on high alert, like something else was going to

happen. And I think that does have an effect on how people, react and that to situations like a kneejerk reaction." [AP1 – Manchester Arena Bomb]

Whereas burnout and exhaustion were repeatedly mentioned in the context of Covid by practitioners such as AP2 and AP3:

"There were just days I just sobbed and sobbed through utter exhaustion and had it not been for the girls around me on that team, and the gents..... I think I'd've had a break down.... it was such an awful and stressful time for us." [AP2 – Covid]

"I remember...I had my first ever panic attack in the anaesthetic room. I'd never had one before, and it was because of the [FFP3] mask. And I think because I'd been on crit care, I'd been in A&E, I'd been to some of the wards, I think I'd just got massively overwhelmed and I think the previous weeks behind I'd just done, just hit me like a ton of bricks. And it was fine, they took me out, but yeah it was.....we felt like robots." [AP3 – Covid]

Anxiety around major incidents was suggested to have an impact upon staff's willingness to engage with redeployment during Covid, as well as their ability to work safely and effectively. Fear of the unknown, particularly during Covid, where staff were asked to work in high-risk areas having little knowledge about the virus, at times meant there was less readily available workforce to deploy when needed.

"I think it's fair to say there was a lot of panic, there was a lot of anxiety, there was a lot of fear in out frontline clinicians. And there was a lot of bravery around that time as well, because it was really, really unknown. There were a lot of face-to-face conversations with people, how can we utilise your skills? And I remember how frightened that

individual was, I think at the thought of doing something that wasn't what they do now, plus the fear of what the risks around some of those roles might be." [SM2 – Covid]

Anxiety was a word frequently used by TP to describe their experiences during the Covid pandemic, with staff repeatedly mentioning being scared. While many staff recalled the fear they felt at the initial time of the event, these symptoms were often discussed in the past tense and not as having emotional power over the participants in the present. Much of this was fear of the unknown, where there are little organisations or managers could do to improve this in future as poignantly explained by AP2:

"I used to find you were anxious to have any time off work. If you had any longer than a day off you were worrying about coming back to work, so it was easier just to keep working because you never knew what the different changes were and like, the first time I did a Covid intubation, the stress and the worry, and the anxiety of all of that, and the not knowing of any of that was really difficult." [AP2 – Covid]

6.2.1.2 Autonomy

The lack of frontline TP autonomy was perceived to have an impact upon wellbeing, particularly for those who were redeployed without having a choice or input in that decision-making process. This particularly became problematic during waves 2 and 3 of Covid, where staff were tired but still being sent to work in other clinical areas. There was perceived greater resistance and lower morale. SM11 outlines the impact this had upon staff in their service:

"I think a lot of people were harmed by psychologically harmed by what they were ***forced*** *to do. You know, this wasn't a choice. Your contracted with the Trust, therefore you will do. You will do you what you've been told to do, and actually that that did harm*

a lot of people and a lot of people I guess left or, or if they if they heard the name crit care, or you are going to be redeployed into crit care again then, they probably would run for the hills." [SM11 – Covid]

The impact of a lack of autonomy regarding redeployment to CCU during Covid, and the subsequent potential negative impact upon TP perceptions of their experiences is highlighted by frontline staff. While this lack of autonomy is necessary during major incidents to ensure sufficient workforce to meet patient need, and this is often understood by staff such as RP2, there are areas of practice which could be improved upon to improve staff experience.

"As to the organisation of it, no I don't remember ever having a choice. It was never a choice. I was fit, I was healthy, there was no reason that I was Covid exempt...and the was definitely how it felt. You know, you came into work, you got told where you were going and you just did it. You just suck it up and do it." [RP2 – Covid]

Lack of choice was again highlighted by SM3. Though all healthcare staff work for organisations who may deploy them anywhere at any time, for most staff they choose a specialty for particular reasons. Asking people to leave their familiar environment and skills to go into the unknown was often difficult, especially as staff weren't being asked, but being told:

"What was difficult was having them conversations because actually, people made the choice to become an anaesthetic ODP, or recovery nurse, or whatever. And actually, they want to do what they made the choice to do." [SM3 – Covid]

Though staff were willing to deploy, imposed change of shift patterns and poor communication around where staff would work daily, increased stress and anxiety.

Furthermore, nurses in this study reported being unable to provide a high standard of patient care, due to lack of expertise, an overwhelming number of patients, or changing guidance. This dissonance between professional identity and the clinical reality was distressing for some such as RP1, who felt their professional values as a nurse were at odds with what was being asked of them.

"You had to. You had to do it. 'Cause at the end of the day who was going to do it? There was no choice or volunteering, you just went in. The first time I worked in ICU it was really hard, seeing all those people you know just vented, and being told when they code [cardiac arrest], there's nothing you can do, just, there's nothing you can do. You know, it's like even though they're telling you someone falls down you can't start CPR [cardiac pulmonary resuscitation] until you 've got your PPE and stuff. You know as a nurse, you don't think about putting on PPE!" [RP1 – Covid].

RP4 further describes how, despite being CCU trained and having extensive CCU and recovery experience, they could not deliver the standard of care they expected. This again caused distress at times, as they were not able to align their professional values with the standard of care they could deliver during the pandemic. This disconnect was not mentioned by ODP's in this research, who only work in OT and do not undertake any ward-level training in their careers. However, all ODPs interviewed in this study were allocated to theatres or intubation teams, and this skills-based care provision may have reduced some cognitive load and perceived disconnect.

"And the standards of care that, certainly I was used to delivering when I was there [CCU], just weren't there. You received the handover for your Covid patients, and it was like 'Covid, sedated, ventilated, they're on XYZ. We'll see you in 4 hours'. So going from when I worked there you hand over was a good 20 minutes. You went through every

single thing. So then really minimal, like less than a minute handover and then that person was gone. It was a bit like ohh." [RP4 – Covid]

It is not possible during major incident response to remove all anxiety from the situation, and to some extent staff will always be anxious in the face of uncertainty. Additionally, the needs of the organisation and operational pressures often mean staffs individual needs cannot be met, and staff autonomy cannot be preserved. However, it is possible here are pragmatic suggestions which could improve psychological safety, and in turn reduce some of the anxiety staff felt. This may then improve wellbeing, and so staff availability.

6.2.1.3 Staff Turnover

Staff turnover post-Covid was frequently mentioned as a challenge to operational recovery. The experience of caring for patients during Covid, often under intense pressure in unfamiliar environments, and not delivering the standard of care many HCPs are used to, was recognised to have a considerable impact upon staff retention, willingness to deploy, and to work overtime. Significant loss of nursing and OT staff were mentioned by numerous managers, and as SM5 and SM7 note this was often viewed as being due to fatigue, burnout or frustration:

"I think we saw a huge turnover of staff post Covid. And I think that… some of that was the fatigue. And actually, I think coming out of Covid, people probably just re-evaluated where they wanted to be and what was important to them." [SM5 – Covid]

"I think there was a lot of dissatisfaction especially amongst nursing staff, because we did see them leave in droves afterwards." [SM7 – Covid]

For nursing staff working in CCU in particular, they were not able to provide the standard of care they would expect and worked with patients with a high rate or mortality and morbidity. This type of working is associated with moral injury. OT staff were generally one of the biggest staff groups redeployed due to the reduction in surgical services, and staff were sent to the very frontline of the pandemic – either CCU or intubation teams. They were then sent back to OT where they faced significant pressure to increase surgical capacity and recover the backlog, and so never had an opportunity for any reflection or recovery from the pandemic. They essentially moved from one highly pressurised environment to another, with no respite. This has had a stark impact upon OT departments abilities to recover the surgical backlog after Covid as there have been huge reductions in available OT workforce. As SM8 observes, the pre-Covid workforce does not exist in NHS services now, and this significantly affected their organisation's ability to deliver services:

"We were running, I think we had 42 theatres up and running prior to Covid. We've still got nine theatres that are mothballed. We're very much well below the baseline, there's no theatre staff, there probably isn't the bed anymore." [SM8 – Covid]

6.2.2 Experience of Events

How staff experience events may impact upon their willingness, or ability, to respond to major incidents, particularly if they have found what they have been asked to do traumatic. This can impact upon the availability of workforce to be deployed in the event of need, regardless of whether the staff have the skills required. As SM1 described, staff were often affected not only by what they were managing in their clinical roles, but by what was occurring in their home lives:

"Was it easy for those staff [redeployed to CCU] …. No. Some did a couple of weeks and it was that traumatic that we had to bring them back out. Some bit the bullet and you know stayed the duration, but then when we had phase 2 couldn't or did not want to go back. And then you've got to remember, we lost staff as well. A lot of staff had lost family it's difficult isn't it, putting them in that position, caring for somebody with Covid when their family members already passed away" [SM1 – Covid-19]

The events also have had a tangible long-term impact upon some senior managers, particularly the Manchester Arena Bomb where numerous managers became emotional discussing their experiences on the night and could still recall specific incidents with great clarity. SM1 again vividly recalls caring for the relatives of a young victim of the bomb, and the emotional toll this took upon them:

"Two families stick in my mind. And one of them, you know the young girl? Saffie. So, I was speaking to and comforting her parents. They were desperately trying to find her and so we were ringing all over. We'd spent a lot of time with that family, trying to trace Sophia and then the family were advised to go to Manchester Royal, and just as the family left the building, we heard that it was highly likely that the team has Sophia over at MRI and she'd passed away. That's awful…To think we'd actually got some news, before the family. That affected me." [SM1 – Manchester Arena Bomb]

If psychological support was consistently available or accessed by managers, who were often supporting frontline staff and taking on additional, often upsetting responsibilities, is unclear. Unsurprisingly, the most significant cause of psychological distress and anxiety for most staff were the events that they witnessed, and how this was managed. Some of the causes identified by staff such as AP3, such as treating colleagues and bomb-victims, or redeploying to CCU during Covid, were unavoidable. Despite this, they caused at time significant distress and there were not consistently

robust support mechanisms in place to help them process this. AP3 identifies how there were often not even informal checks in place to support staff:

"I was involved in one of the Consultant crit care doctors, he got Covid and had to be intubated. Unfortunately, I was the ODP who had to go and do that, and that was really, really emotional, really upsetting. I cried afterwards, the person I was on with cried afterwards, the Anaesthetist was really affected by it. We had his wife on Facetime with his kids saying goodbye before he went off to sleep, and it was really, really hard.....situations like that, you just weren't checked up on, you weren't like 'are you ok?'" [AP3 – Covid]

Some anxiety was caused by experiences which could in hindsight have been better managed, and so provide lessons for future major-incident response. Particularly, there are clear improvements that could be made regarding how staff are communicated with, and how redeployment is organised. RP2 summarises the influence of poor organisation, powerfully describing how the uncertainty of where they would be working every shift impacted upon their wellbeing:

"So, we were redeployed either to Covid ICU, clean ICU, or recovery. So, when I came in on shift, I didn't know where I was going. That was awful. Because my kids were off school and because of like the intensity of it at the time, I was walking to work and walking home, just to try and get like a bit of a break really between. So, we'd come in, didn't have a clue where we were. Like your stomach was in knots coming in, that was awful, I did not like that. And I remember saying at the time, I'd rather be fully deployed to Covid ICU than this. I remember that was really not nice." [RP2 - Covid]

This type of anxiety could have been avoided with a more consistent approach to staffing, or a redeployment block where staff would be sent to one area for a defined period of time. RP1 explains how the lack of consistency, daily allocations to different

departments and different teams, led to staff feeling alienated. This subsequently impacted upon morale and standards of care and could have been avoided with a static deployment.

"I think of how because we were so, disenfranchised. People sort of lost their way. And you feel like there was, the staff morale towards the end did decline. People were tired. People were really, really tired, and you just… I don't know whether we're going to get back to where we were, you know." [RP1 – Covid]

Lessons were learnt in the second and third waves, and mass redeployment was not conducted in the same way. Some staff were then sent to CCU for blocks of time, which was reported to improve their experience, though no staff in this study returned in the second wave so it is not possible to be certain. It is not clear though if this learning that occurred during the pandemic has influenced policy or workforce planning for future incidents, as managers stated this type of post-event learning had not occurred.

6.2.2.1 Length of response time and lack of recovery period

The length of response time was identified numerous times as influencing the desire and ability of staff to continue responding to major incidents. All managers consistently said in the Manchester Arena Bomb, and early days of the pandemic, there was a great swell or support and willingness from staff to do whatever was needed to help. However, as SM4 describes the length of response time impacts upon morale, and staff willingness and ability to respond:

"I'd have no problem with asking anybody in an emergency to look after a couple of extra patients. And most people will be excited and stand up. But we've only got a finite window though, where people then become tired." [SM4]

Incidents involving longer responses, such as Covid, were particularly found to have an adverse impact upon workforce availability the longer the response went on. Even if staff had the skills or knowledge required to care for Covid patients, some were unwilling or unable to continue doing so. Adrenaline and camaraderie got many staff through the first wave, but as SM7 outlines, they did not necessarily anticipate that multiple waves were going to occur:

"We didn't know how long the first wave was going to go for, [but] epidemiologists knew there was going to be a second wave. I think nurses at the end of the bed and the reallocated people didn't realise, and the fatigue and relative reluctance that we saw in the second wave compared with the first wave, was a reflection of that almost shock of 'we thought we'd done Covid. Oh my God, it's happening again.' "[SM7 – Covid-19]

In comparison, short-term events such as the Manchester Areana Bomb, did not reduce workforce availability in the same way. The length of response time was viewed by many to impact upon their willingness to keep going, particularly impacting upon burnout and exhaustion. Though there is nuance in the range of emotions expressed after both Manchester Arena and Covid, there is not a clear correlation between the length of response time and depth of emotional response. Though the Manchester Arena Bomb was a short incident, the impact of the event appears to still be intensely emotive and equally as powerful as Covid. Individual details about specific incidents, such smells and conversations, were still clear for many such as AP3, despite it happening in 2017.

"The way I come in's through Cheetham Hill which is at the back of the Arena, it was like ghost town, absolutely nobody there. All you could hear was sirens, and it was like the most bizarre experience. And it was really hot on the day as well so I had my windows down in car, and it just was really eerie.....the circumstances around it because you can't forget that it's come from a bombing, do you know what I mean." [AP3 – Manchester Arena Bomb]

Conversely, many staff's memories of Covid gave a distinct overall impression of exhaustion and distorted perception of time, or separation between cases. AP2 encapsulates this sense of distortion well, describing how their perception of time during the pandemic is elusive:

"It was just such a busy.... when you think back, you think it only lasted a couple of weeks and it wasn't a couple of weeks, but I think that's the effects of nights and probably trauma as well and blocking some of that out." [AP2 – Covid]

The lack of a recovery period from Covid was particularly identified as being challenging, with staff struggling to adjust from 'Covid' to 'normal' working in a way that did not occur after the bomb. It is possible that staff are just now beginning to process the Arena bomb now there has been some distance from the events, and a similar time-lag may occur in staff processing the pandemic. AP5 raises this concern, particularly drawing upon their experiences of time-limited deployed and decompression in the military, versus the lack of this in the NHS:

"I remember speaking to the theatre manager at the hospital I was working at when this has kicked off and said if this isn't done right, you're gonna have loads of people with issues and post-traumatic stress from this because....I described Covid as a deployment with no end. It was literally eat, sleep, work, repeat. That's a deployment.

The difference is when I was in Afghanistan doing that, I knew when I was going home. You didn't know that in Covid." [AP5 – Covid]

It is impossible to know now what the impact of the pandemic will continue to be in the future, but the lack of recovery period was raised by many staff as being potentially the most damaging consequence of all. Staff largely understood and accepted being asked to work abnormally during the pandemic because it was very clear to all that this was needed, however unpleasant it may have been. However, as RP4 highlights, the lack of recovery or decompression period for staff may have consequences for staff wellbeing in later years:

"I don't know whether, if supported staff well enough after the event from a wellbeing point of view. I think we've tried to flick the switch from Covid, pandemic, you know, all stress that came with that situation to now go in business as usual. But that, it feels to me like we flipped the switch and it's, there's been no gradual phase back into that activity.... And it was, you know, it was getting on the for 12-18 months while activity wasn't normal and that's a long time to then go 'Right, we're business as usual'." [RP4 – Covid]

6.2.2.2 Home-Life Impact

The impact of major incident response upon staffs' homelife had a particular impact upon their wellbeing. Covid particularly, due to the length of response time, had tangible personal consequences for staff which affected their welfare. These costs included night shift workers such as AP2 having little sleep for months due to home-schooling children:

"We talked about the pandemic and it…. you know just the level of pressure, and working in an environment continually like that. For me I think that with the flipped nights, but that wasn't managers asking me to do split nights, it was a necessity. There was nothing else I could have done because otherwise I'd have been on unpaid leave, you've got to look after your children." [AP2 – Covid]

Whereas staff such as RP3 moving out of home to avoid putting vulnerable family members at risk:

"I had to leave home because if I'm working in Covid ICU there was a high chance of me giving it to her [unwell relative]… so I was, I think I moved out of the house March til July, end of July…yeah, so it was horrible. But at the end of the day, that's what you're here for." [RP3 – Covid]

For many, this negatively impacted their welfare in the workplace. RP2 highlights how small decisions, such as changing shift times by half an hour, had substantial impacts upon staff's home-lives. These decisions may have been necessary, but the decision-making process and rationale wasn't always communicated clearly to staff. Although staff may not have realistically had a choice, these types of decisions are the ones that have stayed with them long after the event.

"We changed our shift pattern as well. I remember that. We changed to half an hour earlier because ICU start at 7 and we start at half 7. So, they just changed it, they didn't ask us, they just changed it. I remember that because that had a direct impact on what time [son] went to bed. So, I couldn't, that half an hour meant that I couldn't put him to bed." [RP2 – Covid]

AP3 gives a striking summary of how some staff felt the home-life impact of the pandemic upon them was not always understood or considered by managers. This led to a palpable feeling of disconnection and as though they were not valued as individuals, but only as workers who needed to keep working regardless of the consequences.

"I think they would have to put something in place for staff, knowing how much Covid has affected staff, and it's not just the staff members, it's the family members, it's taking it home to personal life, you know. A lot of staff here have probably lost relatives, had relatives that were really sick, worried about going home to pass things to the kids, you know there's that whole side of it that gets forgotten about, because you come here to do a job, the rest of your life gets forgotten." [AP3 – Covid]

In major incident response, the needs of the individual are necessarily often second to the needs of the organisation. However, a lack of acknowledgement for the impact upon staff's home life is likely to increase how negatively they perceive the decisions.

6.2.3 Teamwork and skills utilisation

Teamwork was characterised as having a protective effect for all staff involved in major incident response. Many managers perceived their experiences of teamwork extremely positively, identifying the camaraderie and support from both pre-existing and newly formed teams as being their primary source of pastoral support. Particularly, SM2 highlighted how strong teamworking improved morale and supported staff through challenging and distressing circumstances, particularly through 'gallows humour' and shared experience.

"So, we worked extremely well as a team together to understand within our division and within our specialty what things we could do. And there were some amazing things that were achieved during that time to maintain services and maintain patient safety, and you know people absolutely stepped up to the plate and it was an amazing positive experience. [SM2 – Covid]

Clinical care was also perceived to be improved through sharing of practices in newly established multidisciplinary teams. SM6 described how this broke down barriers between different organisations and professionals to allow for more collaborative working and innovative solutions.

"We set up [a] clinical advisory group. It was chaired by the Medical Director, or a Director of Nursing and the Clinical Directors were on it, and the Medical Directors were on it. So, they were all the right stakeholders on that meeting to make the right decisions. In the end we got some really good processes in place from that group and once we came out with COVID and the group did carry on probably about 3-4 months afterwards." [SM6 – Covid].

This teamworking extended to the establishment of skills-based teams in some clinical areas, and this appears to have had a protective factor for staff wellbeing. Whilst intubation teams were a standard practice during Covid, one organisation took this further and created several skills-based teams. As described by SM8, this practice was perceived to reduce cognitive load on staff and improve clinical efficiency, by ensuring were deployed to undertake skills they were already competent at, even if they were utilised in an unfamiliar environment and with an unfamiliar team:

"We had teams of ODP's going around and doing the filter changes on all the ventilators that were in crit care [CCU]. Because again, that's something they do on an everyday basis, and actually that probably takes them 90 minutes as opposed to asking each

individual nurse to do their own machine. By putting in those layers of systems, it makes processes more efficient. It takes a lot of stress and the cognitive load off people because asking an ODP to change [a filter] even in full PPE is a piece of piss for them." [SM8 – Covid]

This could have significant implications for organisational resilience, by ensuring staff are effectively utilised in ways that also give greater protection to their wellbeing. In comparison, staff who weren't allocated to teams but were 'blanket' redeployed with no thought to **how** they would be used were highlighted as having a more negative experience. SM3 encapsulates how unfamiliar this may have felt for some staff, especially if they weren't given clear tasks or roles to undertake.

"You know you can understand that if you're a scrub nurse that has got 20 years' experience, us turning round and going, so you can go and can you go to ICU on a Covid positive ward, and this is all stuff we've got to do, how alien that would have felt." [SM3 – Covid]

6.3 Summary

This chapter has explored the inductive thematic analysis interviews with both cohorts of staff, regarding the unexpected theme of workforce wellbeing. Wellbeing has been found to have a significant impact upon frontline staffs' ability to respond to a major incident, and an organisation's ability to utilise them effectively. Several suggestions have been made which could potentially improve perceived wellbeing, such as debriefing and utilising peer support. However, several barriers have also been identified which may impede organisation's ability to protect staff wellbeing, especially where the organisational need to response to an incident directly conflicts with that is in the interest of staff. In the next chapter, the findings of all three findings chapters will be critically discussed, and barriers and enablers to TP utilisation identified.

Chapter 7: Triangulation of Findings

7.1 Introduction

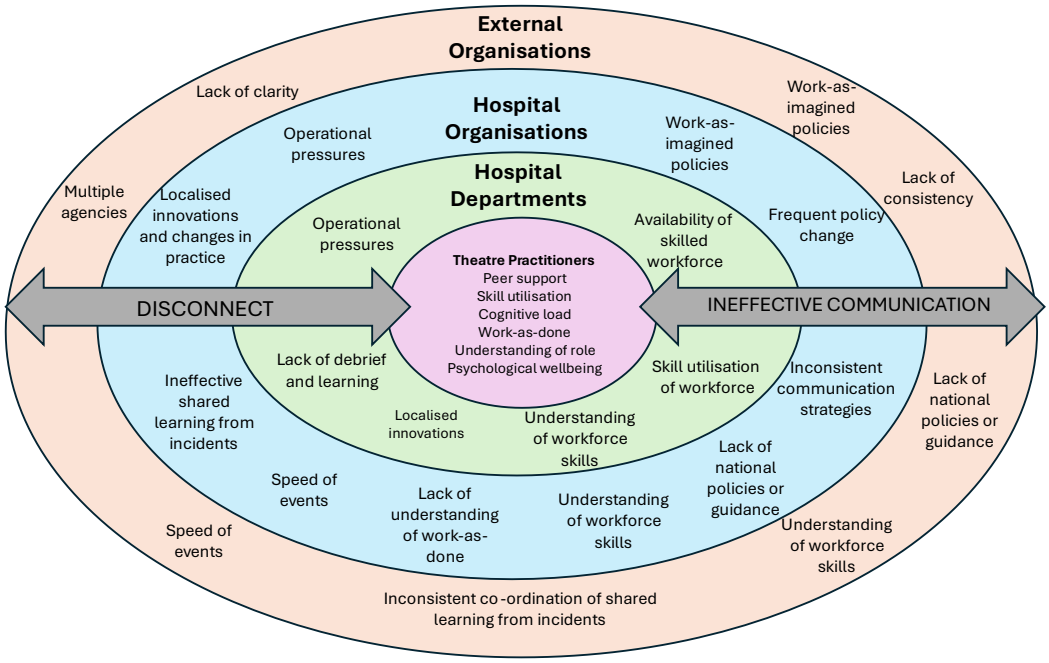
This inductive, qualitative study aimed to identify barriers and enablers to effective utilisation of theatre practitioners during major incidents and how this influences organisational adaptive capacity. To identify the research questions for this study, a systematic review was conducted in Chapter 3. Subsequently, 22 frontline Theatre Practitioners [TP] and senior managers with experience of responding to the Manchester Arena Bombing and/ or the Covid pandemic were interviewed. The interview data was analysed inductively within the context that there is very limited existing evidence looking at the impact of these incidents upon Operating Theatre [OT] departments. Several themes were identified in the analysis, as discussed in Chapters 4, 5 and 6. These will now be considered with reference to the prior systematic review, methodological limitations, and wider context of the post-Covid health service adaptive capacity and recovery planning. The findings will be summarised in a model of how factors influencing TP workforce utilisation during major incidents can affect overall organisational adaptive capacity. The barriers and enablers to operating theatre workforce utilisation identified in the research will be critically discussed in comparison with the existing evidence base.

7.2 Summary of findings

The findings of this research are summarised in figure 4. This figure demonstrates how factors and varying different organisational and individual levels effect the utilisation of TP during major incidents. As the findings of the research highlighted, the complexity of major incident response and recovery is demonstrated by the various actors involved in managing these incidents at macro and micro levels. The figure depicts these inter-

related actors in different sections as described by the participants, with the factors identified as being specific to each group of actors outlined. External organisations within this context are any organisation or governmental body external to individual hospitals which influenced the major incident response of a hospital. This may be through the publication of policies or guidelines, or organisations who work alongside hospitals to provide emergency response. Examples include, but are not limited to, the Ambulance, Police and Fire services, and Governmental bodies or committees such as COBRA, NHS England and Public Health England.

Figure 4: Macro and micro factors that influence TP workforce utilisation



Although each separate group of actors described factors that were specific to them, their job role and their role in the organisations, the findings of this research highlight how intertwined the experiences and decision-making each level of major

incident response were. Two core themes particularly link all these groups, and so the overall organisation's ability to respond to major incidents effectively; ineffective communication; and a disconnect between the actors at different levels involved in major incident response. These two factors influenced the understanding of organisations and departments of how to respond to major incidents, and in turn how to utilise individual skills TPs effectively. In particular, the speed at which events occurred, and the operational pressures organisations were working under often meant there was limited time to reflect or learn from what was, or was not, working in workforce enactment.

At the centre of the figure is a purple oval depicting the factors which influence individual TP and their ability to use their skills effectively in major incidents. This includes skill-based factors, such as direct skills utilisation and the impact this has upon cognitive load. However, factors also found to have a significant impact include; if TP have clarity over their role and expectations of them; support from peers or a team; and if they are undertaking work-as-done as opposed to work-as-imagined. In addition, how these issues interplayed and influenced TP experience of potentially traumatic and stressful events collectively impacted upon how well they were able to apply and utilise their skills in major incidents. TP wellbeing also indirectly influenced skill utilisation and workforce availability. Those who worked in skills-based teams, had roles directly linked to their existing skills, or within their own department, reported more positive experiences. In turn, although wellbeing was still impacted, this did not appear to have the same negative impact upon skill utilisation and willingness to engage in response. Those who did not work in consistent teams, did not have consistency or clarity over their working environment, or were asked to work in roles not linked to their skillset, reported more negative experiences. This was reported to more adversely affect wellbeing, ability to undertake their role, and motivation to continue responding. Those who had a more negative experience were also more likely to report viewing their department, managers or organisation negatively.

The next oval in green depicts how factors at a departmental level impacted the effective utilisation of TP. In this study, the departments studied were primarily OT, and to some extent CCU in the case of staff redeployment. Operational pressures in these

departments included the availability of skilled workforce; organisation of redeployed staff; communication; availability of debrief and embedded learning; and implementation of workforce policies. These factors directly influenced how and if TP could effectively utilise their skills, and indirectly influenced TP wellbeing. TP wellbeing was particularly impacted by the enactment of workforce policies and processes, with redeployment during Covid being described repeatedly as a specific stressor. As discussed above, this in turn affected the availability of workforce (for example those willing to pick up overtime), or their motivation to continue responding to the incident (for example, those willing to volunteer for future redeployment).

Organisational factors are outlined in the blue oval. These are factors identified primarily by the senior managers interviewed which affected their ability to enact workforce policies, understand workforce utilisation, and utilise skills effectively. Actors at this level reported much higher engagement and awareness of the influence of a range external organisations upon their decision making, although frontline TP did discuss governmental agencies and policies. As a result, the organisational factors are affected by the final oval, depicting external organisations. These are those organisations external to the individual NHS hospitals studied in this research and range from NHS England to the Police and North West Ambulance Service, and Local Resilience Forums. These organisations were perceived to shape how individual organisations could respond, and the consistency and clarity around national and regional policy and processes. Examples of this highlighted in this research include the timing or major incident declaration in the aftermath of the Manchester Arena Bomb [see chapter 4 and 5], and the policies for managing to Covid pandemic, such as expectations and availability of PPE [See chapter 5].

Participants described at times working at cross purposes with different actors within their organisations, with different information and competing pressures. This in turn affected organisational adaptive capacity and resilience by influencing the effective utilisation of workforce skills. Barriers and enablers to effective workforce utilisation were identified by both cohorts of interviewees which provide valuable learning opportunities for organisations. How, and if, organisations have the time to identify the vulnerabilities identified in this research, and embed learning into future

incident response, may influence overall organisational resilience. A model of these findings which describes how TP workforce utilisation during major incidents can impact upon organisational adaptive capacity is demonstrated in figure 5 and discussed in section 7.3. This will now be discussed in more detail in comparison with the literature. A critical appraisal and discussion of the available evidence pertaining to the enablers and barriers to TP workforce utilisation will follow this.

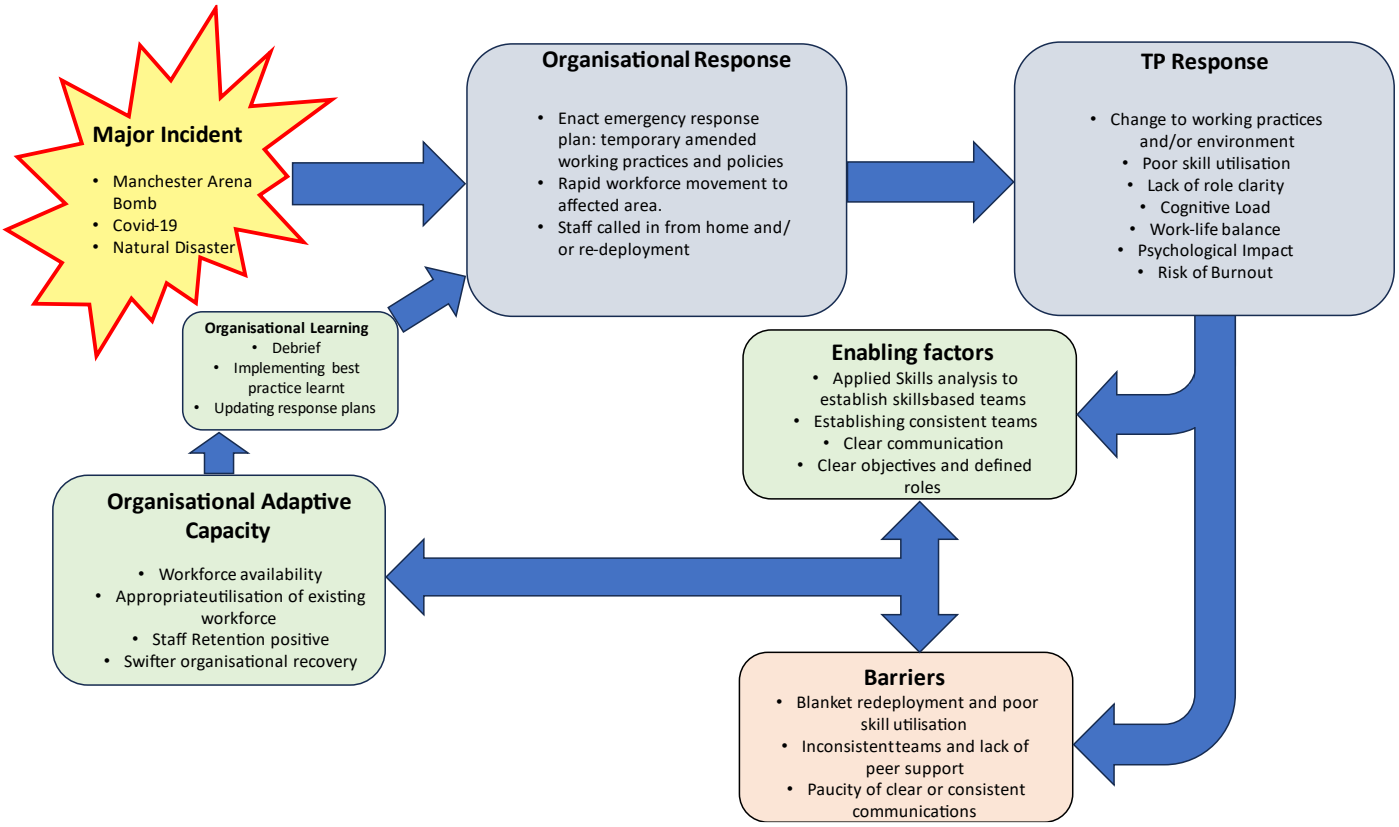
7.3 Theatre Practitioner utilisation and organisational adaptive capacity

This research has identified several ways in which utilisation of TP during major incidents can impact upon organisational adaptive capacity. Adaptive capacity refers to the ability of organisations to adapt to unpredictable events such as major incidents with minimal disruption to services (Engle, 2011, Zhang et al., 2018, Rumsey et al., 2014). A resilient organisation can be defined as one that can 'bounce back' to its normal states after a period of disruption or stress, whilst also absorbing the stress of the event whilst it is occurring (Wiig et al., 2020, Zhang et al., 2018). Resilience in the NHS, particularly within surgical services, has been undermined after the Covid pandemic. The NHS now faces a significant backlog of surgical care, and targets set by NHS England to recover this workload are being consistently missed (NHS, 2022, BMA, 2024b). Although adaptive capacity literature discusses how organisations can reduce vulnerability in the face of major incidents or extreme events (Anderson et al., 2020b, Hollnagel, 2017, Lyng et al., 2022, Wurmb et al., 2020, Zhang et al., 2018), much of this literature is focussed upon systems approaches, such as command and control structures. While Anderson et al. (2020a) and Wiig et al. (2020) suggest multilevel research looking at actors at every level of organisations is important to better understanding organisational capacity, very little available research actually does this.

This research study is multilevel study and adds detailed nuance to the challenges of enacting major incident response at different organisational levels. As a result, it offers some suggestions for how resilience and recovery could be improved

upon. As described in chapters 4 and 5, several factors such as poor communication, a disconnect in actors within organisations, and a misunderstanding of how to use TP skills meant utilisation of TP skills was inconsistent during Covid. Figure 5 outlines how these factors can influence overall organisational adaptive capacity.

Figure 5: The influence of TP utilisation during major incident response upon organisational adaptive capacity



This model is influenced by Zhang et al. (2018) theory of the key determinants organisation vulnerability and response to extreme events. This research builds upon Zhang's work by adding qualitative nuance to the existing quantitative data around organisational adaptive capacity in response to major incidents. In particular, Zhang et al. (2018) suggested further research was required to identify if organisations are

learning from major incidents in ways which will amend future practice. Their quantitative data implied this was not consistently occurring, and the qualitative data in this study supports that finding. However, this study also goes further by highlighting some of the reasons why this is not occurring. In particular, the significant disconnect between actors at different levels of organisational response, and the extent to which frontline staff are not reliably well-utilised or engaged in organisational learning, is suggested as being a major barrier to organisational response and recovery. Van Heel et al. (2024) found workforce availability to be the single biggest limiting factor in assessing the adaptive capacity and flexibility or organisations in crisis mode, and this is reflected in Khalil et al. (2022) research on hospital resilience and subsequent 6S [see section 1.2.3]. If resources are limited, it is therefore important they are used to greatest effect to minimise overall disruption to the organisation and maintain as much operational capability as possible. Those organisations that are able to do this demonstrate fewer performance gaps, and experience less overall harm (Zhang et al., 2018). In turn, organisations that do not learn from incident response, and identify vulnerabilities in said response, become less resilient to future incidents.

As figure 5 demonstrates, this research has identified several factors pertaining to workforce utilisation which can enable or act as barriers to organisational resilience. During the Manchester Arena Bomb, TP resources were largely well utilised. Staff were deployed in roles that utilised their pre-existing skills, and even when asked to work outside their normal scope of practice, were able to apply their pre-existing skills to do this. During Covid however, this type of skills utilisation was inconsistent. Areas of good practice, such as AP deploying to intubation teams, sit alongside areas of practice which could have been improved upon. Participants in this study demonstrated the potential for significant overall organisational harm through the cessation of elective surgical services, and the blanket redeployment of TP. Other research has also found redeployment during Covid to have been inefficient at times. Walker and Gerakios (2021) and Hartley et al. (2024) for example reported so many staff being redeployed to CCU that the units were overstaffed and people didn't have sufficient work to do. This wasted potentially valuable resources, particularly given the services that were paused to support redeployment. It is possible that prioritising some of the TP workforce to

maintain a smaller elective surgical service may have been a better use of underutilised skills to support healthcare organisation's ability to absorb the disruptions caused by Covid by lessening the long-term surgical backlog.

Nevertheless, Zhang et al. (2018) discuss how organisations do not always prioritise considering how these sorts of factors may impact upon organisational response prior to incidents occurring. This failure to consider a holistic view of workforce factors can be compounded by having insufficient feedback and perspectives from all the actors involved. Van Heel et al. (2024) found organisations failure to take workforce opinions and experiences into account is the significant limiting factor to organisational resilience and adaptation after an incident. Instead, responses are confined to the immediate aftermath of the major incident. Mirroring Van Heel et al. (2024), rather than considering under-utilisation of frontline workforce as a risk which could be better prepared for in advance of extreme events, this research has highlighted how the organisations studied only identified this in the immediacy of workforce being required. Multiple frontline participants described how they did not have opportunities for feedback or debrief after their involvement in the incidents discussed, and so their perspectives have been lost to organisational learning [see Chapters 4 and 6].

The varying actors involved in workforce utilisation then perceived this risk differently, and did not always understand or communicate their decision-making effectively. This in turn led at times to poor communication between actors at different organisational levels and an organisational disconnect. However, the contrast between perceived organisational response and communication during the Manchester Arena Bomb and Covid was stark. The OT organisational response to the Arena bomb was perceived to be generally well organised, largely effectively communicated, and efficient. In comparison, the response to Covid was perceived to be chaotic, with communication particularly being repeatedly described as problematic. During both incidents, this manifested in work-as-imagined policies and practices, which were at odds with the work-as-done by frontline TP. The influence of this upon workforce utilisation was reported to be much more significant during Covid. What is more, the extent of the disconnect between actors within the organisations studied became clear

when some senior managers did not have insight into the extent to which their processes were work-as-imagined. Instead, they perceived themselves as having a good understanding of what occurred on the frontline, despite evidence to the contrary from frontline staff. This lack of understanding of what was actually occurring on the frontline is reflected in evidence given to the Covid Inquiry by senior clinicians (Gregory, 2024, Iacobucci, 2024). As theorised by Zhang et al. (2018) and Lyng et al. (2022), organisations improve their capacity to respond to extreme events by identifying performance gaps and associated risks through structured learning from previous events.

Sustained, structured organisational learning from the workforce decisions around Covid and the Manchester Arena bomb is one-way organisations can identify, and address vulnerabilities cause by mass redeployment of staff, and better assess the associated risks. Organisational learning is discussed in greater detail in section 7.5.4. This is turn could support organisational adaptive capacity and resilience by strengthening workforce policies and incorporating the learning identified in this thesis and elsewhere in the literature (Van Heel et al., 2024, Khalil et al., 2022). Nevertheless, the identification of enablers and barriers to workforce utilisation in this research will make little difference to overall organisational adaptive capacity if there is no time or motivation to embed learning into policy and practice. The reported lack of learning reported in Chapters 4 and 5 raises questions about how resilient the NHS organisations studied are, as Lyng et al. (2022) outline risk awareness, learning and communication are three of the ten capacities for resilient organisations. As depicted in Figure 5, this may continue to undermine organisational resilience and key vulnerabilities have not been identified or addressed, despite the importance of this identified in organisational adaptive capacity literature (Engle, 2011, Zhang et al., 2018, Lyng et al., 2022, Van Heel et al., 2024).

In particular, the pausing of elective surgical services and redeployment of TP to CCU during Covid for example was NHS policy (NHS England, 2020b, NHS England, 2013). As depicted in Figure 4, this national policy decision is one of the external factors which influenced individual hospital and departments decision-making process by enforcing a national approach to staffing models and service delivery. This was deemed necessary at the time due to the rapid escalation of the pandemic, and the

intense pressure upon resources. However, a now-identified lack of preparation a national level for this type of event (HoC, 2021) meant the long-term consequences of pausing elective surgery to redeploy TP may not have been considered. Managers such as SM4 however expressed reservations about how sensible it to pause all elective surgery given the long-term repercussions of this decision. Although limited literature looks specifically at OT workforce during Covid, research by Dass et al. (2021) and Hall et al. (2021) suggested of redeployment of TP upon trauma services has been significantly detrimental. This is discussed further in section 7.5.4.2.

It is possible blanket redeployment without consideration for the wider impact of these choices, or the effective utilisation of skills, may be an example of a maladaptation, rather than an adaptation (Engle, 2011). There creates a real risk then that workforce utilisation will continue to be a vulnerability within organisational major incident response if the risk is not recognised, and proactive planning not undertaken to mitigate it. As figure 5 depicts, this research's findings then raise several questions regarding if the NHS is a resilient organisation with the appropriate mechanisms in place to improve adaptive capacity, if organisational learning is not viewed to be a realistic priority. The existing literature pertaining to the enabling factors and barriers to effective workforce utilisation outlined in figure 4 will now be discussed to critically appraise how impactful this learning could be.

7.4 Enabling factors in workforce utilisation

Major incidents are events which can significantly strain the capacity and resources of organisations and the abilities and psychological wellbeing of frontline staff responding to them. Whilst there will always be negative connotations of this type of response, this research has highlighted there are several positives as well. Several enabling factors have been identified that that could support greater utilisation of the TP during major incidents, and so greater overall organisational adaptive capacity, as defined in figure 4. All participants in this study highlighted positive experiences, practices or innovations

which they felt could be useful in future incident response. Though not all these factors will apply to every situation, there are some key points were identified by the inductive analysis in this research which could support improved organisational adaptive capacity and resilience. These include staff willingness to respond to a major incident; the protective role of teams; skills-based teams.

7.4.1 Staff willingness

The vast majority of healthcare staff willing respond to major incidents, and that is reflected repeatedly throughout the literature (Montgomery et al., 2021, Hemingway and Ferguson, 2014, Stephens, 2020, Stucky et al., 2020, Forgione, 2003, Bradbury et al., 2005, Britton et al., 2020, Scrymgeour et al., 2020, Panda et al., 2021). Radford (2021) and Panda et al. (2021) describe the pride staff in their studies had in being able to use their skills to help during major incident response, and that sense of gratitude was identified by several frontline participants in this research [see chapters 4 and 6]. The will of staff to be a part of active major incident response is a powerful enabling factor for organisations, as it allows them to ask staff to work differently. However, this requirement of flexibility in frontline staff can have negative consequences, particularly for staff wellbeing. The incongruity between attitude of staff and the requirements of the organisation is displayed in other studies on redeployment (Panda et al., 2021, Hartley et al., 2024). Interestingly, Hartley et al. (2024) is one of the only studies to identify frontline staff refusing to redeploy, and so being forced to. It is unclear how prevalent this type of refusal might be as this was not raised during the participants in this study and has limited frequency in the literature.

At times, this sense willingness was problematic, particularly in response to short-term incidents such as Mass Casualty Incidents [MCI]. Spontaneous volunteerism on the event of the Manchester Arena bomb meant too many staff attended on the night, and services were not sufficiently staffed the following day. To some extent, this is always likely to occur as this phenomenon is mirrored in other MCI literature looking at the 9/11 World Trade Centre terrorist attack, Boston Marathon

bombings and London 7/7 bombings (Hemingway and Ferguson, 2014, Bradbury et al., 2005, Forgione, 2003). It is unlikely there are many mitigating factors organisations could put in place to prevent healthcare staff responding. In a short-term such as the Arena bomb event this is likely only to have minimal consequences, confined to a short period. However, a challenge for organisations is maintaining this high level of motivation to respond, especially if staff experiences of workforce policies such as redeployment are negative, or the response is prolonged, and staff become tired. There is then a proportionate decrease is staff willingness to continue to work differently. As Hartley et al. (2024) highlighted, this then becomes a barrier to workforce utilisation. For managers and organisations, it therefore becomes important to improve the redeployment experience wherever possible to maintain as high a level of morale as possible. As this research has found, a powerful way of maintaining morale could be to allocate staff to teams.

7.4.2 Protective role of teams

Perhaps the most significant, and practically useful, finding of this study is the potential role of teams in improving organisational resilience and recovery. A significant pull factor for staff remaining in the NHS is identified to be the teams they work with, and so harnessing this potential in major incident response could a significant enabler for healthcare organisations (Weyman, 2024). It is not surprising that those participants in this research who worked in established teams identified their colleagues as their primary pastoral support. This finding is replicated throughout the clinically-based major incident literature (Montgomery et al., 2021, Radford, 2021). Skryabina et al. (2021) state in their study that in MCI response, teamwork was found to be an enabling factor for a supportive and effective response. Montgomery et al. (2021) also identify the role teamwork had in mutual support for healthcare staff during Covid. This reinforced some of the more effective interventions they identified during Covid, such as daily team huddles to trouble-shoot issues, through improved communication and understanding of individuals roles. In contrast, McGlinchey et al. (2021) and Keene et

al. (2021) also found the lack of an established team impacted upon redeployed staffs wellbeing and perceived clinical performance by removing much of their social support. Despite this, the role of teamwork in supporting organisational resilience is not always well understood. Much of the existing literature around teamwork focussed upon areas such as operating teams in routine surgery (Anderson et al., 2020a). What has not been consistently considered at organisational level is how these principles can transfer to major incident response.

Despite the literature supporting teamwork's efficacy in improving major incident response (Skryabina et al., 2021, Salas-Vallina et al., 2020, Montgomery et al., 2021) as it is understood to improve shared decision making (Salas-Vallina et al., 2020), this is not consistently harnessed in major incident or redeployment policy. The potentially valuable role of teams in improving resilience during extreme circumstances is recognised by other agencies such as the British military, who have embedded teamwork and shared team goals within their doctrine. Teamwork is particularly as being central to the overall service achieving tasks quickly and efficiently, by uniting individuals in a shared purpose under often stressful circumstances (British Ministry of Defence, 2021). The potential impact of building successful teams in civilian healthcare can be seen in organisations that innovatively established skills-based teams, such as in Oakley et al. (2020) research, who then saw improved reported clinical efficiency. Additionally, working with stable teams is recognised to improve staffs' sense of security, preserve professional networks and provides a source of informal support (Salas-Vallina et al., 2020, Radford, 2021, Montgomery et al., 2021). Numerous participants in this study describe how going through Covid with their team improved their professional and personal relationships in the department as it was a traumatic but also bonding experience. This satisfaction in a team's response appeared to have a powerful protective factor for staff. Those who expressed this level of pride were also able to justify their hardships through the lens of necessity in the face of disaster. Those who did not tended to also report the most negative experiences. Despite this, the importance of establishing teams to protect staff wellbeing is not consistently reflected in workforce policies. In addition, learning from military healthcare teams does not seem to be cohesively or consistently adopted by civilian healthcare organisations. Although a great

deal of learning regarding clinical care of patients, such as in trauma care, does cross-over, their ability and process for build high-performing healthcare teams offers an opportunity for improving organisational resilience within civilian healthcare (Stalmeijer, 2021). Establishing teams to protect staff, improve workforce availability and so organisational resilience in civilian major incidents has not been fully explored in the available literature and is an area which deserves multidisciplinary further research [see chapter 8].

7.4.3 Skills-Based Teams

One hospital in this study implemented several skills-based teams, beyond the intubation and proning teams which were standard in many places. This was viewed as being extremely successful. Research by Britton et al. (2020) Vera San Juan et al. (2021a) and Oakley et al. (2020) also support skills- or task-based teams as being a pragmatic solution to improving clinical efficiency and reducing cognitive load upon staff. Nevertheless, this does not appear to have been a tool utilised across organisations. There is limited literature looking skills-based teams in major incidents workforce policies and practices and so it is difficult to ascertain if this is an approach used widely. It is also possible this may be difficult to consistently achieve. As Hartley et al. (2024) found, having enough staff with the correct skills to redeploy to the right area can be immensely challenging when hyper-specific skills are needed. Despite this, task-based allocations do not need to be limited to skills staff already have. When staff are inevitably required to learn new skills to meet the circumstances, being allocated to specific tasks could help them develop confidence and clinical competence (Chu et al., 2023). Focussing upon task-based allocations may then allow staff to develop a specific range of skills in confidence, which can develop their wider clinical practice.

The role of skills-based, or task-based, teams in supporting great clinical efficiency is well established across the literature. Vera San Juan et al. (2021a) systematic review of redeployment strategies found deploying staff to skills-based teams was highly effective, particularly if the teams were stable and had clear

leadership. Kennedy et al. (2022), Oakley et al. (2020) and Skryabina et al. (2021) also found task-based allocations improved clinical efficiency and standards of care as having a clear role within a team was a factor in overall improved outcomes. These characteristics were displayed in the intubation teams APs worked on in this study, and which were deemed to be effective. Increased cognitive load already is well established as linking to increased rate of error and poorer patient outcomes (Melnyk et al., 2018, Cimiotti et al., 2012, Jun et al., 2021), and task-based or skills-based teams could reduce this. Despite the evidence suggesting this is a safe and effective approach, skills-based teams are not currently adopted in redeployment policies (Dunning, 2023, Hartley, 2023). For skills-based teams to become an effective tool for organisations, senior managers also need to recognise TP and nurses as skilled practitioners, rather than interchangeable resources (Hartley et al., 2024). Changing this attitude is likely to be a barrier to improving skill utilisation, as it is constantly highlighted as being problematic throughout the literature (Rasmussen et al., 2022, Veenema, 2016, O'Brien-Pallas et al., 2006, Crisp, 2018, Nursing Now, 2020). This is an area which requires more research but could be a pragmatic and effective way to best utilise the available workforce in future major incidents and so improve organisational resilience.

7.5 Barriers to Effective workforce utilisation

OT departments were distinctively affected by both types of major incidents studied in this research, the Manchester Arena bomb and Covid. Covid had a disproportionate impact upon the working practices of OT departments (Ergen et al., 2023, Hall et al., 2021, Khan et al., 2021). Almost all elective surgery was cancelled during the first wave, and significant proportions of OT workforce were prioritised for redeployment to CCU and intubation teams. However, this study has identified several barriers to this required flexibility as depicted in figure 5, especially pertaining to the effective utilisation of the TP workforce. From an organisational perspective, one of the biggest

barriers to effective utilisation of TP was a disconnect between sub-units of the hospitals involved.

7.5.1 Organisational disconnect

This research suggests healthcare organisations are not always as effective or efficient as they could be, and there is at times substantial disconnect between actors who occupy different levels in organisational structures. Organisational disconnect is often poorly understood and difficult to characterise but can be defined as structural holes in professional networks which impede relationships, communication and knowledge transmission (Braithwaite, 2010, Paine and Foote, 2024). Examples of this in healthcare settings are clinicians feeling non-clinical managers are unable to communicate effectively, gaps between managerial and clinical objectives, and discrepancies in policy vs practice. This in turn leads poor feedback processes which produce policies based on work-as-imagined, not work-as-done, reduced staff morale and deteriorations in professional relationships (Creese et al., 2024, Paine and Foote, 2024). This identified disconnect between the frontline, nurse managers and middle-managers is mirrored in other recent Covid research (Hartley et al., 2024). In addition, the UK Covid-19 Inquiry found national emergency planning structures to be overwhelmingly complex, bureaucratic, disjointed and inefficient with a lack of clear and consistent leadership (Hallett, 2024). It is then perhaps unsurprising that healthcare organisations were not as forewarned or organised as they could have been.

To some extent then, a level of disconnect between services is to be anticipated. Healthcare organisations are increasingly complex , and facing ongoing workforce and resource deficits even under normal circumstances (Figueroa et al., 2019). During major incident response, these pre-existing vulnerabilities can manifest as failings as systems are put under pressure. By necessity, learning, adaptation and innovation occurs both at a top-down organisational level, and at a bottom-up clinical level during incident response (Anderson et al., 2020a, Juvet et al., 2021). This is a vital element of organisational resilience to ensure organisations flexibly respond to incidents.

However, as discussed by Bjurling-Sjöberg et al. (2021), extremely pressurised working practices during Covid meant that that organisations were not always able to fully understand system-wide challenges as learning occurs in macro and micro factions. Indeed, Khalil et al. (2022) identified this gap between strategies and services as being an underpinning reason for work-as-imagined policies being implemented [see section 1.2.3]. Competing priorities and insufficient multidisciplinary communication channels led to delayed decision-making, with the full range of information not being available to decision makers at frontline and managerial level. Indeed Hartley et al. (2024) found that some nursing managers who tried to escalate concerns or engage with more senior managers within their own organisation regarding the realities frontline staff faced were actively ignored. Atkinson (2020) and Hallett (2024) outline how the this occurred even at the highest level, where Governmental bodies such as Public Health England did not have sufficient insight into what was occurring at local level to make informed decisions. Instead, silos of information and understanding formed amongst different professional, departmental and managerial groups. Figure 4 demonstrates how these external organisations then affected hospitals' ability to make informed decisions, and how this then influenced all actors at macro and micro level.

There are many potential reasons for this. One of those may be the significant pressure being put on the system due to rapidly escalating patient numbers. During Covid staff at every level of the organisation were overloaded with work for prolonged periods, leaving limited time to pause and reflect upon what was, and was not, working. These pressures often meant communication either failed or was sub-optimal amongst the varying multi-professional groups involved in response. Communication failures are discussed in more detail in section 7.5.2 of this chapter. Similar challenges were identified by Juvet et al. (2021) and Hartley et al. (2024), who also identified extensive organisational disconnect. However, it is difficult to establish how transferable this finding of organisational disconnect is. Little available empirical research exists that integrates multiple viewpoints of events from staff at varying levels of the organisation. Much of the existing research focusses either upon the organisational approach to major incidents, or frontline staffs' experiences within a single department (Carenzo et al., 2020, Craigie et al., 2020, Dark et al., 2021, Griffiths, 2021, Kennedy et al., 2022)

However, a recent study by Hartley et al. (2024) also identified extensive organisational disconnect. Additionally, the multilevel research of major incident responses that is available further supports that there is a disconnect, although more detail is needed to understand this (Juvet et al., 2021, Atkinson, 2020). The need for broader, multi-level research to explore this area in more detail is supported in the resilience and adaptive capacity literature (Bjurling-Sjöberg et al., 2021, Anderson et al., 2020a, Iflaifel et al., 2020). Until more research exists in this area to support or undermine this finding, this study offers the suggestion that organisational disconnect could be a hinderance to workforce utilisation.

7.5.1.1 Disconnect between managers and the frontline

Strong and consistent leadership and an engaged workforce is a hallmark of a resilient organisation with sufficient adaptive capacity to adapt to unpredictable events (Lyng et al., 2022). However, participants repeatedly emphasised a disconnect not just at organisational level, but also between frontline staff and their direct managers during major incident response. A challenge with disconnected services, is whether those with responsibility for the services are aware of it, or the extent of it. This study suggests that not all staff in positions of power of influence are. This is particularly true for those who have no clinical responsibilities, or day-to-day communication and engagement with the frontline. One interpretation of these findings is that organisational disconnect has led to a gulf between the work-as-imagined by senior managers, and the work-as-done by frontline staff. Anderson et al. (2020b) and Bjurling-Sjöberg et al. (2021) outline the impact decisions made at system level can support or hinder the adaptive capacity of lower hierarchical levels. Top-down decision making is often only effective if it reflects the realities and pressures of clinical practice. If not, decision-making risks being based upon work-as-imagined, not work-as-done. For many frontline staff, top-down decision making was their reported reality throughout the pandemic and the resulting impact of work-as-imagined decision-making was clear throughout this research [see chapter 4].

Operational pressures as a cause of disconnect between the frontline and managers is reflected elsewhere in the literature. Juvet et al. (2021) and Hartley et al. (2024) found that managers were perceived to be so busy with organisational planning during Covid, they were not connected with the experiences of the frontline. Figueroa et al. (2019) explain this further, suggesting that, despite healthcare organisations theoretically moving towards shared leadership models, in practice it is still bureaucratic and hierarchical. This can undermine collaboration, so limiting the capacity of middle-mangers and the frontline to adapt, rather than enabling it. As a result, vulnerabilities in workforce redeployment strategies were not always identified, and so organisations could not adapt to improve upon them (Wiig et al., 2020). This finding is supported by Hartley et al. (2024), who also found managers without direct clinical responsibilities perceived nurses to be 'resources', rather than individuals with skills and knowledge. This at times hindered organisational resilience and adaptive capacity, particularly regarding staff retention and utilisation. Lack of staff engagement and involvement with senior management and the wider organisations, combine with increased workloads and lack of recognition of contributions, have been identified as key push factors for staff leaving the NHS (Weyman, 2024). This disconnect is clear throughout the research findings. Although frontline TP in this study had several suggestions for how initiatives such as redeployment could have been improved, but they have had no forum to feed that information back too. As SM2 stated, they are not sure anyone in a management position ever asked.

7.5.2 Communication

Communication was deemed to be the single most significant challenge to staff being able to work effectively during major incidents. Effective, timely communication is a cornerstone of major incident response and resilient organisations (Lyng et al., 2022). However, even in short-term incidents such as the Manchester Arena Bombing, numerous communication challenges were presented. Particularly, lack of one clear, consistent method of communication was raised repeatedly by all participants.

Compromised communications during major incidents are to some extent to be anticipated, as evolving situations mean full details are often not clear until after the response has commenced. This finding is echoed throughout the literature in the field (Hemingway and Ferguson, 2014, Radford, 2021, Skryabina et al., 2021, Vera San Juan et al., 2021a, Walker and Gerakios, 2021, McGlinchey et al., 2021, Bradbury et al., 2005, Atkinson, 2020, Stucky et al., 2022). Although these challenges are to be anticipated, they are consistently highlighted both in this study and throughout the literature as being a significant stressor for staff.

Clear, consistent messaging from managers to the frontline, with specific objectives and task allocation is one way to protect staff wellbeing (Heath et al., 2020). This is particularly true for TP, who are used to working in highly controlled settings with explicit and structured ways of communicating pertinent information through Team Briefs [see sections: Terminology, synonyms, slang, 4.2.1.2]. However, all participants in this study raised the chaotic and confusing communication, and a significant move away from the structured communication methods they are used to. During an incident such as an MCI or pandemic of a novel virus, unreliable or unavailable information is always likely to be an issue, and it is consistently raised as a challenge throughout Covid-based research (McGlinchey et al., 2021, Panda et al., 2021, Juvet et al., 2021, Atkinson, 2020). However, the impact of communication barriers can have upon the organisations adaptive capacity can be significant. A stark finding in this study was how much trust became eroded between the frontline and managers during Covid because of the alleged disconnect between services, particularly perceived poor communication. This is reflected in Atkinson (2020), who highlighted a breakdown in trust between healthcare professionals and the Government during Covid.

Though communication barriers also occurred during the Manchester Arena bomb, the same breakdown of trust did not occur. Short events are often easier to manage as communications challenges are restricted to a few hours or days. In contrast, during Covid, both managers and TP reported that the relationship between frontline staff and managers became more eroded as the pandemic went on. A perceived lack of honesty from more senior managers contributed to this and increased the sense frustration and lack of control of frontline staff. As reflected in McGlinchey et

al. (2021) research, even though frontline TP understood how challenging communication was for managers, the insufficiency coupled with inconsistency still caused unease and anxiety.

7.5.2.1 Communication media employed during incident response

A challenge with communication during major incident responses is that policies and processes within the NHS do not consistently reflect how modern technology is used in practice. All participants in this study identified their personal mobile phones and the instant messaging application WhatsApp as their primary method of communication with their workplace. Other methods of communication, such as Trust email, were not regularly checked by staff. This is unsurprising, as personal mobile phones and WhatsApp in particular are common ways of communicating within the NHS (Tahmassebi et al., 2020). This is also not new during major incidents, as Skryabina et al. (2021) and Craigie et al. (2020) praised the use of WhatsApp in MCI as improving the speed of communications. Radford (2021) also described how staff actively worked round formal communication methods outlined in the major incident plan after the Arena bomb because WhatsApp was faster. However, this unofficial channel of communications is not without problems. Rumours are common in the aftermath of a major incident, as found by Hemingway and Ferguson (2014) and Stucky et al. (2022). One rumour that was repeated in this research, that shrapnel from the Arena bomb was coated in acid, was pervasive and TP altered their clinical responses to this as though it was fact [see Chapter 4]. In addition, use of WhatsApp was deemed to be frustrating by some participants, as different staff groups received different or inaccurate information, inevitably led to misinformation and confusion, echoed by Tahmassebi et al. (2020) .

Even as Tahmassebi et al. (2020) defines the use of personal mobile phones and instant messaging as being ubiquitous in healthcare organisations, many major incident plans do not recognise these forms of informal communication. Policies are therefore based on work-as-imagined, not work-as-done, and do not reflect how communication actually occurs in practice (Anderson et al., 2020b). As a result, there is no strategy to

ensure information being passed through informal channels is accurate. Hemingway and Ferguson (2014) identified new communication strategies to incorporate social media as being a priority after the Boston Marathon bombings, echoed by Vera San Juan et al. (2021a), but this does not seem to have to have occurred in UK policy. Although addressing this would not solve all communication issues, not meaningfully tackling it guarantees communication will continue being a barrier in major incident response.

7.5.3 Wellbeing

The wellbeing of staff was raised by every participant in this study as being of hugely significant consequence [see Chapter 6]. This is foreseeable, as the psychological impact of major incidents up staff is well established (Heath et al., 2020, Panda et al., 2021, Greco et al., 2022, Vera San Juan et al., 2021a, Vindrola-Padros et al., 2020). Staff were impacted in several ways, from anxiety and sleeplessness to mental exhaustion and burnout [see section 1.2.7.1]. Numerous participants in this research particularly emphasised a barrier to wellbeing as the dissonance between the needs of the organisation and the needs of staff. Although this was seen during the Manchester Arena bomb, there appears to have been little long-term impact for organisational resilience as staff did not report this as affecting upon their long-term commitment to work or intention to leave the organisation. Burnout and depression were not discussed in relation to this incident. However, symptoms such as hypervigilance, an increased state of alertness, were mentioned or alluded to [see section 6.2.1.1]. This is comparable with reported symptoms of other MCI's such as the 9/11 World Trade Centre attacks in New York, where the incident itself was short in time scale, but caused by a perceived traumatic incident (Jayasinghe et al., 2008, Skryabina et al., 2021).

This is in stark comparison to Covid where hypervigilance was not discussed, but burnout and anxiety were recurrent themes [see section 6.2.1, 6.2.1.1]. Burnout is specifically linked to exhaustion, and the long-term response required during Covid led to staff working under extremely difficult and unusual circumstances for prolonged

periods of time, often with little professional autonomy (Koutsimani et al., 2019, Teo et al., 2021, Ilyas et al., 2023). Operational pressures due to high volumes of high acuity patients often meant the organisation could not afford staff to have the time off, or workplace adjustments they needed to protect their health, even if managers actively wanted to support them. This heightened sense of stress and vigilance has been repeatedly found to have negative psychological outcomes for HCP, with anxiety, stress and burnout being identified throughout the literature as primary outcomes (Teo et al., 2021, McGlinchey et al., 2021, Panda et al., 2021, Walker and Gerakios, 2021). New recommendations for redeployment arising from Covid advise staff should not be forced to redeploy, and their contract with the Trust should not be used as a tool to force deployment (Dunning, 2023, Hartley, 2023, Hartley et al., 2024), but this is an example of work-as-imagined. During Covid both of those things occurred because the operational pressures made that a necessity [see Chapters 4, 5 and 6]. In any future incident, it is likely this would be a necessity again. Though many managers and frontline staff understood the lack of choice unease, frustration and distress was still prevalent. This can in turn influence how those staff feel about the organisation, and their commitment to it, with burnt-out staff demonstrating higher levels of cynicism and a more negative perception of their workplace (Ilyas et al., 2023, Koutsimani et al., 2019).

This conflict between organisational and individual needs is consistent in the literature (Radford, 2021, Hartley et al., 2024, Van Heel et al., 2024, Greco et al., 2022), and it is difficult to offer meaningful solutions as this is a reality for many emergency workers. Indeed, the impact of organisational and managerial practices even in 'normal' times as well established throughout the literature, with high work-load, low pay, and poor job satisfaction being identified as particular stressors amongst nurses (Chen et al., 2009, Cimiotti et al., 2012, De Lima Garcia et al., 2019, Esmaeil et al., 2022, Jun et al., 2021, Lastovkova et al., 2018, Sharma et al., 2008, Weyman, 2024). This in turn influences organisational motivation and workforce retention (Kelly et al., 2021). However, possible suggestions are discussed in section 7.4 on enabling factors.

Several managers also raised that the NHS does not realistically have the structure or funding to provide trained and skilled psychological support to all staff.

This lack of psychological support was also found in other research into MCI response in the UK (Skryabina et al., 2021, Radford, 2021). However, there are alternatives which may go some way to improving individual and organisation resilience by developing a culture of shared learning. One of these is debriefing (Heath et al., 2020). Almost all frontline staff in this study stated they did not routinely get offered a debrief after any incident, and particularly not after a major incident. This is reflected in Skryabina et al. (2021) study, where 21 hospital staff who responded to an MCI were not offered a debrief. Debriefing does not replace formal psychological intervention and engaging in it will not prevent all psychological harm for staff. Some participants in Radford (2021) study found debriefing actively made their feelings of guilt, anger and frustration worse. Participants in that research did not view debriefing as a helpful tool in psychological support. However, that is a marked contrast to this study, and to research elsewhere which has found debriefing to be a valuable tool (Hemingway and Ferguson, 2014). There is always likely to be a psychological impact upon staff of dealing with major incidents, particularly when they witness traumatic events. Nevertheless, debriefing is one tool which is being repeatedly requested by frontline TP that could be more effectively and consistently utilised to identify or minimise that risk of harm.

7.5.3.1 Influence of wellbeing upon staff retention and organisational recovery

Several managers such as SM1, SM8 and SM9 in this study highlighted that post-Covid, they have been unable to return to full surgical capacity. This same impact upon capacity was not seen after MCI's such as the Manchester Arena Bomb, where there was no reported impact upon staff retention in this research. However post-Covid, they do not have enough TP due to high staff turnover during the pandemic, and retention and recruitment of experienced staff is an ongoing challenge. This pattern is mirrored across the NHS, with 10.7% of NHS staff leaving their roles in 2023, and a 10% vacancy rate in nursing alone (The Kings Fund, 2024a). 71% of staff in one survey cited stress, and 59% stated impact on mental health, as being a push factor to leave the NHS by wave 4 of Covid (Weyman, 2024). In addition, overall NHS productivity has reduced.

The Royal College of Surgeons of England (2024) highlight insufficient TP, and a further inability to recruit experienced TP, as a key impediment to the post-Covid recovery of surgical services in the UK. 56% of surgeons in that census identified access to theatres as being the main challenge facing the surgical profession. The UK already had fewer nurses and doctors that other similar countries prior to the pandemic, and Covid has exacerbated those concerns (Anderson et al., 2021). Higher staff sickness, burnout, and a high turnover of experienced staff leaving a behind junior workforce has all impacted upon this (The Kings Fund, 2024b). As an example of real-time impact, one hospital in this study has been unable to re-open 9 theatres in a single department because they cannot staff them, and cannot recruit experienced TP.

There are numerous challenges to the effective utilisation of the healthcare workforce, but burnout is well recognised to be a key factor in retention and engagement of the workforce (Esmaeil et al., 2022, Lastovkova et al., 2018, Sharma et al., 2008). Several participants in this study self-identified that they had stress, depression, anxiety or burnout that had required them to take time off work, particularly during or after the Covid pandemic [see section 1.2.7.1]. These findings are unsurprising, as work by Figueroa et al. (2019) , Jun et al. (2021) and Sharma et al. (2008) already made the link between staff burnout, poor retention, lower organisational commitment, poorer productivity, increased absenteeism. It is not within the remit of this study to ascertain if staff have burnout or psychological disorders such as stress. The challenges facing the OT workforce are complex and cannot be easily reduced to a single issue. However, there is no doubt from this study that wellbeing is perceived to have had a greater impact upon the OT workforce than any other factor during major incident response.

7.5.4 Organisational learning

Healthcare organisations need to rapidly evolve, adapting to changes in society, technology and epidemiology (Figueroa et al., 2019). To make these adaptations successfully, it is vital that organisations have an open and honest culture to learn from

experiences and mistakes. During both the Manchester Arena Bomb and Covid, there were areas of learning identified by all participants. Many studies identified significant adaptations and learning that was embedded into practice over the course of the pandemic (Tahmassebi et al., 2020, Keene et al., 2021, Knowlson and Torgerson, 2020). However, as figure 5 illustrates, if and how organisations utilise that learning into policy and practice can directly influence organisational resilience in future major incidents.

Adaptive capacity theory outlines how organisations can reduce their vulnerabilities in extreme events, and improve their ability to adapt to a changing environment, by learning from prior experiences (Zhang et al., 2018) [see section 7.3]. As organisations cannot predict or control the nature of events which may occur, such as terrorist attacks, effectively managing vulnerabilities is one measure they can control which may change the course of events. Indeed, one of the markers of a resilient organisation is one which is able to learn from positive and negative experiences, and so learns how to increase the chances of a positive outcome (Anderson et al., 2020b, Hollnagel, 2017). However as Challen et al. (2012), Hallett (2024), Berridge (2019), Bryce et al. (2020) and Anderson et al. (2021) suggest, evidence of learning does not always translate into updated policy or practices in the UK. Although the NHS prides itself on being a learning organisation, the findings in this study suggest that is not always the case. SM2, SM8 and SM10 particularly point to the pressures to move on and recover, particularly after Covid, meant that learning was not a priority for their organisations. Many organisations had a 'firefighting' mentality during major incident response, with little opportunity for reflection or long-term planning.

In this study both Covid and the Manchester Areana bomb were perceived by many to be once in a lifetime incident. This may have impacted engagement with learning from these events to strengthen future response. Innovation occurred during both events, such as use of AP's based in ED to communicate with, and co-ordinate, the OT response to the Arena bomb. This ED-based theatre co-ordination was mirrored in other MCI literature (Bradbury et al., 2005, Hemingway and Ferguson, 2014) but seems to have occurred spontaneously, and does not appear to be embedded within policy. One of the major challenges to learning from these innovations however is if they are publicly available in an accessible forum. A second challenge is whether people have

the will or time to learn about those innovations for a crisis that is now over. Though both the Arena bomb and Covid have prompted significant national public inquiries, these are top-down, time-consuming hearings. Findings are often published years after the event, and as with the Manchester Arena Inquiry, frontline TP are not represented (Saunders, 2022b). Echoing Van Heel et al. (2024) and Panda et al. (2021), frontline workforce have not been engaged within the organisational learning process. As a result, it is likely learning and innovation from TP has been lost. This may undermine the overall organisation's ability to identify vulnerabilities in their response and adapt to future events.

7.5.4.1 Lack of time and opportunity

NHS Leadership structures do not always support shared learning, as the focus is upon individual organisations rather than systems leadership (Gordon et al., 2023). A particular challenge found by participants in this study to being able to identify learning opportunities, was the fragmented dissemination of informal learning at macro and micro level. Resultantly, some potentially positive innovations or shared learning were not vocalised as there was no singular forum to collate them that represented actors at all levels. Panda et al. (2021) goes further to highlight how frontline staff were not engaged in organisational learning during Covid redeployments, despite Van Heel et al. (2024) stressing the importance of engaging the workforce in this process. This in turn undermines the organisations' ability to improve their adaptive capacity and resilience in future major incidents as key vulnerabilities are not identified, and so organisational learning can't fully occur. This lack of integrated, multi-level learning risks repeating past mistakes, and an organisation which is less resilient due to lack of lessons learnt (Atkinson, 2020, Anderson et al., 2020b, Berridge, 2019). It is possible the UK Covid-19 Public Inquiry (Office, 2022) may identify and bring together much of this learning into one place, but the efficacy of this is yet to be seen as the complete findings have not yet been published. Indeed, frontline staff are not amongst the core participants of this study.

Some senior managers in this study demonstrated a lack of interest in learning from events or exploring ways to approach incident response differently. Though not consistent for all managers, this lack of awareness of alternative practices in some areas may be partly explained along professional lines. The Nursing leaders in this study were actively involved in making and influencing local policy decisions, but did not express the same national representation as Medics such as SM7 and 8. This supports findings in other research that nursing and the allied health workforce are under-represented in major incident decision-making platforms at national and international level, particularly in parliamentary decision-making during Covid (Rasmussen et al., 2022, Veenema, 2016, APPG, 2016, Crisp, 2018). McGlinchey et al. (2021), Hartley et al. (2024) also found that healthcare professionals needed engagement with governmental bodies to air their experiences, and support future the identification of protective factors for future policy. It is likely then that opportunities to learn from TP workforce utilisation have been missed because those directly involved had no platform to make their voices heard.

7.5.4.2 Skill utilisation and skills analysis in redeployment

SM1, SM2, SM8, SM9 and SM10 all discussed how TP were prioritised for redeployment into CCU during Covid due to their perceived transferable skills and the vast reduction in elective surgery. Pausing elective surgery and redeploying theatre staff is a commonly recommended approach across international literature and guidance (Britton et al., 2020, NHS, 2020a, NHS, 2020b). However, this has a significant implication for surgical services. SM4 suggested that the elective surgical programme should have continued to avoid the backlog in care currently being seen. This is supported by Khan et al. (2021) and Wright et al. (2021) who highlight how the redeployment of TP, and reduced access to OT, has had significant implications for patient outcomes across orthopaedic trauma and elective services. Over 800,000 orthopaedic patients were on the waiting list for surgery in March 2024, the highest of any speciality (The Kings' Fund, 2024). Several studies have suggested redeployment

methods were wasteful, and led to some redeployed staff being insufficiently utilised when their skills could have been used in their normal roles (Phillips et al., 2022, Walker and Gerakios, 2021, Panda et al., 2021). Though not within the remit of this research, it is worth considering if in hindsight, the blanket redeployment of TP and reduction in surgical services could have been reconsidered to improve organisational recovery.

Many of the recent studies into Covid found the mass redeployment strategies of staff into CCU were problematic. From an organisational perspective, simply increasing numbers of staff in CCU was deemed effective redeployment. Hartley et al. (2024) found very senior managers did not view nurses as skilled individuals, but as interchangeable 'resources'. As Van Heel et al. (2024) determined, though in modern practice is it common for nurses to become hyper-specialised, during major incidents is expected that they could, or should, be multiskilled. Conversely, Panda et al. (2021) found redeployed staff had many transferable skills which were not identified and not utilised, despite participants determining numerous areas they could have been applied. This research supports that finding. There was a reported over-estimation or misunderstanding of some TP's skills and their transferability to CCU, and a lack of defined roles. Nurses particularly were expected to be able to flexibly adapt to working in a different environment with different skills, regardless of whether they had the appropriate or transferable skills to undertake the roles [see Table 2]. In addition, the framework for identifying transferrable skills appears to have been quite narrow, with the broad range of potential skills on offer, or roles those skills could be applied to, not consistently considered (Panda et al., 2021, Walker and Gerakios, 2021). This led to poor skill utilisation in some areas, mirroring findings across much of the literature (Walker and Gerakios, 2021, Marks et al., 2021, Vera San Juan et al., 2021a, Vindrola-Padros et al., 2020, Kennedy et al., 2022, Panda et al., 2021).

This has implications for how redeployment is organised if skills and knowledge are not considered or recognised as being important. Staff who have clearly defined roles, use their skills appropriately, and feel supported by their teams are at a lower occupational risk of burnout (Goh et al., 2016, Gormley, 2011, Jun et al., 2021, O'Brien-Pallas et al., 2006). However Walker and Gerakios (2021) found CCU's were overloaded with staff. Those staff redeployed often had no clear direction and no task allocations,

resulting in feelings of frustration and being undervalued. Examples of good practice, such as intubation teams suggests task-based allocations were deemed to be more successful, and this is discussed section 7.4.3. However, there were also other opportunities for further skill utilisation. A high volume of tracheostomies required during Covid meant the creation of tracheostomy teams in SM8s organisation. These teams could be an excellent utilisation of SP skills because the underlying surgical principles are the remit of SP. However, this level of detail does not always appear to have been considered or understood. Re-considering how skills and tasks are considered for areas required surge staffing may go some way to increasing the effective utilisation of the workforce. There are several strategies which could support this, as discussed in section 7.4.

7.6 Conclusions

This chapter has outlined how the findings from this study answers the research aims and objectives. Figure 4 summarised the findings of the study, and how actors at varying levels of organisations were influenced by workforce decision making during major incident response. The implications of the findings and how this influences organisational adaptive capacity and resilience is then encapsulated into a model in figure 5. The important of the findings in context of organisational adaptive capacity and resilience research, and the contributions of this research to that field, have been discussed. The existing literature pertaining to the barriers and enablers to TP utilisation during major incidents have been discussed and critically appraised. The final chapter in this thesis draws conclusions form this research study, and discusses the implications of the findings for practice and policy, and makes recommendations for future areas of research.

Chapter 8: Discussion and Conclusions

8.1 Introduction

This chapter will conclude this research project and summarises the findings of this research project. Conclusions will be drawn that support how the findings from this research are useful for healthcare professionals, policymakers and researchers. This chapter will discuss the strengths of the research, and how they support the quality of the research and its findings. The findings will be summarised, outlining what is already known about this subject and what this research study adds. Additionally, methodological limitations of the study will also be outlined, and reasons for this explored. The implications of the research findings for clinical practice and policy will be discussed in detail. Recommendations for future research will also be made. Finally, the conclusions drawn from this research will be summarised.

8.2 Summary of Findings

This section will outline what is already known about this topic, and then discuss what this research adds.

8.2.1 What is already known?

Several areas of major incident response and workforce utilisation are already known. Major Incident response can significantly stress organisational resources. Practices such as surge workforce models can help support organisational adaptive capacity by flexing staff to the areas most pressurised to increase available resources (NHS England, 2013, NHS England, 2020b, NMC, 2020a, Harris et al., 2020, Harris and

Coopersmith, 2021, Lefrant et al., 2020, Panda et al., 2021, Winkelmann et al., 2021, Yamamoto et al., 2021).

In addition, workforce models for increasing Emergency Department (Deluca et al., 2022, Faccincani et al., 2018a) and Critical Care Unit staffing are already available. Surge staffing models to enhance the critical care workforce during outbreaks of pandemic illness are particularly well researched and well established (Arabi et al., 2021, Carenzo et al., 2020, Doyle et al., 2022, Dunning, 2023, NHS England, 2013, NHS England, 2020b). Though these are valuable for looking at workforce in those departments during major incidents, versions for OT are not currently available despite their central role in incident response [See chapter 1].

It is also well understood that redeployment can be stressful experience for staff, with Covid redeployment particularly increasing the risk of burnout and anxiety (Denning et al., 2021, Ferres et al., 2005). It is recognised that the redeployment experience needs to be improved to reduce the negative implications for staff, such as stress, anxiety and reduce organisational motivation (Brown et al., 2006, Che et al., 2023, Chu et al., 2023, Cimiotti et al., 2012, Denning et al., 2021).

8.2.2 What this research adds

The aim of this study was to understand if the unique skills of Theatre Practitioners [TP] were utilised effectively during major incident response. Areas of practice which supported, or prevented, successful utilisation were identified and were discussed in detail in chapter 7. This research is currently the only available study looking specifically at TP skills utilisation during major incidents, and so adds a fresh perspective to this field of research. In addition, much of the existing literature in this field looks either at organisational responses to major incidents (Winkelmann et al., 2021, Zorn et al., 2021, Vera San Juan et al., 2021a, Van Heel et al., 2024), or frontline staffs experiences of major incidents (Walker and Gerakios, 2021, Vindrola-Padros et al., 2020, Verheul and Dückers, 2020, Veerapen and Mckeown, 2021). This study looks

at both perspectives, focuses upon specific professional groups, and adds to a smaller body of multilevel incident response research (Bjurling-Sjöberg et al., 2021). Through interviews with frontline TP and senior managers, this study adds greater detail to the understanding of how intra-organisational factors influence major incident response. This allows a deeper understanding of major incident response, and particularly adds a greater level of nuance and detail to the complexities of workforce utilisation.

The findings offer several key insights into barriers and enablers for the effective utilisation of TP. These insights are discussed below. As a result, suggestions for how organisational resilience and adaptive capacity could be improved or undermined are made, with the potential role of establishing teams in incident response being a particularly significant finding which has implications for practice and policy. There is some discrepancy in the perspectives of managers at different levels, and between managers and the frontline staff, regarding the efficacy of major incident response. These discrepancies have been discussed in chapter 7.

Enabling factors were first. Several protective factors for staff during major incident response are identified. **Firstly,** the potential significance of deploying staff to teams were outlined as a pragmatic recommendation for protecting staff wellbeing. This is the most important finding of this research study in terms of a practical solution to supporting organisational adaptive capacity and resilience, and improving the experience and wellbeing of staff during major incidents. **Secondly,** the role of task-based teams was emphasised as an under-exploited tool to improve utilisation of the pre-existing skills of workforce. This method has been found to reduce cognitive load upon staff and improve clinical efficiency and patient safety. **Thirdly,** the utilisation of debrief as a learning and supportive tool has been debated. **Finally**, the potential impact of TP workforce utilisation upon organisational adaptive capacity has been discussed.

Chapter 7 then outlined barriers to workforce utilisation. **Firstly,** considerable organisational and leadership disconnect impacts upon an organisations ability to understand and effectively utilise the skills of its workforce. **Secondly,** organisational learning across the NHS pertaining to workforce utilisation strategies has the potential

to improve organisational response at a local, regional and national level. However, a lack of time and co-ordination of intra-organisational and multidepartment level learning has the potential to undermine future incident response. **Thirdly**, the influence of major incident response upon staff wellbeing has a potential impact upon staff engagement with response, staff retention and organisational recovery. Several factors have been identified which could support improved wellbeing.

8.3 Strengths

There are several strengths of this research. These increase the quality of the research and enhance the transferability of the findings of the study.

8.3.1 Insider research and access

Being an insider researcher in this study afforded access to participants that would have been challenging to gain through any other method. Many participants were recruited by informal, word-of-mouth methods rather than through formal routes such as email. This is particularly true of frontline TP. The researcher being based within an OT department also meant interviews could be conducted flexibly around clinical staff's schedules and workload, without the need for access to IT or off-site premises. This increased the number of frontline TP able to participate, as many would drop in to the researcher's office when their surgeries had finished early. In addition, the insider status of the research allowed for nuance in the interviews to be identified and analysed which may not have been clear to an outsider.

8.3.2 Sampling

The sampling strategy used in this study allowed a broader, more detailed view of major incident workforce utilisation though a multilevel sampling strategy. By interviewing frontline TP and managers with workforce responsibilities, perspectives of a wide range of staff were included. In addition, interview frontline TP from three specialty groups (anaesthetics, scrub and recovery) from two different professions (RN's and ODP's) allowed a nuanced perspective of how the differing skills and experience of these groups were, or were not, utilised. There is no other published research that has data from this variety of TP, and this adds subtlety to the findings of the study. Moreover, there is very limited multilevel research looking at major incident response (Atkinson, 2020, Stoate, 2016, Bjurling-Sjöberg et al., 2021) and this is particularly lacking within healthcare organisations. This type of research is already documented in adaptive capacity research as being important to gain a deeper understanding or how organisational resilience can be improved upon (Anderson et al., 2020a).

8.3.3 Data collection

Qualitative methodology and the use of semi-structured interviews allowed new themes to be generated in an under-researched area. Prior to this study, no other published research looked specifically at the utilisation of TP skills in major incident response. The use of inductive analysis ensured the research data could speak for itself, with no prior hypothesis or theoretical framework limiting the possible conclusions that could be drawn. This has resulted in a fresh perspective on workforce utilisation, and several suggestions for improving practice and policy.

8.3.4 Major Incident experience of participants

Due to the geographical sampling strategy, several participants in this study had experience of one of the most recent mass casualty incidents in the UK, the Manchester Arena Bomb. TP skill utilisation during this event has not been previously studied, and there is no published literature on this from a TP or OT managers perspective. Two participants also had experience of the 1996 Manchester IRA bomb, and so were able to draw direct comparisons of their experiences from the two incidents. In addition, all participants had experience of working during Covid. This has meant the research capture a broad range of experiences to enhance the transferability of the research findings.

8.4 Limitations

There are several limitations of this research which will be discussed below.

8.4.1 *Single researcher coding*

All data collection and analysis were conducted by a single researcher. Although this is recommended in the analytical approach utilised here, reflexive thematic analysis (Braun and Clarke, 2006, Braun and Clarke, 2019), it also risks increasing potential bias in the interpretation of the data. Though every effort was made to reduce any potential bias through critical reflexivity and feedback, it is always possible some subjectivity has influenced the research coding and thematic analysis.

8.4.2 Insider researcher and subjectivity

The researcher is a nurse working within the NHS, with experience of major incidents. It is possible this experience has influenced the data analysis and research findings, though every effort has been made to include critical reflexivity, critical discussion and feedback into the project to minimise this risk. In addition, the researcher already had professional relationships with many of the staff interviewed. Though clear boundaries regarding the role the researcher played during the interviews (e.g. they were there as a researcher and not in their management capacity), it is possible the previously established relationships could have introduced social-desirability or selection bias into the research.

8.4.3 Sampling: Geography

Although interviews were conducted across five hospitals, not all participants had experience of a mass casualty incidents. As Covid was a global pandemic which affected all areas of the country, all participants in this study had some experience of the pandemic. As a result, experiences of workforce utilisation during Covid are over-represented in the data, and mass casualty incidents are under-represented. Efforts to recruit from geographical areas other than Manchester who have had recent experiences of a mass casualty incident, such as London, were unsuccessful. It is likely therefore that there are experiences and learning from mass casualty incident's which have not been identified in this research project.

8.4.4 Sampling: Organisational Representation

Although all efforts were made to recruit both frontline TP and managers from all organisations, some organisations are represented by managers only. Despite repeated efforts, frontline TP could not be recruited to the study from those areas. As a result,

some of the managers perceptions of successful interventions, such as skills-based teams, may have been viewed very differently by the frontline TP. Further research is needed with a broader sample of frontline TP from a range of organisations to ascertain their perspectives on skills-based allocations.

8.5 Implications

There are several implications both for clinical practice and policy from this research.

8.5.1 Implications for Clinical Practice

Several implications are identified which relate specifically to clinical practice. These include suggestions for how skill utilisation could be improved in future major incident response, particularly regarding the potentially significant role of established skills-based teams as soon as possible. In addition, some interventions are indicated which may better protect staff wellbeing. As per the model in figure 5, improving overall wellbeing in theatre practitioners may support organisations prolonging time staff are able to redeploy for, and help improve retention in the recovery period.

8.5.1.1 Debriefing

All staff should be offered debriefing from major incidents and traumatic events. This should be a routine part of OT work, as is common in other emergency care units such as ED and CCU. Debrief was repeatedly requested by frontline participants in this study and is perceived by frontline TP to be an important part of their learning and psychological support after an event. In turn, debriefing may support organisational learning by ensuring staff involved in incidents are given time and space to discuss what did, and did not, go well.

8.5.1.2 Communication

Clear, consistent communication is necessary to promote resilience in the workforce. Where this is not possible, honesty from managers about what is not known is equally important to maintain trust with the frontline teams. It is not possible for managers to control all changes and updates in practice, particularly during a rapidly evolving incident when the facts are unknown. However, it is possible to practically improve methods of communication to increase clarity, even if the message is that managers do not know the answers. Participants in this study wanted short, sharp safety huddles which covered the essential, changing information. It was suggested this is a better form of communication that email or WhatsApp, where essential information can get lost.

However, realistically communication methods such as WhatsApp and social media will continue to be used. Having strategies that include these modern communication methods may support staff having speedy access to accurate information and being able to distinguish between fact and rumour. WhatsApp group chats were prevalent in the groups interviewed in this study. Managers using these groups but having code words to start messages [such as **Emergency Message NHS**] could help ensure staff know which messaging to trust. This may help improve clarity and consistency of communications, particularly when existing systems are slow to respond.

8.5.1.2.1 Communication barriers for shift workers

One of the challenges to this identified by participants in this study is that briefings are not consistently available to all staff. For staff on day shifts, briefings occurred regularly, though some found these to be overloaded with information. However, staff on nights shifts frequently raised these briefings did not occur for them, particularly as

most managers were not on shift at that point. Introducing briefings throughout a range of shifts could be a simple way to help improve communications.

8.5.2 Implications for Policy

There are also several implications for policy from this research which will now be outlined. Policies which could be influenced by this research include those pertaining to Major Incident workforce planning, redeployment of staff, and pandemic planning.

8.5.2.1 Skills analysis

Where skills analysis is needed for redeployment, it is essential these tools recognise individual skills, not just generic staff competencies or roles such as 'Theatre Practitioner'. In this study, frontline staff reported that if skills analysis took place, it was highly generic and did not consistently identify their transferable skills. This was particularly true for scrub practitioners, who reported being poorly utilised during Covid. In addition, approaches to skills analysis in this study were inconsistent, and frontline TP and managers reported their inefficiency. The analysis especially did not directly link to specific job roles or tasks, and so there was no consideration regarding what staff would actually be doing when they were in CCU. Improving the consistency and specificity of skills analysis tools may improve overall utilisation of pre-existing skills in the workforce but supporting task-allocation and skills-based teams.

8.5.2.1.1 Skills database

Given the speed at which events can occur during a major incident, thorough and detailed skills analysis can be challenging to undertake. A possible support mechanism

to speed up this process could be the maintenance of a skills databases held by HR. This approach is already taken in some Asian countries such as China who have experienced several respiratory pandemics in recent decades (Wong et al., 2017, He et al., 2022). This could reduce the lengthy time it took to undertake skills analysis, and allow a well-considered, holistic assessment of skills to take place prior to any incident type. In turn, this could support better utilisation of the existing skill set in the workforce

8.5.2.2 Workforce redeployment models

Workforce redeployment models could be reconsidered to better utilise existing staff skills sets, improve clinical efficiency and reduce cognitive load upon staff. There are two possible ways of doing this: Establishing teams and establishing skills-based teams.

8.5.2.2.1 Establish Teams

This research has highlighted that, when considering major incident response and redeployment, a key part of workforce utilisation practices could be to establish teams as quickly as possible. This has the potential to improve organisational resilience and recovery, and is an approach already adopted and established by other high-impact organisations such as the military. Participants in this study reported identifying their peers as their primary source of emotional and pastoral support during major incidents. Those who did not work in established teams particularly identified the lack of a team as increasing their stress and anxiety and reducing clinical efficiency. Although team working will not remove all stress and anxiety from the workforce, the increased peer support may improve individual resilience.

8.5.2.2.2 Skills-based teams

To improve staff being able to adapt their skills safely and effectively, this research's findings suggest that where possible, any teams established should be skills or task based. Examples of these that were perceived to work well during the pandemic were the intubation, intravenous access, tracheostomy and proning teams in CCU. Frontline staff working on skills or task-based teams, particularly those deployed to intubation teams, reported higher clinical efficiency. The ability to utilise their pre-existing skills to a new environment or situation in particular was reported as reducing cognitive load upon staff. Reducing this load may help support resilience in the workforce, as well as improving organisational resilience by utilising staff and their skills more effectively.

8.6 Recommendations for future research

Following on from this inductive research looking at TP utilisation during major incidents, several important areas for future research have been identified. These recommended research topics would further investigate some of the exploratory findings from this study and add depth and breadth to the knowledge base around this topic.

8.6.1 Theatre Practitioner skill utilisation

More research specifically on the utilisation of theatre practitioners during major incidents across a broader geographical area is required. This would allow for broader identification of enabling factors in TP utilisation, and any additional barriers to it. Greater research regarding TP utilisation in mass casualty incidents is particularly required, as this incident type was under-represented in this study.

8.6.2 Protective role of teams

More research into the potential protective role of healthcare teams in major incidents, particularly pertaining to cognitive load, clinical efficacy and pastoral support. Though this has been identified as a factor for staff wellbeing and clinical efficiency in major incidents, no research study looks specifically at this outside of elective surgical working and the airline industry.

8.6.3 Multilevel, organisational research

Greater multilevel organisational research is needed to identify different organisational approaches to workforce redeployment. There is very little research that includes perspectives of both frontline staff and managers at varying levels, and this research study has highlighted several potential areas where multilevel working was disconnected. Further research into this area from a broader range of organisations may identify more areas of good and poor practice.

8.6.4 Redeployment

Finally, further research is needed into how to improve redeployment. This call for greater research is mirrors in the literature (Kennedy et al., 2022). Potential strategies to reduce stress from redeployment suggests in this study include consistent deployment to specific areas for a period and deploying to a stable team. A recent, large National Institute of Healthcare Research study into the impact of nurse redeployment has suggested several recommendations for redeployment practices (Dunning, 2023, Hartley, 2023, Hartley et al., 2024). However, these recommendations have not been tested, and more multi-organisation research is needed.

8.7 Conclusions

This study aimed to identify and explore factors with enabled, or undermined, Theatre Practitioner skill utilisation during major incidents and how this then impacted upon organisational adaptive capacity. The findings from this study offer several suggestions for how Theatre Practitioner skill utilisation could be supported, or undermined. Qualitative methodology facilitated the collection of a rich dataset from frontline practitioners and managers. Reflexive thematic analysis (Braun and Clarke, 2019, Braun and Clarke, 2021a, Braun and Clarke, 2006) was used as a framework for data analysis. This allowed an understanding of a multilevel perceptions of skill utilisation during major incidents, whilst also developing a nuanced narrative regarding the real-time challenges of utilising a multiskilled workforce in highly pressurised circumstance.

Several **enabling** factors have been identified, namely: The protective role of teams; the potential role of skills-based teams; the utilisation of debriefing as a learning and supportive tool for staff. Several **barriers** to successful skill utilisation were also identified: Firstly, a considerable organisational disconnect; limited, co-ordinated organisational learning; and finally, the influence of major incident response upon staff wellbeing and retention. These findings have been useful to gain a rich understanding both of how theatre practitioners were utilised in major incidents, and how they could potentially be used to greater effect in future incidents. They have also allowed for an understanding of how organisational and managerial perceptions of workforce utilisation may support or hinder major incident response.

The model in figure 5. illustrates the key factors that enable or prevent successful theatre practitioner skill utilisation in major incident response. This study also adds to the growing body of multi-level organisational adaptive capacity research by building upon the work of Zhang et al. (2018), offering qualitative nuance to the quantitative data in Zhang's work. The research findings offer suggestions for improving theatre practitioner utilisation during major incidents, and how embedding the learning from TP utilisation in previous major incidents could improve organisational resilience

and recovery. This is an important area of research which has the potential to be developed further to offer greater insight into workforce utilisation and organisational adaptive capacity.

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Appendix 1: PROSPERO systematic review registration

Dear Mrs Klunder-Rosser,

Thank you for submitting details of your systematic review "Are Operating Theatre Practitioners being effectively engaged and utilised to support the agile adaptive capacity of healthcare organisations during major incident response?" to the PROSPERO register. We are pleased to confirm that the record will be published on our website within the next hour.

Your registration number is: CRD42024572730

You are free to update the record at any time, all submitted changes will be displayed as the latest version with previous versions available to public view. Please also give brief details of the key changes in the Revision notes facility and remember to update your record when your review is published. You can log in to PROSPERO and access your records at https://www.crd.york.ac.uk/PROSPERO.

If you feel that you or members of your review team would benefit from additional training in systematic review methods, prior to commencing your review, we would recommend considering the 'Introduction to systematic reviews course' run by the Centre for Reviews and Dissemination at the University of York.

https://www.york.ac.uk/crd/training-services/introduction-to-systematic-reviews/

Best wishes for the successful completion of your review.

Yours sincerely,

Lesley Indge
PROSPERO Administrator
Centre for Reviews and Dissemination
University of York
York YO10 5DD
e: CRD-register@york.ac.uk
https://www.york.ac.uk/inst/crd

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Email disclaimer: https://www.york.ac.uk/docs/disclaimer/email.htm

Other non-commercial resources that may be of interest
SRDR-Plus is a systematic review data management and archival tool that is available free of charge http://srdrplus.ahrq.gov.

Appendix 2: Table of Evidence

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
Bradbury et al. (2005) London (UK)	Dealing with Disaster	Reflective Report Report on the response from clinicians at one hospital to the July 7th 2005 London Bombings	Medium- no empirical data and no conclusions drawn. However, authors are credible, and account presented in a logical way.	• Lack of clinical experience of blast injuries • Planned communication and co-ordination between services did not occur as anticipated • Telecommunications did not work as anticipated • Large number of complex injuries meant inter-disciplinary OT team had to function at highest level • Communication a key aspect of response, and use of anaesthetic and theatre co-ordinators, and a

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
				runner between ED and OT effective. Allocating resources and theatre capacity challenging, both initially and for long-term surgical management
Britton et al. (2020) East of England	COVID preparedness and response at a large UK major trauma operating theatres department	Narrative Review Description of the OT response to COVID in one hospital in the East of England	High – credible authors presenting a detailed overview of OT response. Clear, consistent conclusions from a logical narrative.	• TP deployed to increase CCU capacity to work as both ICU nurses under surge staffing protocols, and to specific clinical teams (e.g. proning and intubation teams) • Development of a dedicated tracheostomy theatre list • Significant training put in place to develop TP skill set e.g. donning and doffing, proning, blood gas analysis, ward nursing skills.

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
Burnweit and Stylianos (2011) Port Au Prince, Haiti	Disaster response in a paediatric field hospital: lessons learned in Haiti	Reflective report Report on response of a US clinical team to setting up a field hospital in Port Au Prince following the 2010 earthquake	Poor – empirical data presented, but no methods described. Unclear how statistics were ascertained.	• 93% of admissions to field hospital were surgical patients, with 40% undergoing surgery in the first week post-incident • Limited surgical equipment, significant innovation required • 1 OT nurse deployed in the response, compared with 8 CCU/ED nurses
Forgione (2003) Boston (USA)	New horizons for OR nurses – lessons learned from World Trade Centre Attacks	Reflective Report Utilisation of the Disaster Medical Assistance Team [DMAT] during the World Trade attacks response, focussing	Medium - no empirical data and no conclusions drawn. However, authors are credible, and account presented in a logical way.	• Deployed TP not required at Trauma hospitals as expected, but at field hospital Ground Zero as bedside clinicians and to provide surgical intervention e.g. amputation. • Standard surgical equipment too heavy for field hospital.

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
		upon OR staff.		• Need for surgical intervention without electricity so no 'normal' sterilisation or cauterisation. • Need to identify essential surgical supplies in advance of deployment. • Staffs' disaster training ensured a calm and considered response.
Hamlin (2010) Australia	Australian Perioperative Nurses' Humanitarian Activities in Banda Aceh	Reflective Report Reflection on Australian OT nurses experiences responding to the 2004 Indian Ocean tsunami	Medium- no empirical data and no conclusions drawn. However, authors are credible, and account presented in a logical way.	• Significant adaptations to normal working practices to accommodate the clinical environment and equipment availability • Deployed teams responsible for organising and taking all their own equipment and • response

Authors, Date and Location	Title	Method	Methodological Quality	Key Findings
				supplies, including water • Clinicians worked outside of their normal scope of practice, but this was deemed to be safe and effective in the clinical context • Cultural adaptations made to usual practices to accommodate local Indonesian customs Organised
Hemingway and Ferguson (2014) Boston (USA)	Boston Bombings: Response to Disaster	Narrative review Reflection on the OT response to the 2013 Boston Bombing	High – credible authors presenting a logical narrative with clear, well justified conclusions and recommendations for practice.	• Communication compromised, largely telecommunications – staff unable to communicate by mobile phone as normal • Nursing managers priority to establish communication with ED, identify and co-ordinate available clinical

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
				resources, determine OT availability and anticipated workflow • Planning for patient influx and identifying and co-ordinating staffing challenging due to telecommunication and emergency notification failures. • Difficult for clinicians to identify leaders' roles as identified in the emergency preparedness plan. • Traffic control of clinicians challenging due to volume of staff wanting to help • Team debrief a valuable resource
Hemingway and Silvestri (2021)	A Curriculum for	Narrative Review	High. Credible authors presenting a clear, consistent narrative with logical	• TP deployed to CCU and triage cells as part of surge staffing, and

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
Boston (USA)	Perioperative Nurse Deployment During a Pandemic	Report on TP deployment to CCU during the Covid Pandemic in one US hospital	and well justified conclusions.	also, to specific clinical teams (e.g. proning team) Needs assessment conducted to train TP in ward-based nursing care. Curriculum developed to implement this training e.g. IV medications, skin assessments, IT training for ward-based computer systems
Macasieb (2021) Las Vegas (USA)	Deploying perioperative nurses to the intensive care unit during the COVID pandemic	Narrative review OT nurse re-deployment at one Las Vegas Hospital	Poor - Credible author, but limited detail.	• TP identified and successfully deployed to ICU • Flexibility of clinicians essential
Mitchell et al. (2014) Queenslan d (Australia)	Evaluation of an Australian nursing partnership to improve disaster response capacity	Mixed-methods evaluation using survey and focus groups	Medium – empirical data collected, methods and analysis explained in limited detail. Some aspects unclear No philosophical	• Non-acute staff felt well prepared for potential deployment • The partnership developed professional

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
		Evaluation of training programme to prepare non-acute TP for deployment to an acute hospital in a disaster	grounding or positionality of authors. Limited presentation of data. Conclusions and discussion brief.	reciprocity between the two staff cohorts
Montgomery et al. (2021) UK	Critical care work during COVID: a qualitative study of staff experiences in the UK	Qualitative interviews Interviews with experienced and redeployed staff of their experiences during the Covid pandemic	High – clear methodology. Data presented with clarity and consistency. Congruence between methods, data analysis and conclusions.	• Anxiety amongst staff about Covid, organisation and sufficient training. • Staff identified a strong feeling of moral purpose motivating their response • Feeling of isolation from the rest of the hospital, but teamwork in CCU's strong • Rapid acceleration of responsibility and perceived unsafe care.
Owens et al. (2005)		Narrative review	Medium- no empirical data and no conclusions	• Pre-planning led to appropriate equipment,

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
USA	Challenges of international disaster relief: Use of a Deployable Rapid Assembly Shelter and Surgical Hospital	Reflection on the International Medical Surgical Response [IMSuRT-E] response to the 2003 Bam (Iran) earthquake	drawn. However, authors are credible and account presented in a logical way.	including water, being deployed with the clinical team. • Significant logistical and environmental barriers, including lack of water and electricity supply. • Substantial innovation from perioperative staff to adapt procedures to austere environment and lack of available equipment.
Rostami et al. (2023) Kermanshah (Iran)	Experiences of operating room nurses in disaster preparedness of a great disaster in Iran: a qualitative study	Qualitative interviews	Medium – methods described in detail, but some elements (such as sampling) unclear. No philosophical grounding and limited critical analysis. Strengths and limitations not adequately addressed.	• Interviews with 16 OT nurses who worked during the 2017 Kermanshah earthquake • Staff inadequately prepared for disasters • Understanding of responsibilities and roles during disasters,

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
				identified as crucial, but insufficient preparation for this Specialised disaster training and education deemed effective when provided, but opportunities were lacking
Sonneborn et al. (2018a) Victoria (Australia)	Disaster education and prepared ness in the acute care setting: A cross-sectional survey of operating theatre nurse's disaster knowledg e and education	Cross-sectional survey Survey of TP knowledge of their role in a disaster to target future training	High – clear methodology. Congruence between aims, methods, analysis and conclusions. Statistical analysis described in detail. Limitations addressed.	• Only 19.9% of staff had previous experience of a disaster • 94.1% were aware of their disaster preparedness policy • Disaster nursing knowledge was poor, with only a mean of 1.79 correct answers from a possible 7 • Role-specific disaster training and education needed for nurses
	Taking	Editorial	Poor. Credible author, but very	• TP central to the Covid response,

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
Stephens (2020) New York (USA)	Perioperative Nursing Skills Back to the Bedside in Response to the Pandemic	Reflection on a military OT nurse's redeployment to CCU during the Covid pandemic	limited detail. Conclusions vague, and not supported by the narrative.	with roles including logistics and analytics to PPE. • Peri-operative skills adaptable to non-OT environments
Stucky et al. (2020) Southeast USA	COVID: Initial Perioperative and Paranaesthesia Nursing Response in a Military Medical Centre	Reflective report Description of the changing role of TP during the Covid pandemic at one military hospital in the USA	Medium – credible authors present a logical narrative. However limited detail in narrative to support conclusions.	• OTs converted into CCU's, and TP designated into tiered staffing models to care for CCU Covid patients • Curriculum developed for TP to training them in ward nursing skills and Covid-specific skills/education
Stucky et al. (2022) USA (military base in Germany)	Operation Allies Refuge and Operation Allies Welcomes: Military Perioperative and	Report Description of US military TP staffs' response to the 2021 Kabul Airport	High – credible authors provide a detailed and logical narrative. Clear conclusions drawn which are reflective from the narrative presented.	• Communication with clinicians and patients, with lessons learnt from Covid • Logistical challenges and adapting approaches to managing influx of

Authors, Date and Location	**Title**	**Method**	**Methodological Quality**	**Key Findings**
	Peri anaesthesia Nursing support to the Afghan Evacuation Mission	terrorist attacks and humanitarian evacuations on a US military base in Germany		MCI patients • Cultural considerations Adaptive use of TP skills
Thomas (2008) USA	Self-Study: An Effective Method for Bioterrorism Training in the OR	Education Evaluation Pre- and post-intervention survey	Poor – very limited methodological detail. Details of analysis not presented. No detail regarding intervention, and insufficient detail regarding sampling strategy. Not presented as a research study.	• TP surveyed for their bioterrorist knowledge pre- and post- education intervention. • Intervention improved self-perceived competence • Future areas for education identified, such as correct gloving techniques for managing bioterrorists agents

Appendix 3: Pilot Interview Guides

Cohort A: Pilot Interview Topic Guide

Opening questions:

1. Can you tell me a little bit about yourself and your professional experience?
    a. What is your profession?
    b. Which clinical specialty do you work in?
    c. What grade do you work at?
    d. How long have you been qualified for?

2. Can you tell me about your experiences of working as a perioperative clinician during major incidents, such as the Manchester Arena Bombing or Covid-19?
    a. Did you work just within the perioperative environment, or were you redeployed elsewhere?

3. What were your experiences of organization and leadership (at any level) during major incident response?

4. What was your experience of communication in your organisation and/or department during major incident response?

5. Did you feel that you were able to use your skills effectively in the major incidents you've worked in?

6. Did you feel your individual skill set were considered when staff were allocated to certain areas or certain roles?

7. Have you ever been involved in policy or decision making in major incidents?
    a. Did you feel it worked well, or are there lessons that could be learnt?

Closing Questions

8. Have there been any particularly positive impacts upon you or your practice of working during major incidents?

9. Have there been any more negative impacts upon you or your practice impacts of working during major incidents?

Cohort B Pilot Interview Topic Guide

Opening questions:

1. Can you tell me a little bit about yourself and your professional experience?
    a. What is your profession/role?
    b. Can you tell me a bit about your professional responsibilities in your current role/roles where you've been involved in major incident response?

2. Can you tell me about your experiences of working as a manager/policy maker planning for or during major incidents, such as the Manchester Arena Bombing or Covid-19?
    a. Did you work though either major incident, or any other major incident in a leadership position?
    b. Were you involved in developing policies for major incident response?
    c. Did you find the planned organisational response to be well designed and effective?

3. Have you been involved in the decision making/policy formulation for how clinical staff would be utilized and/or deployed during major incidents?

    a. Were you involved in the decision making for redeploying staff to other units?
        i. How did you decide which staff went where?
        ii. Was a skills analysis on individual staff undertaken, or were entire staff groups e.g. scrub staff/nursing staff deployed?
        iii. What informed these decisions?
    b. Did senior executive leaders or leaders in other departments take on board your experience and feedback during incident-response e.g. of the impact upon your service, or the availability of staff?

4. How effective do you feel the decisions made around staff deployment during major incidents were?
    a. Was clinical capacity sufficiently increased to meet need?
        i. Was this done safely in your opinion?
        ii. How did this impact upon the capacity within your service?
    b. Did the pre-existing policies in place at the time (for example around CCU staffing and major incident response) work in real-time?
    c. Were clinicians at all levels engaged in decision-making around use of staff resources in your experience?
    d. Do you feel your organisation and/or service took learning on board throughout the response phase?

For managers with responsibility for surgical services only : e.g. Lead nurses/ADNS/Divisional directors/Chief nurse etc

5. What was the impact upon surgical services/capacity of major incidents and staff availability/deployment?
    a. Were there sufficiently skilled staff available to meet need?
    b. Was sufficient surgical capacity available to meet need?
    c. What has the impact of this been in major incident recovery?
    d. Were there any particular concerns you had regarding staffing?

6. How did you manage communications to staff groups and other mangers during major incident response?

    a. Were there any positive communications strategies?
    b. Were there any examples of poor communication strategies?
    c. What did you find to be the challenges (if any) regarding communication?
        i. Were these challenges addressed?

7. Do you feel that organisational major incident response has had any impact upon clinical staff and organisational capacity in the recovery period?

    a. Have there been any positive impacts upon staff which might improve organisational capacity or learning?
    b. Have there been any particularly negative impacts upon staff which might decrease organisational capacity?
    c. Has the organisation you work put policies/practices in place to engage frontline clinical staff in the learning from major incidents?

d. Do you feel as a leader that your organization has engaged you in post-incident learning and that your feedback from your experiences has been taken on board?
e. Have clinical staff at all levels been engaged in organisational learning post-incident?

Closing Questions

8. From your experiences were there any particularly positive lessons or practices you feel have been learnt from recent major incidents?
    a. Was there anything you found worked particularly well?
    b. Have there been any positive impacts upon future practice from major incident response?
    c. Are there any positive managerial or policy implications from major incident response experiences?

9. From your experiences were there any particularly challenging or negative practices you have learnt from recent major incidents?
    a. Was there anything that in hindsight did not go well, or you would now do differently?
    b. Are there any particular lessons which are important for the organization to learn going forwards regarding staff utilisation in major incidents?
    c. Are there practices which could be avoided/adopted to improve organisational capacity?

Appendix 4: Consent Form

Project Title: Are Operating Theatre Practitioners being effectively engaged and utilised to support the agile adaptive capacity of healthcare organisations' during disaster response?

Consent Form

Please tick the appropriate boxes	**Yes**	**No**
Taking Part in the Project		
I have read and understood the project information sheet dated 1.9.22 or the project has been fully explained to me. (If you will answer No to this question please do not proceed with this consent form until you are fully aware of what your participation in the project will mean.)	☐	☐
I have been given the opportunity to ask questions about the project.	☐	☐
I agree to take part in the project. I understand that taking part in the project will include participating in a one-to-one interview which will be audio recorded.	☐	☐
I understand that by choosing to participate as a volunteer in this research, this does not create a legally binding agreement nor is it intended to create an employment relationship with the University of Sheffield.	☐	☐
I understand that my taking part is voluntary and that I can withdraw from the study before July 2023; I do not have to give any reasons for why I no longer want to take part and there will be no adverse consequences if I choose to withdraw.	☐	☐
How my information will be used during and after the project		
I understand my personal details such as name, phone number, address and email address etc. will not be revealed to people outside the project.	☐	☐
I understand and agree that my words may be quoted in publications, reports, web pages, and other research outputs. I understand that I will not be named in these outputs unless I specifically request this.	☐	☐
I understand and agree that other authorised researchers will have access to this data only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I understand and agree that other authorised researchers may use my data in publications, reports, web pages, and other research outputs, only if they agree to preserve the confidentiality of the information as requested in this form.	☐	☐
I give permission for the audio recording that I provide to be deposited in University of Sheffield ODSA so it can be used for future research and learning	☐	☐
So that the information you provide can be used legally by the researchers		
I agree to assign the copyright I hold in any materials generated as part of this project to The University of Sheffield.	☐	☐

Name of participant [printed] Signature Date

Name of Researcher [printed]	Signature	Date

Project contact details for further information:

Lead Researcher: Jennifer Klunder-Rosser – jklunder-rosser1@sheffield.ac.uk

Project supervisor: Dr John Richmond -j.g.richmond@sheffield.ac.uk

Head of Department: Prof. Mark Strong – M.strong@sheffield.ac.uk

Appendix 5: Participant Information Sheet

Are Operating Theatre Practitioners being effectively engaged and utilized to support the agile adaptive capacity of healthcare organisations during disaster response?

Dear Sir/Madam

You are being invited to take part in a research project: "Are Operating Theatre Practitioners being effectively engaged and utilized to support the agile adaptive capacity of healthcare organisations during disaster response?"

It is important for you to understand why the research is being done and what it will involve before you decide if you wish to participate. If there is anything that is not clear or if you would like more information about, please do not hesitate to contact the researcher. Thankyou for taking the time to read this, and please read through the information below carefully so you can make an informed decision if you would like to take part.

1. What is the project's purpose?

The research forms a PhD project at the University of Sheffield (the study sponsor).

2. Why have I been chosen?

You have been chosen as you are a registered operating theatre practitioner working in a Major Trauma Centre who may have recent experience of working during the Covid-19 pandemic and/or Mass Casualty Incident (such as the Manchester Arena Bomb).

3. Do I have to take part?

No. Participation in this research project is entirely voluntary, and there will be no negative consequences for you if you choose not to take part. You can stop being part of the study at any time, without giving a reason, but we will keep information about you that we already have. If you

wish to withdraw from the project please contact the lead researcher, Jennifer Klunder-Rosser. You do not have to give a reason and there will be no negative consequences for you if you choose to withdraw from the study.

Please note that that by choosing to participate in this research, this will not create a legally binding agreement, nor is it intended to create an employment relationship between you and the University of Sheffield.

4. What will happen to me if I take part? What do I have to do?

If you choose to take part, you will be invited to attend a one-to-one interview with the interviewer at a time and date of your choosing. This can take place in person in your workplace, or online via GoogleMeets. The interviews will be audio recorded, and the recordings will be held confidentially and only accessible to members of the research team.

The interview will take approximately 30-60 minutes, and you will be asked about your experiences of working during disasters such as the Covid-19 pandemic and/or Mass Casualty Incident, especially; how you felt skills were utilised during disasters; if you felt prepared to deal with the disasters you have been involved in; what practices you think went well, and what you think we could learn from your experiences.

The interviews will be semi-structured and all questions open ended, allowing you to discuss your specific experiences in-depth as these may differ to those of your colleagues. You are being asked about your experiences to help the researcher understand how you have experienced disasters as a clinician, what lessons can be learnt from the use of clinicians in previous disasters, and if this could be improved in the event of future incidents.

5. What are the possible disadvantages and risks of taking part?

You will be asked in a one-to-one interview to discuss your experiences of working through disasters. There is a small risk you might find discussing your experiences distressing, and you

will be able to stop the interview at any point should you need to. If you feel you need support after the interview, you can be referred to Occupational Health.

6. What are the possible benefits of taking part?

Whilst there are no immediate benefits for those people participating in the project, it is hoped that this work will help improve the experiences of operating theatre practitioners in future disasters and inform how operating theatres plan for any future incidents.

7. Will my taking part in this project be kept confidential?

We will need to use information from you for this research project. This information will include your:

- Name
- Contact details
- Profession and Banding

People will use this information to do the research or to check your records to make sure that the research is being done properly. People who do not need to know who you are will not be able to see your name or contact details. Your data will have a code number instead.

We will keep all information about you safe and secure. You will not be able to be identified in any reports or publications. If you agree to us sharing the information you provide with other researchers (by making it available in a data archive) then your personal details will not be included.

8. What is the legal basis for processing my personal data?

According to data protection legislation, we are required to inform you that the legal basis we are applying in order to process your personal data is that 'processing is necessary for the performance of a task carried out in the public interest' (Article 6(1)(e)). Further information can be found in the University's Privacy Notice https://www.sheffield.ac.uk/govern/data-protection/privacy/general.'

9. What will happen to the data collected, and the results of the research project?

If you choose to participate, the anonymised transcript of your interviews and held on a secure drive at the University, which will only be accessible to the lead researcher, supervisory team and transcription team. The anonymised recordings of your interview will be kept on a secure drive at the University until the research project has been completed, at which point they will be deleted. The audio and/or video recordings of your activities made during this research will be used only for analysis. No other use will be made of them without your written permission, and no one outside the project will be allowed access to the original recordings. The 'key' which links your anonymised data to you will be kept in a separate, encrypted folder on the secure drive and will only be accessible to the lead researcher and supervisory team. This will be destroyed one data analysis has been completed. Pseudonymised data will be stored on the University of Sheffield Online Research Data (ORDA) drive for up to 10 years.

The results of the research study will be published in peer-reviewed journals, presented at conferences and may be presented to operating theatre management. All data will be anonymised and no individual taking part will be identifiable from these publications. A copy of the published results can be made available to you if you wish to see them. Due to the nature of this research it is very likely that other researchers may find the anonymised data collected to be useful in answering future research questions. We will ask for your explicit consent for your data to be shared in this way.

10. Where can you find out more about how your information is used?

You can find out more about how we use your information

- by asking one of the research team
- by sending an email to Jklunder-rosser1@sheffield.ac.uk,

11. Who is organising and funding the research?

This research is not externally funded.

12. Who is the Data Controller?

The University of Sheffield will act as the Data Controller for this study. This means that the University is responsible for looking after your information and using it properly.

13. Who has ethically reviewed the project?

This project has been ethically approved via the University of Sheffield's Ethics Review Procedure, as administered by 'ScHARR' department. It has also been approved by the NHS Health Research Authority.

14. What if something goes wrong and I wish to complain about the research or report a concern or incident?

If you are dissatisfied with any aspect of the research and wish to make a complaint, please contact Dr John Richmond (j.g.richmond@sheffield.ac.uk) in the first instance. If you feel your complaint has not been handled in a satisfactory way you can contact the Head of the Department of ScHARR If the complaint relates to how your personal data has been handled, you can find information about how to raise a complaint in the University's Privacy Notice: https://www.sheffield.ac.uk/govern/data-protection/privacy/general.

If you wish to make a report of a concern or incident relating to potential exploitation, abuse or harm resulting from your involvement in this project, please contact the project's Designated Safeguarding Contact Dr John Richmond (j.g.richmond@sheffield.ac.uk). If the concern or incident relates to the Designated Safeguarding Contact, or if you feel a report you have made to this Contact has not been handled in a satisfactory way, please contact the Head of the Department of ScHARR Prof. Mark Strong (m.strong@sheffield.ac.uk) and/or the University's Research Ethics & Integrity Manager (Lindsay Unwin; l.v.unwin@sheffield.ac.uk).

If you have any questions about this project please do not hesitate to contact me on the details below;

Jennifer Klunder-Rosser (primary researcher)

Email: Jklunder-rosser1@sheffield.ac.uk

Alternatively if I am unavailable and you have an urgent query please contact:

Dr. John Richmond (primary supervisor)

Email: j.g.richmond@sheffield.ac.uk

Thankyou for considering taking part in this research – your time is greatly appreciated!

Appendix 6: University of Sheffield Ethical Approval

The University Of Sheffield.

Downloaded: 06/10/2022
Approved: 27/09/2022

Jennifer Klunder-Rosser
Registration number: 210127531
School of Health and Related Research
Programme: PhD

Dear Jennifer

PROJECT TITLE: Are Operating Theatre Practitioners being effectively engaged and utilized to support the agile adaptive capacity of healthcare organisations during disaster response?
APPLICATION: Reference Number 045063

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 27/09/2022 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 045063 (form submission date: 27/09/2022); (expected project end date: 04/09/2025).
- Participant information sheet 1103419 version 3 (01/09/2022).
- Participant consent form 1103420 version 3 (01/09/2022).

If during the course of the project you need to deviate significantly from the above-approved documentation please inform me since written approval will be required.

Your responsibilities in delivering this research project are set out at the end of this letter.

Yours sincerely

Devianee Keetharuth
Ethics Administrator
School of Health and Related Research

Please note the following responsibilities of the researcher in delivering the research project:

- The project must abide by the University's Research Ethics Policy:https://www.sheffield.ac.uk/research-services/ethics-integrity/policy
- The project must abide by the University's Good Research & Innovation Practices Policy: https://www.sheffield.ac.uk/polopoly_fs/1.671066!/file/GRIPPolicy.pdf
- The researcher must inform their supervisor (in the case of a student) or Ethics Administrator (in the case of a member of staff) of any significant changes to the project or the approved documentation.
- The researcher must comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data.
- The researcher is responsible for effectively managing the data collected both during and after the end of the project in line with best practice, and any relevant legislative, regulatory or contractual requirements.

Appendix 7: NHS HRA Approval

Ymchwil Iechyd a Gofal Cymru
Health and Care Research Wales

NHS
Health Research Authority

Mrs Jennifer Klunder-Rosser
University of Sheffield
S10 2TN

Email: approvals@hra.nhs.uk
HCRW.approvals@wales.nhs.uk

12 January 2023

Dear Mrs Klunder-Rosser

HRA and Health and Care Research Wales (HCRW) Approval Letter

Study title:	**"Are Operating Theatre Practitioners being effectively engaged and utilized to support the agile adaptive capacity of healthcare organisations during disaster response?"**
IRAS project ID:	**317906**
Protocol number:	**NA**
HRA reference:	**22/HRA/4725**
Sponsor	**University of Sheffield**

I am pleased to confirm that **HRA and Health and Care Research Wales (HCRW) Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications received. You should not expect to receive anything further relating to this application.

Please now work with participating NHS organisations to confirm capacity and capability, in line with the instructions provided in the "Information to support study set up" section towards the end of this letter.

How should I work with participating NHS/HSC organisations in Northern Ireland and Scotland?
HRA and HCRW Approval does not apply to NHS/HSC organisations within Northern Ireland and Scotland.

If you indicated in your IRAS form that you do have participating organisations in either of these devolved administrations, the final document set and the study wide governance report (including this letter) have been sent to the coordinating centre of each participating nation. The relevant national coordinating function/s will contact you as appropriate.

Please see IRAS Help for information on working with NHS/HSC organisations in Northern Ireland and Scotland.

How should I work with participating non-NHS organisations?
HRA and HCRW Approval does not apply to non-NHS organisations. You should work with your non-NHS organisations to obtain local agreement in accordance with their procedures.

What are my notification responsibilities during the study?

The *"After HRA Approval – guidance for sponsors and investigators"* document on the HRA website gives detailed guidance on reporting expectations for studies with HRA and HCRW Approval, including:

- Registration of Research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics and is updated in the light of changes in reporting expectations or procedures.

Who should I contact for further information?
Please do not hesitate to contact me for assistance with this application. My contact details are below.

Your IRAS project ID is **317906**. Please quote this on all correspondence.

Yours sincerely,

Natalie Wilson
Approvals Manager
(Sent on behalf of Barbara Cuddon)

Email: approvals@hra.nhs.uk

Copy to: *Mrs Jennifer Klunder-Rosser, University of Sheffield*

Appendix 8: Sheffield Emergency Care Forum Presentation

SECF Presentation March 2022.pptx

Appendix 9: Publication – Theatre Practitioners and organisational adaptive capacity in disaster response

klunder-rosser-2023-theatre-practitioners-

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