How can the management of pain in adult UK emergency departments be improved? (IMPEDE study)

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List of abbreviations used

Abbreviation	Term
ANP	Advanced Nurse Practitioner
B/A	Before / after
CDU	Clinical Decisions Unit
CQC	Care Quality Commission
ECC	Emergency Care Centre
ED	Emergency Department
ENP	Emergency Nurse Practitioner
FIB	Fascia Iliaca Block
HCA	Healthcare Assistant
IASP	International Association for the Study of Pain
N/A	Not applicable
NHS	National Health Service
NIA	Nurse Initiated Analgesia
NSAID	Non-steroidal anti-inflammatory drug
PGD	Patient Group Directive
RAT	Rapid Assessment and Treatment
RCEM	Royal College of Emergency Medicine
RCT	Randomised Controlled Trial
TTA	Time to analgesia
UK	United Kingdom
VAS	Visual Analogue Score
VNRS	Verbal Numeric Rating Score
VRS	Verbal Rating Scale
VDS	Verbal Descriptor Scale
WBFS	Wong-Baker Faces Scale

Glossary

Omnicell ®	Automated cabinets which can link to electronic prescribing and pharmacy to enable continual stocking. Operated using biometric information to avoid the use of keys.

PGD	Patient Group Directive acts as a prescription signed by medic or pharmacist, to enable non-medical staff to prescribe and/or administer medication that would normally require prescription, under the criteria laid out within the PGD
FIB/FNB	Fascia Iliaca Block or femoral nerve block is a technique recommended by NICE guidance for reducing pain for patients with suspected hip fracture. Fascia Iliaca Compartment Block is a modified method of undertaking FIB, without the use of ultrasound.

Abstract

Pain is a common symptom for patients presenting to the Emergency Department (ED) although pain management in the ED is widely recognised as inadequate. Little is known about the barriers and enablers to pain management within the ED. This thesis addresses the question of how pain management in EDs can be improved, using systematic review of interventions to improve pain management and multiple case study analysis of 3 EDs with different pain management outcomes to explore barriers and enablers to pain management.

Findings from case studies suggested that ED staff conceptualised pain management as distinct from the core role of the ED, and operated within a framework of beliefs around how pain was managed and prioritised that allowed deficiencies in pain management to be perpetuated. Pain management was not considered one of the core maxims for which staff were accountable and staff had limited awareness of their own performance. Attempts to objectify assessment of pain using pain scores to guide pain management encouraged staff to alter patient report and reduced the validity of the score as a measure of change in patient's pain. The reductive processes of pain scoring and providing analgesia according to score set out within current guidelines did not conform to patient expectations/conceptualisations of pain management. The three case study EDs differed in how they altered processes and workforce to address structural barriers to pain management and prioritised how pain was managed.

This thesis found no evidence to support implementation of any particular intervention to improve pain management but suggests multifaceted changes may help by developing a culture in which pain management is integrated into the core work of the ED. EDs may improve pain management by altering processes to actively enable pain management, particularly at initial assessment. Improved communication and reassurance may improve patient experience.

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1. INTRODUCTION

1.1. Pain management in Emergency Departments

Pain is the most common reason for seeking healthcare and is a presenting complaint in an estimated 50-80% of visits to an emergency department (ED) (Cordell et al. 2002), (Todd et al. 2007) (Tanabe and Buschmann 1999). The ED is responsible for treating patients with trauma-related pain, other acute pain (e.g. abdominal pain, headache) and also has a role in the treatment of patients with pain due to chronic disease and terminal illness. Although pain may be viewed as a temporary experience, acute pain can trigger a number of physiological responses and have a significant negative impact on patients (Middleton 2003). Untreated episodes of acute pain can lead to further episodes of pain or debilitating chronic pain syndromes and aggressive behaviour (Johnson 2005b) (Johnson 2005a).

Management of pain is therefore an essential part of the duty of care within an ED and Emergency Medicine colleges recommend that recognition and treatment of pain should be a priority (British Association for Emergency Medicine 2007) (Australian and New Zealand College of Anesthetists Faculty of Pain Medicine 2000) (Joint Commission on the Accreditation of Healthcare Organizations 1999). However, inadequate pain management (oligoanalgesia) resulting from inadequate prescribing or delay in prescribing analgesia in the ED has long been recognised as a significant problem globally (Rupp and Delaney 2004), (Fosnocht et al. 2005b) (Todd et al. 2002). Studies from EDs in Europe, America and Canada suggest that over 50% of patients leave the department in significant or severe pain (Decosterd et al. 2007) (Todd et al. 2002) (Harel et al. 2005). In the UK, a Healthcare Commission (now Care Quality Commission) survey criticised pain management in UK EDs (Picker Institute 2008) and audits undertaken by the Royal College of Emergency Medicine suggest that EDs are not managing pain in accordance with their guidelines (Clinical Effectiveness Committee 2010).

Despite oligoanalgesia being a well-known phenomenon, few solutions have been proposed, although there is an increase in studies reporting interventions to improve pain management in the ED, such as the use of pain scales to improve the assessment of pain, protocols for administration of pain relief or patient or nurse-administered opioids (Fry and Holdgate 2002) (Decosterd et al. 2007) (Kelly 2000a) (Evans et al. 2005). There have been a number of studies and reviews discussing potential barriers to pain management, suggesting a range of barriers relating to organisational, professional and patient factors (Jones et al. 1996) (Raftery et al. 1995) (Motov and Khan 2008) (Ducharme 2005b) (Fosnocht et al. 2005b). However, this work is largely speculative or has involved applying general learning around pain management from other contexts to the ED, rather than studying pain management within the ED to understand

theories and practice specific to the ED. The lack of empirical research on facilitators or obstacles to pain management in the ED has been recognised (Johnson 2005b). There is a particular lack of qualitative research around barriers and facilitators to pain management and any existing research has been based upon factors identified outside the ED (Wilsey et al. 2008a). Studies based specifically within the ED have focussed upon patient factors that are associated with poor provision of pain relief rather than organisational factors (Tanabe and Buschmann 1999) (Wilsey et al. 2008a).

Various guidelines around pain management in EDs exist (British Association for Emergency Medicine 2007) (Joint Commission on the Accreditation of Healthcare Organizations 1999) (Australian and New Zealand College of Anesthetists Faculty of Pain Medicine 2000) but modification of behaviour in response to these has been inadequate and the evidence base for creating effective policy guidance is considered to be weak (Ducharme 2005a) (British Association for Emergency Medicine 2007). Despite some level of improvement in pain management in EDs reported within UK ED patient surveys (Howell 2009), there are still many unanswered questions regarding why so many patients leave the ED with unresolved pain and why such a significant proportion of patients feel that their requests for pain control have not been managed adequately (Fosnocht et al. 2001). In the UK there is considerable variation in patient-reported levels of pain management between providers. In 2008 a national survey of ED patients found that 59% of patients felt that the staff had definitely done everything they could to help control their pain, with the proportion ranging from 41%-74% between EDs (Howell 2009;Picker Institute 2011). In this same survey, 14% of people felt that staff did not even try to control their pain (range 4-26%). Although some of this variation may be due to differences in populations (older age, female gender, ethnic minority are all patient factors that may be associated with delay to analgesia) (Arendts and Fry 2006), these figures were adjusted for age, sex and ethnicity which suggests that there are significant differences in the way pain is managed between departments. Opinion pieces and editorials suggest that a complex combination of organisational, professional and patient factors affect how pain is managed, which may account for some of these differences.

Given that pain management is an acknowledged problem and that this is a significant issue in the quality of care within EDs, improved understanding of the factors that are associated with inadequate pain management may explain variance in performance between EDs. Improved theoretical understanding of current barriers to pain management may then enable development of appropriate interventions to improve pain management in the ED.

1.2. Aims and objectives

This thesis explores the factors that affect how pain is managed in the ED and how pain management within the ED could be improved. The study aims to identify barriers and enablers to pain management within the ED and identify which interventions could be used to improve pain management in the ED.

The specific objectives are:

- To identify interventions that have been developed to modify behaviour and improve pain management within the ED by undertaking systematic review and evidence synthesis of current literature of pain management in the ED.

- To identify which interventions are most effective in improving pain management and could be recommended for use in practice.

- To explore structures, processes and workforce involved in pain management and identify barriers and enablers to pain management in the ED by undertaking case studies within three EDs with different levels of patient satisfaction with pain management.

- To explore the context of and mechanisms by which interventions identified within the systematic review might work.

- To identify how interventions may work to overcome these barriers and identify which interventions may be used to improve pain management within the UK ED.

1.3. Research assumptions and scope

At the outset of this thesis, understanding of pain management was based upon the existing literature on oligoanalgesia in the ED and guidelines for pain management in the ED, based primarily on professional perspectives of pain management and assuming a positivist paradigm. In seeking to improve understanding of the factors that influence pain management, these assumptions were open to challenge. However, for the purposes of understanding the researcher

perspective at the outset of the research, the assumptions underpinning the research design are as follows:

- Pain management is EDs is inadequate, and variable. This variability is assumed to be due to a number of factors, of which some will be modifiable.
- Good pain relief exists; there are sufficient medications available within the ED that staff can administer to alleviate patient's pain, and interventions available that can improve the management of pain.
- Pain management is a desired outcome. There is an 'assumption of mutuality'(Schiavenato and Craig 2010); patients want their pain to be minimised and clinicians want to alleviate it.
- Good pain management can be characterised by timely provision of analgesia, reduction in pain, patient satisfaction.
- ED staff need to objectify patient's pain using pain scoring tools such as the 0-10 pain score in order to assess and manage pain.

This research seeks to understand how to improve pain management for adults in the ED. The research does not look at paediatric pain management, which has similar issues, but relies on communication via parents, and is associated with specific cultural issues (Cummings 2013). The research also does not include consideration of how to improve pre-hospital pain management, due to different contextual factors associated with the pre-hospital setting and the ED, although there is likely considerable overlap in barriers and enablers to pain management in both areas.

1.4. Key concepts relating to the Emergency Department.

Throughout this thesis, reference is made to concepts and terms relating to the way in which EDs work which, although common in the vernacular of the ED, may not be as familiar to a wider audience. These terms are summarised below. These are presented here rather than in the glossary due to being widely referenced throughout the thesis and therefore important for the reader to understand these concepts.

Table 1: Key concepts relating to the Emergency Department referenced within this thesis.

Term	Explanation
Walk-in patients	Patients who self-referred or were referred by a GP or other healthcare professional
Brought-in patients	Patients arriving by ambulance or paramedic
Pre-alert	Brought in patients who are critically ill may come into the ED as a 'pre-alert' and bypass the triage area, going straight to the resus room for management. These patients are booked in and triaged following paramedic handover.

Booking in	The process whereby the patient is officially entered into the ED system and at which the 4-hour target time was generated. At booking in, patients age, address, GP details and basic details about the patient's presenting complaint will be entered by a receptionist.
Triage	The process for streaming patients based upon their presenting complaint and physiological parameters, using an algorithm. This process allows ED staff to understand the acuity of the patient and direct the patient to the appropriate area of the ED. Process of undertaking triage involves a series of questions regarding the patient's condition and basic observations (e.g. blood pressure, heart rate) are usually undertaken, and /or observations already undertaken by ambulance staff are recorded.
Resus	The resuscitation room. This is the area where highest acuity patients are seen. Staff:patient ratios are higher and every bay has equipment to resuscitate patients if necessary.
Majors	The area where primarily non-ambulant patients are seen. Patients are generally of lower acuity than those in resus, but higher than minors.
Minors	The area where patients with minor injuries or illness are seen, primarily ambulatory patients or those not in need of a trolley or bed.
Early Warning Scores (EWS)	Scores that use a combination of physiological observations to identify patients who are unwell or deteriorating, in order to determine acuity. These are used within triage, and repeated throughout the patient journey in the ED.
Reassessment	Reassessment of pain is the process of checking whether initial analgesia (given either at initial or primary assessment) has worked adequately and providing further analgesia where necessary
Controlled drugs	Certain prescriptions medication is controlled under the Misuse of Drugs legislation 2001 and access to these drugs is restricted due to legislative requirements regarding storage. Certain analgesics used within the ED (e.g. morphine) fall into this category and require dual sign out with details and dose of drug taken out signed and counter-signed in a controlled drugs register.
Pain ladder	The WHO pain ladder refers to a framework for providing symptomatic pain relief, which is often adapted for use within guidelines in other settings, including the ED. The ladder involves moving from non-opioid drugs (e.g. paracetamol, NSAID) for mild pain, to weak opioids (e.g. codeine) for mild to moderate pain then strong opioids (+/- adjuvants) (e.g. morphine) for severe pain.
Targets	EDs in England have a 4 hour target for which patients should be seen, treated and admitted or discharged within four hours of arrival in the ED. Similarly, ambulance service performance targets aim for effective patient handover from ambulance team to the ED within 15 minutes of arrival and standards for triage aim for initial assessment to take place within 15 minutes of arrival.
Breach	The term used where one of the principal national targets used within the ED is breached.

1.5. Philosophical perspective

The section describes the philosophical perspective that influenced the research presented within this thesis. This enables any assumptions being made about the nature of reality being studied to be made explicit, and to assess whether research methods proposed are appropriate for building knowledge of this reality (Cresswell 2007) (Bowling 2014) (Punch 2014).

This research was influenced by the paradigm of pragmatism, in part due to being funded by National Institute for Health Research (NIHR), who seek to fund research which will be of direct benefit to patients, with a focus on providing results that are meaningful to NHS staff and patients. Pragmatism as a paradigm for social research has been suggested as a paradigm for situating mixed methods research as a way of reconciling the different paradigms of positivism and anti-positivism (Stanford University 2017) (Pansiri 2005) Pragmatism as a philosophical approach has been defined as 'an approach that evaluates theories or beliefs in terms of the success of their practical application', and emphasises the importance of consequence over theory (Oxford English Dictionary 2017) (Glasgow 2013). According to Pansiri (2006), "to a pragmatist, the mandate of science is not to find truth or reality, the existence of which are perpetually in dispute, but to facilitate human problem-solving" (Pansiri 2005). The analysis of findings has therefore been undertaken with a view to understanding how the findings can be applied in practice. The rationale for the thesis was not solely to contribute to new knowledge for academic purposes, but to improve understanding of how pain management could be improved in UK EDs.

Although this thesis is not being framed as a mixed methods study, as mixed methods normally involve qualitative and quantitative primary research, the research did include a quantitative systematic review approach, and qualitative case study approach. As such, the philosophical stance of pragmatism associated with mixed methods research methods was adopted.

Reporting study findings within the field of Health Services Research has conventionally used the passive voice, rendering the researcher invisible, although more recently the use of the active voice is being encouraged. Throughout this thesis, the passive voice is used, except within sections where personal reflection is required. Discussion of the position of the researcher is particularly important within qualitative research, due to the interpretative nature of data collection and analysis. Interpretation of the data is subject to influence from the researcher's values and experiences. In the following section I therefore consider my background, and how events in my background may have shaped interpretation of the research.

1.6. Summary of my research background and reflections of the impact this may have on the research.

I started my research career in 1996 as a research assistant in the Operational Research section at the School of Health and Related Research (ScHARR), University of Sheffield, undertaking modelling related to health care and health economics. Although I found the work challenging and interesting, I was uncomfortable with the nature of the work; modelling uncertainty and using assumptions to model potential future events in place of what I perceived to be 'real' data. In 2000 I moved into the Medical Care Research Unit to work on a project looking at the scale of, and reasons for removal of patients from GP lists. This mixed methods study involved undertaking surveys of GPs, matched surveys of GPs and patients, and interviews with key stakeholders. These methods of direct elicitation of views felt more natural to me than the use of quantitative analysis of large dataset and expert opinion used to generate the economic models in my previous role. One aspect of this research that held particular interest for me was the matched surveys of GPs and patients, in which two individuals in an encounter provided often greatly contrasting stories as to the events that had preceded the deregistration. This introduced me to the perspective that there may not be an objective truth that research can discover, and thus the 'real' data might not lead to 'true' answers. Each individual appeared to have their own reality, which may differ from an outsider's perspective.

Over the course of the next decade, I worked on a number of research projects within the Health Services Research section of ScHARR. These involved a variety of different methods including clinical trials, systematic reviews and service evaluations, and captured my interest to varying degrees. Throughout my research career, what interested me most was the person aspect of care; how people interpret situations differently depending upon their own experience or how their perceptions of what is important may differ from my own.

When reading other research, or writing up research, I am always greatly concerned with the 'so what' factor; what does this research mean, and why is it important? I realise I hold strong (and perhaps unrealistic) beliefs that research should make a difference and struggle with what I perceive to be the relative insignificance of many research findings. I realise the need to be aware of this concern to 'make a difference' when interpreting and analysing data, due to the implicit temptation to find results that are externally meaningful.

My entire post-graduate career to date has been within ScHARR at the University of Sheffield. I have no clinical training or experience of working within the health services. This lack of understanding of the reality of working within the ED may allow me to enter the field (i.e. the ED) with a degree of naiveté, with fewer preconceptions and prejudices than may be the case for an 'insider' researcher and therefore provide a view of reality. However, this lack of

understanding of the culture and beliefs in which staff working within the ED may also affect my interpretation of events and required greater reflection to understand how things work than may be the case if I was an 'insider'. My perspective throughout my career within health services research has been that of a pragmatic researcher, interested in using a range of methods to understand how health services can be improved.

1.7. Timelines of undertaking this PhD

This thesis was undertaken as part of a NIHR Doctoral Research Fellowship, awarded in July 2011, with a start date of November 2011. The thesis was undertaken on a part time basis, (60% over 5 years), with a 12 month maternity leave break from March 2013 – March 2014. The background literature summarised within the following chapter describes the understanding of current research at the outset of the research (November 2011). Updated literature searches were undertaken over the course of the research, and relevant literature that emerged prior to fieldwork being undertaken is discussed within chapter 4, with a further review of relevant literature undertaken in September 2017 and reported within the discussion chapter at the end of the thesis.

1.8. Presentation of chapters within the thesis

The thesis is organised into the following chapters:

2. Background
3. Systematic review of interventions to improve pain management in EDs
4. Exploration of emerging literature exploring barriers and enablers to pain management in the ED
5. Methodology and methods
6. Multiple Case Study Findings: Descriptive overview of cases
7. ED structures, processes and workforce
8. Priorities and beliefs
9. Knowledge, education and understanding
10. Organisational pressures and accountability
11. Patient expectations of pain management
12. Measuring pain management using the pain score.
13. Discussion

2. BACKGROUND

2.1. Outline of chapter

This background chapter provides an overview of the role pain management in the ED, discusses how pain is managed within the ED and potential barriers to pain management identified within the literature.

2.2. Why is pain management important for the Emergency Department?

The International Association for the Study of Pain (IASP) defines pain as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage" (International Association for the Study of Pain 1979). Acute pain is pain that lasts less than 12 weeks and is associated with tissue damage, inflammation, surgical procedures or short disease process, often seen as a warning that something is wrong. Chronic pain deteriorates and intensifies over a longer period of time and accompanies various diseases (e.g. cancer, arthritis, fibromyalgia) or unresolved injuries (e.g. lower back pain) (Fink 2000). Although pain may be viewed as a temporary experience, acute pain can trigger a number of physiological responses and have a significant negative impact on patients. Adverse effects of severe undertreated acute pain include pressure upon the cardiovascular and respiratory systems (e.g. increased breathing and heart rates), temporarily impaired gastrointestinal function and depression of the immune system, as well as negative psychological and cognitive effects (Middleton 2003) , (Pasero et al. 1999), (Macintyre and Schug 2007). Untreated episodes of acute pain can lead to further episodes of pain or debilitating chronic pain syndromes and aggressive behaviour (Johnson 2005a;Johnson 2005b). A formal statement by the IASP asserts the right of all people to have their pain acknowledged, be informed about how their pain can be assessed and managed, and to have access, without discrimination, to appropriate pain assessment and management from adequately trained health care professionals (International Association for the Study of Pain 2011)

The majority of patients attending an ED have pain as a presenting complaint (Wood et al. 2007) (Tanabe and Buschmann 1999) (Cordell et al. 2002) (Gueant et al. 2011). An estimated 50-80% of patients experience pain during their visit to the ED, of whom between a third and a half consider their pain to be 'severe' (Davies et al. 2011) (Mijojevic et al. 2001) (Gueant et al. 2011). The ED is responsible for treating patients with trauma-related pain, other acute pain and patients with pain resulting from chronic disease and terminal illness (Cordell et al. 2002) (Marco et al. 2011) (Todd et al. 2007). Due to the volume of patients experiencing pain within

the ED, and the physiological importance of managing pain, the management of pain is an essential part of the duty of care for the ED. The recognition and alleviation of pain has been highlighted as a priority for patient care within the ED, with pain management being considered an important ED quality indicator (American College of Emergency Physicians Policy Statement 2004) (Smith 2010) (McHugh et al. 2011).

2.3. How do guidelines recommend pain be managed within the ED?

Patients arriving at the ED will be assessed initially for a set of 'vital signs' and a chief complaint (triaged), at which point their pain levels should be assessed and documented, usually using a simple pain score such as the numeric rating scale (NRS) or verbal rating scale (VRS), which scale from 0 (no pain) to 10 (worst pain imaginable). Although high levels of pain are not in themselves life-threatening, the presence of severe pain leads to a more urgent triage scoring which in turn should expedite the treatment of the patient (Smith 2010). The triage process is often undertaken in a specific area of the ED, usually by a dedicated triage nurse or doctor. Following assessment, the patient will be sent to a different area of the ED or hospital, depending upon the nature and urgency of their condition where they will await further evaluation and treatment.

Accurate assessment of pain is critical to appropriate management of pain, but is difficult due its subjective nature. Guidelines recommend that pain be assessed in the ED using a number of one-dimensional pain scores which are simple and quick to administer (e.g. Visual Analogue Scale (VAS), Verbal Numeric Rating Scale (VNRS) for adults or the Wong-Baker Faces scale and CRIES neonatal pain scale for children). ED staff can estimate pain levels using behavioural and physiological signs of pain, which can be useful for patients with cognitive impairment or communication difficulties (Macintyre and Schug 2007). However pain assessment using behavioural and physiological signs has been demonstrated to significantly underestimate patients' pain levels within the ED.(Marquie et al. 2003) (Baharuddin et al. 2010) (Guru and Dubinsky 2000) (Cigenza et al. 2010). Regular reassessment of pain is important to assess whether patients have received adequate analgesia (Smith 2010).

In the United Kingdom (UK), the Royal College Emergency Medicine (RCEM) guidelines state that patients should be assessed as to whether pain is non-existent, mild (pain score 1-3), moderate (pain score 4-6) or severe (pain score 7-10) and prescribed appropriate medication according to the severity (Smith 2010). Patients in severe pain should be moved to an area where they can be given intravenous or rectal analgesia within 20 minutes of arrival and patients in moderate pain should be offered oral analgesia at triage/assessment. Both should have the effectiveness of analgesia assessed within 60 minutes of receiving the first dose of analgesia and

stronger analgesia combined with non-pharmacological methods should be offered if analgesia is found to be inadequate. They should have received adequate analgesia by discharge (American College of Emergency Physicians Policy Statement 2004;Smith 2010).

2.4. What treatments are available within Emergency Departments?

Pain can be treated within EDs using a wide range of treatment modalities, including pharmacological (e.g. opioids, non-steroidal anti-inflammatories (NSAIDS), corticosteroids) and non-pharmacological methods (e.g. ice, immobilisation, distraction techniques)(Smith 2010) (Curtis and Morrell 2006). Femoral nerve blocks can be used for patients with hip fracture, though they require specialist skills and delivery of a nerve block will depend upon the presence of a suitably trained clinician. Neuropathic pain may also be treated using tricyclic antidepressants and anticonvulsants. Non-pharmacological methods such as ice and elevation for injury, distraction techniques (particularly with children) and explanation of cause of pain and likely outcomes to allay anxiety can be used in combination with pharmacological treatments (Australian and New Zealand College of Anesthetists Faculty of Pain Medicine 2000) (Smith 2010). Optimal treatment and route of delivery (e.g. oral, rectal, intravenous, intramuscular) depend upon the type, severity and location of pain (Curtis and Morrell 2006) (Lipp et al. 2013) (Smith 2010).

Patients with mild to moderate pain may be managed with oral (or rectal) analgesia such as paracetamol or NSAIDs, either alone or in combination. These over-the-counter medicines have well-known contraindications, minimal side-effects and do not require specialist prescription. They can be administered under patient group directive (PGD) by nursing staff, or prescribed by medical staff, and patients do not require close monitoring.

For patients experiencing more severe pain, some form of opioid-based analgesia (e.g. morphine, fentanyl, codeine, oxycodone, hydromorphone) is usually used either orally for moderate pain or parenterally for severe pain, often in combination with a non-opioid (Macintyre and Schug 2007). Patients experiencing severe pain will often require placement of an intravenous (IV) line by nursing or medical staff in order for the drugs to be delivered intravenously, as continuous infusion allows a more steady analgesic effect. All analgesics have side effects but these are more common and severe with opioids. Higher doses of opioids are associated with a 5% risk of severe adverse events (respiratory depression, reduction in oxygen saturation and fall in systolic blood pressure) and patients must be monitored regularly whilst receiving stronger opioids in the ED (Lipp et al. 2013). Opioids also have a range of other side effects and carry a risk of addiction when used for prolonged periods (Macintyre and Schug 2007). Many opioids are controlled drugs requiring specialist prescription. These will often be

kept in a separate locked cabinet within the ED and can be prescribed only by medical staff or nurse prescribers.

2.5. Can effective pain management be achieved?

The aim of pain management will be patient-specific but may include reducing pain to an acceptable level, minimising side-effects of treatment, allowing the patient to regain function and achieving patient satisfaction with pain relief (UW Health 2014). Studies of various different types of analgesia show that analgesia can provide significant reduction in pain levels in the ED, even for patients experiencing severe pain (Lipp et al. 2013) (Chang et al. 2011) (Patanwala et al. 2010). The availability of different modalities and strength of analgesia means that patients who do not initially achieve pain relief should be 'stepped up' and offered stronger alternative combinations of analgesia. Even patients who experience tolerance to opioids should be able to achieve levels of pain relief with alternative agents (e.g. ketamine) whilst in the ED (Macintyre and Schug 2007).

A number of effectiveness reviews and clinical guidelines for the management of pain in EDs exist, summarising the optimal treatment recommended for different patient groups, side-effects and contraindications and what to offer if pain relief is not achieved initially (Australian and New Zealand College of Anesthetists Faculty of Pain Medicine 2000) (Smith 2010) (Joint Commission on the Accreditation of Healthcare Organizations 1999) (American College of Emergency Physicians 2008) (Ducharme 1994) (Le et al. 2009a). In theory therefore, ED patients should be largely able to achieve acceptable levels of pain relief within the ED.

2.6. How well is pain currently managed within Emergency Departments?

Despite the existence of various guidelines, inadequate pain management (oligoanalgesia) resulting from inadequate prescribing or delay in prescribing analgesia in the ED has long been recognised as a significant problem globally (Fosnocht et al. 2005b) (Rupp and Delaney 2004) (Milojevic et al. 2001) (Wilder-Smith et al. 2002) and has been highlighted as an aspect of ED care in need of improvement (NHS surveys 2014). Analgesia prescribing can be inadequate due to patients receiving no analgesia, delayed analgesia, analgesia in insufficient doses, or administered by an inappropriate route to deal effectively with pain.

Guidelines recommend appropriate assessment and documentation of pain (Smith 2010) (Joint Commission on the Accreditation of Healthcare Organizations 1999) (Ducharme 1994). However, the assessment of pain by staff in the ED has been shown to be insufficient, with triage staff, nurses and particularly physicians significantly underestimating pain levels when

not using patient-reported pain scores (Marquie et al. 2003) (Baharuddin et al. 2010) (Guru and Dubinsky 2000) (Cigenza et al. 2010). Although studies suggest that pain scores are often undertaken but not documented (Chisholm et al. 2008) (Probst et al. 2005), significant proportions of patients do not have quantitative patient reported pain scores documented at triage which makes evaluation of improvement of pain difficult (Herd et al. 2009) (Ali et al. 2010) (Drendel et al. 2006).Also, studies suggest that follow-up of pain assessment and repeated pain assessment and documentation (which are necessary to ensuring good pain management) are rarely undertaken in the ED, particularly by physicians (Eder et al. 2003) (Gueant et al. 2011) (Harel et al. 2005). Studies have shown that patients waited longer than they felt was acceptable for pain relief (Fosnocht et al. 2001).

Studies worldwide estimate the proportion of patients attending the ED with severe pain and who remain in moderate to severe pain at discharge to be between half and three-quarters (Decosterd et al. 2007) (Todd et al. 2002) (Todd et al. 2007) (Berben et al. 2008). Although many patients experiencing pain within the ED do not want analgesia, estimates of the proportion of patients who desire analgesia but do not receive it are between 20% and 40%, most of whom are in moderate or severe pain (Singer et al. 2008) (Allione et al. 2011) (Todd et al. 2007) The provision of analgesia may be affected by patient factors such as triage category, gender, ethnic origin and age, although evidence is inconclusive (Arendts and Fry 2006) (Jones et al. 1996) (Raftery et al. 1995) (Madhok and Liu 2011) (Mills et al. 2011b). Many studies suggest that elderly patients and patients experiencing chronic pain are more likely to receive delayed analgesia than younger patients or those with acute conditions (Lazio et al. 2010) (Mejia et al. 2009) (Mills et al. 2011a). The under-treatment of pain is not confined to the ED and is a recognised problem in many areas of healthcare (NICE clinical guidance 2012), but attitudes towards pain relief and attempts to improve the systematic use of pain assessment tools have been shown to be worse in the ED than other departments (Kamgo et al. 2009) (Anwar et al. 2012) (Shapiro et al. 1997).

2.7. Pain management in UK Emergency Departments

Studies exploring how well pain is managed in EDs use different outcomes to evaluate pain management. These outcomes include: provision of analgesia, speed of analgesia, reduction in pain score and patient satisfaction. (Todd et al. 2007) (Fry et al. 2011) (Downey and Zun 2010) (Gueant et al. 2011) (Fry et al. 1999)

In the UK there is considerable variation in patient-reported levels of pain management between providers. In 2008 a national survey of ED patients found that 56% of patients who experienced pain whilst in the ED felt that the staff had definitely done everything they could to help control their pain, with the proportion ranging from 42%-75% between EDs (Picker Institute 2008). In

this same survey, 17% of people felt that staff did not even try to control their pain (range 9-29%). Although some of this variation may be due to differences in populations, these figures were adjusted for factors known to affect patient satisfaction (age, sex and ethnicity) (Thiedke 2007) which suggests that there were significant differences in the way pain was managed between departments. There were no significant differences in patient-reported levels of pain management between surveys conducted in 2004 and 2008, indicating no significant improvement during this time period.

RCEM audits on fracture neck of femur and renal colic in adults showed significant proportions of patients to be waiting for analgesia, with 20% of fracture neck of femur patients with severe receiving analgesia within the recommended 20 minutes of arrival, and 56% receiving analgesia within 60 minutes, with little improvement between 2004-2009. (Clinical Effectiveness Committee 2010)

2.8. Potential barriers to good pain management within the ED

Given that there are effective methods of treating pain in the ED, and guidelines for their use, there is a need to consider why pain is not being managed adequately within the ED, and why there is such a high level of variation in patient satisfaction between EDs. A number of editorials and opinion pieces have been published discussing potential explanations for poor pain management within the ED (Rupp and Delaney 2004) (Motov and Khan 2008) (Duignan and Dunn 2008) (Fosnocht et al. 2005b) (Ducharme 2013). However, there is a recognised lack of empirical research on enablers or obstacles to pain management within the ED (Johnson 2005b) and the articles that have been published are based upon opinion and brief reviews of the literature. A number of cross-sectional studies exploring nurse views of factors affecting pain management within the ED have been published, but are all based on a pre-defined list of factors that were developed outside the ED and therefore likely to have limited applicability to the ED (Wilsey et al. 2008b) (Tsai et al. 2007) (Duignan and Dunn 2009) (Tanabe and Buschmann 2000). There is a particular lack of qualitative research around barriers and enablers to pain management, with the few studies identified again being based on factors identified outside the ED (Wilsey et al. 2008a) or published only in abstract form (Jennissen et al. 2011).

These quantitative studies and editorials suggest a wide range of factors potentially affecting pain management within the ED, and are summarised in Table 2 below. Many of the reasons are common to other areas of healthcare where pain management is problematic (e.g. difficulties in assessing pain) but many are compounded by factors specific to the ED (e.g. lack of time to assess pain). However, the shortage of empirical evidence specifically from EDs means that it is difficult to assess what the main barriers or enablers are for this setting, and to what degree these are widespread. Given the difference in pain management seen between EDs in national

surveys, it is likely that these barriers vary between departments and the differences are due to a complex combination of organisational, professional and patient factors.

Table 2: Summary of factors affecting pain management in the ED identified by reviews of pain management in the ED.

Difficulties in assessing pain	There is a lack of consistent evidence about which pain scores are most appropriate for use within the ED, with a number of different one-dimensional pain scales being advocated (Curtis and Morrell 2006). Scales such as the VAS or VNRS that require the patient to mark on a line between 1 and 100 or 1 and 10 respectively are used extensively within research studies but require high levels of cognitive ability to carry out (Curtis and Morrell 2006). These are more subjective than scales such as the VRS or VDS that use simple phrases to describe the pain but allow improvements in pain to be monitored (Tanabe and Buschmann 2000). Similarly, there is a wide range of pain rating scales for children and a lack of consistency about which should be used (Probst et al. 2005). Assessment of patients with communication problems is worsened within the ED, as trauma or stress can impact upon an individual's ability to communicate (Johnson 2005b) Similarly, the evaluation of successful treatment is difficult as there is a lack of consistent evidence about what level of improvement in pain score constitutes a clinically significant difference in pain score after treatment for different patient groups. (Bijur et al. 2003) (Powell et al. 2001)
Difficulties in reassessing pain	Whilst initial pain assessment can be undertaken at triage with most patients, it is more difficult to find an opportunity to follow-up and reassess pain in the ED. The nature of the ED means that clinical and nursing staff have brief patient interactions and there is no concept of a 'named' nurse or doctor who can offer continuity of care and ensure correct follow-up. Consultation times are brief and the emphasis of the interaction is primarily on diagnosis, with patients frequently left alone once assessed if their condition is not thought to be life-threatening (Fosnocht et al. 2005b). Emergency clinicians have been shown to deal with high volumes of interruptions and 'break-in' tasks, limiting their ability to undertake less urgent tasks such as repeat pain assessments (Chisholm et al. 2001). Management of patients with life-threatening and time-critical conditions has higher priority than pain management, and follow-up of patients requiring pain medications inevitably is of lower priority to staff (Berben et al. 2012) (Bergman 2012). There is evidence that pain management is of lower quality when EDs are busier and overcrowded. (Barrett and Schriger 2008) (Mills et al. 2009)
Reluctance to prescribe opioids	A reluctance to prescribe opioids due to concerns about the perceived dangers of narcotics is thought to have a considerable role in the under treatment of pain in the ED, leading to opioids being under-prescribed, both in quantity and dose (Davies et al. 2011) (Cinar et al. 2011a) (Wilson and Pendleton 1989). Attitudinal barriers to pain management resulting from 'opiophobia' include fear of masking symptoms of acute illness, suspicion of drug-seeking behaviour and concerns about addiction or dependence (Motov and Khan 2008). ED physicians and nurses have been shown to be reluctant to provide pain relief prior to definitive diagnosis, due to belief that treatment of pain will hinder diagnosis of the underlying condition, despite evidence and guidance to the contrary (Kim et al. 2003) (Kiyan et al. 2011) (Lee et al.

	1996) (Tanabe and Buschmann 2000).Concerns about opioid dependence can also lead to a reluctance to prescribe, particularly for patients with chronic conditions and for patients who are considered to be seeking to obtain narcotics to satisfy psychological addiction rather than a genuine need for pain relief (Motov and Khan 2008) (Rupp and Delaney 2004) (Glassberg et al. 2013)
Patient expectations	Patients do not always desire analgesia, even when in severe pain, due to concerns about hindering diagnosis, a concept that they should be able to manage pain themselves and concerns about the addictive nature of pain medications or fear of side-effects. (Allione et al. 2011) In addition, low patient expectations can lead patients to having a passive role towards pain management and a reluctance to request analgesia. The relationship between patient satisfaction and provision of analgesia is complex with mixed evidence as to whether improved pain scores correlate with an improvement in pain satisfaction (Blank et al. 2001) (Kelly 2000c) (Stahmer et al. 1998) (Jao et al. 2011). There is some evidence that listening to the patient and acknowledging pain is as effective in improving patient satisfaction as the provision of analgesia itself (Downey and Zun 2010) (Todd et al. 2007).
Staff knowledge	Knowledge of evidence around pain management and protocols is weak for both physicians and nurses (Wilder-Smith et al. 2002) (Yen and Chiu 2005). Pain management has a low profile within medical education and there is currently no requirement for specialist pain management training in the ED. In particular, junior doctors who undertake most of the patient assessment within the ED lack training on pain management (Sandhu et al. 1998) Similarly, studies of nurses in the ED demonstrate a lack of knowledge and understanding of important aspects of pain management such as choice and duration of analgesia, adverse effects and pain assessment (Wilder-Smith et al. 2002) (Tanabe 1996) (Tsai et al. 2007).

2.9. What can be done to improve pain management?

Improvements in pain management could be achieved through the development of analgesics that offer the same level of pain relief as opioids but with fewer short- and long-term side-effects, or potential for addiction (Burgess and Williams 2010). Studies indicate that newer versions of opioids are more effective and easier to tolerate than older drugs (e.g. hydromorphone v morphine) (Lipp et al. 2013). However, given that effective analgesia already exists that should improve pain for most patients, the development of improved analgesia is unlikely to have a significant impact upon the pain management of patients in the ED until other barriers to pain management have been addressed. This thesis therefore focuses on how to improve the management of pain rather than improving the modalities of achieving pain relief per se.

A number of initiatives to improve the management of pain within EDs have been developed and evaluated within the past twenty years, ranging from simple tools (e.g. use of pain scoring

tools (Thomas and Andruszkiewicz 2004)) to more complex quality improvement initiatives (Doherty et al. 2013;Iyer et al. 2011). These interventions principally seek to change professional behaviour around the management of pain and include the introduction or mandating of pain scales to improve the assessment of pain, introduction of protocols or guidelines for pain management, educational interventions to increase knowledge of pain management or changes to the administration of analgesia (e.g. introducing nurse-administered opioids) (Boyd and Stuart 2005) (Campbell et al. 2004) (Corwin et al. 2012). Many interventions aim to improve single aspects of the pain management process (e.g. increase documentation of pain) (Baumann et al. 2007), whilst others address multiple aspects of pain management (e.g. combining educational interventions with the introduction of a pain protocol and pain scoring) (Wong et al. 2007). There are currently no reviews of the effectiveness, acceptability or uptake of interventions to improve pain management in the ED and no guidance on which interventions were most effective, or which components of interventions might be effective. In order to understand how the management of pain can be improved, an improved understanding of the evidence around which interventions to improve pain management in the ED work, and the context in which they work, is needed.

2.10. Summary

- Pain management in EDs is often inadequate, despite effective analgesia being available. Audits of pain management in the ED in the UK suggest significant variation in ED performance and patient satisfaction with pain management.
- Current literature examining potential reasons for inadequate pain management is based largely upon opinion pieces, and a lack of empirical research exploring potential barriers to improving pain management in the ED was identified.
- Interventions to improve pain management in the ED have been developed, but there is currently no evidence to suggest which interventions are most effective, or in which context they may be effective.

The following chapter presents a systematic review of interventions that aims to identify any interventions that have been developed to modify behaviour and improve pain management in EDs, and identify which interventions are most effective in improving pain management and could be recommended for use in practice.

3. SYSTEMATIC REVIEW OF INTERVENTIONS TO IMPROVE PAIN MANAGEMENT IN EMERGENCY DEPARTMENTS

3.1. Outline of chapter

The initial literature search identified a lack of reviews and subsequent guidance as to which interventions to improve pain management are most effective in the ED. This chapter presents a systematic review of interventions to improve pain management within the ED. The methods, results and discussion are presented within this chapter, with tables detailing the characteristics of included studies included within Appendix 3.

3.2. Rationale for undertaking systematic review

There is considerable variation within interventions that have been evaluated and reported within the medical literature and a lack of evidence synthesis means that there is no clear message about types of interventions that may be effective. Systematic reviews are a transparent, efficient way of synthesizing evidence to enable decision-making, which are based upon up-to-date and comprehensive evidence. An important characteristic of the systematic review is "to assess whether results of scientific findings are consistent and can be generalised across populations, settings, and treatment variations" (Donovan 1983) (Mulrow 1994). This chapter describes a systematic review that aims to identify interventions that seek to improve the management of pain within EDs, synthesize the existing literature and understand the context in which different interventions work. Specifically, the review includes any intervention seeking to improve the delivery of pain management and change pain management behaviour within an ED, rather than identify optimal treatments or test the efficacy of individual treatments for pain.

3.3. Methods

The reporting of systematic reviews in emergency medicine journals has been criticised for being of poor quality, undermining their value (Kelly et al. 2001). This systematic review is reported following the criteria suggested within the PRISMA checklist, which was developed in order to improve the quality of reporting of systematic reviews. (Moher et al. 2009) The PRISMA checklist is presented in Appendix 2

3.3.1. Defining the scope of the literature search (justification of inclusion criteria)

Defining the nature of the scope for systematic review is problematic and often cyclical (Evidence for Policy and Practice Information and Co-ordinating Centre 2010). The concept of an intervention to improve the management of pain is ambiguous; articles comparing different drugs for pain relief could be argued to aim to improve the management of pain. In order to help to focus the scope, two main distinctions were made: studies should involve interventions that aimed to alter behaviour prior to the point at which analgesia was given and studies should focus on the *management* of pain, rather than the type of treatment provided. Therefore studies evaluating interventions that were designed to improve the rate and speed of analgesia delivery were included, and studies evaluating interventions which related to the type or method of analgesia were excluded.

Studies evaluating the efficacy of different types of analgesia (e.g. opioids v NSAIDs) were excluded as were studies evaluating different methods of administering analgesia (e.g. patient controlled analgesia, studies comparing intramuscular v intravenous delivery), as the intervention applied only to patients who had already had their pain assessed and the decision to provide pain relief had been made. However, studies evaluating different methods of delivering analgesia that involved a change of practice within the department (i.e. nurse-initiated opioids) were included as this would impact upon the time to provision of analgesia. The intervention should seek to act at an organisational or staff level rather than patient level and needs to include all patients with the selected condition prior to pain assessment being undertaken.

3.3.2. Eligibility criteria:

3.3.2.1. ***Report characteristics:***

The search included all articles where a title or abstract in English was available. Studies reported within abstract only were included. No constraints on year of publication or language were made and searches included all available years from individual databases.

3.3.2.2. ***Study characteristics:***

The search aimed to identify all studies reporting an intervention to improve pain management in EDs. Specific criteria for inclusion were developed using the 'PICOS' approach, in which the following five components are detailed to help to structure the research question: (P) population or participants; (I) interventions (C) control or comparator group, (0) outcomes of the intervention being assessed; (S) study designs included. (O'Connor et al. 2008) Specific criteria used are as follows:

Participants: Patients presenting to EDs (exclude pre-hospital, post discharge). Any age. Patients must be selected prior to pain assessment being undertaken. Exclusions: specialist ED (e.g. dental, obstetrics)

Rationale: Although pain management varies according to age and differs specifically for paediatrics, interventions that seek to change the behaviour of staff within EDs are likely to be relevant within both adult and paediatric departments, even though specific tools used to assess pain etc. may differ. The intervention itself may be aimed at the staff or ED itself, but the outcomes of the interventions will be measured on the patients.

Although this thesis focuses on adult pain management, interventions developed for use in paediatric populations were still included as these may have some applicability to the adult population.

Intervention: Any intervention that aims to improve the management of pain within EDs by changing clinical behaviour around the management of pain. Interventions aimed at altering the management of pain for a population of patients attending the ED, not the type of pain relief that is administered once the decision to administer analgesia has been made. Not efficacy of drug or method of delivery alone. Exclude procedural sedation and anaesthesia.

Rationale: There are many different pharmacological and non-pharmacological interventions for the treatment of pain, which differ according to patient group. This study aims to look not at which treatment is most appropriate, but how the professional can be encouraged to ensure the patient is given the treatment in an appropriate and timely manner. Procedural sedation and anaesthesia are excluded as this is a specialist category and not relevant to general ED pain management.

Comparisons: The effectiveness of the intervention must be compared against a control group who have not received the intervention.

Rationale: Outcomes need to be reported against a comparison group to identify any changes that may be attributable to the intervention.

Types of outcome measures: Studies must report at least one of the following primary outcome measures: % of patients receiving analgesia, % patients receiving appropriate (as defined by the study) analgesia, time to analgesia (median/mean), change in pain score following ED stay, documentation of pain score, reassessment of pain, repeat administration of analgesia. Secondary measure: patient satisfaction with pain management.

Rationale: There are a number of different outcome measures that are appropriate to measure changes in pain management depending upon the aim of the intervention. The main aims for interventions to improve pain management are to increase the proportion of patients in pain who

receive analgesia, to decrease the length of time they have to wait for analgesia and improve the appropriateness of analgesia given (i.e. ensure better quality of pain management) (Doherty et al. 2013). The measure of proportion of patients being given appropriate analgesia and repeat dosage of analgesia are important as they indicate that patients are being given treatment appropriate to their needs and the process of pain management is ongoing. The definition of appropriate analgesia is likely to vary according to the patient population considered, but is likely to involve an increase in use of parenteral narcotics and appropriate dosing (Goodacre and Roden 1996) (Doherty et al. 2013) (Steinberg et al. 2011) The definition of 'appropriate' should be provided within the study.

The effectiveness of analgesia can best be estimated by a reduction in pain score (using a validated and appropriate tool such as VAS for adults and WBFS for children) following analgesia. This outcome measure requires objective measurement of pain upon presentation to ED, and at specific time periods after (usually discharge). The study must define the definition of a clinically significant reduction in pain score.

Appropriate objective documentation of pain is thought to be necessary to assess levels of pain and therefore the level of analgesia needed, although documentation of pain does not always equate to an improvement in patient pain experience. Documentation of pain score is considered an important outcome as objective assessment can help to overcome differences in patient, physician and nurse assessment of pain. (Ducharme and Barber 1995)

The relationship between patient satisfaction with pain management and levels of analgesia administered or reduction in pain scores achieved is complex (Afilalo and Tselios 1996). No specific tool for measuring patient satisfaction with pain in the ED was identified and papers reporting patient satisfaction within this domain used a wide range of measures. Patient satisfaction measures were therefore only collected as a secondary outcome measure to contribute to discussion, and studies using patient satisfaction as an outcome measure were only included when other primary outcomes were also considered.

Study design: Any controlled study (randomised controlled trials, non-randomised controlled trials, controlled before and after studies, interrupted time series, before and after studies)

Rationale: Few limits were placed upon the type of design as initial literature searching suggested that most of the available studies used uncontrolled before and after study designs and it would therefore be inappropriate to exclude studies that were not RCTs. Also, the aim of the review was to identify any potential methods of improving analgesia that had been evaluated in practice rather than just to determine whether methods were effective.

3.3.3. Information sources.

Studies were identified by searching electronic databases, scanning reference lists of any articles identified for inclusion within the review and searching the grey literature (more here). The following databases were searched: Medline (via Ovid), Embase (via Ovid), Cinahl (EBSCO), Web of Science, Cochrane central register of controlled trials. The following grey literature sources were also searched: Opengrey (previously SIGLE), Health Management Information Consortium. No hand searching of journals was undertaken as the pain management interventions used in EDs were reported in a wide range of journals, and the search criteria were felt to be broad enough to incorporate any relevant articles. The literature search was originally undertaken in December 2011 and updated in November 2012.

3.3.4. Search strategy

The search strategy is included in appendix 1. An interactive approach to the protocol was employed and the search strategy was revised following citation searches on a sample of key review articles.

Search results were downloaded into reference manager and duplicate searches performed to remove potential duplicates.

3.3.5. Study selection

Screening was done on a 2 stage basis; initial screening to identify potential articles using the inclusion criteria and then screening of the articles identified as being potentially relevant. (O'Connor et al. 2008) The initial screening involved reading the titles, subheadings and abstracts to identify any articles that appeared to test an intervention intended to improve the management of pain within the ED. This process was repeated at the stage of updating the literature review to identify any studies that may have been missed initially. The abstracts of the shortlist of potential articles were then reviewed by myself and a second reviewer (Steve Goodacre) independently to check whether they met the inclusion criteria. Where the abstract did not provide enough information to ascertain whether the study met the inclusion criteria, the full text of the study was obtained and reviewed (where available). Reasons for exclusion at this stage were noted.

3.3.6. Data collection process

A data extraction sheet was developed and piloted on the first 5 studies identified. This was then amended and simplified. Data was not double extracted as the data was not going to be used within meta-analysis and therefore the accuracy of the figures was not felt to be important enough to warrant double-extraction. Multiple publications reporting the same set of data were identified by author, location, size and type of study. Where more than one article reported the

same set of data, the later published set of data was used (usually the full article following a conference contribution).

3.3.7. Data items

Items of information extracted from each included study is detailed below in Table 3

Table 3: Data items extracted

Data item	Details
Reference details	Author, year, country
Description of intervention	Content, duration, coverage, tailored (ED specific), active
Participants	Inclusion and exclusion criteria, patient characteristics (age, sex, ethnicity, other)
Setting	Context, size, timing of data collection period (pre, post, length of interval)
Pre-specified outcomes	Pre-specified outcomes, statistics used
Results	Number in each group, primary and secondary outcome measures reported, conclusions
Methods / quality	Study design, how patients recruited, how data collected (prospective, retrospective), blinding, other quality control
Other notes	Other notes about the structure of the article or comments from the discussion that may affect the conclusions of the study.

3.3.8. Rationale for choice of data items:

Reference details: The management of pain is likely to differ significantly by country and studies suggest different levels in the treatment of pain within EDs worldwide (Ricard-Hibon et al. 2004) (Fry et al. 2004). Similarly, there is considerable variation in the profile of pain management and availability of national guidelines or initiatives to improve the management of pain, with Australia and the USA issuing guidance mandating the use of pain scores at triage (Department of Health 2013) (Lanser and Gesell 2001).

Description of intervention: The intervention should be described in terms of what it involves, the length of implementation period (i.e. the exposure to the intervention), who receives it and also factors that have been shown to influence the effectiveness of interventions such as whether the intervention was developed within house (increasing relevance and likelihood of success), and whether it was an active rather than passive intervention. (National Centre for Reviews & Dissemination 1995)

Participants: Inclusion and exclusion criteria must be reported as the management of pain may differ depending upon the conditions included. For example patients presenting with vaso-

occlusive pain from sickle cell disease will trigger different pain management pathways than trauma patients (Odesina et al. 2010) (Gawthorne et al. 2010). Also, the likelihood of requiring and receiving pain medication has been shown to differ for different conditions (Lazio et al. 2010). The reporting of patient characteristics is important to ensure that the intervention and control groups are matched, as there is some evidence of differences in how pain is experienced and managed depending upon age, ethnicity and gender (Green et al. 2003).

Setting: The context of the study is reported in terms of type and size of department. Pain management is likely to differ depending upon the size and 'busyness' of the department (Mills et al. 2009). The timing of the data collection period is crucial, as interventions that are assessed immediately after implementation may still be in their 'honeymoon' phase and the level of effectiveness may be greater than if they are assessed after a longer period. Similarly, if interventions are evaluated too soon after implementation they may not have had chance to be embedded within the workplace and the full benefits may not be realised. A recent study of pain management interventions found benefits to peak at around 9 months after the start of an intervention, and to plateau or drop off after (Doherty et al. 2013).

Pre-specified outcomes: The authors should report which outcomes they aim to evaluate and report all outcomes, regardless of whether results are positive or negative. Any pre-specified outcomes were extracted to allow assessment of whether there was evidence of any reporting bias. The statistics used were extracted to assess whether data had been analysed appropriately.

Results: Results were extracted for any of the outcome measures specified as primary or secondary outcome measures. The total number of patients was included as the size of the trial should be considered when judging the validity of the results, even though the results are not being summarised quantitatively. Where the authors had included other outcome measures, this was reported as 'other' in order to check whether any important measures had been missed a priori.

Methods/Quality: A number of methodological items relating to the quality of the study design were extracted (see below). The rationale for extracting these items, along with other data extraction items is provided in Table 4below.

Other: Other notes about the structure of the article or comments from the discussion that may affect the conclusions of the study were extracted to help discussion of the relevance of results.

3.3.9. Risk of bias in individual studies (quality assessment)

Quality assessment or critical appraisal of the evidence aims to assess whether the methods and results of the individual studies are valid. Quality assessment should assess the strength of findings (validity and reliability) as well as the applicability of findings, which will determine

the contribution each study can make to the findings of the whole review, and thus the strength of recommendations for practice. It is also necessary in identifying heterogeneity (between-study differences), which may affect the results of studies. (Booth et al. 2012) Quality assessment seeks to identify potential sources of bias and confounding that may limit or alter the findings of a study. (O'Connor et al. 2008). Liberati et al recommend that reviewers make a distinction between assessing 'quality' (i.e. the best the authors were able to do) and assessment of risk of bias, and focus on the latter when appraising individual studies. (Liberati et al. 2009)

The risk of bias can be assessed using checklists, scales and individual components. Appropriate checklists to use will depend upon the type of study included (e.g. CASP for RCTs, TREND for non-randomised studies) (Critical Appraisal Skills Programme 2013) (Des Jarlais et al. 2004), although there are a number of recognised checklists that are designed to be used across different study designs (Downs and Black 1998). Many checklists refer to the quality of the reporting of the study, rather than the validity of the study. There is an important distinction between quality assessment of the intervention and quality assessment of the evaluation or reporting. (National Centre for Reviews & Dissemination 1995). A well designed study that is poorly reported may therefore appear as poor quality, or a well written scientific paper may hide some of the weaknesses of the research design (Harden and Gough 2012). However, as Sandelowski & Barroso 2002 argue, the quality of research reporting may be a proxy for overall quality and 'research cannot be separated from its communication in a research report', it is important to include some measure of the quality of reporting within quality appraisal. (Sandelowski and Barroso 2002)

Although checklists are widely used in systematic reviews and can be useful in assessing study quality, they have their limitations. As checklists are often designed for specific types of study, they are not appropriate to use where exact study criteria are not met and are often suited to one specific study design. Checklists that are designed to assess quality criteria across a range of study designs can be used, (Downs and Black 1998), but acknowledging that certain study designs have a lower maximum potential score than others (McDermott et al. 2012). However, the utility of the 'score' in assessing the value of the evidence is not always clear, and other effects than those included within the quality score can impact more upon the results than those in the checklist. (McDermott et al. 2012)

Booth et al advocate using quality criteria that are appropriate to the review in question and suggested developing study specific quality criteria rather than automatically using a checklist. (Booth et al. 2012) Similarly, Liberati et al guard against using scales that numerically summarise multiple components into a quality score and advocate the assessment of individual components. (Liberati et al. 2009)

Checklists such as those developed by EPOC that include quality assessment for multiple study designs include specific criteria by which to appraise interrupted time series or controlled before and after studies, but cannot be used for uncontrolled before and after studies. There is an argument that the risk of bias inherent in these uncontrolled before and after studies is great enough to warrant exclusion from systematic reviews (Deeks et al. 2003). However, whilst the data may not be of high enough quality to be able to provide information about effectiveness of interventions, the studies may yield other important information about feasibility or acceptability of interventions and have been included within other published systematic reviews using narrative synthesis (Chisolm et al. 2012) (McDermott et al. 2012). These studies were included within this systematic review and a subset of quality criteria that were considered relevant to this study design and the nature of the interventions being considered was developed to enable discussion of the validity and reliability of studies as well as applicability of findings. This tailored assessment should offer a more appropriate method of assessing the risk of bias than existing checklists.

The quality criteria assessment aimed to address various sources of bias. Three major sources of bias have been highlighted as important within quality assessment; selection bias (subjects in sample may not be representative of population of interest), measurement biases (relating to how the outcome of interest was measured), intervention (exposure) biases (differences in how the intervention was carried out, or how subjects were exposed to the factor of interest) (University of Medicine and Dentistry of New Jersey 2013). The Cochrane collaboration's tool for assessing risk of bias breaks the latter two sources into three categories (performance bias, attrition bias, detection bias) and adds reporting bias (O'Connor et al. 2008). The following criteria for validity assessment were developed from criteria used in previous reviews that included non-randomised study designs (McDermott et al. 2012) (Ogilvie et al. 2007) (see Table 4)

Table 4: Items to include within data extraction to address risk of bias.

Risk of bias	Rationale (source of bias)
Were groups comparable?	Report whether the baseline characteristics of control and intervention groups are comparable in order to address selection bias. There is evidence that pain is measured and managed differently for different patient groups. (Lazio et al. 2010) Groups need to be comparable in terms of characteristics thought to affect pain management (e.g. gender, age, ethnicity).
Were periods of assessment in control and intervention group comparable?	Consider the time period of assessment in terms of length and seasonality. This aims to assess measurement/detection bias. Studies should use comparable periods of assessment. As quality measures within EDs are strongly affected by seasonality, the use of a single control period or of different time periods for intervention and control significantly weakens the design of the study.
Were subjects	Report whether recruitment was consecutive/random/convenience to

representative of the study population?	address selection bias. Recruitment or inclusion of patients' needs to be random or consecutive in order to ensure 'difficult' patients, or patients at times when pain management may be more problematic are not excluded. Convenience sampling often takes place within hours and management of pain for attendances out of hours is likely to differ considerably, thus limiting the external validity of results.
Were participants blinded (staff and patients?)	Report any blinding attempted to address measurement bias (also performance, expectation or attention bias). Where appropriate, staff, patients and assessors should be blinded to the existence of the study as people may be more likely to seek or give treatment for pain management if their awareness of pain management is raised.
Did authors discuss any concurrent intervention that may contaminate results?	Report any discussion of concurrent interventions or factors that may affect the performance of the intervention. This addresses performance bias (contamination or co-intervention bias) In order to detect whether any changes are reported are due to the intervention itself and not to, e.g. any overall quality improvement programmes that the intervention may be a part of, the authors need to discuss the existence of any concurrent intervention that may impact upon pain management.
Was selective reporting bias avoided?	Report on whether authors reported on all outcomes they intended to measure in aims of study and whether appropriate statistical measures used. This will address reporting bias. As there are so many potential outcomes with which to assess pain management, authors should state which authors they intend to use a priori, to ensure any negative or equivocal findings are not omitted.
Was data collected in similar method before and after?	Report on whether patients were recruited prospectively or retrospectively to assess detection bias. In studies looking at behavioural change such as changes in pain management, there is a significant risk of Hawthorne effect, where the increased awareness of the intervention being studied and the research itself leading to a false or temporary improvement in performance. The risk is reduced where both sets of data were collected prospectively as any improvement resulting directly from the research taking place is likely to be seen across both control and post-intervention periods and therefore unlikely to significantly confound any changes in performance post-intervention. However, where control data was collected prospectively and post-intervention data collected retrospectively, a significant level of bias is introduced. The collection of data retrospectively avoids risk of Hawthorne effect but is subject to inaccuracies in recording and coding. This is particularly problematic for assessing data items such as pain scoring tools, which are frequently not recorded in the notes even when used (Chisholm et al. 2008) (Probst et al. 2005).
Was there a minimum sample size in each group with equal attrition rate?	Report on the sample size and any details of attrition rate in order to address attrition bias. This outcome was not included within the final assessment of risk of bias as there were so few studies with a design that may experience attrition.

3.3.10. Use of quality assessment.

Appraisals of quality or risk of bias within systematic reviews can be used in various ways within the review. Some studies use the appraisal to select only high quality studies (i.e. studies meeting a certain threshold on a checklist) to include within the evidence synthesis, whereas others report upon the risk of bias to make it explicit to readers but do not use it to exclude studies from the analysis (Coren et al. 2011;Dixon-Woods et al. 2006). Dixon-Woods et al prioritised relevance of studies over particular methodological standards and excluded only studies which had little relevance and met one or more criteria of a checklist of 'fatal flaws'(Dixon-Woods et al. 2006). A similar approach was used here as even studies which had methodological flaws could offer value in terms of explaining how an intervention may have been developed and explanations of potential barriers and enablers to implementation. The results of the appraisal of risk of bias were used to aid with discussion of the potential value of studies.

3.3.11. Outcomes and summary measures

The outcome measures included were documented earlier. As outcomes were not summarised quantitatively, summary measures for each outcome were not required.

3.3.12. Synthesis of results

The synthesis of evidence is the process by which the evidence from different studies is brought together to identify patterns and direction of findings, and integrated to produce a new explanation or theory which attempts to account for the range of findings (Mays et al. 2005)). The method of data synthesis used depends upon the design and quality of studies included in the review, and the diversity, or degree of heterogeneity within the studies.(O'Connor et al. 2008) Where good quality evidence from RCTs is available and studies are not heterogeneous, data can be synthesized using meta-analysis and other statistical techniques. However, where the quality of evidence is not strong enough to be able to provide valid conclusions about the effectiveness of interventions, or the studies are too diverse, other techniques need to be considered. As there was significant heterogeneity within the studies included in this review, both in terms of the interventions included and the outcomes reported, and the design of the studies precluded any useful estimate of effectiveness, a descriptive or narrative approach was chosen to synthesise data for this review.

Traditional narrative approaches have been criticised for being open to bias and misinterpretation so the more formalised method of narrative synthesis and tabulation of data was chosen as a more appropriate method of synthesising quantitative data where outcomes are not reported in 'comparable format' (Booth et al. 2012). Narrative synthesis is a textual

approach to summarising and explaining the findings from multiple studies and can be useful in answering questions that are not based solely around effectiveness of interventions (Popay et al. 2006). The data is tabulated and allows the reader to begin to identify patterns between studies and to characterise studies to produce a body of evidence. Tabulation of the data initially can aid in the identification of themes or categories for later data analysis. Narrative synthesis was undertaken following the four principles proposed by Popay et al:

1. Developing a theory of how the intervention works, why and for whom
2. Developing a preliminary synthesis of findings of included studies
3. Exploring relationships in the data
4. Assessing the robustness of the synthesis.

Studies were summarised within tables based upon the Cochrane 'characteristics of included studies' table format, as recommended by Popay. In addition, the introduction, results and discussion sections of included studies were reviewed to elicit the aims of the intervention and any lessons around feasibility and acceptability of interventions in the ED. Information around implementation and process issues of interventions are rarely described within the methods. (Popay et al. 2006)

3.4. Results

3.4.1. Study selection

A total of 8083 articles (once duplicates had been removed) were identified and titles and abstracts reviewed. All were identified from the database searches as citation searches did not identify any additional articles, probably due to the sensitivity of the broad search strategy. 75 articles were then identified for full review, of which 2 were found to be duplicates and 2 had no abstract available. The remaining 71 were double reviewed by 2 reviewers and 29 were found not to meet the full inclusion criteria. A total of 42 studies were included in this review. The kappa score for inter-rater agreement on articles to include was 0.81.

Table 5: Articles identified and sources

Source and dates	Total number identified (excluding duplicates)	Number identified for initial inclusion	Articles included in the final review.
Medline (1966-)	3769	51	34
Embase	1690	9	4
Cinahl	829	11	2
Cochrane	753	1	0
Web of Science	1005	3	2
Citation search	0	0	0
Grey literature	37	0	0

Total	8083	75	42

3.4.2. Characteristics of included studies

There was significant variation between studies in terms of important variables including design of the intervention, outcomes reported, length of follow-up, patient group and country (see Table 6).

Table 6: Characteristics of included studies

Author	Year	Country	Population	Age	N	Study design *
Baumann	2007	USA	Traumatic or non-traumatic pain	>8	768 v 474	B / A
Blankenship	2012	USA	Any pain-related complaint	18+	646 v 592	B / A
Boyd	2005	Australia	Peripheral limb injuries	Paediatrics	151 v 140 v 126	B / A
Campbell	2004	USA	Any non-urgent pain	NR	N/A	B / A
Clere	2001	France	All patients	NR	1839 v 1984	B / A
Corwin	2012	USA	All patients in pain	Paediatrics	103 v 109	B / A
Crocker	2012	USA	Painful condition, injury or procedure	Paediatrics	531 v 263	B / A
Day	1995	USA	Acute low back pain	>16	103 v 259	B / A
Decosterd	2007	Switzerland	Any acute or recent pain	Adult	249 v 192	B / A
Doherty	2012	Australia	Abdominal and pelvic pain, injuries.	All	16,627 total	Stepped wedge design
Eisen	2007	UK	Any painful conditions	Age 4-16	115 v 116	B / A
Ender	2010	USA	Sickle cell disease with vaso-occlusive pain	Age 3-18	68	Cohort
Fosnocht	2007	USA	Traumatic extremity or back pain	18+	471 v 112	B / A
Gawthorne	2010	Australia	Trauma patients	NR	100 v 100	B / A
Goodacre	1996	UK	Acute skeletal injuries	NR	200 v 200	B / A
Hawkes	2008	Ireland	NR	Age 1-16	95 v 145	B / A
Iyer	2011	USA	Isolated long-bone extremity fracture	Paediatrics	387 v 615	B / A
Jackson	2010	USA	Hip fracture	>65	151 v 151	B / A
Jadav	2009	UK	Long bone fracture, burns	<=11	187 v 163	B / A
Jones	1999	USA	Acute painful conditions	NR	54 v 72	B / A
Kaplan	2008	USA	All patients	Age 3-20	462 v 372	B / A
Kelly	2000	Australia	Long bone fractures	NR	79 v 83	B / A
Kelly	2000	Australia	Renal colic	NR	63 v 65	B / A
Kuan	2010	Ireland	Any pain complaint	NR	50 v 50 v 51	B / A
LeMay	2009	Canada	Burn, fracture, laceration, sprain or acute abdominal pain	Paediatrics	150 v 104 v 119	B / A
Morrissey	2009	USA	SCD with pain	Paediatrics	51 v 212	B / A

Author	Year	Country	Population	Age	N	Study design *
Muntlin	2011	Sweden	Abdominal pain	18+	50 v 100 v 50	B / A / B
Nelson	2004	USA	Renal colic, extremity trauma, headache, opthalmologic trauma, soft tissue injury	NR	521 v 479	B / A
Odesina	2011	USA	Sickle Cell Disease	Adults	44 v 66	B/A
Perron	2007	Switzerland	All patients	Age 18+	653 v 337 v 419	B / A
Rogovik	2007	Canada	Limb or clavicle injury	Paediatric 3+	179 v 131	B / A / B / A
Santervas	2010	Spain	Abdominal pain, chest pain, headache	Age 3-18	150 v 150	B / A
Somers	2001	UK	Painful injuries	<16	129 v 133	B / A
Stalnikowicz	2005	Israel	Orthopaedic conditions	12+	70 v 70	B / A
Steinberg	2011	USA	Renal colic (diagnosed)	Age 18-65	50 v 44	B / A
Sucov	2005	USA	Long bone or extremity fractures	All	235 v 1219	B / A
Tanabe	2012	USA	Sickle Cell Disease with vaso-occlusive pain	Adults	959 v 807 v 1169	Cohort
Thomas	2004	USA	All patients	18+	100 v 100 v 100	RCT
Vazirani	2012	Australia	All patients	Adults	8743 v 8462 v 9043 v 9380	B / A
Williams	2012	Australia	Abdominal pain	Age 2-16	80 v 80	B / A
Wong	2007	Hong Kong	Minor isolated single limb injury	18+	96 v 199	B / A
Yanuka	2008	Israel	Minor-moderate trauma	18+	1000 v 700	B / A

* B/A = Before / After, B/A/B = Before/After/Before, N/R =Not reported

Studies were predominantly before and after studies in a single site (n=38), with different lengths of follow-up period. There were two cohort studies of patients with sickle cell disease attending ED for vaso-occlusive crisis pain (Ender et al. 2010) (Tanabe et al. 2012)and one randomised controlled trial of different methods of displaying pain scores within ED charts (Thomas and Andruszkiewicz 2004). One study reported a stepped-wedge design of 55 Australian EDs involved in a national pain initiative project, with over 16,600 data points. (Doherty et al. 2013)

Study populations consisted of all patients attending the ED (n=5), patients with a range of painful conditions (n=17) and specific conditions (n=19), including fracture (n=5), renal colic (n=2), sickle cell disease (n=4) and others (n=8). One study did not specify their inclusion criteria. Articles reported on studies which were undertaken in the following countries: USA (n=19), Australia (n=7), UK (n=4), Israel (n=2), Switzerland (n=2), Canada (n=2), Ireland (n=2), Spain (n=1), Hong Kong (n=1), Sweden (n=1) and France (n=1). Very few studies

reported details of the population that the intervention was aimed at (i.e. the staff of the ED). Patient populations included paediatrics only (n=15), adults or mixed (n=18) , with 9 not reporting details.

3.4.3. Risk of bias within studies

Results from the assessment of risk of bias are shown in Table 7, with further details of individual studies available in the table of characteristics of included studies (see Appendix 3). The level of risk of bias was high, notably due to the uncontrolled before and after design as well as lack of blinding, unmatched data collection periods and differences in collection of pre- and post- intervention data.

The majority of studies reported at least two baseline characteristics of control and intervention groups (age and gender), although there were very few who reported other characteristics that may potentially affect pain management such as ethnicity (Arendts and Fry 2006) (Green et al. 2003) or baseline pain score, which would allow reduction in pain score to be assessed. Some studies did not report the actual numbers for baseline characteristics but reported that there were no differences between groups.

There were only two studies in which the control and intervention groups were concurrent, with most studies having a before/after study design. One of these studies used a stepped wedge design (intervention was introduced in a second wave) so only a proportion of the data was concurrent control, and it was not clear how this control data was used. Periods of assessment in control and intervention group varied considerably and there was little consistency in design. Many studies did not report full details of the three time periods (length of control, start and duration of intervention period, length of post-intervention follow-up). The length of control and follow-up were frequently unequal (leading to uneven group sizes) and the time during which the intervention was undertaken varied from less than a week to 2 years. Data collection was prospective in fewer than a third (15/42) of studies and just under half the studies did not state which outcomes they were reporting a priori. Only five studies discussed any concurrent interventions that may contaminate results.

Table 7: Assessment of risk of bias

Author	Comparability [1]	Period of assessment [2]	Representative [3]	Blinding [4]	Contamination [5]	Reporting bias [6]	Prospective [7]
Baumann	N	N	NR	Y	NR	Y	P/P
Blankenship	Y	N	N	Y	NR	Y	P/P

Author	Comparability [1]	Period of assessment [2]	Representative [3]	Blinding [4]	Contamination [5]	Reporting bias [6]	Prospective [7]
Boyd	NR	N	Y	NR	NR	Y	P/P
Campbell	NR	N	N	NR	NR	NR	NR
Clere	NR	N	NR	NR	NR	Y	R/P
Corwin	Y	N	N	N	NR	Y	P/P
Crocker	N	N	Y	NR	NR	Y	P/P
Day	NR	N	Y	NR	NR	Y	R/R
Decosterd	Y	N	Y	N	N	Y	P/P
Doherty	Y	Y*	Y	NR	NR	Y	R/R
Eisen,	NR	N	NR	NR	NR	NR	NR
Ender	NR	N	NR	NR	NR	NR	P (cohort)
Fosnocht	NR	N	N	Y	NR	Y	R/P
Gawthorne	Y	N	Y	N	NR	NR	R/R
Goodacre,	NR	N	Y	N	NR	NR	P/P
Hawkes	NR	N	Y	NR	NR	NR	R/R
Iyer	NR	N	NR	NR	Y	Y	R/R
Jackson	NR	N	Y	NR	NR	NR	R/P
Jadav	NR	N	NR	N	NR	NR	R/R
Jones	Y	N	N	Y	NR	Y	P/P
Kaplan	N	N	NR	Y	NR	Y	R/R
Kelly	Y	N	Y	NR	Y	NR	R/R
Kelly	Y	N	Y	NR	NR	NR	R/R
Kuan	NR	N	NR	NR	NR	NR	NR
LeMay	NR	N	Y	NR	NR	Y	R/R
Morrissey	Y	N	Y	NR	NR	NR	R/R
Muntlin	Y	N	Y	N	NR	Y	P/P
Nelson	Y	N	Y	Y	NR	Y	R/R
Odesina	NR	N	NR	NR	NR	NR	R/P
Perron	NR	N	Y	NR	NR	NR	R/R
Rogovik	NR	N	Y	N	NR	Y	P/Unclear
Santervas	NR	N	Y	NR	NR	NR	R/R
Somers	Y	N	NR	NR	NR	Y	R/R
Stalnikowicz	Y	N	Y	NR	NR	Y	P/P
Steinberg	Y	N	NR	N	NR	Y	R/P
Sucov	NR	N	Y	NR	Y	NR	R/R
Tanabe	Y	N	Y	NR	NR	Y	P (Cohort)
Thomas	Y	Y	Y	Y	NR	Y	P (RCT)
Vazirani	Y	N	Y	Y	Y	Y	NR
Williams	Y	N	NR	NR	NR	Y	R/R
Wong	Y	N	N	N	Y	NR	P/P
Yanuka	Y	N	N	NR	NR	NR	P/P

Y=Yes, N=No, NR= Not reported, P=Prospective, R=Retrospective

*This was a step-wedge design so only part of the data was from a concurrent control

1. Were groups comparable in terms of baseline characteristics thought to affect pain management?
2. Were control and intervention groups concurrent?
3. Were subjects representative of the study population (random or consecutive recruitment)
4. Was there any evidence of blinding staff or patients?
5. Did authors discuss any concurrent interventions that may contaminate results?
6. Were all main outcomes reported?
7. Was data collected in similar methods for control and intervention? Report whether prospective/retrospective for each.

3.4.4. Results of individual studies

Full details of individual studies can be found in appendix 3. Summary data has not been included here due to the high level of potential bias within included studies and the level of heterogeneity between studies.

3.4.5. Synthesis of results

The synthesis of results are presented below following the four principals proposed by Popay et al (Popay et al. 2006)

3.4.5.1. *Stage 1: Development of theory of how the intervention works, why and for whom*

There are a number of theories about why pain management is poor in the ED but little empirical evidence supporting any individual theory (see Table 2). Different types of intervention to improve pain management will have been developed according to an implicit theory of why pain management is poor. As very few studies explicitly reported the rationale or theory behind the development of an intervention, the distinct rationales and types of intervention were identified based on reading the introduction, methods and discussion sections of the articles to understand the implicit rationale behind each intervention. This was used as a preliminary theoretical framework for synthesizing results. (See Table 8)

Table 8: Theoretical framework for rationale of interventions.

How the intervention works	Rationale
1. Changing subjective measurement of pain into an objective measure by using	Pain is a subjective measure that is difficult to assess and there are differences in the estimation of pain by clinicians, nurses and patients (Guru and Dubinsky 2000). In order to be treated properly, pain needs to be assessed by an objective, validated pain scoring tool that can be understood by patients, clinical and nursing staff. The use of pain

pain scoring tools	scoring tools should therefore improve ED staff awareness of patients' pain and allow them to administer analgesia accordingly.
2. Removing **structural barriers** that lead to delays in provision of analgesia	Barriers to timely analgesia include physical access barriers and delays associated with the need for medical staff to assess and prescribe opioids and other narcotics. Structural changes to the ED as well as a move towards increased nursing involvement (e.g. nurse-initiated analgesia) should improve pain management, as there is evidence that nursing staff have a lower turnover, a stronger belief in the need for change in practice and are more able to estimate patient's pain than medical staff (Muntlin et al. 2011) (Perron et al. 2007).
3. Removing **attitudinal and knowledge barriers** to the management of pain	ED staff receive very little training about the importance of pain management and a lack of knowledge and misbeliefs around pain management are seen as barriers to the delivery of appropriate analgesia. Educational interventions should therefore help to increase ED staff understanding of the theory behind pain management and enable them to improve the management of pain. Similarly, pain protocols should decrease staff uncertainty and provide information as to how to manage pain and offer appropriate analgesia.
4. **Combining different methods** of improving behaviour change to address different aspects of poor pain management	The reasons for poor pain management are multiple and complex, and therefore need addressing with a multifaceted intervention which involves a combination of methods (e.g. protocol with education and pain scoring) to maximise behaviour change around pain management. Problems may be department specific and can best be resolved by individualised interventions taking into account the needs of the department. A combination of these methods may lead to increased effectiveness, as seen in other contexts (Robertson and Jochelson 2006)
5. Understanding how pain can be managed better within an individual department by developing interventions based upon **diagnostic analysis** of the problems within that department.	Research in other settings suggests that interventions attempting to change behaviour should involve a 'diagnostic analysis' to identify barriers and factors likely to affect change (National Centre for Reviews & Dissemination 1995). Studies that have undertaken research or audit in their departments and developed interventions based on a strong theoretical framework are more likely to address barriers to pain management and therefore achieve an improvement in pain management within their ED.

As the focus of the synthesis was not on effectiveness, due to the design of the studies included, studies were not categorised by outcome, country of origin, population studied, or any other category for which there may be a clear rationale for not combining results. Instead, the categorisation by 'type' of intervention was undertaken to allow lessons about feasibility and acceptability to be included.

3.4.5.2. *Stage 2: Development of a preliminary synthesis of findings of included studies.*

Full details of the interventions and study findings are included in appendix 3. The types of intervention, outcomes reported and any significant results are summarised in Table 9 and discussed in stage 3 below.

Table 9: Components of interventions and outcomes reported

	Components of interventions										Outcomes reported							
Author	Pain protocol / guideline	Documentation of assessment	Educational intervention	Nurse admin analgesia	Other	Training in use of intervention	Audit and feedback	Reminders	Theoretical framework	Local development	AA	AAA	TTA	DPS	RDPS	RedPS	RAA	PatSat
Baumann		•									•			• *	• *			
Jadav		•									•	• *		• *				
Kaplan		•				•					•		• ^	• *				
Nelson		•									• *		• ^					
Rogovik		•									• ^	•	•					
Thomas		•									• *	• ^	• *			•		
Blankenship					•	•					•		•					
Day					•	•				•	•	•						
Clere	•											•						
Eisen,	•	•									• *		• *	• *				
Ender, K	•					•						• *	• *					
Goodacre,	•						•				• ^	• ^						
Morrissey	•				•					•		• *	• *	• *				
Steinberg	•									•		• *	•					
Tanabe	•			•	•		•			•			• -			• *		• ^
Jackson			•								• ^		•		• *			
Jones			•							•						• *		
LeMay			•							•	• *			• *				
Sucov			•				•				• *							
Boyd		•		•		•	•				• *		• *					
Campbell	•		•		•		•											
Decosterd	•		•					•			• ^		•		• ^	•		• ^
Fosnocht	•	•		•		•	•				• ^		• *			• ^		
Gawthorne	•		•					•		•	• *	• *	• ^	•				
Kuan	•		•								•		• ^	• *	• -			
Muntlin	•		•	•						•	• *		• *					•
Odesina	•		•									• ^	• ^					
Santervas	•	•				•					• ^			• *				
Somers	•		•		•			•					• *					
Vazirani		•	•								• ^		• ^	• ^				

	Components of interventions										Outcomes reported							
Author	Pain protocol / guideline	Documentation of pain score	Educational intervention	Nurse admin analgesia	Other	Training in use of intervention	Audit and feedback	Reminders	Theoretical framework	Local development	AA	AAA	TTA	DPS	RDPS	RedPS	RAA	PatSat
Wong	•	•	•	•						•			•	• *		•		
Yanuka	•		•		•		•			•	• *		• *		•			• *
Corwin	•	•	•					•	•	•			•		• *	•		
Hawkes	•	•		•		•	•	•	•	•	• ^		• ^	• ^				
Iyer	•								•	•			• ^					• ^
Kelly	•	•		•					•	•	•	• *						
Kelly	•								•	•		• *						
Perron	•	•	•		•		•		•	•	• *			• *	• *			•
Crocker	•	•	•						•	•								•
Doherty	•		•		• [1]		•		•	•		• ^	• *	• *		•		
Williams	•	•						•	•	•			•	• *	•			
Stalnikowicz,	•								•	•	• ^		• *					

[1] Interventions differed by site but included some of these components. They were all individually tailored and encouraged to use the components listed.

Outcomes:

AA –proportion of patients administered analgesia

AAA – proportion of patients administered appropriate analgesia

TTA – time to analgesia

DPS – documentation of pain score

RDPS – repeat documentation of pain score

RedPS – reduction in pain score between admission and discharge from ED

RAA – repeat analgesia administered

Patsat – patient satisfaction outcomes reported

- ^ outcome reported but significance not measured
- * significant improvement in outcome found ($p<0.05$)
- - significant deterioration in outcome found ($p<005$)
- no significant improvement in outcome found

The most commonly reported outcomes were proportion of patients given analgesia (n=26) and time to analgesia (n=27). For both measures, ten studies reported a significant improvement and the remainder reported no significant difference (n=7, n=8 respectively) or did not report significance levels (n=9, n=8). One study reported a significant increase in time to analgesia. There were 14 studies that reported the proportion of patients who were given appropriate or adequate analgesia as an outcome (though the definition of 'appropriate' differed between studies), 7 of which reported a significant improvement. Fifteen studies reported documentation of pain score as an outcome, of which 11 reported a significant improvement. Only eight studies

reported reduction of pain score as an outcome, of which two saw a significant reduction in score. Doherty et al reported no significant reduction in pain score in their large multi-centre study, but this was only for patients in severe pain and only had repeat pain scores for a subset of patients.

The different components of interventions are discussed in Table 10 below. Studies attempted to improve implementation of the intervention by offering training in the use of the intervention (n=8), audit and feedback (n=10) and making use of reminders (n=6). Nearly half of the interventions (n=20) were developed in-house, using local staff and knowledge.

3.4.5.3. *Stage 3: Exploration of relationships in the data*

Key messages emerging from analysis of the studies are summarised in Table 10. There was some overlap within the 'types' of intervention and some studies were included within more than one category.

Table 10: Key messages from studies grouped by rationale for intervention.

Method	No. studies	Key messages
1. Interventions aiming to encourage objective measurement of pain by using **pain scoring tools**	Six studies reported on the use of a pain scoring tool alone, either as an addition to the existing triage tools or as a mandated part of the triage process. A further twelve used pain scoring within a multifaceted intervention. One RCT reported 3 different methods of displaying pain scores.	Studies concluded that improving the use and availability of pain scoring tools increased the documentation of pain, but that this did not translate into an increase in the proportion of patients receiving analgesia (with the exception of one study(Nelson et al. 2004)). There was little discussion of why the use of a pain score had not translated into improved analgesia. The use of pain scoring tools was common in multifaceted interventions and appeared to be an inexpensive, simple and acceptable method of improving pain management. The single RCT identified within this review compared different ways of presenting the VAS and reported higher physician awareness of pain scores where VAS was measured every 12 minutes and reported on a graph at the end of the bed, compared with a 2 measurements of VAS at presentation and 2 hours. The measurement of VAS every 12 minutes was associated with expedited analgesia ($p<0.001$) but there was no significant difference in the % given analgesia ($p=0.69$) (Thomas and Andruszkiewicz 2004)
2. Interventions aiming to remove **structural barriers** that lead to delays in the provision of analgesia	Seven studies reported interventions that included introduction of nurse-initiated analgesia as a method of reducing delays to analgesia but these were all part of multi-faceted interventions. No interventions aimed to remove	Organisational changes reported as part of a multi-faceted intervention included nurse-initiated analgesia as an alternative to clinician administered analgesia (n=7), changes to physical access to opioids (n=1) and changes to the process of physician prescribing to decrease the length of time required to obtain analgesia (n=1). Changes to the role of nursing staff were felt to have a positive impact upon the pain management process. Interventions aimed at involving nurses more in the assessment and treatment of pain suggested that nurses can make autonomous decisions regarding the prescription of analgesia and the use of nurse-initiated

	structural barriers alone.	analgesia was safe and well accepted by nurses(Muntlin et al. 2011). There was some evidence that interventions aimed at nurses had improved uptake than those aimed at doctors (Nelson et al. 2004) (Rogovik et al. 2007). The high turnover of medical staff has been identified as a barrier to the uptake of interventions (Perron et al. 2007) and therefore the lower turnover of nursing staff should enable effectiveness of interventions to be sustained.
3. Interventions aiming to remove attitudinal and knowledge barriers to pain management	In total, 33 studies reported on interventions incorporating pain protocols or education to improve knowledge around pain management. Eighteen studies reported on the use of an educational intervention either alone (n=3) or within a multi-faceted intervention (n=15) and 28 studies reported on interventions including protocols or guidelines, either alone (n=6) or as part of multifaceted interventions (n=22).	Studies of educational interventions reported varying levels of success in improving pain documentation and administration of analgesia. Interventions differed in content, format, length and coverage. Success was attributed by the authors to the active nature of an educational intervention(Le et al. 2009b), simplicity(Sucov et al. 2005) and ability to fit round work schedules(Le et al. 2009b). Ongoing education and reminders are needed due to rapid turnaround of medical staff. Protocols ranged from simple guidelines offering specific treatment and dosing guidance for a well-defined group of patients (Steinberg et al. 2011), to more complex protocols providing specific information as to how pain should be managed within the departments, and may include reinforcement of existing procedures or a change in pain management procedure (e.g. (Corwin et al. 2012)). Some included department-specific information as to how the patient should be assessed, by whom and specific recommendations for reassessment of pain. There was considerable variation in the level of detail of the contents of protocols reported within studies, making comparison of their content difficult. Authors offered little insight into the feasibility or acceptability of protocols, despite largely concluding that the introduction of a protocol led to improved outcomes in their populations. Two studies reported variable or poor compliance with the protocol but did not discuss potential reasons (Hawkes et al. 2008) (Fosnocht and Swanson 2007). The use of pain scoring tools within protocols was felt to help appropriate pain management as recommended analgesia route and dosage was often related to pain severity
4. Multifaceted interventions aiming to combine different methods of improving behaviour change to address different aspects of poor pain	The majority (n=26) of studies reported on multifaceted interventions that included more than one of the individual ‘types’ of interventions.	Interventions most commonly combined a protocol with use of pain scoring tool (n=10) or protocol and educational intervention (n=13). Interventions were also considered multifaceted if they made use of additional tools to improve implementation that have been shown to work in other settings (e.g. audit, feedback, reminders). Only a subset of these interventions referred to themselves as ‘multifaceted interventions’. Interventions reported on a range of outcomes and authors concluded that it was difficult to differentiate which parts of the multifaceted intervention had contributed to any success. There was little discussion of the benefits of multifaceted interventions, although one study undertaking pre-intervention audit concluded that a range of drivers were essential as optimising one driver at a

management		time did not achieve the magnitude of effect required(Iyer et al. 2011).
5. Interventions based upon diagnostic analysis of department specific problems in order to understand how pain can be managed better within that department.	Seven studies reported multifaceted interventions with an explicit theoretical framework that had been developed following research or audit into the barriers existing within their department.	Studies provided little detail on how the research or audits that identified the barriers around which interventions were developed. Studies did not comment on how the targeting of interventions to department-specific problems may have impacted upon the uptake or success of the intervention. Doherty et al developed a national project to compare pain management based upon findings of an extensive barrier analysis and reported results of a large study with step-wedged design. (Doherty et al. 2013) Local protocols were developed at each site, addressing 4 main clinical indicators aimed at monitoring key components of analgesic practice. There was no significant decrease in pain levels, although an increase in documentation of pain scores and reduction in time to analgesia was observed. As there was no single protocol, it was not possible to attribute any improvements in outcome to any specific part of the intervention.

Further exploration of outcomes

No single intervention was identified that consistently reported improved rates of analgesia or reduction in time to analgesia. Of the seven studies reporting significant improvement in rates of appropriate or adequate analgesia, six included the use of a protocol or guideline, yet the mechanism as to how these may have been effective is not clear. Many of the protocols included information about the correct route and dosage of analgesia in order to ensure the analgesia is administered appropriately. However, the risk of bias inherent in the design of the studies means that interpretation of effectiveness must be interpreted with caution.

Ten of the eleven studies that reported a significant improvement in documentation of pain included pain scoring within their intervention, either alone or within a multi-faceted intervention, suggesting that the inclusion of pain scoring may improve documentation. The number of studies reporting reduction in pain score was low, which may be due to the difficulty in recording this as an outcome as full recording of pain score at the beginning and end of the ED visit is required.

3.4.5.4. *Stage 4: Assessment of the robustness of the synthesis*

Any attempt to synthesize data across different groups must be interpreted cautiously. There are a number of different factors within studies of pain management in EDs that influence the effectiveness of any interventions attempted. The populations studied varied widely both in terms of ages and conditions included. Assessing the success of interventions is more difficult in paediatric populations due to communication of pain levels. Pain relief may be harder to

achieve in certain conditions (Corwin et al. 2012) and pain may be more likely to be treated when known to be due to a painful condition (e.g. fracture) (Blankenship et al. 2011) (Muntlin et al. 2011) and less likely when diagnostic workup is required (Nelson et al. 2004).

Differences in settings, particularly country, may influence effectiveness of interventions due to different expectations of pain relief and baseline levels of pain management. The implementation of pain protocols may have less impact in countries such as the USA and Australia where there are already established national guidelines and national bodies already recommend the mandating of pain scoring (Joint Commission on the Accreditation of Healthcare Organizations 1999) (Department of Health 2013) (National Institute of Clinical Studies 2011)

Differences in length and timing of follow-up can affect outcomes, and is a source of significant bias in before and after studies. Several studies reported follow-up at less than one month post-intervention, when the 'honeymoon' effect would likely still be strong. Outcomes from studies with significantly longer follow-up risk of confounding due to secular trends . The time periods used to assess pre- and post-intervention outcomes were often not comparable in terms of length of time and seasonality, despite ED attendances being highly seasonal (Cinar et al. 2011b) and correlation between quality indicators and 'busyness' of a department (Hwang et al. 2008). There was considerable variation within the 'types' of interventions reported and there is little value in comparing, e.g. a department-specific protocol reinforced by interactive educational sessions, audit and reminders with a more simple protocol reinforced by a single didactic education session.

3.5. Discussion

The primary aim of this systematic review was to identify any interventions that aim to improve the management of pain within EDs, assess the effectiveness of interventions and understand the context in which different interventions work. Barriers and enablers to implementation of any intervention found to be effective and suitable for adoption within the ED could then be evaluated within the empirical phase of the research. However, the review did not identify any particular intervention that could be recommended for implementation, or enable understanding of the context in which interventions might be successful, due to high risk of bias in the design of studies.

3.5.1. Strengths and limitations of the systematic review

Despite a very broad search and wide inclusion strategy this evidence synthesis revealed a lack of good quality evidence of effectiveness of interventions to improve pain management within EDs. Over 70 studies were identified and 42 included, yet all but four used an uncontrolled

before and after study design, with just one RCT looking at methods of displaying pain scores. This RCT compared methods of presenting pain scores with a 'control' of the VAS recorded at presentation and at 2 hours, which will not represent current practice in many EDs and therefore limits the utility of the study's conclusions (Thomas and Andruszkiewicz 2004). Due to significant variation in the design of interventions, populations studied, length of follow-up and outcome measures used even within multifaceted interventions, it was difficult to attribute any level of 'success' to an individual element of the intervention (Doherty et al. 2013) (Williams et al. 2012). As the quality of these studies was moderate and the design not capable of producing strong evidence, it was not possible to undertake meta-analysis of the results and indicate which methods were most effective at improving pain management. However, the use of narrative synthesis allows a comprehensive synthesis of the literature pertaining to pain management interventions within the ED and offers some lessons about the feasibility of implementing interventions.

3.5.2. Lessons around feasibility of implementing interventions

Interventions that aimed to improve visibility of and access to pain scoring tools improved documentation of pain and were reported as simple, acceptable and inexpensive methods of improving documentation of pain. However, the improved levels of documentation did not translate into the anticipated improved provision of analgesia in the majority of studies reporting pain scoring alone (Baumann et al. 2007) (Jadav et al. 2009) (Kaplan et al. 2008) (Rogovik et al. 2007).Some authors hypothesised that interventions aimed at nurses were felt to have a greater impact upon the pain management process as nurses were felt to be more understanding of the need to improve pain management, and the lower turnover of nursing staff would extend the impact of interventions upon the department (Perron et al. 2007). Similarly, Muntlin et al identified that, whilst doctors felt that pain relief was not a priority in quality improvement work, nurses were more concerned about inadequate pain management and wanted further education about pain management. (Muntlin et al. 2011)Although some authors discussed what they felt attributed to the 'success' of their interventions (e.g. targeting interventions at nurses as above), many articles included very little discussion on the feasibility or acceptability of the interventions or why, for example, the improvement in pain scoring did not lead to an increase in the provision of analgesia. This lack of systematic exploration around how and why interventions worked limits the validity of synthesis in terms of providing useful messages as to how and why interventions may work, but the synthesis does provide a framework for understanding what barriers interventions are attempting to overcome.

It may also be the case that even with good quality evidence there is no 'magic bullet' that can be recommended as a 'solution' for all (Oxman et al. 1995) (Robertson and Jochelson 2006) As in other areas, the value of the intervention will likely depend upon the context and an individual intervention may work most effectively within the setting for which it was designed

(National Centre for Reviews & Dissemination 1995) (Dixon-Woods 2014). The positive impact of an intervention may depend upon the baseline performance of a department, and the degree to which the intervention has been tailored towards a specific department's needs (Doherty et al. 2013).

Many of the studies included within this review were based upon local audits undertaken by nursing and clinical staff with little or no external support or funding. Studies often reported their intervention to be successful in terms of pain management even where most of their pre-specified outcomes had not shown significant change. It may be that the implementation of an intervention did have positive effects for that department, although there are too many potential sources of bias for the results to have any external validity. The process of developing an intervention, and in particular feeding back the results of pre-intervention audits, may have been sufficient to raise the profile of pain management within EDs, regardless of the type of intervention used. The use of audit as an intervention in itself has been shown to have a moderate impact upon changing clinical behaviour in other settings (Robertson and Jochelson 2006). Some studies within this review reported that a change in practice had been observed following feedback of the pre-intervention audit, and prior to an intervention being implemented, as some EDs needed the audit feedback to understand how they were performing (Williams et al. 2012) (Shaban et al. 2012).

Although future studies of interventions to improve pain management in EDs would benefit from a stronger research design (e.g. cluster RCT), it seems unlikely that the evaluation of any individual intervention will provide valid recommendations for adoption that could be generalised to other EDs without a stronger understanding of the theoretical underpinning for the interventions. The multisite study in Australia (in which ED developed their own interventions) suffered from some attrition due to competing department priorities, funding pressures and loss of project lead, suggesting that even where there is initial local support, there needs to be clearer understanding of the barriers to pain management in order for interventions to address barriers, become embedded and achieve long-term improvements (Doherty et al. 2013).

3.6. Summary

- This systematic review of interventions to improve pain management in the ED identified a range of interventions that intended to modify behaviour and improve pain management within the ED.

- Due to the risk of bias within the studies included, the review did not identify any particular intervention that could be recommended for use in practice.

- Interventions identified sought to address a wide range of underlying theories as to how pain management could be improved (though these underlying theories were not always make explicit), suggesting a range of potential barriers to pain management.

- Studies reported limited exploration of how interventions had been implemented, or consideration of how and why interventions may or may not be effective.

- Improved understanding of the factors affecting pain management may be beneficial to developing and implementing further interventions.

The following chapter explores the qualitative literature that has emerged during the period between the outset of the study and undertaking the empirical research to understand whether the emerging literature can help to understand the barriers and enablers to pain management in the ED.

4. EXPLORATION OF EMERGING QUALITATIVE LITERATURE ON BARRIERS AND ENABLERS TO PAIN MANAGEMENT IN THE ED.

4.1. Outline of chapter

The systematic review of interventions to improve pain management in the ED presented within the previous chapter identified a range of interventions to improve pain management within the ED, yet no single intervention that could be recommended for use in practice, partly due to the risk of bias within the study design used. The review identified that interventions implicitly seek to overcome particular barriers to pain management, which were not always made explicit by authors when reporting the studies. Studies also reported limited exploration of how and why interventions worked. This suggests that improved understanding of the barriers that underpin the rationale behind developing interventions is needed to understand which interventions might work, and why. However, although there are articles speculating on barriers to pain management within the literature, these are not based on empirical evidence. A lack of qualitative research exploring the barriers and enablers to pain management in the ED was highlighted within the background section at the outset of this research (see chapter 2).

The research plan was formulated based upon this clear research gap and the application for ethical approval was developed in early 2012 on the basis of this research gap. However, during the intervening period between the outset of the research and finalising ethical approval, a small amount of qualitative literature around barriers and enablers emerged, along with potential barriers described within studies of interventions identified within the systematic review.

These are summarised here to understand whether the research that emerged during the period since the outset of the study and planning the empirical research can help to understand the barriers and enablers to pain management in the ED.

4.2. Why is understanding of context important?

Given the importance of understanding context in developing effective interventions (Bate et al. 2014) (Dixon-Woods 2014), it is possible that the continuing inadequate management of pain within the ED stems from a lack of understanding of the specific barriers to pain management in the ED. Much of the existing literature around barriers and enablers to pain management in the ED is speculative or has involved applying general learning around pain management from other contexts to the ED, rather than exploring pain management within the ED to understand processes and behaviours that are specific to the ED (Wilsey et al. 2008a) (Todd et al. 2002).

Evidence from other settings suggests that interventions to change professional behaviour need to be based upon a diagnostic analysis of factors that are likely to influence change (National Centre for Reviews & Dissemination 1995). Similarly, interventions are likely to achieve change if they are feasible and have organisational support, which can only be achieved with an understanding of local context (Robertson and Jochelson 2006) (National Centre for Reviews & Dissemination 1995). Pawson & Tilley argue that understanding the context in which interventions work is vital to developing interventions that can provide a trigger for change, and that the mechanisms within an intervention that can bring about change will differ according to context (Pawson and Tilley 1997). Theory based interventions facilitate understanding of what works and provide a basis for developing better theory across different settings and contexts (Michie et al. 2008). Interventions therefore need to be based around a solid theoretical understanding of the factors that influence pain management and an understanding of how the mechanism of the intervention interacts with the context to produce the required outcomes (Pawson and Tilley 1997) (Pettigrew et al. 1992). The existing research around factors that influence pain management within the ED is summarised below.

4.1. Methods

This section explores the literature around barriers to pain management in the ED in two steps. Firstly, the articles that reported undertaking diagnostic analysis of barriers to pain management prior to development of interventions (identified within the systematic review in the previous chapter) were reviewed to explore what barriers they reported within their diagnostic analysis. Secondly, the broad literature search that was undertaken for the systematic review was updated and reviewed to identify any studies that reported empirical data on staff or patient views of barriers and enablers to pain management in the ED, including qualitative and quantitative studies. This aimed to identify any studies that had been published since the outset of this research.

4.2. Potential barriers to pain management identified within emerging literature

Studies reporting diagnostic analysis of barriers

Ten studies were identified within this systematic review as having undertaken diagnostic analysis of barriers prior to developing an intervention. The level of detail about diagnostic analysis or barriers provided within the studies varied considerably. Of the ten studies, two did not report how analysis was undertaken (Kelly 2000b), (Crocker et al. 2012), five undertook an audit of current practice (Williams et al. 2012) (Hawkes et al. 2008), or other assessment of current pain management practice (Stalnikowicz et al. 2005) (Corwin et al. 2012) (Kelly 2000a).

Perron, Doherty and Iyer all used multidisciplinary teams to understand current deficiencies in practice, using qualitative methods (observation and interviews) to understand existing barriers and briefly reported the outcome of their analysis (Perron et al. 2007) (Iyer et al. 2011) (Doherty et al. 2013)

Iyer et al developed a quality improvement initiative which aimed to identify operational factors or key drivers that were felt to be key to improving pain management for patients with clinically apparent long bone fracture (Iyer et al. 2011) The process involved interviews with key stakeholders, expert consensus and reviews of individual patients, and examined the processes patients followed within the ED. They identified that, despite being assessed and screened for pain by a triage nurse, analgesic therapy was not routinely offered and processes to improve TTA were not being used due to workload and competing priorities.

Perron et al underook a needs assessment conducted by a multidisciplinary team through observation of patient care and group discussion with nursing staff (Perron et al. 2007). They identified a lack of systematic documentation of pain, low use of medication prior to attendance, lack of continuity of care and rapid turnover of medical staff as barriers to be addressed by the intervention.

Further qualitative research exploring barriers and enablers to pain management in the ED

Details of the diagnostic analysis designed to aid intervention development within the study reported by Doherty et al (Doherty et al. 2013) was published by Bennetts et al in a separate research article reporting staff views of barriers and enablers to pain management in Australian EDs (Bennetts et al. 2012). Shaban et al reported results of a linked study of staff views of barriers and enablers to implementing interventions recommended for best practice pain management in the ED (Shaban et al. 2012).

Two further studies were published in 2012 that used qualitative methods to explore barriers and enablers to pain management in the ED. Bergman used semi-structured interviews to explore emergency nurses perceived barriers to demonstrating caring when managing pain in the ED in the USA (Bergman 2012). Berben reported qualitative interviews and focus groups to explore the barriers and facilitators to pain management for trauma patients in the chain of emergency care (including prehospital care) in the Netherlands (Berben et al. 2012).

The broad findings of these four studies, all published in 2012, are summarised below, grouped into potential themes, along with the results from Iyer and Perron highlighted above.

Table 11: Summary of barriers identified in emerging qualitative literature

Theme	Barrier

Assessment	Lack of documentation of pain (Perron)
	Attitude problems towards assessment of pain or need to improve (Berben, Shaban)
Teamwork	Rapid turnover of medical staff (Perron)
	Lack of cohesiveness of healthcare team (Bergman)
Environment	Workload and competing priorities (Berben, Bennetts, Iyer, Bergman, Shaban)
	Organisational protocols and legislative issues (Bennetts)
	Lack of organisational support (Shaban)
	Environment not conducive to caring (Bergman)
	Lack of continuity of care (Perron)
Knowledge	Knowledge deficits, reliance on expert opinion (Berben, Bennetts)
	Lack of professional communication and organisational feedback (Berben)
Patient factors	Unrealistic patient expectations (Bergman)
	Low use of medication prior to arrival (Perron)

4.3. Identification of research gap

The recent publication of qualitative research into the barriers and enablers to pain management in the ED suggests that some evidence is beginning to emerge around the barriers and enablers to pain management. The results of these studies suggest that barriers to pain management are complex, with potential themes emerging that are specific to the ED context and the environment of the ED, with the difficulty of dealing with high workload and competing priorities in particular being most commonly cited. However, there was considerable variation in reported barriers between studies, perhaps due to the different settings of the research or due to the slight variation in research questions addressed. The themes identified within these studies have some overlap with factors reported as barriers to pain management within cross-sectional studies discussed in section 2.8, but also introduce concepts not addressed within these cross-sectional studies, such as attitudes or teamwork, demonstrating the importance of undertaking qualitative work to identify context-specific explanations. At this stage, no research has been identified that explores barriers to pain management within the UK.

Importantly, the studies reported insufficient detail to understand how pain management could be improved within UK EDs. These studies were undertaken within three different healthcare systems of USA, Netherlands and Australia and, although offering interesting insights into what staff felt were barriers and enablers within their contexts, did not provide significant insight as to why interventions might not work, or explain why improvements in some aspects of care (i.e. pain documentation) did not necessarily lead to improvements in proportions of patients

receiving analgesia (Doherty et al. 2013). These qualitative studies included only staff *views* of barriers, which may be subject to different types of conscious and subconscious bias, and staff may not be aware of embedded behaviours or cultural influences that impact upon how they manage pain.

There is currently insufficient evidence to recommend any interventions to improve pain management within EDs for widespread adoption, partly due to high risk of bias in existing studies, but also due to a lack of consistent results amongst existing studies. This emerging empirical evidence base around barriers and enablers to pain management within the ED suggests a need for further research to improve understanding of the context of the ED, in order to understand the barriers and enablers to pain management, why interventions may or may not work, and how barriers may be overcome to improve pain management in future.

4.4. Summary

- A small number of empirical studies using qualitative research methods to examine enablers and barriers to pain management have emerged during the development of first stage of this thesis and offer some insight into potential factors that ED staff feel affect their pain management practice

- Barriers reported were diverse but focussed more extensively on the environment of the ED and difficulties related to high workload and competing priorities.

- The majority of the literature identified discussing potential barriers to pain management comes from North America and Australia, which has limited application to the UK.

- Existing literature on barriers and enablers does not provide sufficient detail to understand how pain management could be improved, or explore how barriers of workload and environment may be countered. There is currently insufficient evidence to recommend any particular intervention for use within the ED.

- Empirical work within the UK setting is needed to understand the barriers and enablers to pain management within the ED by exploring the environment of the ED and structures, processes and workforce factors that impact upon pain management in depth. This should develop understanding of how pain management can be improved, and how interventions may address barriers in order to improve pain management.

The following chapter describes the aims and objectives, methodology and methods used within empirical research that seeks to address this research gap.

5. METHODOLOGY AND METHODS

5.1. Outline of chapter

The previous chapter highlighted a research gap for empirical research into barriers and enabler to pain management in the ED. This chapter describes the aims and objectives, methodology and methods used within empirical research that seeks to address this gap. This chapter is split into the following sections:

- Summary of aims and objectives
- Justification of methodology and use of multiple case study design
- Ethical considerations raised by the research methods
- Description and analysis of a pilot study that was undertaken to improve the processes and data collection tools used within case study site fieldwork (outlined here, further details available in Appendix 4)
- Details of how the case study sites were selected (outlined here, further details available in Appendix 5)
- Description of the methods and analysis used within the fieldwork

5.2. Aims and objectives

The initial research question addressed by this PhD was: 'How can the management of pain in EDs be improved?' The first step of the research process involved investigating whether any existing interventions have been shown to improve the management of pain by undertaking a systematic review of the current literature, reported in chapter 3. The systematic review of interventions to improve pain management in EDs revealed a lack of quality evidence supporting any particular intervention, but notably revealed a lack of understanding of why and how interventions may work. Given the importance of understanding context in developing successful interventions (Dixon-Woods 2014) (Fulop and Robert 2015) (Bate et al. 2014) a better understanding of the factors affecting pain management (barriers and enablers) was needed in order to be able to develop interventions to target these barriers.

The next step of the research summarised existing empirical literature examining barriers and enablers to pain management in EDs. This revealed a limited volume of literature on the subject, identifying no literature from the UK and scant qualitative research investigating barriers and enablers to pain management in the ED worldwide. This demonstrated a clear research gap for empirical research into barriers and enablers to pain management in EDs (see 4.3).

The aim of the empirical phase of this thesis was therefore to identify barriers and enablers to pain management in the ED, by understanding how pain is managed, understanding the structures, processes and workforce involved in pain management and factors that affect the management of pain within the ED. This should develop understanding of how pain management can be improved and how interventions might help improve pain management. The empirical study used a multiple case study approach, incorporating staff and patient interviews, non-participant observation, informal interviews and documentary evidence.

5.3. Justification of methodology and use of multiple case study design.

Given the limited existing evidence on which to build theories around barriers and enablers, a methodology using naturalistic, qualitative methods to develop theories around barriers and enablers inductively within the ED (rather than building on theories developed deductively from other contexts) was chosen. (Walshe et al. 2012) Importantly, the interpretative nature of qualitative research means that assumptions and ideas that were previously taken for granted can be questioned, (Pope and Mays 2000) which is particularly relevant in this context, where the literature still consists mostly of editorials and opinion pieces written by people who work in the ED and who are therefore embedded in the existing culture.

5.3.1. A case study approach

Existing qualitative research studies identified within the area of pain management in the ED used staff interviews and focus groups to elicit staff opinions about pain management (Berben et al. 2012) (Bergman 2012) (Bennetts et al. 2012). However, the use of direct elicitation methods alone may be limiting due to various response biases, and offer a limited sphere of perspective (discussed in section 5.3.4.2 below). A case study approach was selected for this research as it was felt to allow exploration and understanding of how pain is managed, why it is managed as it is, the contextual factors affecting pain management in EDs, and to enable a more in-depth exploration of differences between different case study sites. Case study research is useful in helping to understand complex phenomena, behaviours or organisations, and in particular for answering 'how' and 'why' questions (Yin 2003) Case study uses a naturalistic design as it is used to explain, describe or explore an event or phenomenon in depth and in its natural context (Crowe et al. 2011).

Different case study approaches are advocated by different methodologists (e.g. (Yin 2003) (Gerring 2007a) (Stake 1995) (Merriam 1998) with Yin being commonly referenced within case studies in Health Services Research (Yin 1999). However, whilst there are differences in the epistemological perspectives, techniques and strategies used, all three methodologies are in agreement about the importance of the use of multiple data sources in helping to understand the

research question addressed. As suggested by Yazan in his summary of different methodologies proposed by Yin, Stake and Merriam, (Yazan 2015) the method used within this thesis combines different elements from the different approaches, but draws primarily on lessons from Yin and Merriam, as well as lessons on developing theory from case studies from Eisenhardt (Eisenhardt 1989) (Yin 2003) (Merriam 1998).

Yin highlights three principal types of case study: descriptive, exploratory and explanatory. The case study design was an exploratory case study as it aims to generate hypotheses for later investigation, rather than illustrating how predefined theories could explain how pain was managed (explanatory case study).

5.3.2. Single or multiple case studies

Gerring describes case study as 'an intensive study of a single unit for the purpose of understanding a larger class of (similar) units' (Gerring 2007b). Within multiple case study design, a number of units can be studied together. (Yin 2003) A multiple case study design was chosen to enable understanding of the context of how pain is managed in EDs and why there may be variation between performance at different EDs. The barriers and enablers to pain management are likely to differ between departments and investigating the barriers and enablers within one department may have limited generalisability to other departments. Whilst single case studies have the advantage of greater depth of analysis, multiple case studies are recognised to increase the external validity of the results and increase the strength of analytic generalisation by providing some evidence that can be generalised beyond the case itself (Yin 2003). This research used 3 cases (ED sites), which was considered practical to maximise diversity and increase the strength of analytic generalisation, but within the context of limited time available within the Fellowship within which to undertake the fieldwork and analysis.

5.3.3. Sampling of cases

Different approaches to sampling can be undertaken in multiple case study designs (e.g. typical, extreme, deviant)(Yin 2003) (Gerring 2007b). Whilst these techniques refer principally to explanatory case studies, the sampling used to select the first two sites within this study could be described as diverse or 'polar types' sampling, as the aim was to identify case study sites that capture maximum variation in practice (Eisenhardt 1989). For the purposes of maximising diversity, one case with good pain management[1], and one case with poor pain management were selected. Assuming that all departments will have some examples of good and poor practice, the aim was not to understand what makes a 'good' or 'poor' site (as an explanatory case study would aim to), but to explore what factors affect pain management, assuming that the sites where pain is managed well will identify more enablers, and that more barriers will be observed

[1] 'Good' and 'poor' pain management were defined using criteria from ED patient satisfaction surveys undertaken by Care Quality Commission (CQC). Further details are provided in 5.8

at the sites where pain is not as well managed. A further 'improving' site was selected as a third site to test emerging theories around barriers and enablers identified. (see 5.8)

5.3.4. Sources of evidence

Case studies use multiple sources of evidence, often combining quantitative and qualitative methods in order to consider emerging similarities and differences in cross-case comparisons, as well as being able to provide a detailed description of each case (Crowe et al. 2011). The case studies incorporated data from multiple sources: semi-structured interviews, observation, informal interviews and documentary evidence. Each source offered different perspectives and complementary evidence that helped construct an understanding of how pain was managed, and the barriers and enablers to pain management within the case study sites. Yin also suggests other sources of evidence such as quantitative surveys, archival records and physical artefacts. Quantitative surveys of staff were not developed initially, as there were no a-priori theories that would be suitable for testing using this method. No sources of archival records or physical artefacts were identified as potential sources within the EDs (though anonymised printouts of patient notes may classify as physical artefacts rather than documentation). The rationale for using each source of evidence is discussed briefly below.

5.3.4.1. *Semi –structured interviews.*

The use of qualitative interviews rather than quantitative surveys enables access to new ideas and concepts that may not have previously been considered when designing surveys, and a more in-depth exploration of people's views and experiences than structured surveys allow. The use of interviews as a research tool is important as it allows the research to access a range of participants' points of view and constructions of reality (Ritchie et al. 2014). The interview can be seen as a 'guided conversation' (Yin 2003) which allows the researcher to understand the respondents' views and insights into the research subject. Some criticism of interviews as a source of data are that responses are socially constructed; the respondent offers opinions that they feel the researcher wants to hear, or that they feel comfortable reporting. Responses may be subject to a number of different biases, both conscious and subconscious (Dingwall 1997).

5.3.4.2. *Non-participant observation.*

The use of non-participant observation within case study research is important as it enables an inductive approach to developing theories that is less reliant on prior conceptualisations of the setting than other qualitative methods (Patton 1990). Observation is a useful research method to enable a researcher to understand how people's actions may differ from accounts of their actions, and to 'expose influences and behaviours that people may not be explicitly aware of' (Ritchie et al. 2014). Whilst interviews provide valuable insights into why people act the way they do, they are limited to the information the interviewee decides to provide. Interviewees

may (consciously or subconsciously) portray a socially acceptable version of reality, but also portray their own reality in which they are unaware of embedded behaviours or cultural influences (Pope and Mays 2006) (Walshe et al. 2012). The use of observation allows the researcher to see what participants do, not what they say they do and the use of observation alongside interviews counters some of the biases encountered within semi-structured interviews (e.g. social acceptability bias), as well as helping the researcher question why there may be dissonance between participants actions and reports of their own actions. (Dingwall 1997) (Schensul et al. 1999)

5.3.4.3. *Informal interviews and conversations*

Informal interviews are useful because the less formal nature of interview can make the respondent more at ease, helping to build a rapport between the fieldworker and staff being observed. Informal interviews were used to improve understanding of what was being observed, to clarify aspects of the observation that were unclear and to check that interpretation of events observed were accurate. Informal conversations were also used to supplement data from semi-structured interviews and gain insight into pain management in a more natural environment than the semi-structured interview setting.

5.3.4.4. *Documentary evidence*

The use of unobtrusive data collection methods such as collection of documentary and archival evidence can provide useful information and context without the risk of influencing the data that accompanies other, interventionist methods such as interviews or observation (Richards 2016). Documentary evidence may reveal evidence around how pain is managed or perceived within the department that may not be revealed within interviews or observation as it is constructed for the purposes of enabling the everyday work of the department to take place, rather than for the researcher.

5.3.5. Distinguishing case studies and ethnography.

Case study and ethnography use similar research methods (White et al. 2009). I chose a case study design rather than an ethnographic study for a number of reasons.

There are many alternative definitions for ethnography and considerable debate as to what ethnography entails (Waring and Jones 2016) (White et al. 2009). Ethnography aims to generate an understanding of a phenomenon or group of people by observing people going about their daily lives, with the researcher 'ideally living with and like them', usually using participant observation (Pope and Mays 2000). Although ethnographic methods were used within this research, this research could not be considered 'an ethnography' as it did not seek to fully understand the world in which ED staff operate. One of the hallmarks of ethnography is extended period of time spent within the field, which was not possible within the confines of

this thesis (White et al. 2009) However, the approach undertaken within this thesis has similarities to the 'rapid ethnographic approach' undertaken more recently within the field of Health Services Research, which was described as "characterised by a range of data collection methods to provide an understanding of actors and activities in a given (short) time frame" (Turnbull et al. 2014) (Salway et al. 2013). Rapid ethnography uses the same basic techniques as ethnography, and is founded on the same theoretical principles of providing an in-depth understanding of a complex social phenomenon but is based on shorter time frames and quicker turnaround of results, often using multiple investigators to obtain in-depth results within the shorter time frame (Ackerman et al. 2015).

Many researchers argue that participant observation, and the close relations between the researcher and those being observed are key to ethnographic research, whilst case study research does not necessarily require participant observation (White et al. 2009) (Differencebetween.com 2011). I would argue that although this case study research employed many of the methods used by ethnographers, the length of time spent within the field, the use of a single investigator and the brief nature of interactions with participants did not enable an understanding of the motivations and culture of the EDs sufficient to warrant the term ethnography, or even rapid ethnography.

5.4. Ethical considerations

Any research involving human participants requires consideration of the ethical implications of the research for participants. The ethical consideration and how the research was designed to account for them are detailed below, with reference to three basic ethical principles: autonomy (individuals are treated as autonomous agents and people with diminished autonomy are entitled to protection), beneficence (maximise possible benefits and minimise possible harm) and justice (burdens and benefits of research should be distributed fairly) (Office of the Secretary 1979). The research design and conduct needed to meet the standards required to obtain such approval, but also to meet ethical standards with which I, as a researcher felt comfortable (Patton 1990) The measures taken to ensure ethical standards were applied are also outlined within this section below.

5.4.1. Autonomy: the use of informed consent.

The principal of autonomy can be addressed by the use of informed consent; a process that requires provision of information, comprehension and voluntariness (Office of the Secretary 1979). The issue of informed consent within qualitative research has been the subject of some controversy within the literature (Goodwin 2008) (Murphy and Dingwall 2007). Informed consent is felt to be a prerequisite of obtaining ethical approval, "except in cases where ethics committee judges that such consent is not possible and where it is felt that the benefits of the

research outweigh the potential harm" (Richards and Schwartz 2002). The extent to which consent can be fully 'informed' within qualitative research is debatable, as the nature of the research means subject areas are not known fully a priori (Murphy and Dingwall 2007) (Goodwin 2008)

The requirement for informed consent in observational or ethnographic research is particularly problematic. Obtaining informed consent from every person within a public or semi-public space (such as an ED) is impractical and may cause anxiety to participants who do not understand why consent is required (Moore and Savage 2002). Murphy & Dingwall argue that whilst the principle of autonomy (which lies behind the requirement for informed consent) should be respected within ethnographic study, the current bureaucratic norms for informed consent are 'more suited to biomedical experimentation' and suggest flexibility when applying principals of autonomy to ethnographic study (Murphy and Dingwall 2007). Informed written consent was obtained from all staff and patients who participated in semi-structured interviews. The process for obtaining consent in observation is discussed in below.

5.4.1.1. *Covert or overt methods*

The extent to which research is fully 'overt' or 'covert' is a continuum, ranging from fully overt research in which full informed consent is obtained by all participants, to fully covert research in which participants know no details of the research and may have been deceived into believing the researcher has another purpose. Some ethnographers advocate the use of fully covert methods, in which participants have no awareness of the research being undertaken and could sometimes be misled as to what the purpose of the research was, arguing that the compromise of autonomy is outweighed by the beneficence of findings. Patton contends that the decision about the extent to which observation is overt or covert involves the researcher 'balancing the search for truth against their sense of professional ethics' (Patton 1990).

In order to minimize the impact of observer effect upon the interactions being observed within the fieldwork, covert methods would ideally have been used as far as possible (McCambridge et al. 2014). By bringing the nature of the research to the attention of staff, it is possible that both patients and staff would modify their behaviour (i.e. change how pain was managed) thus 'distorting the setting' and rendering any related findings unrepresentative (Murphy and Dingwall 2007). The option chosen was neither fully overt, nor fully covert. Participants were not all fully informed of the purposes and processes of the research at each stage of the research.

Information sheets and posters were placed within the ED, informing participants that I would be undertaking observation within the department, and giving staff and patients the option to opt out of participation. I also introduced myself to staff in the department and explained my research. No patient identifiable data was collected whilst observing staff-patient interactions. This compromise was felt to balance the respect for patient and staff autonomy with the

practical requirements of undertaking the research, and the need to work with and obtain the trust of the staff being observed, particularly as perceptions of deception amongst staff could impact negatively upon future prospects of undertaking research within the ED (Bryman 2008).

Informed consent can only be considered valid if given voluntarily, without coercion or undue influence (Office of the Secretary 1979). In order to avoid staff feeling as though they were coerced into participating, staff were approached personally, rather than being approached by senior members of staff, as they may feel obliged to take part if asked by members of staff to whom they were responsible. Patients were identified by staff, as this required access to patient notes, and the member of staff asked the patient whether they would be happy to have a researcher come and talk to them. If the patient agreed, I took their contact details then gave them the information sheet, consent forms and an SAE to return any forms to me at a later date, informing them that their decision to participate or not would in no way influence the care they received. Patients were not asked to provide informed consent whilst experiencing significant pain, as pain may inhibit their decisional capacity and compromise the ability to provide informed consent.

5.4.2. Beneficence: assessment of risks and benefits of the research.

The principle of beneficence requires systematic assessment of the potential short and long-term risks and benefits of the research (13374}. Richards and Schwartz highlighted five main areas of risk to participants in qualitative health services research: anxiety, exploitation, misrepresentation, identification of participants and inconvenience (Richards and Schwartz 2002). These risks are addressed below:

5.4.2.1. *Anxiety*

The nature of qualitative research is such that the subject matter cannot be known fully in advance and areas that may be considered sensitive may arise. Whilst the subject matter was not considered highly sensitive, there was a potential that interviews could cause some anxiety to participants who may be discussing potential shortcomings of staff or colleagues, and they may feel as though they were 'whistleblowing' and need assurance about confidentiality of data. The participant information sheets informed participants that, should interviews cause any distress, they could be stopped at any time, and that they were free not to respond to any questions they considered inappropriate. The participant information sheets also informed participants of the respect for confidentiality and assured them that any quotes would be anonymised in order to ensure participants could not be recognised.

5.4.2.2. *Exploitation*

Exploitation could be a potential concern in situations where the researcher is also a health professional, as patient participants may feel some obligation to take part in the research, or

confuse the interview with a consultation. In order to minimize the risks associated with confusion of the research process with a therapeutic encounter, I identified myself to participants as an independent health services researcher and not a healthcare professional.

5.4.2.3. *Misrepresentation*

The interpretive nature of qualitative research means that the results presented are only the researcher's version of 'truth'. Participants may feel that their data has been misrepresented and consider themselves the subject of negative stereotyping. This issue can be addressed to a degree by undertaking 'respondent validation' in which participants view and comment on the analysis prior to final publication. However, the issue of a mismatch between the patient's interpretation of findings and that of the researcher may still not be resolved after respondent validation (Richards and Schwartz 2002). After each interview a brief summary of my interpretation of what the interviewee had said was fed back to the interviewee for comment, in order to minimise the risk of misrepresentation.

5.4.2.4. *Identification of participants*

As addressed within discussion of anxiety above, participants may fear identification of their participation in research for fear of causing offence to people treating them, or staff may fear reprisals from comments made about colleagues (Ahern 2012). This harm can be minimised by ensuring anonymity and confidentiality to as great an extent as possible (Goodwin 2008). When reporting direct quotations in written analysis, any contextual clues of speech mannerisms that could potentially identify participants were removed. Similarly, staff roles ascribed to quotes were reported within categories of seniority rather than particular roles in order not to identify participants. (Goodwin 2008).

5.4.2.5. *Inconvenience*

Participants in semi-structured interviews could be inconvenienced by taking part in the research as they were not compensated financially for their time. In order to minimise the inconvenience to participants, they were given the option of undertaking the interviews within their own homes, within the ED or on the telephone at a later date.

The potential risks need to be balanced with benefits, with the benefit and risks shown to be 'in favourable ratio' (Office of the Secretary 1979). The research methods must be appropriate and the need for participation in research deemed necessary, with no alternative method of achieving the research results. Participation in research has been demonstrated to be beneficial to participants as interviews and focus groups allow participants to feel they are valued as experts and feel empowered (Hutchinson et al. 1994)

5.4.2.6. *Benefits of the research*

Semi-structured interviews may allow participants to provide their voice and opinions, and research suggests that participants in research benefit from participation in research, with staff feeling benefits from being given the opportunity to reflect on their practice (Ahern 2012). Ethical considerations need to balance any potential risks to participants with the potential harm resulting from a lack of progress in research. From a consequentialist perspective, I would argue that the potential value of undertaking the research outweighs any potential risks to patients of the research being undertaken, such as being observed without consent. The benefit (respecting autonomy) of seeking informed consent should be outweighed by the risk (causing inconvenience, distress and confusion).

5.4.3. Justice: selection of research participants

The principle of justice refers to who 'ought to receive the benefits of research and bear its burdens'. (Office of the Secretary 1979). Participants may benefit from taking part in qualitative studies and allowing their voices to be heard, which makes it important to attempt to recruit patients from all patient groups and not exclude, for example, disadvantaged groups who are often under-represented in research. (Townsend et al. 2010)) Whilst the recruitment strategy attempted to identify staff and patients who were generally representative of the whole cohort of those who could benefit from the research (staff within the ED, patients experiencing pain), there were some issues relating to the principle of justice. Patients who did not have capacity to consent or who had communication difficulties (e.g. patients with dementia) were excluded as it would not be possible for them to provide informed consent. These are a potentially important group of patients, for whom pain management is recognised as being problematic due to communication problems. In addition, there was no provision for non-English speaking participants within the budget of the project, which again excludes a potentially important group who may have a different experience due to communication difficulties. Where possible, patients who did not have adequate English to undertake an interview were still approached and the information sheet was given to relatives who were able to speak English. In practice, there was only one patient who was approached by this means.

Dissemination of results can be an important justice issue if participants are taking part in research in order to improve practice. The information sheets were left with participants in order for participants to be able to follow up the research (using the website details, and researcher contact details) and arrangements to distribute the results of the PhD to individual sites, as well as via open access publications were detailed on the information sheets.

5.5. Application for ethical approval.

As the research plan involved recruitment of both NHS patients and staff, approval from an NHS Research Ethics Committee and appropriate Research Governance permissions from participating NHS Trusts (BMJ 2014) were required prior to any fieldwork taking place. An application for ethical approval was submitted in July 2012, applying the ethical principles detailed above. The application was discussed at the REC meeting of 30th August, and further clarification of a number of points was requested. These were addressed and study approval was granted by NRES committee Yorkshire and the Humber – South Yorkshire on 31st October 2012. The letter of approval and relevant documentation are attached within appendices (x) Once individual sites were identified (see 5.8 below), research governance approval was obtained for each site prior to undertaking fieldwork. An honorary contract was issued from site 2, and a letter of access issued by sites 1 and 3. NIHR portfolio status was also granted, due to the research being funded by an NIHR doctoral fellowship grant.

5.6. Pilot case study

Between obtaining ethical approval and starting empirical research, one year of maternity leave was taken. Upon returning from maternity leave, and with ethical approval and R&D approval in place, a pilot study was undertaken prior to undertaking the main case studies in order to gain familiarity with the ED environment, assess the likely success of proposed recruitment approaches, test interview schedules and proposed data collection techniques. Undertaking a pilot study is important as it provides the opportunity to refine data collection techniques, provide conceptual clarification of the research design and identify potential problems or ethical issues within a distinct formative case prior to the 'real' cases being undertaken. (Yin 2003) (Sampson 2004) (van Teijlingen and Hundley 2001) (Sampson 2004). On a personal level, I felt this was particularly important as an opportunity to 'practice' observation techniques and approaches for recruiting staff, as pilots can be particularly useful for qualitative researchers who lack confidence or experience in the method (van Teijlingen and Hundley 2001). Sampson et al highlight the identification of gaps and wastage in data collection as one of the principal benefits of undertaking a pilot in ethnographic study {14445].

Van Teijlingen & Hundley advocate the publication of pilot studies, given their important role in the development of the research project, and criticise researchers for claiming to have 'learned from the pilot study' without detailing what they have learnt, and how {13148}. The aims and objectives, methods, limitations of the pilot and overview of lessons learned and actions undertaken as a consequence of undertaking the pilot study are summarised below (5.6.1 to 5.6.4). Details of the methods and detailed findings of the pilot are included within the appendix 4 simply because of the length of the thesis.

5.6.1. Pilot aims and objectives:

The main aims of the pilot were as follows:

- To gain familiarity with the ED environment and observation techniques
- To assess the likely success of accessing the field and recruitment approaches within agreed ethical boundaries.
- To test the survey instruments to be used
- To test proposed data collection and recording techniques.

The objectives for each element of the pilot were as follows:

	Objectives and specific questions
Observation	• Identify key locations to undertake observation (where does pain management take place, what is role of pain management in different locations). • Identify how to manage the process of undertaking observation (how to explain my presence to staff, whilst being mindful of not being too 'visible' in order to reduce the risk of research participation effects, what to wear, where to stand/sit, how to deal with my audio recorder whilst taking notes). • Assess how to access the field (how to approach staff, how to deal with consent, how to negotiate moving around the ED without observing the clinical areas). • Identify the data to be collected (what should I observe, what documentation I need access to, publicly available documentation, private patient notes, anonymisation of notes, when will I need to see notes) • Assess how to collect and record data (how to record observations and reflections, when to do reflections, how to collect observations so they can be understood to an external party, how much detail to include, what are the key areas to map)
Staff interviews	• Test recruitment strategy for staff interviews (identify them myself, ad hoc, snowball sampling, use PI as gatekeeper) • Identify most feasible location and timing of interviews (when to undertake them, will staff need to arrange cover, will they need to take place somewhere where staff can be called in) • Assess the appropriateness of the interview schedule (how does the interview schedule work, does it give the interviewee chance to say what they need to say, is it an appropriate length, does it enable research objectives to be met).
Patient interviews	• Identify how and where to approach patients in order to achieve an appropriate sample (which staff will act as gatekeeper, how will they identify appropriate patients, where are the most appropriate locations to recruit) • Assess likely success of achieving recruitment targets. (How long will it take to recruit enough patients? Do patients seem interested in the

	research when approached?) • Where and when should I interview the patients? Are there places we can go to where I can ensure my safety. • Assess the appropriateness of the interview schedule (how does the interview schedule work, does it give the interviewee chance to say what they need to say, is it an appropriate length, does it enable research objectives to be met).

5.6.2. Methods and findings

Details of the methods and findings relating to the pilot objectives are detailed within Appendix 4.

5.6.3. Strength and Limitations of the pilot

The pilot was invaluable in terms of gaining familiarity of the techniques used in undertaking non-participant observation, and in highlighting changes needed to interview schedules and the terms of ethical approval (see below). The pilot had limited value in terms of managing processes of observation and accessing the field, as some of the lessons learned were context specific with limited generalisability to other EDs. The limited testing of the patient interview schedule and lack of important nursing voice within the pilot interviews restricted the learning from pilot interviews. Although covering a long time period, there were only 16 hours of observation and, given that this was my first experience of observation, a greater number of pilot visits would likely have been beneficial to future fieldwork. However, due to the nature of case study and observational research methods, learning was ongoing throughout the subsequent fieldwork visits and a number of useful lessons were learned within this pilot.

5.6.4. Overview of lessons learned and actions taken as a consequence of undertaking the pilot study

The principal learning and actions taken as a consequence of the pilot research are summarised below:

- Pilot observation revealed significant limitations to the scope of the research if observation was not allowed within clinical areas. This led to an amendment to protocol and application to NHS REC to allow observation to be undertaken within clinical areas. (See 5.7)
- Observation to focus on staff in different areas of the department, rather than following individual patients as this was felt to yield less useful data.
- The need to identify as an observer to patients, in order not to cause distress.

- Observations to include consideration and description of the everyday work of staff (rather than focusing solely on interactions relating to pain management), in order to improve understanding of the context.
- Writing up observations requires more detailed and 'thicker' description of observations in order to increase validity of observations. Write up notes more regularly and as quickly as possible after the event.
- Recruitment of staff to interview needs to allow staff to undertake the interview outside of work time, in order not to exclude important staff groups who do not have office time outside the ED itself.
- Staff interview schedule focussed overly on describing processes of pain management rather than attitudes. Changes to the interview were made to focus more on how participants considered their role in pain management, and added questions about aims and benefits of pain management in order to capture more information about staff attitudes.
- The interview schedules for both the patient and staff interviews were revised to improve the flow, the use of prompts and the depth of questions

5.7. Submission of an amendment to ethics

In September 2014, a substantial amendment to ethical approval was submitted in order to allow observation of patients within private areas, such as triage room and private bays. This was approved after issues raised by the committee were clarified and assurances given. Permission to observe in non-public areas, with verbal consent from patients was granted in March 2015. Copies of the amendments and letters of approval are included within Appendix 6.

5.8. Methods: Case study site selection

5.8.1. Measures available to assess quality of pain management

The selection of case study sites was based on the premise that it would be possible to identify sites with good, poor and improving pain management outcomes. However, selection of sites based on quality of pain management assumes that the quality of pain management can be measured and necessitates the use of data sources that allow comparison of these measures between sites. Unfortunately there appears to be little consensus as to which outcome measures provide the best indicator of quality of pain management, as evidenced by the wide range of outcome measures used in studies of interventions to improve pain management, and in trials of different modalities of analgesia (e.g.(Bhardwaj 2015) Bhardwaj).

Whilst it would have been useful to undertake site selection based upon a combination of different outcome measures, (e.g. mean time to analgesia, provision of adequate analgesia and patient satisfaction with pain management), sites were selected using pragmatic rather than ideal criteria. The criteria for selecting EDs for case study were necessarily based only upon quality measures that were available. Two sources of data were identified as providing some measure of pain management in EDs in England: the CQC survey of patient experience in the ED (now available for 2012, in addition to 2008 data referenced within the background) (Picker Institute 2008) and the Royal College of Emergency Medicine (RCEM) audits of fracture neck of femur and renal colic (2012) (The College of Emergency Medicine 2013). The following two outcome measures were used in site selection:

- CQC outcomes from the question "Did you feel staff did everything they could to help control your pain?" to which respondents could respond "yes completely", "yes, partly" or "no".
- RCEM audit outcomes of proportion of patients with fracture neck of femur receiving analgesia within 60 minutes.

Further details of how these outcome measures were collected and formulated are included within the Appendix 5 in sections 14.3 - 14.4.

Appropriate case selection is vital when undertaking theory-testing, explanatory case studies, (e.g. selection of intrinsic cases or typical cases); in order to explain why an ED manages pain well, it is essential that a case is selected that does manage pain well. However, the aim of these exploratory case studies was not to explain the characteristics of a 'good' or 'poor' site, but to generate theories that could help understand what barriers and enablers might exist within EDs. Three sites ('good', 'poor' and 'improving') were selected in order to capture a range of barriers and enablers, assuming more enablers would be evident at the 'good' and 'improving' sites, and more barriers evident at the 'poor' site. Case selection was considered important, but not vital to the aims of the research.

Full discussion of the different data sources and details as to how these were used to select cases is reported in Appendix 5. An overview of how sites were selected and the rationale behind selection is detailed below:

5.9. Selection of case study site 1: recruitment of a case with potentially good pain management.

The first main case study site was a case with potentially good pain management. This was selected in 2014 prior to the results of the 2014 CQC survey results being released so was based on CQC data from 2012 alone. Four of the top 10 performing EDs were highlighted by CQC as

performing better than anticipated and were considered for recruitment. The top 2 sites were invited to take part, and the first to respond was recruited.

5.10. Selection of case study site 2: recruitment of a case with potentially poor pain management.

The poorer performing site was selected in 2015, by which time further ED survey data was available from the 2014 CQC ED patient survey, as well as the RCEM 2012 individualised audit data being obtained. In order to improve the chances of recruiting a site with poor pain management, a shortlist of all Trusts that were in the bottom 20% for 2012 and 2014 CQC data was drawn up (n=12). Trusts with a higher than 10% breach of the 4 hour waiting time target were excluded as it was felt that the departments would be under too much pressure that would make the practicalities of undertaking research difficult (n=3). The three sites who were highlighted by CQC as performing worse than anticipated were invited. After non-response, a further five sites were invited. Two of these responded and the site with the lowest CEM fracture neck of femur audit result was recruited.

5.11. Selection of case study site 3: recruitment of an improving case.

Recruitment of a third site aimed to recruit a site that appeared to have improved in metrics between data points with the aim of understanding what had led to improvements in pain management. However, the results from the CQC data did not identify any clear improving sites from the 2008, 2102 and 2014 data, possible due to a change in wording of the questions. However, in February 2016, an audit of pain management in the ED undertaken at the pilot site had been sent to me by the PI at that site, and recommendations accompanying the audit suggested that efforts to improve pain management had been undertaken since the period of the pilot data collection. A pragmatic decision to expand the pilot site into a full case study site was taken, and this site was considered a potentially improving site due to measures being taken to attempt to improve. In addition, the opportunity of exploring how changes being undertaken within the site to improve pain management were being embedded and used was felt to be useful in exploring how potential barriers or enablers to pain management.

5.12. Incorporating the pilot data into case study site 3 (improving).

Data from the pilot was incorporated into the wider dataset of data from site 3. The use of pilot data within quantitative studies is considered inappropriate when the pilot has led to modification of sampling frame or procedures due to potential contamination of results (Thabane et al. 2010). However, within qualitative studies, pilot data can still be incorporated as

valuable data in itself due to the constantly evolving nature of inquiry and ongoing process of theory generation during qualitative research. Unlike pilots in quantitative research, where the pilot results can be seen as a distinct entity, it is difficult to separate out the learning and theory generation from an exploratory case study pilot from theory generation from subsequent sites.

The observation data from the pilot was from non-clinical areas only, whereas data from subsequent data collection included clinical areas, following the amendment to the NHS REC. However, the data from non-clinical areas was still useful data as observation in other sites included non-clinical and clinical areas. Although the interview schedules changed during the pilot (after 5 interviews) in order to focus more on attitudes, the main part of the interview schedule remained the same. It was considered acceptable to include the pilot interviews as semi-structured interview schedules often evolve during the process of research as new findings emerge.

As data collection and analysis progressed in sites 1 and 2, it became clear that many of the objectives of the pilot addressing data collection techniques were only partly addressed within the pilot itself and that the learning curve was still steep during data collection at other sites. The nature of observational research, with concurrent analysis and data collection meant that the data collected was focussing on different areas throughout the data collection period, and that data collected during the pilot was no less valuable for being less focussed. The pilot was therefore not a clear 'distinct case' separate from the other 2 sites, but merely a site with less experienced data collection than site 1, which in turn was less experienced than site 2. Richards supports the use of pilot data within wider studies, stating that "your project can cheerfully be regarded as one long pilot" (Richards 2016).

5.13. Undertaking fieldwork

For the purposes of the rest of the thesis, the case study sites are labelled as follows:

- Site 1 – potentially good pain management
- Site 2 – potentially poor pain management.
- Site 3 – pilot site, attempting to improve

Fieldwork was undertaken sequentially (pilot site, site 1, site 2, site 3), with some overlap as return visits were made to sites 1 and 2 for a final site visit near the end of the fieldwork period, in order to follow up lines of enquiry that emerged during earlier fieldwork.

The results presented in section 6 represent my understanding of the processes and structures within the departments as at the time of the final fieldwork visit for each site. A total of 143

hours observation were undertaken (excluding time taken out for semi-structured interviews); 54 hours at site 1, 50 hours at site 2 and 39 hours at site 3 (including 16 hours during the pilot stage). The timing of fieldwork visits are summarised below:

Table 12: Timing of observation visits at each site.

	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	July 2015	Aug 2015	Sep 2015	Oct 2015	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016	Jun 2016	Jul 2016
Site 1																							
Site 2																							
Site 3																							

Access to sites differed by site. Prior to visits at site 1, initial meetings were set up with the local collaborator in which details of when fieldwork would take place were discussed and the local collaborator agreed to inform staff of my presence. At site 2, the Local Collaborator was difficult to contact so access was gained via the departmental research nurse, who facilitated access on his behalf. At site 3, the local collaborator worked part-time at the ED so was frequently not present during site visits. Instead, introductions were made with the consultant or nurse in charge at each visit, who then informed other staff of my presence as appropriate.

Fieldwork involved staff and patient interviews, non-participant observation and documentary analysis. Each of these components are described in detail below. Interviews, observation and documentary analysis took place concurrently, with emerging findings shaping the focus of observations and interview schedules over the course of the fieldwork period.

5.13.1. Staff interviews

Semi-structured interviews with staff were carried out to ascertain respondents' views and insights into how pain was managed and prioritised within their ED, and to understand the processes and structures of pain management and staff perspectives of barriers and enablers to pain management.

5.13.1.1. *Developing the topic guide*

The aim of the interviews was to understand what staff themselves felt were the barriers and enablers to pain management and how they understood their own role and motivations in pain management. The questions aimed to provide a mixture of 'fact-finding' questions that would improve understanding of the staff roles and processes involved in pain management within each department (i.e. I can assess pain, but I can't administer analgesia) as well as broader questions to understand staff motivations and attitudes in undertaking pain management. The topic guide was kept as short as possible, partly in order to keep the interviews from being too

time-consuming for the participant, but partly to avoid questioning being too prescriptive and to encourage more in-depth responses to the questions. As the interviews progressed, further questions were added to follow up evolving lines of enquiry, but the same basic structure was retained.

5.13.1.2. *Recruitment procedure*

Staff were recruited purposively, to include a range of roles within the ED, experience and gender. Selecting purposively for gender was difficult in certain roles due to preponderance of, for example, male consultants and female nurses. The process of recruiting staff was sufficiently difficult that recruitment was based on roles (with seniority of roles accounting for length of experience) and participants were not rejected on the basis of their gender. The majority of staff were recruited whilst working within the ED and engaged in conversations about this research, as this was suggested as the best approach by the local collaborators at sites 1 and 2. Some staff were also recruited in staff rooms whilst on their breaks, as they had more time to talk. Whilst initially staff who had been most receptive to conversations about this research were interviewed, attempts to recruit staff who appeared either uninterested in the research, or even slightly hostile to my presence were then targeted, in order to understand some more negative voices. Some staff initially consented to take part but then didn't respond to attempts to follow up and arrange a time for interview (see Appendix 7).

5.13.1.3. *Staff interview data collection*

Due to budget and time constraints, staff were interviewed during ED site visits, or by telephone during interviewees spare time at a later date. Although telephone interviews may not be generally felt to give as rich data as face-to-face interviewing due to loss of contextual and non-verbal data, there is some evidence that telephone interviews allow respondents to feel more relaxed and able to disclose sensitive information than during face-to-face interviews. (Novick 2008) Within the fieldwork reported here, telephone interviews appeared to provide more in-depth responses than face-to-face interviews, as respondents had more time to talk, and possibly did not feel restrained by the nearby presence of other colleagues. The interviews that took place within the ED were carried out within a variety of locations, mainly within unoccupied rooms, bays or offices within the ED. Two were carried out in the staff kitchen, and two in the middle of a ward whist staff were on duty as they wanted to undertake the interview there and then but needed to stay within their ward. Interviews within the ED were frequently subject to short interruptions, during which I paused the recordings. Whilst undertaking the interviews in a neutral, more private location may have enabled staff to be more open about their opinions, the participant had to make the decision as to where they felt comfortable and able to talk.

Interviews were recorded using a digital voice recorder (including a second back-up recorder where one was available) to allow for more attentive listening to interviewee responses, and

enable prompting for further information where necessary, without being distracted by the need to take extensive notes. Telephone interviews were recorded via an earpiece. Brief notes were taken, particularly when the interviewee was difficult to understand, or when noting prompts needed for returning later to follow up on points that required clarification. Notes and observations relating to the interview were written up after the interview.

Data were transcribed verbatim by two transcribers and all transcripts were checked against the original audio recordings for accuracy. Although the process of transcription can be seen as the first step in familiarising the researcher with the data, this was undertaken by a 3rd party due to time constraints (Braun and Clarke 2006). Instead, the process of checking all transcripts was used as a familiarisation process, as well as checking the accuracy of the transcripts. The transcription records logged any 'significant' pauses (longer than 2 seconds) but did not record the level of detail that would allow, for example, conversational analysis to be undertaken.

Details of interviewees are included in Appendix 7.

A total of 36 staff took part in semi-structured interviews across the 3 sites (15 at site 1, 11 at site 2, 10 at site 3). Participants included 8 consultant, 4 registrars, 8 junior doctors, 7 senior nurses, 8 staff nurses and 1 support worker. A further 6 staff (1 HCA, 1 junior doctor and 3 nurses) at site 2 signed consent forms but declined to participate. Interviews took an average of 31 minutes (range: 10 – 71)

5.13.2. Patient interviews

Semi-structured interviews were also carried out with patients who were experiencing pain whilst in the ED, in order to understand their patient journey and experiences of pain management within the ED, their perspectives on how well they felt pain was managed, and what could be improved.

5.13.2.1. *Developing the topic guide*

The aim of the topic guide was to understand the patient experience of pain management; what they felt worked and didn't work, and to understand their motivations and needs in seeking pain management. The topic guide used open-ended questions that aimed to capture the patient experience (i.e. can you tell me what happened when you arrived in the ED…), then asking more focused questions around different aspects of their time in the ED (e.g. reassessment). As fieldwork progressed, extra questions were added, notably around their understanding of the pain score, and their expectations of pain relief.

5.13.2.2. *Recruitment procedure*

Patients were recruited purposively, with the aim of producing a maximum diversity sample based on condition, age, gender and ethnicity. The latter three criteria have been shown to affect

patient satisfaction with care (Thiedke 2007) and there is a body of research examining whether these characteristics impact on the pain experience in the ED, (Todd et al. 1994) (Yen et al. 2001) (Barlow and Hwang 2012) (Mills et al. 2007) although evidence is inconclusive. There is some evidence that pain management experience may differ depending upon the condition, and the 'visibility' of the pain.

Finding patients to interview proved to be significantly more difficult than anticipated. Despite a high prevalence of patients with painful conditions in the ED, it was difficult to find patients who had sufficient pain to describe their pain management experience, yet in a condition where it would be acceptable for me to introduce myself and ask whether they would be willing for me to contact them at a later date. Patients were identified and approached initially by staff. This raised some possibility of bias in that staff may be unlikely to recruit patients who they felt had had a poor experience, but also there was implicit judgement by staff as to whether the patient had experienced significant pain. In 2 sites, the ED wards had whiteboards with brief descriptions of patient conditions for each bay (e.g. 'abdo pain', 'fall') which meant that staff could ask approach patients identified from this list on my behalf. However, by the later site visits, this information had been removed – at one site due to concerns about patient confidentiality, and at the other due to computerisation of all notes. Some patients were identified at the ambulance base, as the paramedic should provide details of any pain to the co-ordinator. A further 2 patients were recruited at the fracture clinic as these patients would have been admitted via the ED. However, this method was only suitable for a small number of patients in order to achieve a sample incorporating a range of conditions.

If the patient expressed an interest when approached by staff, I then took their contact details, gave them the information sheet, consent forms and an SAE to return any forms to me at a later date. They were then followed up on a different day, either at home or when returning to the hospital for follow-up.

5.13.2.3. *Patient interview data collection*

With the exception of one patient who was interviewed face-to-face whilst waiting for a physiotherapy appointment, all interviews were conducted as telephone interviews once the patient was home from hospital. Procedures for recording data were as described within the section on staff interview data collection (see 5.13.1.3)

Details of interviewees are included in Appendix 7.

A total of 19 patients took part in interviews across the 3 sites, 8 from site 1, 5 from site 2 and 6 from site 3. Twelve of the interviews took place within 2 weeks of the ED attendance and 3 took place over a month from attendance(range 0-60). Interviews lasted an average of 17 minutes

(range 8m56 to 25m52). A wide range of conditions were included, though there was a preponderance of trauma patients (10 were related to trauma/falls).

Details of non-recruited patients are also detailed within Appendix 7. This includes patients who were approached at the site, expressed an interest in taking part and took the information and consent forms, but then either didn't get in touch of did not respond to calls. Recruitment from site 2 was particularly difficult, with patients providing numbers but not responding.

5.13.3. Non-participant observation

Non-participant observation was undertaken to enable understanding of the patient journey, staff roles, patient and staff interactions, and to provide context for the interviews.

Observation times were structured to capture activity at different times and different days, ensuring that every day was covered at each site. An orientation visit was undertaken at sites 1 and 2 (and pilot undertaken at site 3) to enable introductions with the local collaborator for the site, an introductory tour of the site and discuss how to progress with the research at the site. This was followed up with further visits of between 1-3 days. Data was analysed concurrently and the total number of hours observation at each site depended upon the length of time it took until some saturation of themes occurred and it was felt that significant new data was no longer being collected.

Over time, observation visits were arranged for times when staff were more available to talk (i.e. early morning) than the busier times when it was difficult to engage with staff. As 'busyness' and 'lack of time' were cited as key barriers from an early stage, observation focussed more on how pain was managed when the department was less busy, as felt that this was when other barriers would be more likely to emerge.

Observation took part in all areas of the ED in order to build a picture of how pain was managed throughout the whole department. When entering a new area, introductions were made to staff, explaining and checking they had no objections to my presence.

In addition to the formal interviews, a number of informal conversations took place to help check my understanding and interpretation of events that had taken place, and also to further my understanding of the environment and follow up any questions arising from observations. The busy nature of the ED meant that there were often times when events occurred it was not possible to engage staff in conversation, or staff made it clear that they were too busy to talk.

5.13.3.1. *Generating fieldnotes*

Fieldnotes are the primary means of capturing data collected from observation. Data are not so much 'collected' as 'created' by the researcher whose challenge is to endeavour to capture, condense and describe as many relevant details of a research event as possible within the fieldnotes, which serve as the observation record (LeCompte and Schensul 1999). The fieldnotes allow the researcher to construct a "model" of the data (Kawulich 2005) which represents the researcher's filter of reality and includes as little interpretation as possible. These primary observations are then recorded alongside secondary observations (the researchers interpretative statement of what happened) and experiential data (record of the researcher's feelings and values). These fieldnotes should contain as much 'thick description' as possible to help reduce the impact of researcher selectivity in the detail recorded (Yin 2003)

The decisions as to what to observe, and what to record were challenging throughout the research process, particularly given the broad nature of the research question (i.e. how is pain being managed, who is involved, what are the barriers etc.). The main focus of data collection was to collect data relating to patient/staff interactions when assessing or negotiating analgesia, staff interactions when discussing pain relief and patients experiencing pain, patient journeys for patients experiencing pain and processes for staff addressing patients pain (see pilot). A total of 143 hours observation were undertaken across the three sites. This was the total number of hours observing within the ED, not the number of hours specifically observing 'pain-related' events. However, due to the high prevalence of pain, a large proportion of the time observing was spent observing events related to pain management, and there were occasions where the depth of notes taken was not as great as would have been desirable due to different events occurring simultaneously. Fieldnotes attempted where possible to capture "all pertinent information about the research event, the respondent or the setting, and all the knowledge gained, including your impressions, reflections and interpretations" (Richards and Schwartz 2002) p66.

Extensive handwritten notes were made during the observation process, then elaborated on during tea or meal breaks to ensure they were legible, particularly where verbatim quotes were noted. Notes of primary observations were then typed up at the end of the day where possible, or at the end of the fieldwork visit otherwise. Where possible, a quiet space was found in which to record reflections or observations using a voice recorder at regular intervals throughout the day in order to minimise recall bias. Reflective notes (including interpretations of what happened, feelings and reflections) were typed up separately and referred to within the observation notes so that the observation data could be read by another researcher without knowledge of my concerns and thoughts at the time. Reflexive notes were used to question the learning behind each event, considering how each event reflected or contrasted with previous events. (Eisenhardt 1989) The amount of detail and 'thick description' increased over the course

of the research, with fieldnotes at the end of the data collection containing more details of the context, timings, workforce involved than at the beginning of the pilot.

5.13.4. Documentary evidence

Documentary evidence around pain management was collected from each of the ED sites. This included looking for any documentation and records pertaining to pain management, such as pain management protocols or guidance, pain audits, evidence of pain documentation within notes, patient information leaflets or posters referring to pain visible within the department.

Blank copies of ED notes, triage notes and observation notes were obtained from all sites. In addition, copies of anonymised notes for a subset of patients were obtained from sites 2 and 3 to identify how pain was recorded and referenced within the notes. These were anonymised (so the site could not be identified) and scanned and uploaded into NVivo, with hard copies kept in a locked filing cabinet. Copies of pain audits that had been undertaken, or any guidelines or protocols relating to pain, along with any patient information leaflets that were on display within the department were similarly filed. Posters or notes relating to pain management that were displayed within the public areas of the departments were photographed and filed.

5.14. Analysis

The fieldwork undertaken within the three case studies resulted in a substantial dataset containing a diverse range of data sources. The process of analysis, or 'making sense' of this data was an ongoing process throughout all stages of the research, from the development of the interview schedules to the interpretation of analytical themes once data collection had been completed. Within case study analysis, the concurrent process of analysis is particularly important in order to focus data collection, and follow up new theories that develop throughout the process of fieldwork (Merriam 1998). Throughout the process of data collection and analysis, attention was paid to how the data was collected, why particular events were being noted, what was being recorded and in particular whether there may be data being missed. The task of analysing the data once fieldwork was completed required the use of analytic tools to help to guide the analysis process. For the purposes of this thesis, thematic analysis was used.

5.14.1. Use of thematic analysis

Thematic analysis was undertaken, following the principles of Braun & Clark (Braun and Clarke 2006). Specifically, Braun & Clarke recommend thematic analysis as a useful analysis tool in 'applied research', and for research that goes beyond the academic arena, into implementation. (Braun and Clarke 2014) Due to the focus of this research on understanding the barriers and enablers to pain management in the ED, with a view to understanding how pain management can be improved within the ED, this analytic approach was felt to support the

pragmatic, focus of the research. Thematic analysis involves searching across a data set (i.e. the interviews, observation notes, memos and documentation) to find repeated patterns of meaning, or 'themes'. (Braun and Clarke 2014) The thematic analysis aimed to provide a broad view and rich description of the entire data set, rather than detailed analysis of single aspects of the data, due to the sparsity of current research in the area and the exploratory nature of the research. Themes were identified inductively, rather than deductively, as there were no preconceived theories, coding frameworks or analytic preconceptions prior to analysis. The themes were closely tied to the data rather than being strongly linked to the interview schedule.

Whilst there is some criticism of thematic analysis as an approach in terms of limitations of lack of sophistication and interpretative power, Braun and Clark argue that the criticisms of thematic analysis do not stem from structural problems with the method itself, but from poor application of the method and have demonstrated that it can be a useful approach, if used critically. This analysis was undertaken paying close attention to the potential pitfalls associated with poor application of thematic analysis and following the six steps set out by Braun and Clarke: familiarisation, generating initial codes, searching for themes, reviewing themes, defining and naming themes and writing up the analysis.

5.14.1.1. *Familiarisation with the data.*

The process of familiarisation and immersion in the data involved actively reading and re-reading data to seek patterns and meaning within the data. The process of writing up field notes and typing up reflexive notes, along with checking of interview transcripts for accuracy enabled the process of familiarisation. Once data were checked for accuracy, the 'data corpus', including all observation notes, interviews, documentation and reflective notes were input into NVIVO version 10 and data were re-read prior to coding.

5.14.1.2. *Generating initial coding*

The data corpus (as described by Braun & Clark) to be coded incorporated all data, regardless of purpose. Memos and notes made during fieldwork and during the process of familiarisation with data were added to the data corpus prior to developing the initial coding. Memos were used as data as represented ongoing analysis and questions asked of the data. The process of coding is described as 'organising your data into meaningful groups' (Tuckett 2005).

Codes can be inductive (allowing the data to 'speak for itself') or deductive, derived from theories or concepts from the study design and reflected in the interview schedule (Hennink et al. 2011) p219. Inductive codes were developed by reading, re-reading and questioning the data, rather than using apriori coding linked to the research questions asked within the interview schedule. Inductive coding has the advantage of identifying new phenomena not considered prior to analysis.

Data were coded on a line-by-line basis, with every part of the data set being coded. Where staff described factual information regarding roles and processes that contributed to the descriptive analysis of sites (see chapter 6), this was coded within the broad theme of 'background'. Otherwise, data was coded according to initial codes that would feed into the later analysis, with data often coded under several codes as definitive themes were not yet known. According to Miles & Huberman (2nd Ed) "If you don't know what matters more, everything matters" (Miles and Huberman 1994)(p55)

5.14.1.3. *Searching for themes*

After coding of the dataset using the initial descriptive coding, the 'second cycle coding' (Miles, Huberman & Sadana) , or search for themes was undertaken in which codes were sorted into themes, moving from the descriptive 'this is what they are saying/doing' to 'this is what it means'. The process ended with a group of 'candidate themes' and sub-themes, which made up the candidate themes. Hennink describes this phase of analysis as 'analytic reading' or reading "beyond the words" (Hennink et al. 2011) (p224) as the process where the data is scrutinised more carefully to pick up codes and subtleties that may have been missed initially. More explicitly, coding accounted for the *implied* barriers (i.e. those observed or emerging from analysis), as distinct from the *stated* barriers (i.e. barriers that participants explicitly reported as barriers). (Tavender et al. 2015)

5.14.1.4. *Reviewing themes*

The fourth phase of Braun & Clarke involves reviewing and refining existing 'candidate' themes by revisiting the coded extracts and re-reading the entire data set.

5.14.1.5. *Defining and naming themes*

The fifth stage of thematic analysis involved refining the specifics of each theme and the overall story to identify the salient points of each theme. Braun & Clark suggest one good test for understanding whether themes are well defined is for the researcher to see whether they can "describe the scope and content of each theme in a couple of sentences" (p22). This was undertaken and these sentences were used as a descriptor at the beginning of the report of each theme.

5.14.1.6. *Writing the report.*

The final phase of writing the report of thematic analysis is to "tell the complicated story of your data in a way which convinces the reader of the merit and validity of your analysis" (Braun and Clarke 2006) p93.

The process of writing should ideally be undertaken once a fully worked-out set of themes has been developed and the full 'story' of the data is understood (Braun and Clarke 2006).

However, within this analysis, the latter three phases of the research were revisited cyclically, with the process of writing up enabling further development of themes, and reviewing of themes. Drafts of chapters of the analysis were shared with supervisors, who commented on the appropriateness of themes, and whether the story being told matched the themes defined, and aligned with data from the sample of transcripts they had read. Prior to undertaking the final draft of analysis, the theme summary was added to each theme in order to ensure the data mapped appropriately and the final analysis was written with these summaries in mind.

5.14.1.7. *Presenting the case study report*

The aim of the case study analysis was to understand barriers and enablers to pain management to improve understanding of how pain could be managed. Case studies were used to provide in-depth analysis of three different sites to understand what factors may enable or create barriers to pain management, assuming that the sites where pain was reported as managed well would identify more enablers, and that more barriers would be observed at the sites where pain was reportedly not as well managed. Again, the aim was not to fully understand what makes a 'good' or 'poor' site per se, but to use the different sites to understand how pain is managed and access a wider range of factors affecting pain management.

Data was analysed across cases and cross-cutting themes were reported. Descriptive templates of the characteristics of each site were reported, along with a narrative of the 'holistic' story of each case, integrating and triangulating the different data sources used (Salway et al. 2013). Eisenhardt advocates the presentation of detailed descriptive case study write ups for each site as these are "central to generation of insight" prior to generalising patterns across cases (Eisenhardt 1989). Whilst there was variation between cases in certain themes (e.g. structures and processes), other cross-cutting themes (e.g. priorities and beliefs) were evident across sites and differences between sites were not reported.

5.14.2. Validity and reliability

The concepts of reliability and validity are central to consideration of the quality of qualitative research (i.e. if we repeated the study again, would we get similar results, do the findings reflect the phenomenon under study?). In order for wider inferences to be made from qualitative research, the researcher must demonstrate the results to be robust, credible and undertaken with scientific rigour. There is some methodological debate around the terms used to report quality within qualitative research (see Lincoln and Guba 1985, Robson 2011) and different authors suggest the use of different criteria to assess the trustworthiness and validity of qualitative research (Lincoln and Guba 1985) (Robson 2011) (Ritchie et al. 2014) . This section describes how issues of quality have been addressed within this thesis.

5.14.2.1. *Reflexivity*

The concept of bias due to researcher assumptions and experience is important within qualitative research, due to ongoing construction of data by the researcher (who selects what data is to be observed and recorded, which questions are asked), and the subsequent risk of bias this introduces. Due to the interpretative nature of qualitative research, and the potential for personal views to affect data interpretation, it is essential that qualitative researchers practice reflexivity throughout the research process. This involves making explicit prior assumptions and prejudices that the researcher may hold, and continually questioning how the researcher interprets data depending upon their own experiences. The aim of the qualitative researcher is to achieve as high a level of neutrality as possible in order to avoid sources of bias. Reflexive practice was undertaken throughout the fieldwork, and reflections after each fieldwork visit were recorded separately from observation notes. Details of how reflexivity was practiced throughout the fieldwork are detailed within the discussion at the end of the thesis (see 13.9)

5.14.2.2. *Descriptive validity*

Descriptive validity refers to the factual accuracy of the research account, i.e. whether what was reported as taking place actually took place and whether the researcher reported what was seen and heard accurately. Strategies to improve descriptive validity, and hence the credibility of the research, include the use of multiple observers to record and analyse data and cross-checking data analysis. The nature of this research as a PhD fellowship precluded the use of investigator triangulation in recording observational data. However, transcripts of semi-structured interview recordings and transcripts of observation notes were shared with supervisors and members of PPI group (see 5.14.3)

The use of an audit trail to allow others to verify descriptions and trace the researcher's logic should help add confirmability to findings. All raw data, interview schedules, memos and reflexive notes along with the reflective diary which reported ongoing analysis thoughts and theories were placed within the NVivo database. Memos were used to describe current thoughts, reflections and questions asked of the data. Discussions with supervisors in which aspects of analysis were discussed were written up in supervision reports. Notes on the audit trail are described later, within section 13.6.2.

5.14.2.3. *Interpretive validity*

Interpretative validity considers the degree to which the researcher is accurately representing the participant's reality (viewpoints, thoughts and intentions). The use of respondent validation may be useful in enhancing interpretative validity, in which interpretations of participant views are fed back to the participant in order to clarify meanings and understanding of views. At the end of semi-structured interviews, a short summary of the interviewee's views was fed back to

the interviewee, providing them with an opportunity to clarify any misunderstandings, as well as add any further detail which they considered relevant. This was not done within informal interviews and observation, although informal interviews were used to clarify understanding of observations where possible.

The use of verbatim quotes and extracts from observation within the results of the thematic analysis below (see chapter 5.15) help the reader to understand the participant's point of view (emic perspective) and substantiate interpretative claims.

5.14.2.4. *Credibility and plausibiltiy*

The credibility (internal validity) of qualitative research depends upon how well the researcher justifies relationships proposed within the qualitative findings, i.e. how well suggested barriers to pain management are justified from the analysis of the data. Internal validity can be improved by consideration of rival hypotheses and constant questioning of emerging theories, including any other plausible alternative explanations. The use of different data collection procedures (staff and patient interviews, observation, documentary analysis) within the case studies (method triangulation) helped to enhance credibility, as did the inclusion of different data sources (collection of observation data on different days of the week, interviews with different staff roles and patients). Plausibility (theoretical validity) can be improved by extended fieldwork and paying attention to negative cases. Transcripts were shared with members of the PPI group, supervisors, and colleagues in order to discuss potential themes and consider other obvious readings or interpretations of data during early stages of analysis. Early results were also shared with the PPI group, supervisors, and other colleagues in order to ensure any unclear or potentially misleading interpretations were challenged.

5.14.2.5. *Transferability*

The extent to which results from research can be generalized to other settings or contexts influences the relevance of the research and the degree to which the research findings can contribute to the wider body of knowledge (Pope and Mays 2006) Providing adequate details of the research settings, and interview participants can help to provide the reader with sufficient detail to understand the extent to which findings can be applied to other settings. Description of the settings is provided within chapter 6.

5.14.3. Patient and public involvement

Patient and public (PPI) involvement in research has been demonstrated to help to define what is ethically acceptable, improve the process of informed consent, improve the experience of participating in research and aid dissemination of results (Involve.National Institute for Health Research 2017). At the outset of the Fellowship, a PPI group was set up, which included members of an existing PPI group; the Sheffield Emergency Care Forum as well as users with

expertise on pain management, both from the patient (Ian Semmons) perspective and a clinical perspective (Dr Beverley Collett). This user group was consulted at regular intervals throughout the research to advise on patient information sheets and other documents relating to ethical approval, discussion of emerging themes and discussion of emerging results. Further discussion of how consideration of how the PPI group helped development of the research is discussed in consideration of reflexivity (section 13.9).

5.15. Summary

This chapter has described the aims and objectives, methodology and methods involved in exploratory multiple case study research aiming to improve understanding of barriers and enablers to pain management within UK EDs. Fieldwork incorporated 143 hours of observation, 36 staff interviews and 19 patient interviews and documentary analysis across 3 case study sites. These sites were characterised as follows:

- Case study site 1 – potentially good pain management
- Case study site 2 – potentially poor pain management.
- Case study site 3 – pilot site, attempting to improve

Data was analysed using thematic analysis, following the principles of Braun & Clark (Braun and Clarke 2006) and the results are presented over the next seven chapters (chapters 6 - 12). The following chapter presents a descriptive overview of the 3 case study sites, along with reflective case summaries for each site.

6. MULTIPLE CASE STUDY FINDINGS: DESCRIPTIVE OVERVIEW OF CASES

6.1. Outline of chapter

Chapter 5 summarised the methodology and methods used within the case study component of this thesis. The following chapters (6 to 12) present the findings from analysis of fieldwork undertaken within the three case studies. This chapter reports a descriptive overview of cases, identifying similarities and differences between the three case study sites, along with reflective case summaries. This chapter is presented in two sections:

- Descriptive overview, mapping the structures, processes and workforce involved in pain management between cases.
- Individual case reflections, summarising my perspective on the case as a whole, particularly in relation to why the case was selected initially.

The descriptive overview and narrative summaries aim to provide context for discussion of the overarching themes developed from analysis of fieldwork data, that are presented within the subsequent chapters (7 - 12).

6.2. Descriptive overview of cases

This section provides a descriptive summary of the structure, processes and staff roles involved in pain management at each site using data from staff interviews, observation and documentary analysis. During fieldwork, attention was paid to the processes of pain management itself but also to the general workload and flow of patients through departments, in order to see where pain management fits in with the overall work of the ED. The wider work of the ED emerged as important as impacting upon the time available for staff to deal with pain management. Data for the descriptive summaries below came from observation and information provided by staff during informal conversations and semi-structured interviews, as well as documentation. Where there were differences between processes and structures related by staff and those observed, this was noted in the descriptive summary.

The RCEM guidelines for assessment of adults with acute pain are presented below, in order to understand how guidelines at the time of fieldwork recommended EDs should organise services for pain management (France et al. 2014).

RCEM guidelines (2014) are summarised below:

- Patients should have their pain assessed within 20 minutes of arrival.

- Process for recognition and alleviation of pain should begin at triage
- Patients with severe pain should be moved to an area where they can receive appropriate IV or rectal analgesia within 20 minutes of arrival.
- Patients in moderate pain should be offered oral analgesia at triage/assessment.
- Patients in severe pain should have the effectiveness of analgesia re-evaluated within 30 minutes of receiving the first dose of analgesia
- All other patients should have pain reassessed within 60 minutes of analgesia, or within 60 minutes of assessment for those with no pain at initial assessment**.**

6.2.1. Structures

Organisational characteristic of case study sites

The following section describes the organisational characteristics of the three sites that aim to illustrate the similarities and differences in the context of the departments. The average wait in the department, proportion of patients waiting > 4 hours were reported as proxies for busyness, as there is evidence that evidence that pain management is adversely affected by crowding (Hwang et al. 2008) (Pines and Hollander 2008) (Mills et al. 2009). Similarly, age and ethnicity were reported as some studies suggest pain management differs according to patient age and ethnicity, although the evidence is mixed (Green et al. 2003) (Arendts and Fry 2006) (Mejia et al. 2009) (Raftery et al. 1995) (Jones et al. 1996). Trauma centre status was recorded as pain management may differ depending upon the condition, with traumatic injuries being more visible than other painful conditions.

Sites 1 and 2 were similar in terms of size and structure and were both described as serving majority white British populations with high levels of deprivation, though site 2 had a higher proportion of older patients. Sites 1 and 2 both treated adults and children although children were triaged and managed separately in dedicated paediatric areas. This research took place only within the adult areas of the ED.

Site 3 was a larger site than sites 1 and 2 and a regional trauma centre. This was an adults only department, with a children's ED located within the same city. This hospital was one of the largest teaching hospitals in the country and the ED had strong links to local universities with academic roles for medical and nursing staff. This site was used as the pilot site, then became the final case study site in 2016. Partly due to the initial fieldwork being undertaken as part of the pilot, fewer hours fieldwork were undertaken at site 3 than at sites 1 and 2.

Table 13: Organisational characteristics of ED case study sites

Site characteristics	Site 1	Site 2	Site 3

Types of Patients	Mixed adult and paediatric population.	Mixed adult and paediatric population.	Adult only department. All under 16s go to nearby specialist children's hospital.
Trauma centre/unit	Trauma unit. Nearest trauma centre 5 miles away.	Trauma unit. Nearest trauma centre 16 miles away.	Trauma centre.
Other urgent care services co-located	Co-located primary care	Co-located primary care	GP collaborative centre on site, but not co-located. Staff operate within the MIU which is located 3 miles away.
Attendances p.a.*	60-70k	80-90k	140-150k
% patients seen in 4 hours*	95%	94%	93%
% adult patients >70*	20%	24%	22%

**Statistics from HSCIC 2012/13. Provider level analysis for Hospital Episode Statistics 2012-13 **Data from 2012 CQC ED patient survey.*

Physical layout

The physical layout of the department is described to help provide an understanding of how patients flow through the department and where pain management takes place. During fieldwork, the ED in site 1 moved into a new purpose-built centre. As fieldwork was undertaken within both old and new EDs, the layout of both EDs is described. The following table briefly describes each area of the ED

Table 14: Layout of ED.

Location	Site 1 (pre-move)	Site 1 (ECC)	Site 2	Pilot / Site 3
Overall layout	Small department, with 2 short corridors (majors and minors), linked by small corridors and a staff base. Resus room is off the majors corridor. The x-ray department is situated at the other side of the waiting room to the main ED.	Large, spacious department with 9 'pods' laid out in a 3x3 grid system linked by wide corridors. Front 3 pods include Resus, Minors 1, Minors 2 (Walk-in centre), middle 3 pods include majors, x-ray and paediatrics, and back 3 pods for	Small department with modern front and reception, but main department in complicated layout. Ambulance entrance leads to one corridor, with resus, paediatrics and x-ray off one side, and triage and majors off the other side. The walk-in centre	Large department centred around one long corridor, with 1 major ward and x-ray on one side, another majors ward and resus off the other side. One end of the corridor is flanked by triage/ambulance co-ordinators and behind that is the minors ward. The other end

		emergency admissions.	entrance leads through a small see-and-treat room, adjacent to a long minors corridor. Both of these lead into the boot-shaped majors corridor, centred around a staff base.	of the corridor leads to the Clinical Decisions Unit and the medical admissions wards.
Triage area	1 triage room linking waiting room to minors area. Additional triage room available on other side of waiting room for use when triage is busy.	2 triage rooms for walk-in patients linking the waiting room to the minors corridor.	Joint ambulance and walk-in trage. 1 triage room with 2 curtained bays and 1 small private room. One side of the room links to the waiting room, the other to the ambulance entrance.	2 triage rooms for walk-in patients linking the waiting room to the ambulance entrance.
Ambulance handover	Ambulance handovers are triaged by the nurse co-ordinator within the corridor linking the ambulance entrance to majors	Ambulance handovers are triaged by the nurse co-ordinator within the corridor linking the ambulance entrance to majors.	Ambulance handover done within triage (above)	Ambulance handover station has 2 curtained bays and a workstation for the ambulance triage co-ordinator. Staffed by senior doctor or nurse.
Resus	5 bed resus room, off majors corridor	4 bed resus room within one of the central pods.	4 bed resus room, opens directly from ambulance entrance on one side, to opposite majors bay on other	9 bed resus room, opens from the corridor linking the ambulance entrance to the wards
Majors	Central corridor with 4 private rooms, plus additional treatment rooms often used for majors patients.	Central corridor with 8 private rooms, with windows visible from the central corridor	Boot shaped ward with 16 beds, 7 of which are private rooms. Half of bays are visible from staff base.	2 separate L-shaped wards off the main corridor with 15 and 10 bays respectively. Half of bays are visible from the staff base.
Minors	Central corridor leading from the waiting room and triage room. 5 curtained bays plus treatment rooms	Central corridor with 8 private rooms, with windows visible from the central corridor	Long ward with 7 curtained bays, 4 of which were visible from the staff base	Long ward with 3 curtained bays for trolleys and smaller area for 5 ambulatory patients.
Observation area	None	None	Observation ward	Clinical decisions unit.

Proximity to emergency admissions units	Located within a 10 minute walk of the ED. Patients are accompanied by a porter and a nurse.	Co-located.	Located within a 10 minute walk of the ED. Patients are accompanied by EDA.	Co-located
Reflections on physical space	Small and compact, easy for staff to find each other and easy to communicate. Cramped space for ambulance patients and patients had to wait in overspill areas.	Spacious and modern new build. Wide corridors and separate zones make it easy for staff and patients to transfer easily. Felt quieter, staff less visible.	Narrow corridor in between majors and resus area very busy. Difficult cramped layout.	Large and unwieldy layout. Ambulance area often congested. Tannoy system loud.

Access to analgesia

At initial visits, all sites used locked controlled drugs cabinets whose keys were held by the nurse in charge of the area where the drugs were kept. The introduction of Omnicell ® systems, which use biometric data to allow staff to access the cupboard by means of biometric technology (fingerprints), was undertaken during the fieldwork, with site 1 moving completely to Omnicell®, (except for medication cabinets in triage) and site 2 changing the cupboard in resus to Omnicell®. This could be operated by any member of staff who had undertaken Omnicell® training. The use of biometric technology removed the need for keys to be carried by a named nurse, although at site 2 the position of the cabinet in resus meant that most analgesia was obtained from the locked cupboard in majors. The system is also linked to central pharmacy so that the cupboards should be restocked when supplies are low.

Table 15: Access to analgesia within ED

	Site 1 (pre-move)	Site 1 (ECC)	Site 2	Pilot/ Site 3
Triage	Lockable cupboard containing paracetamol, ibuprofen and codeine. Keys kept in triage.	Lockable cupboard containing paracetamol, ibuprofen and codeine. Keys kept in triage.	Lockable cupboard reported to hold paracetamol and ibuprofen but key was lost for duration of fieldwork.	Lockable cupboard containing paracetamol, ibuprofen and co-codamol. Keys kept in triage post-pilot. Key kept by ambulance co-ordinator, or triage nurse variably at pilot.
Location of controlled drugs	Locked cupboard in resus room. Keys held by nurse in	Omnicell®in resus room	Omnicell®in resus Locked cupboard in	Locked cupboard in resus room. Keys held by nurse in

	charge of resus	Omnicell®in minors.	swipecard entry room in majors.	charge of resus.
Location of other analgesia	Swipe card entry room in corridor between minors and majors. Drugs cupboard in resus.	Omnicell®in resus room Omnicell®in minors	Cupboard in minors (not really used, doesn't contain co-codamol). Main cupboard in swipecard entry room in majors. Omnicell®in resus	Lockable cupboard at ambulance handover station Swipecard entry cupboard in corridor between 2 wards. Small cupboard in staff bases, not always stocked.

6.2.2. Processes for assessment of pain and provision of analgesia.

The processes involved in how patients flow through the ED are described below, highlighting any areas where pain management may take place. Many of the processes were common to all three sites and are discussed together, with differences between sites highlighted within tables.

Prehospital

Prior to arrival at the ED, patients may have taken their own analgesia or have received analgesia within the ambulance. Brought in patients should have had their pain assessed by paramedics, had their pain score documented on the ambulance patient report form and may have been given appropriate analgesia. Non-NHS ambulance services were not always staffed by paramedics, and patients conveyed by non-NHS ambulance services may not therefore have received pre-hospital analgesia. Entonox administered by paramedics may be removed upon handover to the ED, with the expectation that the ED may administer their own Entonox.

Booking in

Upon arrival, walk-in patients registered with the receptionist and were 'booked in'. After booking in, patients were asked to wait in the waiting room until they were called for triage. Brought in patients were booked in with the receptionist by the paramedic after triage.

Computerised tracking

All the sites used computerised patient tracking to show where patients were in the department, using colour-coding to show how long patients had been in the department, based upon their booking-in time. There was significant focus upon these screens at all sites; the screens helped staff to identify which patients needed to be seen next, locate patients within the department and indicate when a patient was approaching target time.

Triage (initial assessment)

All patients underwent initial assessment at triage, with the exception of those with the highest acuity category of 'pre-alert', who went straight to resus. Patients were triaged to assess the urgency of their condition and determine their management. Analgesia at triage for patients with mild-moderate pain (paracetamol, codeine, co-codamol, ibuprofen) could be administered under Patient Group Directive (PGD) by triage nurses who had signed off the relevant documentation, although this varied between sites, and depended on route of entry. There were no PGDs for morphine or other stronger analgesia for triage nurses at the case study sites. Sites 2 and 3 operated some form of senior doctor triage, which enabled patient to receive prescriptions for severe pain, as well as mild-moderate pain, alongside providing other treatments (e.g. antibiotics) and requests for x-rays, or other diagnostic tests. Again, operation of senior doctor triage was variable and although analgesia could be prescribed, it was not usually administered by doctors within triage.

Table 16: Procedures for pain management at initial assessment

	Site 1	Site 2	Pilot/ Site 3
Triage procedures for walk-in patients	Patients assessed by nurse with PGD for paracetamol, ibuprofen and codeine (30mg). Patients were routinely asked about their pain and allergies.	Patients assessed by a nurse, who may have a PGD for paracetamol and ibuprofen. Patients were routinely asked about allergies and asked about pain on an ad-hoc basis. Rapid Assessment and Treatment (RAT) system with senior doctor working in the triage room supporting nurses operates 9-5 weekdays officially, although was rarely in operation during fieldwork.	Patients assessed by nurse with PGD for paracetamol, ibuprofen and co-codamol. Patients were routinely asked about pain and allergies in post-pilot fieldwork. Sometimes ENP in triage can also order x-rays and bloods.
Triage procedures for ambulance patients	Rapid assessment by nurse co-ordinator in corridor. Reporting of pain by paramedics ad-hoc and often reported only when	As above (one triage area for brought in and walk in patients).	Senior doctor triage operated from 8am-8pm. Outside these hours, triage was operated by nurse with PGD for

	analgesia has been given. The triage co-ordinator made assessment of patient pain.		paracetamol, ibuprofen and co-codamol.
Availability of analgesia at triage	Lockable cupboards in each triage room with paracetamol, ibuprofen and codeine 30mg available for walk-in patients. No cupboard at ambulance co-ordinator bay.	Cupboard in triage containing ibuprofen and paracetamol has no key. Some triage nurses with PGDs carried paracetamol in their pockets.	Lockable cupboards containing paracetamol, co-codamol and ibuprofen in triage rooms and ambulance assessment area.

Medical/ANP assessment

Following triage assessment, patients were either sent back into the waiting room, or directed to an area of the ED appropriate for their care (e.g. majors), where they waited in time order for medical assessment. Patients with minor injuries who were eligible for 'See and Treat' (e.g. lacerations, burns) were usually seen by a nurse practitioner, who could deal with the patient's condition, prescribe and administer analgesia, and discharge directly from the See and Treat area.

Other patients awaited assessment, generally by a junior doctor (or ANPs in later visits) or more senior doctor in complex cases. Medical assessment included ordering diagnostic tests (e.g. x-rays, bloods, scans) and drawing up a management plan, which may include analgesia. Upon completion of assessment, treatment requests (i.e. antibiotics, fluids, analgesia) were documented and then filed within notes boxes or online to await nursing staff to administer treatment, unless any particular treatment was escalated.

Reassessment

Following medical assessment, patients were either admitted to hospital, discharged, stayed in the area where they had been assessed to await diagnostic tests, treatment, test results or they were moved to an observation ward or clinical decisions unit to await their results. Patients had ongoing observations undertaken at regular intervals during their ED stay, with frequency of observation depending upon the acuity of their condition. Observations were usually undertaken by a junior nurse or support worker, and may include assessment of pain.

Sites 2 and 3 both had an observation ward/ clinical decisions unit where patients who were awaiting some further service prior to discharge (e.g. physiotherapy, blood tests) could be

referred. These were geographically separate from the rest of the ED, accessible by swipecard entry alone, and with separate access to analgesia.

There were no processes identified for ensuring reassessment was undertaken, although site 1 had amended documentation to encourage documentation of reassessment .

Information systems

Information systems describe how patient notes and information relevant to pain management (the need for, provision of, and patient response to pain management) are documented and communicated between staff. RCEM guidelines state that 'documentation of analgesia is essential and departments are encouraged to formalise pain recording in the same manner as the regular documentation of vital signs'.

Documentation of pain, ongoing assessment of pain and documentation of analgesia prescribed and administered were recorded using either computerised or paper patient notes. The documentation processes differed across sites, notably in terms of the use of electronic or hard notes, and whether documentation of pain was mandated. Documentation of pain usually involved use of some form of pain severity rating (mild/moderate/severe) or the 0-10 pain score.

The following items of documentation were used to record patient notes in the case study EDs:

- Ambulance patient report form (PRF). This is a standardised document and includes a space for the 0-10 pain score at initial assessment, as well as any medication given in the ambulance.
- Triage assessment form. This differed between departments and included some form of assessment of pain severity.
- ED notes. These differed between departments and contain details of patient assessment, history, investigations ordered.
- Nursing notes. These provide additional notes from nursing care.
- Prescribing record. This provides details of medications prescribed and administered whilst in the ED
- Observations record. This provides details of regular observations undertaken whilst the patient is in the ED. Whilst all based on versions of national Early Warning Scores (EWS), they differed in how pain was recorded or situated within the form.

Computerised or paper patient notes appeared to have a role in aiding processes for pain management, by providing reminders to assess or administer pain relief. At site 1, the ED notes had been altered to encourage documentation of assessment and reassessment of pain, with the pain score situated centrally on the front sheet, and details of time or prescription/administration of drugs located directly below the score. Paper notes at site 3 during the pilot were lengthier

and less clear but changed prior to post-pilot visits due to the computerisation of notes. At site 2, and at site 3 pilot, the documentation of pain score on patient notes used a 0-3 score (none, mild, moderate, severe), which didn't correspond with the score used within ambulance notes. Both of these were changed during the course of the fieldwork and the observations record at site 2 was altered to include pain score within the main page, which appeared to increase the documentation of pain within assessment.

Table 17: Documentation recording aspects of pain management

	Site 1	Site 2	Pilot/ Site 3
Ambulance	PRF is transferred electronically once the patient has been booked in. There is no hard copy.	Hard copy of PRF is handed over with the patient. This is then kept with other patient notes.	PRF is scanned onto the system after paramedics have booked the patient in. The hard copy is filed
Triage assessment	Mandated pain score within computer triage system and incorporated into the algorithm that provides triage category.	No mandatory pain scoring tool within assessment documents or computer triage. Optional scoring for mild/moderate/severe pain within computer triage, incorporated into algorithm that provides triage category.	Pilot: triage assessment documentation used mild/mod/severe categorisation but documentation was not mandated. Post-pilot: mandated pain score within computer triage system, incorporated into algorithm that provides triage category.
ED notes	Hard copy of ED notes printed out for all patients after triage. Space for pain score and time of assessment is central. Also introduced space for reassessment pain score and time. Notes kept in boxes by triage order	ED notes all computerised, except for agency nurses and locums who use separate paper documentation. No mention of pain score on computer form, pain score included in agency nurse documentation.	At pilot, hard copy of ED notes printed out for all patients after triage. Now computerised.
Prescribing	Prescribing information is recorded on the front	Prescribing information is recorded on separate	Prescribing information all electronic

	page of ED notes, below the section around pain assessment.	documents.	
Changes to documentation	Changed documentation to include a box for reassessment.	Introduced pain score to main NEWS form, moving pain assessment from back page to be included within main observations.	Documentation changed to electronic patient record.

Other forms of communication included notices on walls, reminders and protocols that were visible to staff and patients. Verbal communication systems were used to communicate directly with other members of staff where face-to-face contact was not possible.

Table 18: Other forms of communication of information regarding pain.

	Site 1	Site 2	Pilot/ Site 3
Other reminders or prompts	Pain ladder on wall in triage.	Nursing staff use pegs on patient notes to remind them to do treatments. Pain assessment tool for patients with dementia on wall in triage at last visit.	Tickbox within computer notes to remind nursing staff to administer early analgesia when prescribed at triage by senior doctor.
Communication systems	Staff use individualised wifi communication system to contact other staff within the Emergency Care Centre. No communication system prior to move and staff relied on face-to-face communication.	Telephone used as main method of contact between areas, principally between observation ward and rest of ED.	Tannoy system used to contact staff in all areas of ED
Patient information	Patient information leaflets include reminders to take analgesia.	Patient information leaflets do not all incorporate use of analgesia.	Poster in waiting room outside CDU informing patients to ask for pain relief if required. Patient information leaflets include (x)

Audit and guidelines

RCEM guidelines recommend that pain management should be audited regularly, ideally annually. Documentation analysis included identification of any protocols, guidelines or audits relating to pain management. No ED specific guidelines were identified, although internal clinical audits were identified at sites 1 and 3.

Table 19: Protocols and audits relating to pain management.

	Site 1	Site 2	Pilot/ Site 3
Protocols for pain management in the ED	None identified. Some staff mentioned Trust guidelines for management of acute pain.	None identified	None identified
Clinical audit	Audits of pain management in triage undertaken every 2 years and results fed back to nursing staff. Copy of audit report was provided. RCEM audits undertaken by named consultant, who was responsible for making changes in response to the audits.	Clinical lead referenced an audit which revealed long waits between prescription and administration. This was not referenced by other staff and other key staff had no awareness of any audit that had taken place. RCEM audits were undertaken but staff could not identify who they were undertaken by.	Clinical audit undertaken 2014. Highlighted need to improve documentation of pain and provision of analgesia at triage. Copy of audit report was provided.

6.2.3. Staffing roles

Whilst all sites used fundamentally similar staff structures in terms of how patients were assessed and managed, there were differences in roles and competencies of staff between the sites. A number of different roles were involved in the management of patient's pain at some level: assessment (identification of the existence of pain), prescription of analgesia, cannulation for patients who require intravenous analgesia and administration of analgesia or non-pharmacological method.

Paramedics

Paramedics may prescribe and administer analgesia in the ambulance prior to the patient arriving in the ED. This should be documented within the patient report form that is handed over to the ED. During handovers, paramedics were observed to inform the ED staff at triage about the patient's pain, any analgesia given and sometimes a pain score (particularly at site 3 post pilot).

Nursing staff

Nursing staff were involved principally in assessment and administration of analgesia, as well as undertaking non-pharmaceutical methods. Some nurses could also supply and administer analgesia under Patient Group Directive (PGD), under certain conditions. Most PGDs were for use within triage, although some PGDs enabled nursing staff to administer analgesia throughout the department. Nursing staff (ANPs, ENPs or nurse consultants) who had undertaken the non-medical prescribing course could also prescribe stronger analgesia, such as morphine.

Support grade nurses had a role in pain management at all sites by undertaking observations, and undertaking some of the nursing tasks relating to pain management, e.g. splinting, administering analgesia (supervised) and cannulating, where they had received appropriate training.

Other related roles

At site 3, much of the cannulation and phlebotomy was undertaken by clinical technicians, with many nurses being unable to cannulate. During the pilot phase, clinical technicians worked from 8am until midnight, but this was extended to 24/7 during the post-pilot phase due to a reported shortage of nurses able to cannulate at night. At site 2, the healthcare assistant role had been combined with a portering role to create a 'generic support worker' who could undertake ECGs, bloods etc. as well as traditional portering roles.

Medical staff

Medical staff prescribed (but did not usually administer) any analgesia available within the ED, and also undertook nerve blocks for certain painful conditions, although training for undertaking blocks was variable. The consultant role was described as overseeing the department and dealing with more complex clinical need. Their role with regards to pain management appeared to be to manage patients with more intractable or complex pain, or patients suspected of drug-seeking behaviour. Initial assessment is undertaken primarily by junior doctors who undertake a 4 month rotation in the department (or longer), with middle grade and consultants assessing patients with more complex needs or higher acuity.

ANPs had also been introduced into the majors area to undertake the role of junior doctors at site 1, and were being trained into the role at site 3 towards the end of the site visits.

The following table summarises differences between roles and competencies relevant to pain management at each site.

Table 20: Staff roles and competencies relating to pain management.

	Site 1	Site 2	Pilot/ Site 3
Nursing roles related to pain management	All nurses can cannulate. All triage nurses have PGDs for paracetamol, ibuprofen and codeine 30mg. IV paracetamol and ibuprofen. 19/37 nurses triage trained, 4 in process, all of whom have PGDs	Some nurses can cannulate. Not all triage nurses have PGDs. Some nurses have PGDs for paracetamol and ibuprofen	Some nurses can cannulate. All triage nurses have PGDs for paracetamol, ibuprofen and co-codamol 8/500. PGDs for 30/500 also introduced.
Other supporting roles	Porters 24/7	10 EDAs. Do a similar role to the HCA. 24/7	10 phlebotomists. ED orderlies undertake portering role. Now have clinical technicians 24/7. At pilot, only worked until midnight.
Further training for pain management.	All consultants and registrars trained to do FIB for fracture neck of femur. Unsure how many of junior doctors.	6 of the consultants trained to do FIB for fracture neck of femur, no registrars or junior doctors trained.	Unsure how many of consultants trained to do FIB for fracture neck of femur, but described as 'patchy'. Not all consultants or registrars have been trained.
Recent changes to staffing structure or roles	2016 introduced ENPs into the majors section of the ED to replace junior and middle grade doctors due to lower turnover.	Recently (2014) stopped porters working in the ED and introduced EDAs, who do transfers, bloods, ECGs.	2016 training ANPs to undertake work of junior doctors within majors area.

Staff vacancies and the use of agency and locum staff were reported at each site, although the extent of the problem of staff shortages differed by site.

Table 21: Staff recruitment issues.

	Site 1	Site 2	Pilot/ Site 3

Use of agency or locum staffs	3 /FTE 8.5 consultant posts available but struggling to recruit. 5 / 8 of middle grades filled by regular locums, one of which was permanent.	2 /FTE 9.5 consultant posts available. Described as relying heavily on locums and agency staff. 1 consultant is a permanent locum. Also permanent locum middle grades on rota	No permanent vacancies on consultant rota.
Recruitment problems	Agency and locum staff have no access to omnicell but can access main drug cupboards and drug cabinets in triage rooms. High turnover of nursing staff	Agency and locum staff have no access to main swipe entry drug cupboard and omnicell. Agency nursing staff cannot use the computer system and have their own sets of nursing notes. High turnover of nursing staff	Use agency staff but less reliant on locums than other sites. Agency staff can access the computer system using a ghost log-in.
Staffing rota information	Hard copy of duty rota kept with staff rotas kept by co-ordinators station. Always completed at observation.	List of medical staff written on whiteboard in majors. Not always completed at observation.	Teams and team leader staff written on white board in main corridor. Not always completed at observation

6.2.4. Significant changes within the department during the course of the research

Over the course of the fieldwork, a number of changes took place in within the departments that may have influenced pain management. This was particularly the case for site 3, where there was a significant time gap between initial pilot site visits and the final fieldwork visit, and for site 1 who moved into a purpose built new Emergency Care Centre (ECC) during the course of the fieldwork. Some changes were made explicitly to improve pain management (e.g. increasing number of drug cupboards available), whereas others indirectly affected the management (e.g. restructuring the department)

Site 1

During the course of the fieldwork, the ED in site 1 relocated to a new purpose built ECC on the same hospital site. This ECC incorporated the ED, Walk-in centre, GP Out of Hours, and the

emergency admissions unit. The first 2 fieldwork visits took place in the old building and the final 2 visits in the new ECC. Prior to the move, staff were concerned that the spacious new building would make it more difficult to communicate but were pleased that nursing staff would be released from the previous requirement to accompany patients to the medical and surgical admissions wards at different parts of the hospital.

As the ED in site 1 moved into a new purpose-built centre halfway through the fieldwork, this afforded an opportunity to consider the impact of physical space. However, during the move to the new centre, a number of other changes in patient management occurred (e.g. integration with the walk-in centre, changes in how teams were managed) making it difficult to detect changes due to the new layout.

A new box including reassessment had been added to the ED notes prior to the final fieldwork visit in an attempt to improve documentation of reassessment, as this was an area highlighted as weak within audits. At the final fieldwork visit, the lead nurse had just instigated a push to ensure all eligible staff had undertaken their training, as a recent high turnover of nursing staff had left the department with too many staff who were not yet eligible to undertake triage training, putting pressure on the existing triage trained staff.

Site 2

Prior to my final fieldwork visit, a number of changes had been made to improve the flow of patients through the department, including the introduction of ambulatory pathways and the introduction of medics coming down to the ED from MAU to assess and potentially discharge patients directly from the ED.

Prior to the final fieldwork visit, a specialist pain tool for assessing pain in patients with dementia (Abbey Pain Tool) had been placed on the wall in triage by one of the senior nursing staff as they had identified problems with assessing pain in patients with dementia. Teaching sessions were being reintroduced as PGDs and training had been ‘let slip’ due to the matron in charge being on sick leave.

During fieldwork, the local collaborator was in the process of trying to get the Trust Board to change the position of the pain score within the observation notes from its position on the back page of the EWS booklet, to be integrated with the rest of the observations, in an attempt to improve the visibility of the score and improve the assessment of pain.

Site 3

During the period between pilot fieldwork and further fieldwork at site 3, the electronic patient record was introduced throughout the Trust. The system went live in September 2015 and all departments simultaneously moved onto the paper-free system, with staff issued smart cards to

activate the system. The following few months were described as a 'bedding in' period, where several changes and refinements were made to the system. The ED introduced a number of changes to their documentation, including significant changes to how the triage assessment was undertaken. The new computer system incorporated a mandatory pain score at assessment, and a tick box to alert teams within majors if a patient needed urgent medication (including analgesia). The tick box would not enable staff to continue without entering a pain score.

Actions to improve the management of pain included mandated documentation of pain at triage increasing availability of simple drugs in cupboards and changing the keys so that one key fitted all cupboards (except for the controlled drugs cabinet).

6.3. Reflective case summaries

The above tables and descriptions of the physical layout, structures and processes of the department contain a subset of the information collated about each department. More nuanced and difficult to describe characteristics, such as the 'feel' or 'atmosphere' of the site are difficult to describe yet may contribute to providing a richer description of each site. The following section provides a more reflective summary of each case study site, summarising my perspective on the site as a whole, particularly in relation to why the site was selected initially. This section focuses on who are the key players (if any) relating to pain management, what focus is there on pain management, who leads change, how did the department respond to the research

6.3.1. Site 1: site with potentially good pain management

This site was selected as the site with potentially good pain management as it scored highly within the CQC patient satisfaction data, highlighted as performing 'better than expected'. RCEM fracture neck of femur audit data also showed the site scored highly in the proportion of patients given analgesia within 60 minutes. Established staff spoke with pride of the department, stating that they would be happy to have their relatives treated there, feeling that they treat patients well, and were supportive, with a strong sense of teamwork. The clinical lead felt that pain was managed well due to a good proactive team, but that processes were probably no better than elsewhere.

Staff were aware of the importance of analgesia at triage and perceived their pain management to be successful due to the early assessment of pain and provision of analgesia. However, this focus on nurse PGDs and assessment within triage appeared to detract from other areas where processes for managing pain were not so efficient. In particular, there seemed little recognition of the potential for pain assessment to be missed at ambulance handover, due to a lack of assessment and lack of immediately available analgesia.

Staff at site 1 generally responded positively to my presence and showed an interest in the research, with staff often volunteering how they felt the site managed pain well (triage & PGDs). Both the local collaborator for this project and nurse co-ordinator on duty at each visit were instrumental in helping find staff and patients to interview. A memo regarding my presence was added to the notes on the staffing rota for my fieldwork visits.

Changes made to improve pain management prior to fieldwork

Changes made to improve pain management included the introduction of PGDs for nurse administration of analgesia at triage, changes to documentation to improve the documenting of pain and analgesia and attempts to improve documentation of reassessment. There was evidence of changes being fine-tuned and altered when difficulties were encountered.

The use of PGDs within triage was introduced in 2004, in response to a review of pain management by 2 senior nurses. Changes to documentation were undertaken after experimentation with the use and documentation of different scales, before deciding upon a 'simple space' for the 0-10 pain score. The pain score was accorded its own section in the centre of the front page of the combined triage & ED notes, appearing more visible than other clinical observations. The time of prescription and time of administration had also been added to the pharmacy notes, just below the pain score and were described as mandatory in order for time to treatment to be assessed.

As the site was described as having some of the highest rates of regular attenders, the lead consultant had introduced management plans for a number of patients who regularly attended for analgesia, so that staff now knew what to do when they attended. These were referenced by staff within the ED as being beneficial.

Environment

The new ECC was significantly larger (described as 3-4 times larger) than the old ED, with long, wide corridors. The site appeared calm and in control even when experiencing bed shortages. There was a low consultant presence, and the nurse co-ordinator appeared to be looked to for leadership.

The move to the ECC included a move to separate out the care of patients into specific teams (majors, minors, resus),which was hoped would improve patient care by enabling staff to know the needs of their own patients better, rather than the previous set up where staff flexed across sections more. The move was also seen as beneficial due to the co-location with the MAU which allowed improved patient handovers.

Staff engagement

Staff appeared to share a more collective view of pain management at site 1 than other sites, with little variation in attitude amongst established staff towards how pain should be managed. All roles were described as playing a part in the identification of patients in pain, and there was support for the role of the HCAs in undertaking assessment and identification of pain. During fieldwork, there was evidence of some conflict between one member of the senior nursing team and other members of staff. She left sometime between my 3rd and 4th visits, described as due to 'differences in opinion' between her and other staff members.

Organisational support

The new ECC building appeared to have been built with co-operation between the ED and the Trust and the ED had been funded for 2 additional HCA posts to account for the additional workload resulting from the increased size of the department. No issues regarding organisational support arose during fieldwork.

Key personnel

Changes appeared to have been made by both nursing and medical staff, with different staff responsible for different aspects of improvements, suggesting commitment across the team. There did not appear to be a single pain champion for the department. Two senior nursing staff introduced PGDs for simple analgesia in 2004 and changes to documentation and audit were undertaken by different consultants.

Other motivations

Although the site was busy and struggling with exit block at the time of my visits (having had to divert ambulances at one visit due to lack of capacity), staff did not appear to be under too much pressure to meet 4 hour targets, and at my final visit were described as one of the few departments within the region to hit their target.

Profile of pain management

Pain management appeared to be integrated into the functions of the ED, with multifactorial initiatives having been embedded over the course of the past decade. The assessment and prescription of pain at triage appeared to be embedded within the triage process and triage nursing staff always asked walk-in patients whether they had pain and whether they wanted analgesia at observation, although they did not usually ask the pain score. The triage score listed on the computer menu was shown with corresponding functional status so that staff could assess the score (1-3 Few problems, do most things – mild, 4-6 Causes difficulties, stops most things – moderate, 7-9 Disabling, stops normal activities – severe, 10 – No control.)

Nursing staff were encouraged to undertake triage and PGD training as soon as they were eligible in order to have as many staff available to undertake triage as possible. Access to analgesia was facilitated at triage and within the main ED, although there was no analgesia immediately available at the nurse co-ordinators station within the new UCC.

Pain management appeared to have a higher profile and be seen as a more integral part of ED work within site 1 than the other sites, with staff talking about pain management, being aware of processes for improving pain management and evidence of improvements having occurred. There appeared to be a higher level of commitment to ensuring patients have pain relief, and less acceptance of patients waiting without pain. Patients were asked about allergies and pain at triage, even when their attendance did not appear to be pain-related. For example, this walk-in patient who was triaged at site 1 was questioned about the need for analgesia, even when attending for a condition that the patient had not described as painful (blood in his vomit).

Nurse S1A: Have you had any breathing problems?

Patient: No

Nurse S1A: Have you got any pain anywhere?

Patient: I've got pain in my leg, nothing to do with the coughing.

Nurse S1A: Nothing that brought you in today?

Patient: No

Nurse S1A: Have you had any painkillers for the pain in your leg?

Patient: No

Nurse S1A: Do you need any painkillers?

Patient: No.

(Observation, Case Study 1, visit 2)

Patients were observed to be asked about pain within other sections of the ED, and staff appeared to be encouraged to ask about pain, whether this was visible or not. This band 2 support nurse explained:

So everyone really, who gets triaged is asked about pain relief. I think as well the NEWS chart works, because it prompts us to ask about pain. You know, when people aren't obviously in pain, then not obviously expressing how they feel because that's just their nature. They're not crying and things like that. It prompts you to say 'oh how's your pain doing?', they might just be being really brave. (HCA, Case study site 1)

6.3.2. Site 2

This site was selected as the site with potentially poor pain management as it scored poorly within the CQC patient satisfaction data and RCEM audit data. Staff felt that they managed pain well, though there was some recognition from senior medical staff that there were delays to administration of analgesia. The clinical lead felt that delays to pain management were largely due to difficulties in administering analgesia due to double sign-out and nursing staff shortages.

I felt there was a level of resistance to my presence from a number of nursing staff who were unresponsive or hostile when I introduced my research, and detected a level of defensiveness that was not evident at other sites. Whilst some staff, particularly senior medical staff and one ANP, were keen to participate and appeared interested, others appeared disinterested or reluctant, appearing concerned about what I was 'trying to find out' and worried about giving 'the wrong answers'. One nurse who had been talking openly about his opinions of the department, and very helpful in answering questions, became wary of his opinions getting back to the department when asked to participate in a semi-structured interview and later declined an interview, despite originally signing a consent form. The local collaborator was the research lead for the department, which had recently become very engaged in research and were successfully recruiting to clinical trials. The department had a research nurse who was responsible for recruiting patients. Although both were helpful, they appeared to struggle to engage with the qualitative nature of the study and were not able to help with identification of staff for interview.

Changes made to improve pain management prior to fieldwork

During the year prior to fieldwork, changes had been made to improve pain management by asking staff to complete the pain score on the back of the NEWS form, and putting simple analgesia in a small cupboard in triage..

Some changes had been introduced but not followed through, such as the provision of analgesia at triage, or the introduction of pain scoring within triage assessment, which was not followed up as it was felt to be a metric that 'added no wisdom'. Some work had been undertaken to develop management plans, but this was referenced as time consuming and difficult.

There was evidence of a number of changes to improve pain management that had been led by the research lead, but had not been fully integrated into the processes of the department, or had not been followed up.

Environment

The site appeared somewhat chaotic and busy, partly due to the layout which did not flow well and became physically blocked up easily. At busy times patients became stacked up down the

main corridor between majors and resus, and there was little space within the minors department to allow for overflow from majors when all bays were full. There was significant focus in the narrative of staff on patient flow, which was described as problematic, and a number of initiatives were identified that had taken place recently, or over the course of fieldwork to attempt to improve patient flow, in particular the use of senior doctor triage (RAT).

Access to analgesia was limited and was centred mainly on two cupboards which required swipe card entry or fingerprint entry respectively. Codeine was kept in the swipe card entry cupboard due to concerns about theft. The key to the triage cupboard was missing for the period covered by fieldwork so staff had no immediate access to analgesia, except for some nursing staff who kept paracetamol in their pockets. The nearest drugs cupboard within the minors area was reported to be not well stocked, and staff were observed bypassing it to go to the swipe-card entry drugs cupboard in the majors area.

Staff engagement with pain management

Whilst staff appeared willing to provide pain management when asked, and were observed to advocate for patients, there was less evidence of support to enable staff to provide analgesia, or encouraging staff to ask about analgesia at site 2 than at other sites. Some of the more peripheral roles to pain management (i.e. ECAs, HCAs) who were felt to be integral to pain management processes at other sites did not recognise their role in pain management despite being able to assess pain and some being able to cannulate. There were also references to a minority of staff who created tensions within the department and were felt to provide inadequate standards of care. For example, in the following informal conversation a nurse describes her perception of some staff leaving patients in pain:

> *[Conversation with nurse S2AM in staff room] As she was getting ready to go, she asked me "are you going to report on what we're doing wrong then?" [I explained my research]. She said "Well, if you could suggest something to improve things that would be great. I mean, another thing they are getting keen on now is nerve blocks for fracture neck of femur. Nurse practitioners are really keen on them. I mean, depending on the consultant but it feels like they just make them suffer.*
>
> *FS: You mean they leave them?*
>
> *Nurse S2AM: Yes. I mean I know it's different for everyone but it's never good to leave someone in pain. You can see people writhing around on the bed, clearly in agony. You tell them, even though they can see they are on in pain, they will just leave them in agony. They just say 'well, we'll just see how they get on for the next hour or so'. If you could bring something, that would be great. I hate it when you see them in agony, or when you see them huffing and puffing on entonox. They shouldn't be on that for too long.*

(Observation, Case Study site 2, visit 3).

Organisational support

At site 2, there appeared to be a lack of organisational support and level of conflict characterised by an 'us and them' attitude between the ED and the wider hospital board that was not observed at other sites. Staff appeared to feel disempowered, and the low staff morale did not appear conducive to making changes around pain management, or other issues. Senior staff perceived a lack of commitment and support to attempts to changes within the department from Trust management. In the following informal conversation, the consultant revealed frustration at not being listened to.

> *[I had been discussing the research with one of the Consultants in the corridor. We had been discussing my research, what I was doing and whether highlighting where the problems lie would help to produce solutions]*
>
> *Consultant S2V: No, but we can get them upstairs to listen to us then*
>
> *FS: Who do you mean by "them upstairs"?*
>
> *Cons S2V: You know, [name] and [name] the managers.*
>
> *FS: Are they ED managers?*
>
> *Cons S2V: No, at executive level. We might be able to get some money for things if they listened to us.*
>
> *FS: Do you think it would be listened to more than if it came from an external source?*
>
> *Cons S2V: Yes I don't know why but if we've been saying something for ages and saying something's a problem, they are just more likely to listen if someone from outside comes and says it's a problem. They may throw some money this way. (Nodding, looking interested).*

(Informal conversation, Case Study 2, visit 4)

Key personnel

The research lead was interested in undertaking this research as felt that it was an opportunity to demonstrate that they were doing something to improve pain, as this was the subject on many complaints. The research lead was enthusiastic about the research and expressed an interest in helping, but was extremely difficult to get hold of and referred to extensively as being the 'go to' person within the department, not just for research. Staff appeared to rely on him to make changes and decisions within the department. He appeared to be the lead for change within the department, and as the clinical governance lead, was responsible for feeding back complaints

and other external feedback to staff. During the period of fieldwork, he was in negotiations with the Trust board to get the paperwork changed so that the pain score could be moved to the main observations section of the NEWS form, but appeared unsupported.

Other motivations

Tensions between the department and external departments were apparent. The department had attempted to install e-prescribing system, but other departments didn't take it up, and the system ended up getting abandoned due to problems with the system. Similarly, the provision of senior doctor triage appeared to cause tensions, as it was undertaken on an ad-hoc basis, depending on which consultant was on duty. Staff appeared to have a higher consciousness of targets due to increased pressure from the hospital board that was not evidenced at other sites. Documentation in the hospital entrance showed the CQC report highlighting areas in need for improvement, including the ED, who were being 'closely monitored' by the Trust board (Case study 2 documentation). This sense of being 'closely monitored' was evident in conversations between staff regarding bed monitoring meetings and the reaction of staff when staff from the bed bureau came to check on patients who were about to breach their target.

Changes to pain management appeared to be introduced in response to a need to 'be seen to be acting' (S3S6) in response to patient complaints, in order to provide defence against criticism. The research lead described part of the reason that he was encouraging the Trust to change the EWS form to include pain score as follows:

> *One of the more common complaints is 'I was moved out of the department and I was still in a lot of pain'. At least if we document pain score, then we can go back to them and say 'well, you had a pain score of 3'.*

(Informal conversation, case study 2, visit 1)

Profile of pain management

Staff reported pain being dealt with well in triage yet observations showed staff rarely offered analgesia in triage during fieldwork. Despite the lack of processes in place, there was evidence of staff attempting to deal with patients pain, questioning patients and prioritising their pain once they were within the assessment areas. Nurses in particular were often seen requesting analgesia from doctors, and subsequently administering it. When patients asked for analgesia within triage, nurses would go and fetch some quickly, but this process was time consuming and they sometimes handed the job over to another member of staff when there were long waits for triage.

Staff did not appear to be encouraged to ask about pain within triage and questioning around pain tended to be framed towards establishing whether analgesia had been taken, rather than

ascertaining whether the patient needed any more. For example, this patient presented with a condition that he reported as painful (a foreign object in his nail), and which the triage nurse acknowledged to her colleague looked painful, yet didn't encourage the patient to have further analgesia:

> *Nurse S2C: Have you had painkillers?*
>
> *Patient: Yes, ibuprofen.*
>
> *Nurse S2C: Fabulous. Go and take a seat in the waiting room and I'll get someone to see you.*
>
> *After she left, the nurse and the student nurse chatted about how painful and inflamed it looked, commenting that he might have to have his nail removed.*

(Observation in triage room, case study 2 visit 2)

Whilst a number of nurses did have PGDs for paracetamol and ibuprofen, training for PGDs did not appear to be strongly advocated and the existing PGDs were out of date. Junior nursing staff involved in informal conversations were unaware of the existence of PGDs or of the procedures for undertaking them.

Pain was not felt to be 'talked about' within the department and there was a lack of knowledge about performance measures regarding pain. There appeared to be a lack of impetus to change and pain management was not seen as high on the agenda. One senior nurse who talked about pain not being one of the 'maxims' of the ED described how the ED prioritised pain:

> *S2S15: mmm, I don't think its erm; it's not top so if, if, if what we judge what a departmental response to pain is, erm, we dish out loads of painkillers but we don't worry about pain. We worry about sepsis for instance; we worry about strokes, and time to thrombolysis. We worry about has a patient had a heart attack, so we will do ECG's very rapidly on anybody and anything with a slight chest pain, erm but the ECG is important and not the pain relief. Are you with me?*

(Semi-structured interview, Case Study 2, Senior Nurse)

6.3.1. Site 3

This site was selected as a pilot due to its location, and then expanded into a full case study site as it appeared to be an 'improving' site. However, there were fewer interviews and hours of observation undertaken at this site than at sites 1 and 2, which led to some limitations in the depth of data collected, and particularly lower awareness of the influence of organisational structures, staff engagement and other motivations, which are not discussed here.

The department has a strong research background and academic focus. Staff were observed being encouraged to attend training sessions and provide feedback on areas of care they felt required improvement. Staff frequently asked me what I was doing and showed an interest in the research, often offering an opinion on the subject and expressing an awareness of the need to improve, particularly in relation to delays between patients being prescribed morphine at the ambulance entrance and receiving it on the ward . On later visits, there was talk amongst a range of staff about a move towards improving assessment at the front door, motivated partly by a need to provide treatments such as analgesia in a more timely fashion

Changes made to improve pain management prior to fieldwork

PGDs had been introduced for paracetamol, co-codamol and ibuprofen and more senior nursing staff were encouraged to undertake nurse prescribing courses. Analgesia cupboards had been introduced in the ambulance co-ordinators area along with a water fountain in order for patients to be able to take painkillers at ambulance triage.

Environment

The department is large, with long corridors linking the different areas. The ambulance assessment area held several trolleys and the area could get busy with paramedics and patients awaiting triage assessment. Communication between different areas of the department was by means of tannoy which I found distracting and noisy. The staff bases on wards were small and cramped and the layout of the wards was such that patients were not visible from the staff bases.

Key personnel

No individual was identified as being responsible for changes in the department. A member of the senior nursing team had been instrumental in encouraging nurse prescribing and introducing PGDs for morphine for trauma. Audits had been undertaken by a combination of nursing and senior medical staff, who were responsible for feeding results back into the department.

Profile of pain management

During pilot observation, pain was not routinely documented either at triage or later assessment and the use of the pain score within documentation was described as ad-hoc. It was not possible to tell whether staff asked about pain as ethical approval for observing in private areas had not yet been obtained. The triage form allowed documentation of pain severity using mild/moderate/severe categories, which differed from the 0-10 scale used by paramedics and did not appear to be used routinely**.**

There was a noticeable difference in the profile of pain management between pilot and later fieldwork, with changes made during the period between pilot and post-pilot fieldwork, largely

in relation to improving documentation of pain and access to analgesia, but also in how pain was talked about. Staff appeared to be aware of the changes made, and of the need to document pain scores, although senior doctors at ambulance co-ordinators station appeared to be struggling to get used to the system and were observed having to go back to complete the pain score box when they had forgotten.

At site 3, there was less evidence around the 'culture', possibly due to less fieldwork being undertaken here. Staff appeared to recognise the need to improve pain management and the department had responded to audits and made a number of changes in-between the pilot and post-pilot fieldwork, but changes were more recent than those made in site 1 and had not been embedded. One nurse described the improvements to the department, but suggested the 'culture' was not yet changed.

> *S3S9: [Talking about another location where they worked, and what made pain management better] Erm no, only just putting more onus on the nurses and giving them more access to the PGDs and then just creating a culture I think that it wasn't acceptable to have somebody in pain, I think that was another thing.*
>
> *I: Yeah. So do you think that's missing here?*
>
> *S3S9: Yeah. I think it is. There's certainly not the onus put on it.*

(Semi-structured interview, Case Study 3, Senior Nurse)

6.4. Summary:

A thumbnail sketch of the three sites is summarised as follows:

- Case study site 1 – pain management is important, we have tried to do something about it. Still making changes, it's on our radar. Maybe don't recognise areas of weakness.
- Case study site 2 – pain management is important but we don't have time to do anything about it. Need external resources.
- Case study site 3 – pain management has long been recognised as a problem, gradually trying to do something about it , with a recent push.

As well as identifying similarities and differences between the three case study sites, the analysis identified overarching themes that emerged as factors affecting pain management that were common to all sites. These over-arching themes are presented as cross-case findings within the following chapters (7 - 12). Where differences between cases were evident within the overarching themes, these are highlighted within the summary of findings at the end of each section.)

7. ED STRUCTURES, PROCESSES AND WORKFORCE

7.1. Outline of chapter

This chapter discusses how the structures, processes and workforce involved in pain management highlighted within the previous chapter 6.2 may impact upon how pain is managed, and the potential impact of differences observed between the three case study EDs.

This chapter focuses more heavily on observation data than the subsequent results chapters because, whilst the physical environment was rarely specifically mentioned as a barrier during staff interviews, during observation, differences between the layout and processes associated with pain management at the three case study EDs appeared to have an impact upon pain management. These barriers may not be apparent to staff working within the ED, particularly those who had not worked elsewhere and were not aware of different ways of working across different sites.

The theme summary for ED structures, processes and workforce is as follows:

A number of structural, process and workforce barriers were identified that made tasks relating to pain management more difficult and could contribute to delays. Although structural barriers to pain management differed between sites, many barriers could be modified by improvements in processes and enhancement of staff roles.

7.2. Structures

7.2.1. Provision of analgesia is simpler when staff involved are in close proximity.

Close proximity of staff involved in pain management appeared to enable good pain management, by easing the process of finding staff to cannulate, prescribe or administer analgesia, particularly where processes of pain management involved handovers of responsibility between different members of staff. The physical layout of the ED was observed to create time pressures and communication barriers due to increased time required for staff to cover the greater physical distances between different areas of the department, and decreased visibility of staff making it more difficult for particular staff to be found.

The compact layout and shared staff base at site 1 (pre-move) appeared to facilitate communication between staff when requesting analgesia, or other aspects of care. Staff could obtain a prescription or second sign-out for controlled drugs without needing to leave the area

where they were working. One consultant described how he felt the physical space impacted on his ability to monitor patients with pain:

> *S1S6: In this department in particular, which we will lose very shortly because we're moving into a bigger department, it's relatively easy because all of the department patients are in two corridors, so for me, if I just walk up one then down the other, I can get a general idea of everything that's going on here. I can walk down resus and I can check what was going on, so that's probably another factor that's helped. If I see somebody arriving or looking like they're distressed with pain, I will stick my nose in and go 'what's going on?', but the chances are, somebody will have already done that. But we have to maintain that when they go in the new department, because that's a very long corridor, and it's much more segmented, so that'll be our challenge. (Semi-structured interview, Case Study 1, Consultant)*

In contrast, at site 3, the long corridors and geographically separate areas of the ED led to staff being more physically isolated than at other sites. The greater distance between triage and the wards, or controlled drugs cupboard were observed to make it difficult for ED staff in triage to physically request analgesia for patients who had been prescribed analgesia at triage.

7.2.2. Physical space is required to provide analgesia

The need for patients to be on a bed or trolley when receiving IV drugs or opiates meant that opportunities to provide IV analgesia or opiates at initial assessment were limited due to a lack of space within the initial assessment area. The triage assessment areas for ambulance and walk-in patients were not designed to accommodate patients for longer than short triage assessment periods, with space for few trolleys, and patients were required to move out of the area to enable other patients to be triaged as quickly as possible.

At site 3, post-pilot, staff referred to plans to restructure the front door assessment system with the creation of an area in which patients could be assessed, treated and investigations ordered, including the prescription and administration of analgesia, as there is currently no space for patients to receive treatment. At site 2, the lack of physical space was cited as a contributory factor to enabling the RAT system to improve patient turnaround, along with staff shortages. Difficult or cramped layout of sections of the EDs (notably staff bases in sites 2 and 3, and the majors area of site 2) made movement around the departments difficult, with staff observed having to wait and squeeze past each other to gain access to computers or patient notes.

7.2.3. Communication systems may counter difficulties from lack of face-to-face communication.

Where ED staff felt analgesia was to be given priority outside of normal processes, (either in requesting prescription of analgesia, or requesting administration of analgesia), ED staff relied

on verbal communication. Whilst some staff at site 1 expressed concerns about the impact of the new larger department prior to the move, the pod layout meant staff within each section were still visible from the main corridor, and increased difficulties in communication appeared to be countered to some degree by the use of the wifi communication system which staff were observed to use to communicate with individual staff, and identify particular staff with whom they could discuss and seek advice about analgesia requirements. At sites 2 and 3, nursing staff in the clinical decisions unit and observation ward relied on the tannoy or telephone communication systems when they required medical input and were observed trying to contact doctors via telephone/tannoy system to prescribe simple analgesia, and having to wait for a doctor to arrive to provide a prescription. These call systems appeared to lead to repeated requests, possibly due to the lack of direct communication to individuals required.

7.2.4. Visibility creates a reminder

Documentation of pain and pain management appeared key to communicating a need for pain management, particularly where there were handovers of responsibility for pain management that did not involve face-to-face contact. Computerised or paper patient notes provided reminders to assess or administer pain relief. At site 1, the ED notes had been altered to encourage documentation of assessment and reassessment of pain, with the pain score situated centrally on the front sheet, and details of time or prescription/administration of drugs located directly below the score. The pain score and details of analgesia had been placed in a prominent position in order to encourage staff to provide and reassess analgesia, and were more visible than other observations (e.g. blood pressure, pulse). In contrast, at site 3, the reminder for nursing staff to initiate early analgesia (for patients who had been prescribed analgesia at senior doctor triage) was reported to be easily missed, due to its position at the bottom of the computerised triage assessment form.

Differences in how pain was documented and visible at different parts of the journey made it difficult for staff to understand prior reporting and management of pain easily. At site 2 (and site 3 pilot) pain was documented at triage using 0-3 score (none, mild, moderate, severe), which rendered comparison with ambulance reported pain score (0-10), and understanding of any change in pain score, difficult. Using a combination of electronic and hard copies of documentation appeared to increase the risk of particular sources of information being overlooked (i.e. ambulance notes), as staff had to consciously look for additional information (i.e. log onto different computer system).

7.2.5. Facilitating access to analgesia may ease administration of analgesia

The legislative requirement for double sign-off for controlled drugs such as morphine was frequently reported as a barrier, due to the additional nursing time required to obtain drugs from the controlled drugs cupboard and undertake the paperwork. However, at site 2 where the main

cupboard was by the central staff base, the presence of numerous staff meant that during observations, the process of signing out drugs did not appear to be onerous.

S2S1: It's not that we don't want to give them analgesia, it's just all that shenanigans. It's quite simple – the problem is all the bureaucracy around morphine, the double signing out and all that.

(Informal conversation, Case Study 2, Consultant)

Improved physical access to analgesia was observed to enable pain management by reducing the time involved in administering analgesia. Lack of analgesia within, or near the triage area at site 2 meant triage nursing staff had to leave their area to fetch analgesia from the swipecard entry room in the majors area. In contrast, the presence of well stocked medication cabinets within the triage rooms at sites 1 and 3(post-pilot) appeared to facilitate provision of analgesia at triage.

S1S1-Yes, I think if there wasn't a drugs cupboard or access to drugs in the triage room, I'm sure patients wouldn't get as much medication in triage as they do. Just because if the nurse has to walk to another part of the department to retrieve something and go back, it's going to add time to what they do. It's all about lean thinking I suppose isn't it. I think that would be a barrier. (Semi-structured interview, Case Study 1, Consultant)

At sites 1 and 2, the new Omnicell ® cupboards were reported to have been introduced to improve access and stocking issues, but problems with access were observed with staff being unable to access the system due to problems with fingerprint recognition, or staff not being registered on the system (i.e. doctors, agency nurses). . However, the use of Omnicell ® did remove the need for nursing staff to find the person in charge of keys for the controlled drugs cupboard, which was often complicated by staffing boards being left uncompleted. Whilst this process per se did not take a significant amount of time, the process of searching for keys was observed to add an additional step into the process of pain management, particularly when it was not clear which member of staff was in charge of the keys. In the following observation, a nurse explained how accessing the key to the cabinet could be time-consuming:

While we were sitting in resus, someone came in and shouted for the CD cabinet key. Everyone looked around; it was not immediately obvious who had it. When I asked how they locate the key, the nurse said 'Somebody has the key, we have to shout for it. That's how efficient we are. We have to find them [keys] on a regular basis. We never lose them, but we have to find them'. He told me that the keys are kept by a nurse in resus, but the nurse may not always be in resus as they may be transferring a patient into one of the bays, for example. (Observation, Case Study 3, visit 1)

7.2.6. Limited formulary limits options for severe or chronic pain.

Limited access to a range of different types of analgesia was reported by staff to be problematic when managing pain, particularly for patients with severe or chronic pain. At site 1, diclofenac for patients with renal colic had recently been removed from the hospital formulary due to safety concerns, leaving staff feeling frustrated that they had few options for patients with severe pain.

Triage nurses at site 1 had PGDs for paracetamol and codeine separately, which allowed them to provide codeine to patients who had taken their own paracetamol. Triage nurses at site 3 had PGDs for co-codamol, but not codeine separately, which was reported to be a barrier to offering stronger pain relief for patients who had already taken paracetamol, along with a lack of physical access to codeine at triage.

> *[Observation at ambulance co-ordinator station.] Paramedic has just completed handover. [Consultant] writes 'PS8' then goes over to see the patient. He asks where it hurts, questions the patient as to where the pain is and then asks if she wants some painkillers. He sits back down and turns to me and says 'she had paracetamol at the nursing home but the time is ineligible so we can't use it'. FS: what will you do? [Consultant]: I'll just give her some codeine I think. Again, I'll put 'give medication early' as we don't have codeine in here. FS: Why? [Consultant]: (Shrugs). I don't know why. It would be an easy win. (Observation, Case Study 3, visit 6)*

7.3. Processes

Processes affected where patients received pain management within the patient journey, and appeared to lead to variation in how different groups of patients were managed, depending upon their route of entry or location of treatment. Although processes were described as offering many opportunities for pain management, with patients being assessed upon entry to the ED (at triage), at initial assessment and then ongoing reassessments during their time in the department, there also appeared to be a number of opportunities for pain management to be missed.

7.3.1. Access to analgesia differed by route of entry

Provision of analgesia at initial assessment was observed to be different for walk-in and brought-in patients at sites 1 and 3, with analgesia rarely being administered to brought-in patients at initial assessment. At site 1 and site 3 (post-pilot), walk-in patients were always asked about pain during observations, and simple analgesia was administered under PGD within the triage room. At site 3, improvements to access of analgesia within the ambulance co-ordinators area, and improved communication of patients pain (due to mandating of pain score) between ambulance co-ordinator and paramedics were noted during observation post-pilot, yet

staff reported that this did not necessarily translate into improved provision of analgesia. Pressures to meet ambulance turnaround times, and undertake swift handovers were felt to impact upon the ability of ED or ambulance staff to provide analgesia within the ambulance assessment area. Staff at site 3 particularly felt that the area was not conducive to providing analgesia, and that even though there had been improvements to the availability of analgesia at ambulance handover, staff did not feel that it was appropriate to administer analgesia here.

Brought-in patients at site 1 were handed over by the paramedic to the co-ordinator, who quickly assessed the patient and asked the paramedic to take the patient to the appropriate area of the ED. In contrast to the walk-in triage process at site 1, the patient was often not asked about their pain and the interaction was considerably shorter than the walk-in patient triage. Although pain score was mandated at site 1, the patient-reported score was rarely obtained and the handover process relied on the paramedic to provide details of pain or analgesia given.

> *[Chatting to the nurse co-ordinator about how they assess the pain score] When you are in minors, you will ask them what their pain score is. They will say they are a 10 but you see them walking and being fine. She [gestures towards other nurse standing by co-ordinators base] may have a different way of assessing pain. On triage it's different, you ask the pain score. Here [majors] you don't ask their pain score as you don't have time and often don't even see the patient. (Informal conversation, Case Study 1, visit 1)*

At site 2, all patients were triaged in the same area and did not appear to differ in how their pain was assessed and treated, with neither group of patients offered simple analgesia as standard.

Although many brought-in patients with severe pain had received analgesia from the ambulance, patients did not always receive prehospital analgesia, and there was scope for patients whose pain may not have been adequately managed prior to arrival in the ED to miss out on early analgesia. Paramedics were referenced as starting the pain management process and patients were frequently observed to have been administered morphine by ambulance crews prior to arrival, but this was felt to be variable and nursing staff revealed a level of frustration at some paramedic's over-reliance on Entonox, which is short-lasting and is often taken off the patient once the ambulance crew hand the patient over.

> *15:15 I returned from my break to the nurse co-ordinators station. She said "I was just thinking about you. We've just had a patient come in with pain management needs. He has pancreatitis but has just been given entonox by the crews. We train paramedics up and empower people and teach them to give morphine but then they go and give entonox, which is pretty useless. They have the skills to cannulate and give more, but they don't use it. We've got him seen and he has got sorted but that is a prime example of not being managed appropriately." (Observation, Case Study 1, visit 3)*

7.3.2. 'Linear processes' mean handovers of care can lead to delays in pain management

Handovers of responsibility for pain management between different members of staff were observed to lead to delays to analgesia. Processes in which patients were assessed, prescribed and administered pain relief by different staff members appeared to lead to delays or pain management being overlooked, particularly if one handover of responsibility was missed. Delays in pain management due to the processes involved in the patient journey were recognised particularly by ED staff and informal conversations with paramedics at site 3. One consultant described the impact these 'linear' processes had, in which different members of staff undertook their own duty (assess, prescribe, administer) then handed over responsibility to the next member of staff.

> *S3S5: The worst place here is probably in [ward 1] or [ward 2] team just because it takes so long for the process to work its way through.[…] But because it takes, we still have a very old-fashioned, very linear process where the patient will come in , wait to be assessed by a nurse, wait to be assessed by a doctor then the card goes back in a box for some treatments then wait for a nurse again. So you can easily be waiting 2 or 3 hours before you actually get some analgesia. (Semi-structured interview, Case Study 3, Consultant)*

Processes for certain groups of patients (e.g. minor illness or injury) who could be seen as 'see and treat' patients appeared to be more streamlined, due to a reduction in handovers of responsibility. 'See and treat' patients were usually seen by a senior nurse (usually an ENP or ANP) who could assess, treat and discharge within a single care episode, avoiding the delays associated with handovers of care experienced within other sections.

For patients with conditions not currently suitable as 'see and treat', administration of analgesia at the 'front door' was seen as an opportunity to reduce the impact of 'linear processes' by combining the process of assessment, prescription and administration for simple analgesia, when undertaken by triage nurses with PGDs. For patients with severe pain, the use of senior doctor triage at assessment (at sites 2 and 3) allowed analgesia for severe pain to be prescribed at initial assessment, although not administered. Whilst this was described as enabling pain management and as evidence of good pain management by consultants at site 2 (where it had been introduced more recently), nursing staff revealed that it was rarely in operation, and the service was observed to be in operation only sporadically during short periods of the day during fieldwork visits. As with site 3, even when analgesia was prescribed, the patient then had to await administration of analgesia once they had moved into a ward or day, due to lack of space to administer analgesia within the triage area.

The following extract from observation notes demonstrated the impact of multiple handovers of pain management on one patient. These notes relate to a single patient who, despite rapid

prescription, was still awaiting analgesia over an hour later as the processes did not ensure that the prescription was followed through.

18:00 Paramedic handover. F, suspected fracture neck of femur. Consultant sitting at [co-ordinators station] typed the patient details on the computer, looked over at the patient and asked the porter to wheel the patient to x-ray. The porter went to fetch the patient, who asked the porter for painkillers. She winced and jumped when touched. The porter then turned to the consultant and explained that the patient was in a lot of pain. The consultant walked over to the patient and spoke to her, asking about her pain. Consultant wrote her a prescription for morphine and explained that the patient would need a cannula to sort her pain out, explaining that it 'hopefully won't be that long'. She sent the patient off with the porter.

18:10 Clinical technician went to pick up the notes of who needed blood taking and the consultant called over to ask her to prioritise putting a cannula in for this patient as she needs morphine. The clinical technician says 'hasn't she just gone to x-ray', to which the consultant replies 'I hope not, she needs some morphine and I want to get that sorted first'. Clinical technician asks the lady in bay 2 of the co-ordinators station "are you [name]?". The consultant checks the computer and says "no, she's gone to [ward]".

18:12 Clinical technician came out of [ward], rolled her eyes at me and said 'they've taken her into x-ray"

18:20 In x-ray waiting area. This patient is the only patient in the waiting room. X-ray technician explained to the patient what would happen with the x-ray. The patient asked about pain relief. The x-ray technician replied that it was up to the nurses if they want to give pain relief then wheeled the patient into x-ray.

18:22 Clinical technician comes up to me, annoyed about the patient going into x-ray. She said it always happens – the patient gets sent straight to x-ray when they could be getting bloods done and getting a cannula in first. She said they are often waiting an hour for x-ray if it is busy. They used to have a tick-box on the form saying the patient had gone to x-ray so she would know where to find them, but they got rid of it.

18:27 Patient returns to [ward] and is wheeled into a bay. Clinical technician does her bloods and puts the cannula in, chats to the patient and explains that they are going to give her morphine.

18:30 Clinical technician leaves the bay. There are 13 bases full in [ward]. 2 nurses, 1 F2 sitting in staff base

19:00 3 nurses all on the ward, all with patients. The patient's relatives arrive. She has still not been seen by anyone.

19:15. Nurses are having a tea break. Consultant comes over and says there won't be time for a proper handover so just let him know if there are any issues. Patient's relative comes out and stands at the nurses station. No-one turns to talk to her so she interrupts them. She explains that the patient has learning difficulties and asks when she is going to be seen. The nurse says they can't see the results yet and the patient needs to be seen by a doctor. She looks at the folders in the pigeon holes to see how many patients will be seen by the doctor before they get to this patient. She explains that it is going to be at least half an hour to 1 hour before the patient can be seen by a doctor, or she could do a nurse referral for pain relief when she has finished her break, in order to sort out pain relief for the patient.

(Observation, Case Study 3 (pilot), visit 1)

7.3.3. Providing simple analgesia at the front door may minimise the impact of delays further on in patient journey.

Although staff at sites 1 and 2 both reported providing analgesia at the front door within interviews, during observation, there were notable differences in provision of simple analgesia at triage. Patients were routinely asked about pain and allergies at triage at sites 1 and 3 (post-pilot), and regularly observed to be given analgesia for mild to moderate pain. Questioning around pain was on a more ad-hoc basis at site 2, and patients were often not given analgesia unless they requested it. Patients complaining of pain at triage at site 2 were observed being sent in to wait in the waiting room, being informed of a long wait, with no offer of analgesia.

Staff felt that provision of simple analgesia at the front door was an enabler to good pain management as this provided patients with 'something to be going on with'. During observations, nursing staff at site 2 were frequently observed finding medical staff within the majors or minors areas to request simple analgesia. These requests for paracetamol, ibuprofen or co-codamol were not observed at site 1, which may be due to the provision of analgesia at triage. The infrequent prescribing of analgesia at triage mean that processes for providing pain relief at site 2 appeared to be complex, and often involved a number of handovers of responsibility which created delays in administration of analgesia. The following observation illustrates this, with a request for a non-controlled drug taking 15 minutes and involving 5 different staff members:

17:45. [ENP] walks into the ambulatory area and approaches [Registrar] sitting at the computer. She hands him a prescription form and says "Are you happy to prescribe me some co-codamol? She looks like she might have broken her foot".' [Registrar] says "her foot?", leans over and writes out the prescription. She thanks him and hands the prescription form over to [Advanced Practitioner], saying "Would you mind asking someone to go and fetch some co-codamol for me? She's gone to x-ray". [Advanced Practitioner] hands it overs to

[Staff nurse] who has just walked in who then heads straight off to get the tablets. She brings them back and places the script and tablets on the staff base desk.

17:52. [Advanced Practitioner] and [Staff Nurse] are sitting talking [Advanced Practitioner] notices the painkillers sitting on the side and says "Oh, has she not had them?" [Staff nurse] says said "I'd told her [the ENP] I'd got them – has she not had them?" [Advanced Practitioner] goes to find the ENP who asked for them. She returns and says "She's outside x-ray". [Staff nurse] asks [Student Nurse] "Can you go and given them to him?" [Student nurse] disappears off then comes back with them as the patient is still in x-ray.

17:58 [Advanced Practitioner] comes in and explains the patient is in x-ray and asks where she will go. She says "Tell you what, I'll tell her to come back in this way when she's done and she can get them then".

18:00 The patient is wheeled through. [Student nurse] checks if she has had any other medications then gives her the co-codamol. (Observation, Case Study 2, visit 2)

This observation of prescription of co-codamol for a patient from triage contrasts with, for example, this patient at site 3 who was administered co-codamol under PGD by the ENP in triage, in which the process of fetching and administering the drugs took a few seconds.

21: 17 Walk-in patient. Male, RTA with chest pain.

Triage nurse S3S8: What can we do for you? (Patient explains he's had the pain since this morning when he was in an accident) S3S8: Have you got pain in your neck, have you had any painkillers? (No) Would you like some whilst you are waiting? (Yes) How bad is your pain out of 10? (7, 6) And you're not allergic to anything? (No). She turns round, takes some tablets out of the cupboard, goes to get him some water, and hands over the painkillers. He asks "paracetamol?" S3S8 says "co-codamol". She then explains that he needs to go back into the waiting room and sends him through. (Observation, Case Study 3, visit 5)

7.3.4. Existing processes may limit opportunities for reassessment.

Reassessment of pain was highlighted as being inadequate by staff and patients in semi-structured interviews at all sites, and patients at all sites were observed to be left awaiting reassessment of their pain following initial assessment. ED staff explained how reassessment was difficult due to the high workload and volume of other tasks. Observation suggested that the processes through which patients were managed did not encourage reassessment of pain and could lead to reassessment being overlooked. As described within chapter 6, once the patient had had their medical assessment, the focus of the doctor/ANP in following up their care moved

physically away from the patient, focusing on the follow up of diagnostic test results and decisions as to where the patient would go next. Responsibility for administering treatment was handed over to the nursing staff, with nursing auxiliaries responsible for ongoing observations. The doctor/ANP then moved onto the next patient awaiting initial assessment, undertaking follow-up of the patient at the staff base, away from the patient. Medical staff recognised reassessment as part of their role in monitoring the patient but relied on nursing staff who undertook observations, when this was overlooked. The need to revisit the patients to reassess, when there were new patients who had not yet been seen was viewed as a barrier.

> *03S4-I think barriers to providing better continuing pain management are staffing time and level, because we've always got an influx of new patients, who haven't had their pain addressed. Therefore we want to treat them, and we sort of have a tendency to forget about people who we have already seen. Whereas, in an ideal world, we'd have enough staff to keep going round. (Semi-structured interview, Case Study 3, Registrar)*

The process of reassessment was therefore often passed onto the staff undertaking observations, usually junior or student nursing staff. However, although they may ask about pain as part of ongoing observations (where this was a requirement of documentation), there were no processes for altering medication unless they decided to bring the patients pain to the attention of a member of staff who can prescribe, which relied on junior nursing staff recognising this as their role. Within informal interviews, there appeared to be variation in how junior nursing staff perceived their role in relation to pain management, with healthcare assistants at site 2 reporting they 'have nothing to do with pain management', but support workers at site 3 and HCAs at site 1 reporting an important role in assessment of patient's pain. For example, at site 1, this nurse explained how she actioned the patient report but would then hand back responsibility to the doctor or nurse in charge:

> *S1S13-If the pain score shows that the patient is scoring highly, then obviously that triggers on the form, and then I will have to inform someone that they're scoring high or that the score went up. Up to 4, we wouldn't action anything. When it goes in the medium which is 5+ and then obviously high which is 7+, we then have to document that on the front of the observation chart that it's high and what we've done in response to that. So I would write something like 'score of 7, due to BP, pyrexic, whatever, and then inform the nurse or inform the doctor, so that passes on the responsibility to them. So I haven't just scored them high and left it. Then it's the nurse and doctors responsibility to action it. (Semi-structured interview, Case Study 1, Support Worker)*

7.3.5. Patients can be seen outside normal processes through escalation

Staff described the processes of deciding which patient to see next as 'in time order, unless unwell' (03S2), as defined by early warning score systems. Patients with signs and symptoms

that may give cause for concern may therefore be escalated outside of the normal processes. Similarly, although not a symptom picked up in early warning score systems within the case study sites, pain was observed to lead to escalation of care outside of normal processes in all sites, with nursing staff requesting analgesia prior to the patient being assessed by the doctor, and doctors prompting nurses to administer analgesia. Examples of escalation were seen frequently within observation at all sites and in interviews, staff often spoke of analgesia being escalated outside normal processes for patients in significant pain.

> *S2S3: If it's myself that's assessing them, and it's me that identifies they've got pain and prescribes, again, it depends on how urgent I feel it is as to how quickly they get it. If I feel that the patient's in agony and needs analgesia quickly, I'll find a nurse and hand the card to them, and say can you do this quickly. It depends on what else is going on in the department as to how quickly that is. If it's less urgent, it gets put in the treatment box, and nurses pick them up in order to give those prescriptions. (Semi-structured interview, Case Study 2, junior doctor)*

However, this prioritising of pain management outside normal processes relied largely upon patient or relatives prompting staff for analgesia, or staff undertaking patient observations being proactive in questioning about pain, potentially leading to patients who were unaccompanied or less vocal with their pain being left to wait. The role of patient prompting was observed to be particularly important in reassessment of pain, which was described as 'ad-hoc', with staff relying on patients to ask for analgesia.

7.4. Workforce

7.4.1. Teamwork and a horizontal hierarchy may enable escalation of pain

Good teamworking and a lower consciousness of role hierarchy appeared to enable good pain management by blurring role boundaries and enabling pain management to be escalated. The ED was described as having a 'horizontal hierarchy' (S1S5) with an open culture which enabled different staff groups to communicate without the traditional hierarchy of medical / nursing staff that may be evident in other departments. Although consultants described their roles as 'overseeing' the department, consultants were often only available on an on-call basis at night, and the nurse co-ordinator was considered 'in charge' of the department, deciding where patients should go, and telling staff where they were needed. The horizontal hierarchy was particularly apparent at site 1, where there was a low consultant presence, and where the ED co-ordinator appeared to be the 'go-to' person for advice by junior and middle grade medical staff, as well as nursing staff.

> *S1S5: There is not really a 'go to' person who says 'this is how you treat pain' but in A&E we have got a horizontal hierarchy, so staff will have no qualms about asking questions of*

different staff, nursing staff and consultants. A&E is a different working environment than other places. Nurses will come and ask 'I think this patient needs morphine' etc. (Semi-structured interview, Case Study 2, Registrar)

S1S7: This is one of the few places where people genuinely work as a team. It's not 'them and us'. (Semi-structured interview, Case Study 1, Nurse)

During observations, evidence of the horizontal hierarchy existing and facilitating pain management was evident at all sites but was referenced in interviews mainly by staff at site 1 who felt that the teamwork enabled their pain management. This lack of hierarchy enabled staff in junior roles, or non-clinical roles (e.g. receptionists, porters) to escalate a patient's pain management by bringing it to the attention of another member of nursing or medical staff who had a mandate to prescribe or administer analgesia.

Professional role boundaries were not distinct, with staff appearing to have a collective understanding of the work that needed to be done within the ED. Staff were observed to undertake tasks that were not necessarily within their role, but needed doing, such as doctors fetching sandwiches for patients, or fetching analgesia when nursing staff were busy. Staff discussions around patient care often involved medical and nursing staff, with junior medical staff seeking advice from nursing as well as medical staff and there appeared to strong levels of trust between medical and nursing staff.

7.4.2. Nursing roles are central to pain management

Nursing staff appeared to play a key role in pain management; acting as the patient advocate in escalating their pain management and making decisions about patient's analgesia requirements. Nurses were described as being crucial in the role of pain management by staff at all sites and were observed to be involved in all aspects of pain management. Nursing staff were felt to be key personnel in identifying patients in pain, requesting and administering analgesia, as well as prescribing under PGD. The central role of the nurse in pain management was described particularly at site 1, where the use of nurse PGDs was widespread, and other roles such as nursing auxiliaries were also referenced as being important. This was in part due to their ability to administer some analgesia, and non-pharmaceutical methods (e.g. splints), but particularly as the person to notice a patients pain when undertaking regular observations. In the following quote, a consultant reflects on improvement in pain management and describes the importance of the nurse as the 'patient advocate' in the management of pain:

S1S14-I think we're much more aware of pain these days than we were when I first started in the business. […] I think our nurses are much more attuned to it, and they will react when pain isn't being managed effectively, and will ensure, work very much as a patient advocate

to get them analgesia as soon as possible. So I think that's' all good, I think we're much better at that. (Semi-structured interview, Case Study 1, Consultant)

Despite not having a mandate to prescribe, nurses appeared to have an important role in decision making around the provision of analgesia. This was seen across all sites, though was more visible at site 2, perhaps due to the lack of nurse PGDs for co-codamol or codeine, and less frequent provision of analgesia at triage. Although within the interviews doctors described 'eyeballing' a patient or undertaking some form of rapid assessment when they had not had time to undertake a full assessment, some reported allowing a nurse to make the decision if it was a nurse they trusted. Nurses were observed to be central in discussions as to what analgesia was required, or in prescription decisions where doctors accepted nursing requests for analgesia, sometimes without question.

The following transcript of observation at site 2 demonstrates how the nurse responded to the patient prompting and undertook the decision making around the pain management required for patients with different painful conditions. In both instances, the nurse made a recommendation as to what she felt the patient required, and the doctor wrote out the prescription without consulting the patient.

18:30 [Majors staff base] [Nurse] comes over and speaks to the co-ordinator about the patient with suspected ovarian pain. "I'm going to have to get her some oramorph until someone goes to see her." The co-ordinator asks "Do you want me to cannulate her?" The nurse replies "If you could." [...] The co-ordinator disappears into the swipecard entry drugs cupboard and the nurse goes over to speak to one of the doctors on the staff base. "Can I have some oramorph for this patient (hands over the notes) – she's in a lot of pain. She's had co-codamol and she's on entonox but it's just not working. We can't get a line in her" The doctor looks at the notes and asks a couple of questions, then says "2.5?". The nurse replies "No, she's in quite a lot of pain". The doctor writes a prescription (which I later noted was for 5mg oramorph) and the nurse says 'thanks', then goes into the swipecard entry drugs cupboard to fetch the drugs.

18:40 A lady comes over to the co-ordinators station and asks for some painkillers as she's got a terrible headache and it hurts a lot. The nurse says "That's fine", then goes over to one of the doctors and says "Can I have some paracetamol for a lady who's got a bit of a headache? She doesn't have any allergies". The doctor says "oral", the nurse replies "yes". He writes a prescription and hands it over. (Observation, Case Study 2, visit 5).

Although none of the sites involved within this study allowed nurses to prescribe or administer morphine under PGD, the administration of IV morphine was usually undertaken by nursing staff, who titrated the drug up to the maximum dosage prescribed by the doctor. The nurses

could give the patient a smaller dose than prescribed if they felt that was sufficient, or more appropriate and again appeared to have responsibility for judging analgesia requirements.

7.4.3. Extended competencies enables pain management by reducing handovers of responsibility.

Enabling more staff to undertake each of the different processes of pain management may streamline pain management by reducing handovers of responsibility. Although the horizontal hierarchy and sense of teamwork appeared to enable pain management by staff 'helping out' with tasks not specific to their role, a lack of competencies for specific roles were reported to create barriers. Whilst staff expressed or demonstrated a willingness to undertake tasks outside their specific job roles in order to help move patients through the department, they were not always authorised to do so. Staff reported frustration at role limitations that, although appropriate in terms of departmental skill-mix and efficiency, were seen to impede pain management, e.g. nurses being unable to cannulate, or doctors unable to fetch analgesia. At site 3, many nurses were not able to cannulate and cannulation was carried out by clinical technicians. During the pilot, this was highlighted as a barrier as clinical technicians only operated 8-midnight, though this was changed to a 24/7 role prior to the site 3 follow up visits. The ability to cannulate was seen as an enabler to good pain management by a senior doctor at site 1, where all nurses can cannulate:

> *S1S1: I mean it's sort of anecdotal this, and I might be slightly biased because I work here now but they're very proactive compared to nurses in some other trusts that won't do bloods. They see that as a doctor role. They won't put cannulas in. Ours tend to do that. (Semi-structured interview, Case Study 1, Consultant).*

Doctors described going to fetch analgesia when nursing staff were busy, in order to cut a step out of the process for pain management, even though this was discouraged due to safety recommendations that medications were not prescribed and administered by a single member of staff. At site 1, junior doctors found themselves unable to access the Omnicell ® following the move to the new department, as only nursing staff were registered to use the system, adding another step onto the process of pain management at busy times.

> *S1S11: The other thing actually, that, having moved into this department, you know now we've got these Omnicell® machines instead of drug cupboards. And historically, where I had a patient who just needed something basic, I would just go and get it, but I can't now, because I have no access to the Omnicell®. […]. But things like paracetemol or codeine, if that was all that was needed, or you know, an antacid or whatever, I would just go and get that, and now I can't. So we have to wait for a nurse to become available. (Semi-structured interview, Case study 1, Junior Doctor)*

Nursing staff at site 1 could all cannulate, and a high proportion could also prescribe under PGD. In contrast, at site 2, there appeared to be more variation in tasks that could be undertaken by different members of staff, with fewer staff being signed off for PGDs and variation in which members of nursing staff could do various tasks, such as ECGs, bloods or cannulation. Some of the ECPs and some of the HCAs could cannulate, 'depending if they've got training and got signed off', meaning that there could be shifts where no support staff had the necessary skills to support pain management.

7.4.4. Staffing shortages impact upon pain management due to increased workload and reliance on agency staff.

Staffing shortages were reported as a significant barrier to pain management due to workload being too high for pain management to be prioritised. The reliance on locum and agency staff also appeared to impact upon the team-working and doctor-nurse trust relationships which facilitate pain management, as well as reducing staff competencies relating to pain management.

Staff shortages

High volumes of workload and a shortage of staff to undertake the work was widely cited as a principal barrier to providing pain management across all three sites. At the time of fieldwork, there was a national shortage of ED nurses and middle and consultant grade medical staff. Although site 3 had no permanent consultant vacancies, sites 1 and 2 particularly were reliant on locum staff to fill middle grade and consultant rotas and all sites were struggling with nursing staff sickness and understaffed rotas. The following extract from observation at site 1 demonstrates what was described as a 'typical' scenario whereby staff sickness and shortages led to them working with 3 out of 5 doctors covered by locum staff and 8 nurses on duty (including the co-ordinator) instead of the proposed 11 on the rota for a daytime shift:

> *9:15 Nurse co-ordinator (S1S11) explained to me that they are 2 qualified nurses short today and people are just having to try to cover each other's areas. She said that people had just phoned in sick or said they can't come.*
>
> *13:00. Minors is being staffed by 2 locum doctors (L2 male, L3 female, works in other departments in the hospital doing bank shifts) and 1 HCA (S1S13). There is no qualified nurse in minors, due to staff shortages. The nursing role is being shared with other sections (majors and resus). (Observation, Case Study 1, Visit 3)*

Staff shortages were observed to affect pain management as ratios of nurses to patients decreased, patients in corridors were left without nurses to administer treatments (including analgesia) and, in the example above, the unqualified nurse was seen waiting for nurses from another area to fetch analgesia for patients in pain. All three sites appeared to be working on

improving their staffing profile to improve their ability to meet demand and were in the process of changing nursing roles in particular to meet the demands of the department. Site 2 were in the process of undergoing a staffing review carried out by an external body to establish their nursing levels and enable more posts to be funded. The impact of staffing shortages was felt to significantly affect the ability of staff to provide adequate pain relief, and staff felt pain management would be feasible if staffing levels were improved, particularly given the time-consuming nature of providing intravenous analgesia for severe pain.

> *S2S6: I've long been pushing the fact that we don't have enough nursing staff to work in the area that I consider the patients with the most pain would go to. And a lot of these drugs, especially if you're giving out opiates, or any drug actually, a lot of them will need double checking or dual-checking. And when you've only got three nurses working in an area of 17 cubicles, and you require two to do dual-checking, that is, you know, that's a bottle neck to the system. So I mean that has been addressed and we're looking at workforce planning and doing things differently. (Semi-structured interview, Case Study 2, Consultant)*

Staff shortages also appeared to impact upon pain management due to the employment of locum and agency staff who were less likely to know departmental procedures and understand the culture of the department, but also lacked physical access to patient notes and analgesia. Sites reported a high turnover of staff, with junior doctors mainly working in the ED on 4 month rotations and nurses moving out of the ED and taking up promotion opportunities elsewhere, or moving to different sites. Staff talked about the high turnover creating pressures as new staff needed training, were not aware of departmental procedures and lacked knowledge gained from experience in the ED. For nursing staff in particular, the high turnover meant that there was a limited pool of staff with competencies associated with pain management (i.e. PGDs, cannulation) and triage training in particular, as staff needed a level of experience in the department before undertaking training.

Use of locums and agency staff

The use of locum and agency staff were observed to impact upon pain management through staff not understanding procedures within the department, and not being able to access patient notes and analgesia. The computerisation of patient notes at sites 2 and 3 led to problems with staff accessing patient notes, with agency paperwork being filed separately and staff not being able to access systems to check results, or past medical history. At site 3, one nurse described the use of agency nurses as a "nightmare" (informal conversation, Case Study 3, visit 6) due to the inability for agency staff to use the computer system, requiring another member of staff to access the system and type up documentation. Similarly, agency and locum staff could not access fingerprint operated Omnicell ® drugs cabinets, and at site 3 swipe card access was

required for the principal drugs cupboard, resulting in nurses having to wait for access to the cupboard for non-controlled drugs.

Whilst some of these problems were overcome by the use of bank or regular agency staff who could be trained to use the computerised systems, other difficulties arising from the use of locum and agency staff related to problems of staff competencies and trust. Problems of staff shortages caused by high turnover of staff appeared to be compounded by the use of locums and agency staff which created a workforce lacking knowledge of local processes and experience. During one observation session, the nurse co-ordinator had been getting frustrated at doctors not being proactive in seeing patients and providing the level of service she expected. She voiced some of her frustrations to me as I was observing:

> *[Talking to the co-ordinator by the co-ordinators station] The co-ordinator comments to me "The doctors have been driving me mad today. We've got lots of locums and locums don't know how the triage works, how the system works." I ask her whether this affects pain management. She says "They don't know what we do about pain scores. It depends on their background; they might not even be A&E doctors." (Observation, Case Study 1, visit 2).*

Concerns about the competencies of locum doctors were echoed by other members of staff who spoke about the lack of control over locum and agency staff, and the lack of appropriate knowledge locum and agency staff may have. However, even regular 'trusted' locums were seen as limiting the effectiveness of the workforce, as they could not be signed off on competencies necessary for development of the workforce. One consultant described how the use of temporary staffing may limit development opportunities in pain management for the department as they could not realistically invest in training for staff which would not benefit the department.

> *S2S6: We have two registrars on nights, which is certainly better. However, again that's very locum dependent, so there's a lack of consistency and sort of consistent competency there as well. So you know, if I had a department with a consistent middle grade tier, then all the things with regards to competency training and sign off would be really efficient. You know, we could do analgesia day, we could get an actual pharmacist to come in to see the pain team and we could just hammer it home. And then we'd all have the certificates, and I'd be happy knowing that on the night shift, I have people who are signed off, competent and have had the information given to them. When I'm so locum dependent, I'm loathe to want to pay locums to go to training that actually they're probably going to take away with them and not stay with us. That sounds very selfish, but it's a very realistic way of looking at things. (Semi-structured interview, Case Study 2, Consultant)*

7.5. Summary of findings

A number of structural, process and workforce barriers were identified that made tasks relating to pain management more difficult and could contribute to delays. Although structural barriers to pain management differed between sites, these could be modified by improvements in processes and enhancement of staff roles.

- *Physical barriers appeared to indirectly affect pain management by increasing time and effort required to undertake tasks relating to pain management. Inadequate physical space made provision of analgesia close to front door assessment areas difficult and extensive distances between areas of the department hindered face-to-face communication between members of staff involved in pain management. Physical limitations may be countered by improvements to processes and communication/reminders.*
- *Documentation of pain and pain management appeared to be key to communication where staff were not in close proximity. The visibility and accessibility of pain assessment and notes regarding analgesia appeared to act as a reminder.*
- *Access to analgesia differed between sites, which depends on route of entry, with reliance on paramedics for brought-in patients.*
- *The processes by which ED patients were managed meant that unless pain was assessed and treated at initial assessment , patients were likely to experience delays to pain management when the department was busy, due to waits for medical assessment. Lack of provision of analgesia at the front door appeared to create further workload within the ED due to staff requesting simple analgesia from medical staff within the majors or minors areas.*
- *Attempts to improve prescribing through senior doctor triage at the front door were limited by the need for the patient to wait for administration of analgesia, elsewhere in the department.*
- *Escalation beyond standard processes for patients in severe pain appeared to be accepted as normal, but relied on patients or carers either requesting analgesia themselves, or nursing staff recognising and acting on recognition of patient's pain. Nursing staff played a key role in pain management, acting as the patient advocate in escalating pain management and making decisions about patient's analgesia requirements, even where they could not prescribe.*
- *Reliance on locum or agency staff created pressures on existing staff due to agency staff being unable to access equipment, documentation and analgesia. This appeared to be compounded by external staff being unaware of site-specific processes, and existing staff lacking trust in external staff competencies.*

- *Good teamworking and a lower awareness of role hierarchy appeared to enable good pain management by blurring role boundaries and enabling escalation of pain management. Good working relationships appeared to enable pain management, but were harder to establish with a temporary workforce.*
- *Processes focused on diagnosis and patient flow and could lead to reassessment getting overlooked.*

8. PRIORITIES AND BELIEFS.

8.1. Outline of chapter

The previous chapter summarised the role structures, processes and workforce of the ED to pain management. This chapter explores how staff perceptions of how pain is managed, and the system of beliefs in which they operate within the context of the ED may affect the management of pain, in particular how pain is not believed to be central to the work of the ED.

Attitudinal and knowledge barriers were highlighted within the theoretical framework of rationale for interventions in the systematic review of interventions to improve pain management (see Table **8**) as a barrier that interventions were designed to overcome, mainly through the development of protocols and educational interventions. The focus of the interventions was to enable staff to increase understanding of theory behind pain management, counter myths associated with beliefs around pain management and decrease uncertainty as to how to improve appropriate prescribing of analgesia.

Analysis of this fieldwork revealed a distinction between the barriers stated directly by participants, and those revealed throughout the interviews. When asked what staff felt were barriers to pain management, staff principally quoted barriers relating to volume of work, staff shortages, the time-consuming nature of fetching controlled drugs and being unable to assess the patient's level of pain. When exploring their responses further, they revealed other barriers around how they prioritise and relate to pain management within the context of their other work. Analysis revealed a framework of embedded beliefs in which ED staff appeared to operate, which are discussed below.

The theme summary for Priorities and Beliefs is as follows:

Staff appeared to operate within a framework of beliefs around pain management which enabled inadequate pain management to be perpetuated.

8.2. Belief in patient's pain

ED staff assessed patient's pain, sometimes asking them to report pain using a pain score, and made treatment decisions based upon the level of pain reported. However, their level of belief in patient report appeared to be influenced by their ability to see the cause of the pain, or evidence that the patient was genuinely experiencing the level of pain reported.

8.2.1. Seeing is believing

Staff talked about the importance of visible signs in assessing pain and appeared to have a higher level of belief in visible signs than patient reporting when judging pain scores. When describing patient's pain, they perceived they could 'tell' when a patient was in pain. They described physiological and behavioural signs such as increased pulse rate, blood pressure, doubling up, guarding and wincing as indicators of pain. Patients were perceived to behave in a certain way when in pain, and staff hesitated to accept a patient pain score when patients acted outside of these norms. Patients who were perceived as behaving 'normally', i.e. carrying out normal activities, would not be considered to be in significant pain by staff. For example, in the following observation, the nurse qualifies the patient-reported score with an observation about the patient's behaviour that may sit outside the expected norms for an '8'.

> *Observation at nurse co-ordinators station. Overheard a nurse talking to a consultant about one of the patients in majors. "He has a score of 8 out of 10 but he accepted a sandwich and a coffee". (Observation, Case Study 1, visit 2)*

The type of injury or illness emerged as an important factor in judging pain levels. Staff reported knowing certain categories of condition to be painful whilst patient reported pain scores for other conditions were more likely to be perceived as prone to exaggeration. In particular, visible injury such as wounds and fracture were reported to be more likely to be accorded a pain score closer to patient report than, for example, abdominal pain where the possibility of exaggerating or 'faking' were higher. For example, in the following observation, the consultant and paramedic at triage made the judgement based on the visibility of the injury, although the patient was not displaying visible signs of being in pain.

> *Paramedic handover. F 82, fallen in garden. Paramedic runs through observations. "Didn't get a pain score, but I'm guessing it was a 10. There's an obvious deformity – you can see something sticking out. Pain in her hip too. She's had 1g paracetamol and entonox." The consultant looks over and winces, agreeing. The patient is lying fairly still, talking to another paramedic. Her wrist is strapped up. The paramedic comments that the patient is very stoic, "but I bet next month's salary it is broken." (Observation, Case Study 3, Visit 5)*

This reluctance to believe pain appeared to be driven partially by consciousness of a group of patients who were known as 'regulars', who attended the ED seeking opiates due to addiction.

8.2.2. Once bitten, twice shy: past experience affects staff beliefs.

Whilst the majority of patients within this sample were attending with acute pain, or acute exacerbations of painful conditions and appeared to have relatively low expectations of pain relief, staff spoke of the difficulties of patients with chronic conditions who were perceived as

difficult to help, or having high expectations of pain relief that could not be met within the ED. Easy patients were described as being younger, with straightforward conditions and pain of clear origin, who could be managed with simple analgesia. Difficult patients were categorised as those for whom communication of pain was difficult (e.g. children, patients with dementia), those with complex or difficult to treat conditions (e.g. complex headache, chronic pain) and patients whose pain was of questionable origin and required careful management. Patients with communication difficulties were difficult to assess, those with complex pain were difficult to manage due to a lack of appropriate analgesic modalities within the ED and patients perceived to be drug-seeking were reported as difficult to manage because staff did not know whether they were genuinely in pain.

> *03S2: I'd say the people who are a bit more difficult are the intravenous drug users and people with substance misuse history because sometimes they come in with medication seeking behaviour and it's down to how much is their actually genuine problem and how much is them wanting the extra effect of whatever they have come in for, which I think is actually quite a common problem throughout A&E departments. (Semi-structured interview, Case Study 3, Junior Doctor)*

Overheard conversations around pain, and informal conversations frequently referred to difficulties in understanding or believing whether a patient was in 'genuine' pain, and dilemmas as to whether to provide the analgesia requested. Staff spoke of past experiences where they had trusted patients, then found out the patient had been seeking opiates and felt their trust had been abused. The following extracts from observation notes regarding the management of a patient with pain who was being managed by a registrar demonstrate how the registrar was visibly distressed at being convinced by a patient who had a history of addiction to painkillers:

> *19:05 Registrar (S1S5) tells me more about the patient in pain they have identified for me to approach (Patient A, triaged 18:34, given 1g IV paracetamol 18:50, pain score 5 documented). He says "She's another one who knows nothing about her health. She's had recurrent abdominal pain, various surgeries but can tell me nothing about them. The first thing she asked for was morphine. I offered her diclofenac but she wants morphine. She will probably get it". I asked whether he thought she [patient A] was drug-seeking. He thought, then said "Probably not, no."*
>
> *[…] 19:37. S1S5 was in the staff bay and had just found out by looking on the system that Patient A was a methadone user, but she had not had her methadone today. He told me and seemed annoyed to have found out that she was on methadone. "She didn't mention that [she was a methadone user]. Patients lie. Never trust a patient. You have to use all sorts of tricks to find out". (He paused, and looked reflective) She does look in pain, her obs are fine, she's not unwell" (Observation, Case Study 1, Visit 2)*

Experiences such as these where staff had been 'duped' appeared to contribute to a level of suspicion in future interactions with patients, with a residual level of mistrust of patient's pain that affected how they assessed and managed pain for all patients. Staff appeared to have an awareness of patients with drug-seeking behaviour and a level of mistrust of patients that contributed to concerns over belief of patient's pain. Their past experience was brought into each patient encounter and appeared to justify why 'good' patient behaviour was necessary; to indicate the genuine nature of their need. (See section 11.5)

8.3. You can't die of pain; belief in pain as distinct from clinical priorities.

Pain management was presented as important but distinct from clinical priorities throughout the interviews and informal conversations. Pain was reported to be a high priority and a common reason for patients attending the ED, but not a top priority for staff who had to deal with patients with urgent, life-threatening conditions. Staff frequently referenced the concept that "you can't die of pain" (S1S2) when explaining how pain was prioritised, presenting scenarios whereby they would have to choose a medical emergency rather than pain management as this was not considered a 'clinical priority'.

> *S1S7: If someone is in pain but it is not life-threatening, we will deal with the life-threatening patient first and leave the patient in pain. (Semi-structured interview, Case Study 1, Nurse)*

> *S1S5: OK, it's not the most important thing but it is quite high up. Clinical priority always comes first. If it's a sprained ankle versus someone who is going to die, then they may not get their pain relief within 20 minutes, or whatever the guidelines are. (Semi-structured interview, Case Study 1, Registrar)*

However, whilst staff presented these examples of having to deal with critically ill patients to demonstrate why pain may not be prioritised, the more commonly observed scenario whereby staff chose to prioritise non-critical tasks over pain relief were less frequently mentioned within interviews. During observations, staff often had to manage a number of patients who were not critically ill but required multiple aspects of care. The distinction of pain management from clinical priorities meant that pain management appeared to be considered important, but a secondary priority alongside taking bloods, diagnostic tests, giving fluids, offering food and comfort. In the following quote from a semi-structured interview, a nurse working in the observation ward explained the pressures of trying to undertake the various nursing tasks required, along with moving patients and ensuring patient flow.

02S9: It doesn't stop for us, it's quite relentless. We don't have periods of, long periods of time with empty beds. We're just constantly moving people all the time. So along with that, you're trying to do a medication round, you're trying to get analgesia out, you're trying to make sure that people are dry, fed, can mobilize, make sure there's no pressure sores, so yes. (Informal conversation, Case Study 2, Nurse)

Pain was presented as just one task within a set of tasks that nursing staff were trying to do within a time-pressured environment. In the following extract from an informal conversation when observing at site 2, a nurse explained his immediate workload concerns, referencing pain management as one of many urgent duties that would be done once other tasks had been completed.

12.00- (On staff bay in Majors. I asked the nurse about the analgesia some of the patients identified as in pain had received). I asked the nurse 'what about patient [8]?' He hesitated and then said 'he's not had any either, I've not given him any. I need to get up there now and see him as he needs fluids'. He gestured towards the patient, waving his forms in his hand. He had several forms of treatments and notes in his hand. 'As you can see, I've got 6 patients. One's in respiratory failure; I've got her in the corridor who's mine too; I've got to do bloods, ECGs, get them cannulated and then (gestures to all the patients) give them fluids and all that before I can even think about dealing with their pain'. (Observation, Case Study 2, Visit 3)

There appeared to be uncertainty around where pain was placed within the list of different priorities. Whilst the nurse above referred to needing to do the other tasks before "I can even think about dealing with their pain" other staff described pain management as taking priority over, for example, administering antibiotics or fluids and staff were observed to interrupt other duties to provide analgesia. The inclusion of pain management within the category of 'other' priorities, distinct from the urgent clinical priorities that drive the ED, appeared to leave the placement of pain management as a priority open to subjectivity of individual clinical judgement. Pain management may be prioritised differently by different staff, and within the busy environment of the ED may get overlooked. One senior nurse described this as 'getting lost' within other workload:

S2S5: Nonetheless in terms of resolving people in pain, you know, trying to help people that are in pain, I don't think we do a terrible job I just think sometimes it gets lost in the mayhem and chaos. (Semi-structured interview, Case Study 2, Senior Nurse)

Despite staff defining pain as distinct from clinical priorities, the triage systems at all three sites considered pain a clinical priority, including pain as a discriminator within the priority setting software and allocating a higher priority to patients with severe pain. Patients were observed to be triaged higher due to pain, and staff at site 1 were observed to give analgesia to patients in

pain, to reduce their pain and lower their triage category. However, the judgement as to whether patients were in sufficient pain to warrant a higher triage category was made by triage staff who were responsible for assessing and inputting pain levels, and could over-ride if they felt other patients had more urgent needs. Some staff reported a reluctance to allocate a high triage priority to patients with pain when there were higher clinical priorities to be met. Again, despite the triage system allocating pain a high priority, the inputting of triage information by individual staff meant that the priority allocated to pain was a subjective decision made by individual staff, and appeared to be led by concerns around other priorities.

8.4. We're doing as well as we can; belief that barriers to prioritising pain management are outside the control of the ED.

Staff revealed low levels of belief in the ability to improve pain management significantly due to the overwhelming volume of work and staff shortages faced by the ED. Whilst some staff referred to changes they wished to make and the potential for improvements, other staff perceived there was little they could do to improve. When asked about barriers to pain management within their department, staffing shortages and volume of workload were widely cited as the principal barriers to improving pain management. Staff asserted they were doing 'as well as we can', or when talking about areas where they felt that improvements could theoretically be made, improvements were seen as impossible in reality due to staffing shortages.

> *S2S4: I think it's difficult to say. It's difficult to say, I'd say, because we are trying our best. It's not as if we don't want to give pain relief to everyone. I'd say it's all slightly out of our control. (Semi-structured interview, Case Study 2, Junior Doctor)*

Staff appeared overwhelmed at times by the sheer volume of patients and the lack of time and staffing to deal with patients appropriately within the time available. ED workload varies constantly, with unpredictable surges in demand and staff were conscious of how quickly workload could increase. In addition to the management of patients in front of them, they appeared to have an awareness of the volume of work approaching and a consciousness of the pressures and targets of the department, compounding feelings of being overwhelmed. The ability to prioritise pain management when faced with a high workload and the need to meet targets for ambulance turnaround and four-hour waits was seen as difficult. This nurse describes a situation summarising the difficulties in providing pain management when the department is under pressure.

> *S3S9: Well, if someone comes in and they need something, say if someone comes in in 9 out of 10 pain and they have got renal colic or something and they are writhing around on the bed, you want to give them morphine don't you that's the only thing that's really going to*

help. So you've got to get them cannulated then you've got to get the card printed off then you've got to find a doctor to write you up some morphine then you've got to deliver the morphine, then there's 15 other ambulances queuing up to get in and handover, it's just not a, an environment that's really conducive to giving fast effective pain relief. (Semi-structured interview, Case Study 3, Nurse)

The reassessment of pain was particularly referenced as being poor at all sites, but outside of staff control and due to volume of other work that required prioritising. Again, pain was seen as a secondary priority when faced with other tasks and staff felt that pain was not reassessed without patient prompting due to insufficient staffing. Many staff appeared to accept the inevitability of patients not getting adequate pain relief due to staff shortages in finding doctors to prescribe, or nurses to administer analgesia.

S1S16: It [pain management] just really varies, but obviously when the department is busy, I don't think the priority of the nurses is to be doing the checking, because they've got a lot of other things to do. I think it's probably as good as can be in this department.(Semi-structured interview, Case Study 1, Nurse)

The presentation of other priorities as taking precedent over pain management was used to mitigate explanations of suboptimal pain management. Pain management was implicitly considered a lower priority than, for example, patient flow, and staff appeared to separate individual choice from overall departmental responsibility. For example, in the following quote from a semi-structured interview, the nurse uses capacity pressures to explain how consciousness of capacity pressures are implicitly considered to be of higher priority than dealing with individual's pain.

S1S14: We're all very busy. Trying to, (pause)- I don't mean we don't do it, but there are times when you think actually it would be easier if I just let the next person sort this out. It would be the wrong thing, but you can see why it happens. Sometimes, somebody will be in triage and they won't have been given their analgesics at triage. Then you go back to the triage and say 'you've scored them at 7 on the pain score. Why didn't you do anything?', and the answer might come back 'well I've got another half a dozen people in the waiting room to sort out, so I didn't have time'. So sometimes it's capacity pressures I suppose. (Semi-structured interview, Case Study 1, Consultant)

8.5. Pain management may be prioritised when it supports the other business of the ED.

Pain management was described as a caring function, aimed at relieving patient symptoms, with further benefits pertaining to facilitation of patient management. When under pressure, these caring functions appeared to become secondary to other concerns such as ease of diagnosis or management of the patient. During semi-structured interviews, staff were asked their opinions on the aims and potential benefits of pain management. The reported aims of pain management fell into two main categories: to improve the patient experience, and ease the management of patients whilst in the ED. Staff asserted that pain management was a fundamental caring function and part of the duty of care of any healthcare professional within the ED. Alleviating patient suffering by dealing with pain was described as the 'right thing to do' ethically and morally, and many staff stressed that no-one wanted to leave patients in pain.

> *S1S14: The aim of pain management is to relieve patient suffering and discomfort, which is paramount. (Semi-structured interview, Case Study 1, Consultant)*

Staff also discussed benefits of pain management for the overall management of the ED. Watching or hearing patients suffering with pain was considered distressing to staff and other patients, and felt to impact negatively upon the atmosphere of the department. Pain was seen as making patients agitated and demanding, and providing pain relief was reported to 'keep them quiet' (03S5) and reduce stress on staff, allowing them to get on with dealing with other work.

> *S1S12-Ultimately it's going to help you on the floor, because if you're seeing x number of patients, it's going to take up a lot of your time if you don't get the pain under control, and you're constantly answering the buzzer and going back and forward from the same room. (Semi-structured interview, Case Study 1, Nurse)*

Dealing with pain was also reported to improve patient flow through the department, particularly given the expectation that pain would be under control prior to being discharged from the department. Staff discussed how managing patient's pain could help speed up patient discharge, or help with the assessment and diagnosis of the underlying condition. Patients experiencing pain were seen as difficult to assess as they were too distressed to provide accurate histories or allow physical examination, and pain was felt to impact upon their vital signs (e.g. increase heart rate and blood pressure). Pain was described as masking other symptoms and therefore needed to be managed in order to aid diagnosis.

> *S3S2: And it can sort of contribute to better management of the patient in that if the patients not in as much pain then they are much more amenable to what you are doing. If they are in*

pain, they can be quite distressed. And pain can obviously then cause changes to vital signs and diseases because if you are in pain and you're agitated, your heart rate is going to be quicker, you're going to be breathing more quickly, so that will sort of mask potential symptoms of other things you want to look at. (Semi-structured interview, Case Study 3, Junior Doctor)

S1S4: It stabilises the patient's condition, gives us chance to observe and treat patients between, get more information from the patient about their condition. If they are in pain, they can't give information properly. If they are comfortable, they are much easier to manage. (Semi-structured interview, Case Study 1, Nurse)

During fieldwork observation, staff appeared to demonstrate empathy and concern for patients in pain and provision of analgesia was frequently observed. However, there was some evidence that when staff were busy, patients who were more demanding of pain relief, or who were louder in their expression of pain attracted the attention of nurses who would then escalate pain relief, whilst patients who were more stoical and quiet in their presentation of pain were seen to wait without analgesia. When under pressure, prioritising the alleviation of suffering may not be prime concern for staff. During an informal conversation, this consultant explains why patient who are more vocal with their pain may receive analgesia sooner than patients who may be experiencing similar pain, but creating less disturbance to the department.

S3S5: Someone who is making lots of noise will be given attention. Clinically, this attention may be misplaced but it might be the right thing to do organisationally. We are keen to shut people up – we like order and stability. (Semi-structured interview, Case Study 3, Consultant)

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8.6. Belief that pain is managed well may impede improvements.

Although some staff acknowledged deficiencies in the management of pain within their departments, many staff appeared to operate within a belief system in which pain management was done well, with little impetus to change. These beliefs appeared to be maintained due to a lack of discourse around pain management, confusion around success criteria for pain management and poor distinction between seeing analgesia given, and pain being managed well.

8.6.1. Pain management isn't a talked about subject in the ED

Within semi-structured interviews and informal conversations, many staff appeared not to have given previous consideration as to how well pain was managed within their ED. Responding to the question 'how well do you feel pain is managed in this department' caused some respondents difficulties that suggested this wasn't a question they thought about critically.

I: Yes, ok and how do you feel pain is managed within the department?

S2S16: Erm I think we do manage it quite well, erm I think it could probably be, it's on, I suppose, I don't know because we do give them, we give them analgesia at triage obviously, if they have been brought in by ambulance they obviously give analgesia as well. Yeah, I don't know, that's a hard question really. I don't know…. (Semi-structured interview, Case Study 2, Nurse)

Taking part in the research, or talking about the research led some staff to report having had to think about aspects of pain management they had not considered previously, suggesting that this was not a subject that was frequently discussed. Pain management appeared to be seen as something that was done, and seen to be done, but not really something that was thought about, with responses to questions around how well pain was managed often being superficial or simplistic. Pain management did not appear to be a core priority within EDs and was not a 'talked about' subject within the dialogue of the ED, such as sepsis, chest pain or other clinical priorities.

S2S16: It's not something that is talked about - it's just ingrained as a nurse. (Semi-structured interview, Case Study 2, Nurse)

S2S15: We don't really talk about it [pain] that much. So the maxims that we use and the informal as well as the formal dialogue, heart attacks are up there, strokes are up there, sepsis is there, acute kidney injury is even there these days, but we don't tend to talk about pain as a, either informally and formally. (Semi-structured interview, Case Study 2, Senior Nurse)

8.6.2. Staff believe they manage pain well because they see it being done.

A high level of visibility of pain management appeared to contribute to perceptions amongst some staff that pain is managed well. Within both formal staff interviews and informal conversations, staff were keen to assert that pain was managed well, as they saw patients in pain being given analgesia. Pain was felt (and observed) to be a common presentation, and as such staff were regularly seen requesting or writing prescriptions, or administering analgesia. Providing analgesia per se. was seen as managing pain well, with little reflection as to whether analgesia was adequate or appropriate.

I-Ok, how do you feel that pain is managed within this department?

S1S12-Well from the number of times I've wrote a cover for pain relief I'd say really well, yes (Semi-structured interview, Case Study 1, Nurse)

Failure to manage pain adequately at triage may create an illusion that pain was being managed better within the other sections of the ED, due to more frequent interruptions of medical

workflow from nurse requests for analgesia. At site 2, many of the interactions within the majors or minors areas, where prescriptions for analgesia were requested from another member of staff, were for simple analgesics like paracetamol and co-codamol, which would have been given at triage at sites 1 and 3.

8.6.3. Staff may believe they are managing pain well because they have no definition of success

For many staff, defining how well pain was managed was not in reference to a known 'gold standard' of how pain should be managed, but a judgement based on their individual definition of good pain management. Outcomes were referenced in terms of processes of pain management, not patient outcomes, i.e. pain was defined as managed well in terms of analgesia being provided 'regularly' (visibly), or quickly, but not in terms of whether patients had significant reductions in levels of pain, or were satisfied with pain relief. For example;

> *FS: Right ok. Right, so how do you feel pain's managed within this department?*
>
> *S2S6: I think, to be honest, giving initial pain relief, I think that we're good. I think there should be, there's an awareness of paramedics giving what the paramedics prescribe. I think we're good at identifying patients' pain relief. I think we're good at prescribing pain relief. I think we need to improve the time it takes from prescription to administration, and I think that's a consequence of workforce and staffing. (Semi-structured interview, Case Study 2, Consultant)*

However, when describing what they considered the aim of pain management to be, staff referred to patient outcomes in terms of levels of pain. Whilst a small number of staff said they aimed to get patients pain-free, staff generally stated their aim to have a patient 'comfortable' or 'manageable' and able to function with their level of pain.

> *FS: (Pause) What would you say was the aim of pain management?*
>
> *01S7: It's not always possible to get everyone pain free, but we would aim to get it manageable.*
>
> *FS: How would you define manageable?*
>
> *01S7: Well, say if they're doubled up, we would try to get them relaxed, rather than doubled up. (Semi-structured interview, Case Study 1, Nurse)*

8.6.4. Staff base their perceptions on the part of the patient journey that is visible to them.

The fragmented nature of care within the ED may lead to staff having limited awareness of whole patient journeys and experience whilst in the department. Patients were dealt with in a 'chain' of care involving different personnel within different physical areas. ED pain management could take place prehospital, in triage, within the subsequent assessment area (i.e. majors, minors), or when the patient was moved to a further observation unit (e.g. clinical decisions unit). Each area was dealt with by a different team of staff, with no individual overseeing patient care. The focus of the ED was such that, due partly to the four-hour target, staff were highly aware of the total length of time the patient had spent within the department. However, within the case study EDs there were few mechanisms to indicate how long patients have waited for individual elements of care, such as analgesia. The fragmentation of care and demanding nature of individual staff workload meant that staff may not get the opportunity to reflect on the part of the patient journey that is not visible to them.

Within the fieldwork, there appeared to be a disconnect between staff reports of how quickly pain was managed, and observations of patients awaiting analgesia for severe pain. This may be partly due to difficulties in seeing the 'whole picture'; e.g. senior medical staff say that they give pain relief 'immediately' but don't realise how long the patient has been waiting previously, or how long it might take for the prescription to actually be given. Unless they are motivated to find out, there is therefore little opportunity for staff to understand how long patients may have to wait prior to receiving analgesia, or for assessment. This is illustrated within the following observation where the nurse took time out from her usual tasks to help me identify analgesia timings from patient notes, and was clearly surprised at the result:

> *(Sitting in minors with a nurse who was trying to identify patients to recruit for interview. She had identified a patient who had been referred for surgery.) We flicked through the notes together – there was nothing written in the triage notes about pain score. I asked what time the patient had been in triage. Nurse S2Y looked through the notes and said 'triaged at 13:35', then flicked forward and commented 'given morphine at (pause) 16:25 (in surprised voice)". (Observation, Case Study 2, Visit 3)*

Again, the visibility of pain management suggests that staff based their perceptions of how pain was managed upon seeing it managed, or providing analgesia themselves, rather than any reflection of the whole patient experience. Senior medical staff may also perceive pain management in terms of how things *should* happen, rather than how it *does* happen. This was particularly notable at site 2 where consultants reported how well pain was managed at triage, or due to RAT, where they prescribed analgesia at the front door, yet did not necessarily see how this worked in practice (as observed, or reported by nursing staff). For example, these

consultants reported how pain was managed at the front door, which differed significantly from the observed practice.

S2S6: So what we did was we put a lock up cupboard where the initial assessment occurs, out with the clinical area, although immediately adjacent to it. So what we said was well actually simple analgesia can be provided. So we got the nurses to do their, what we call the PDG's that allows them to be able to prescribe certain medications in certain circumstances and then they can prescribe cocodamol and paracetamol and ibuprofen at the point of entry. So again, that's quite effective for those low to low-moderate pain score patients. But also I mean it helps identify the patients who maybe have more significant pain: one, because of their pain score, so if someone has got a pain score of 10 and comes in with […] that will often flag up and they will be placed somewhere where they will get appropriate analgesia promptly. (Semi-structured interview, Case Study 2, Consultant)

FS: What do you think helps provide good pain management?

S2S1: Instant access to the medication. Just actually having a drug cupboard at triage to get patients the painkillers as soon as they arrive means rather than waiting and saying 'what does this patient need?' , they need painkillers, they're going: pop pop, there are your painkillers, prescribed, signed for and done and dusted as they go to the waiting room for ambulatory, you know. (Semi-structured interview, Case Study 2, Consultant)

8.7. Summary of findings

Staff appeared to operate within a framework of beliefs around pain management which enabled inadequate pain management to be perpetuated.

- *ED staff judged patients pain levels based on behavioural signs, physiological signs and evidence of known painful conditions alongside patient reports of pain. Staff sought evidence of 'genuine' pain due to past experiences of patients seeking analgesics.*
- *Pain management was considered important, but distinct from clinical priorities and could therefore get 'lost' in the workload of busy EDs. Pain management may be prioritised at busy times if it enabled patient flow or improved the ED environment.*
- *Staff perceived a lack of control over their ability to prioritise pain management, mainly due to the barriers of workload volume and staff shortages. In the face of overwhelming volume of workload, staff appeared to believe they were doing as well as they could, accepting the inadequate reassessment of pain in particular as inevitable.*

- *Pain management appeared to be something that was done frequently but not particularly talked about as a priority within the ED, although this varied by site. Reflection on how well pain is managed appeared difficult for individual staff as the fragmented nature of care in the ED means that staff had little awareness of what happens outside their immediate area of care.*
- *Staff may believe that they manage pain well as do not see the whole patient journey and lack a point of reference to which to compare their own practice. Staff referenced the visibility and frequency of provision of analgesia to demonstrate 'doing it well'.*
- *Despite significant differences observed in how pain was managed and prioritised between the EDs, differences in how well staff reported managing pain were less evident. This may be due to a lack of awareness of how pain was managed, due to seeing only their own sphere of work, and lack of knowledge of how pain was managed elsewhere.*

9. KNOWLEDGE, EDUCATION AND UNDERSTANDING

9.1. Outline of chapter

This chapter explores how ED staff understand how to manage pain, and understand how well they manage pain as a department. The systematic review of interventions to improve pain management (chapter 3) identified 18 studies that included education or training as a component of their intervention. The rationale behind using education and training within interventions was to overcome barriers in knowledge of pain management principles, although the evidence that barriers in knowledge led to poor pain management is inconclusive. Similarly, protocols and guidance were components of 28 studies within the interventions, with a similar rationale of reducing uncertainty and knowledge deficits around pain management. Within semi-structured interviews, staff were asked about education and training relating to pain management, as well as knowledge of protocols or guidance. Themes relating to knowledge also arose during observations as staff sought advice from colleagues, or demonstrated knowledge (or knowledge deficits) relating to pain management within formal and informal interviews. Themes relating to tacit knowledge gained from experience also arose, in addition to the use of sources of transferable knowledge (education, training, guidelines or protocols and colleagues).

The theme results are summarised below:

Pain management may be variable due to reliance on collegiate and experience-based learning. A lack of education and training in pain management may enable poor practice or inaccurate beliefs around pain management to be perpetuated. External feedback may improve knowledge of performance.

9.2. Knowledge of pain management in the ED is gained from colleagues, not formal training.

Staff at all sites and across all roles reported a lack of ED-specific formal training and education around pain management. For medical staff, pain management was included within general medical training, but there was no ED specific training within the induction or ongoing training package that any of the staff interviewed were aware of, with the exception of some condition-specific training (e.g. fascia-iliac block for suspected fracture neck of femur). This was similar for nursing staff, although those who had undertaken triage training or had PGDs within the ED cited these as useful sources of education around pain management. Learning about pain management was described by one registrar as “on the job apprenticeship” (01S4).

I-Have you had any training or education around pain management? Either informal or formal.

S1S13-Maybe informally as I've gained experience because I've been here for 6 years, so I'm one of the more experienced nurse assistants in this department. So I think I do have, but that's just an informal thing that I've done, it's just come to me with time and experience. But I've never had anything formalised. Nothing formal. (Semi-structured interview, Case Study 1, HCA)

Staff referred to their experience within other specialties as providing them with useful knowledge around pain management, referencing training or experience in anaesthetics, orthopaedics, pain clinics or palliative medicine as increasing their knowledge base. Staff also described the influence of mentors who influenced their attitudes towards pain management, and how they had learned specific pieces of knowledge from colleagues outside the ED, which they would then pass onto ED colleagues, as described below.

S2S6: As I say, there used to be, I think her name was [name], but she was the pain person on the orthopaedic ward, and I learnt so much from her with regards to analgesia. I mean she was the one that taught me 'why are you prescribing co-codamol?' And I go 'well you're getting 60 milligrams of morphine' and she said 'yes but it's no better than 30, and if you give 30 every 3 hours, actually your analgesia profile in your system's much better'. So there's little things like that, little tricks like that, that you learn and you keep, if you see what I mean, and then you pass on. (Semi-structured interview, Case Study 2, Consultant)

New knowledge appeared to be gleaned from hearing and talking, particularly from conversations with colleagues and advice from colleagues with more experience, rather than from evidence-based written sources. Within observations in all three sites, staff were observed seeking help from colleagues (particularly senior medical and nursing staff) when unsure how to deal with patient's pain.

9.3. Experiential knowledge and preferences may affect prescribing decisions.

Personal experience and judgement affected prescribing behaviour, with staff stating personal preferences for particular analgesics, or reporting perceptions that certain analgesics were more effective than others. Personal concerns or preferences influenced their choice of analgesia, particularly for drugs for severe pain, but also for simple drugs such as ibuprofen, due to the potential contraindications in certain populations. This consultant explains his personal preference for morphine over tramadol, based on experience:

S2S6: […] I'm not a big fan of tramadol, I don't know why. I don't like tramadol. I think patients sometimes get a bit of a hangover from it. I think morphine's a cleaner drug but I couldn't give you any evidence behind that, it's just from experience, if you like. (Semi-structured interview, Case Study 2, Consultant)

Personal preference appeared to stem from experience, with particular concerns around safety of particular analgesics for specific patient populations (e.g. morphine and older patients). Staff appeared to have a comfort zone within which they could prescribe, which may not incorporate the full range of drugs available to them, but which they felt safe in prescribing. This registrar described prescribing decisions as a 'personal thing'

S1S5: Because we have got so many options, it's quite a personal thing. It's not like heart attacks where you have got distinct drugs and guidelines. You've got to be comfortable with it, for example ketamine, you've got to be comfortable with it as it can be dangerous. (Semi-structured interview, Case Study 1, Registrar)

This reliance on preference and personal experience may stem from knowledge deficits around pharmacology, analgesia interactions and dosing, which appeared to affect prescribing and administering behaviour. Morphine in particular was referenced as being both over-prescribed, and under-prescribed due to staff lacking knowledge of interactions and dosage, and requiring caution due to potential side-effects. In the following semi-structured interview, a nurse describes an experience which stemmed from inadequate knowledge of the mechanisms of analgesia, and how it affected her future pain management.

S3S7: If they are having things like morphine, you can tell if they have had too much. I tend to err on the side of caution. I once had a lady sent to ITU with overdose as I had given too much once to a little Asian lady and didn't know that Asian people have different enzymes in their blood which can react. So I am always rather cautious. (Semi-structured interview, Case Study 3, Senior Nurse)

9.4. Knowledge of pain management principles is inconsistent

The research questions during fieldwork did not seek specifically to test staff knowledge of pain management principles, yet some discrepancies in reported knowledge between different members of staff around certain aspects of pain management were revealed during the fieldwork. These were mainly in relation to how the WHO pain ladder was used, but also around knowledge of how analgesics worked, interactions between drugs and the use of physiological signs to assess the presence of pain. The following example demonstrates different understanding of morphine peak effect times between a nurse (who can administer the drug) and consultant (who can prescribe the drug) at site 1:

FS. OK and how do you decide, say, when they have had enough morphine? S1S7: We say 'tell us when it takes the pain away, or makes you feel really awful'. I'll give them 3ml, then it hits pretty quickly so I will go straight onto the next dose if it hasn't worked. FS: And how long does it take to take maximum effect? S1S7: Oh pretty much straight away. (Semi-structured interview, Case Study 1, Nurse)

S1S1-For optimum, I think morphine takes 10-15 minutes for the peak effect. Some of the nurses may not be as aware that it can take that long for its peak effect to come on. (Semi-structured interview, Case Study 1, Consultant)

Discrepancies were also noted between how staff described their management of severe pain, with some stating you have to 'hit it hard (01S14)', but others describing 'working up the ladder (01S12) ' (i.e. not offering opiates until other less strong analgesia has been tried). Staff frequently referred to the WHO pain ladder but differed in how they felt it should be used, potentially due to influences from experience with different specialties:

S3S2: I've never felt I can't give any pain relief, but sometimes I might, and when you give pain relief you tend to work in a ladder, there is some sort of discrepancy, so from our training you tend to start with paracetamol then work up. What acute pain specialists would argue is that you actually start higher up and work down. (Semi-structured interview, Case Study 3, Junior Doctor)

Variation in knowledge and training in the newer analgesic regimens and use of techniques such as femoral iliac block (FIB) were evident between sites, in particular between sites 1 (where all consultants and most registrars could undertake FIB and sites 2 and 3 where many of the consultants and registrars were not trained to undertake FIBs.

9.5. Guidelines were not a significant source of knowledge.

None of the sites had specific pain management guidelines within the ED, although some staff at site 1 recalled seeing acute pain guidelines, but could not place them when asked. Staff referenced the pain ladder as a source of knowledge of appropriate treatment (particularly at site 1, where these were displayed within the triage room), but there was little awareness of, or reference to these as coming from the RCEM guidelines. Some staff expressed a desire for guidelines, particularly at site 3, in the hope that protocols or education would increase confidence, enable greater consistency in pain management, and help move away from 'clinical judgement' (S1M, informal observation) towards a more objective, evidence based approach.

S3S5: We've got far too many different drugs that people just randomly prescribe without any thought as to why they are giving them. We haven't got, as far as I'm aware, any

guidelines for managing pain. Even though it's the single commonest symptom I would have thought that we treat in the department

FS: So you don't have a protocol?

S3S5: I don't think we do, no. Erm so because we don't have a protocol people just do whatever they want. So whatever was normal practice wherever they last worked, they just start to do here. (Semi-structured interview, Case Study 3, Consultant)

9.6. Treatment decisions are based around tacit understanding of patient's pain

Prescribing decisions around pain management appeared to be made based on a combination of specific knowledge around pharmacology, alongside a tacit understanding of the type of analgesia required based on personal experience and judgement, rather than guidelines. Staff appeared to rely on tacit knowledge, or intuition, when managing pain, particularly when assessing patient's pain and judging the appropriate level of analgesia to use. They described a tacit understanding of patient's pain ("you just know"), as an understanding gained from experience. Staff reported junior medical staff in particular as being unable to assess patient's pain properly due to lack of experience, and an inability to understand the patient's behaviour that reflects 'real pain'. Experience was seen as an enabler to pain management, partly due to improved knowledge (gained from colleagues and experience) but also improved intuition and understanding. Staff appeared to accept that, with experience they could 'read their [the patient's] level of pain accurately' (S2S11), and develop an implicit, true understanding of how much patients are in. In the following quote, a consultant explains how junior staff may over-analgise or under-analgise due to a lack of understanding of an implied appropriate level of pain relief.

S1S14: Sometimes, the first time they ever have to give someone a strong analgesic is when they come to work in the department, if they're handling someone who's broken their leg for example. So sometimes, you'll have a trainee who under-analgises them because they haven't seen it before. Or we have the opposite where somebody on the ambulatory side comes in, and one of the junior over-analgises them, because they think 'oh that must be very painful', and maybe takes the patients opinion at face value. (Semi-structured interview, Case Study 1, Consultant)

This reliance on tacit knowledge or understanding was particularly evident in descriptions of how treatment decisions were made. Staff described how they used the pain ladder (referenced in the RCEM guidelines) as a source of knowledge to decide analgesia requirements, yet revealed a reliance on tacit understanding of the patient's level of pain to guide decisions. Staff

described how they used a 'mental mapping' (S2S6) of the pain score to analgesia requirements when making treatment decisions, yet made judgements of pain score based on instinct:

> *S1S10: […] Again, that depends on the pain score. If they have a pain score of 0 to 3 it would be an offer of paracetamol. Erm, up to 5 I think is paracetamol and a non-steroidal. A pain score of 5 to 7 would be adding codeine in as well. Obviously as long as they didn't have contra-indications. And above 7, you would be considering IV morphine. Unfortunately, patients who come in with sprained ankles, if you ask them on a scale of 1 to 10 what their pain is, they'll quite often tell you 8, but you know that you don't need to give them IV morphine, do you know what I mean? (Semi-structured interview, Case Study , Senior nurse)*

Despite reporting knowledge of the pain ladder, treatment decisions appeared to be based upon intuitive judgement of patient's level of pain, rather than the patient-reported score.

> *S2S15: Erm nine times out of 10 it will be, whatever score it is, I will go with my gut feeling anyway. I might give paracetamol to an 8/10 if I think there's a lot of exaggeration or I might give morphine to someone with a pain score of 2/10 and might think they are being strangely stoic you know and I'm worried about their pain. So it tends to be just on judgement. (Semi-structured interview, Case Study 2, Senior Nurse)*

9.7. Knowledge of audit and external feedback may challenge beliefs and initiate change

Knowledge of external feedback (e.g. internal audit, CQC reports, RCEM reports and patient complaints) appeared to improve ED staff knowledge of pain management performance and enable ED staff to understand and challenge inaccurate beliefs around perceptions of their performance. All three EDs had undertaken CQC ED patient surveys (previously undertaken by Picker) and RCEM audits on fracture neck of femur and renal colic, which provided an indicator of how their ED performed in relation to other EDs.

> *'Pain is one of those things you think you do well because you see it all the time but then you look at the audit data and you realise you don't actually do it that well'. S3S6 during orientation visit*

Awareness of audit data appeared to give staff a benchmark upon which to understand their performance, providing an overview of how the department as a whole was performing, outside the sphere of their own work. Staff reported knowledge of external feedback as evidence to support changes to improve pain management in a number of ways. For example, in the following quote from an informal conversation during observation, a consultant explains how they used audit results to prompt changes to the documentation of pain:

(Chatting to consultant by ambulance co-ordinators station. S3A.): There's recent guidance come out from RCEM about pain management and we've looked into our performance here. Our performance at [ambulance co-ordinator station] is abysmal, to the point that we have already changed things to try to do something about it. FS: What makes you say it's so bad? S3A: Well, before we had this new system in where we have to record pain score, we didn't record it at [ambulance co-ordinator station], and were very poor at administering it. So, the RCEM guidelines say if pain score is bigger than x, we have to administer within 20 minutes, whereas we weren't even finding out what the pain score is. Now, we have to record it and we have to act on it. (Observation, Case Study31, Visit 1, Pilot)

However, knowledge of feedback and mechanisms for sharing external feedback appeared to differ between sites. Internal audits (included within documentary analysis) were referenced by staff at sites 1 and 3 who demonstrated knowledge of audits as evidence for their perceptions of pain management performance. At site 2, with the exception of senior consultants, staff demonstrated little knowledge of any pain audits, or patient complaints regarding pain management, and messages from audits or complaints did not appear to have filtered down to other staff groups. For example, in the following extract from an informal conversation with a senior nurse who sits on the clinical governance board, appeared knowledgeable about research and showed interest in my research, the nurse knew nothing about any internal audits and was surprised not to have received feedback about the CQC survey.

He asked me what the criteria were for selecting [name] as a research site and I explained about the CQC survey and how I selected the criteria. He appeared interested, nodded and said that he had never heard of the ED survey, or of them not performing very well. He appeared perturbed by this: "I should know – I mean I've worked here 3.5 years and I didn't even know that these surveys exist". (Observation, Case Study 2, Visit 3)

9.8. Summary of findings

Pain management may be variable due to reliance on collegiate and experience-based learning. A lack of education and training in pain management may enable poor practice or inaccurate beliefs around pain management to be perpetuated. External feedback can improve knowledge of performance.

- Pain management may be variable due to reliance on unsystematic methods of gathering knowledge, relying on collegiate and experience-based learning rather than formal education, training or guidelines.
- Staff revealed inconsistencies in knowledge around pain management principles.

- Staff felt they gained knowledge from experience and developed an implicit understanding of how pain should be managed, due to improved understanding of how to understand patient's pain that came with experience.
- Knowledge of audit or other forms of external feedback appeared to enable staff to understand their own performance, and provide a benchmark for how pain should be managed. Senior staff had more awareness of audit results than junior staff.
- Staff at site 2 showed less awareness of any form of external feedback than those at sites 1 and 3.

10. ORGANISATIONAL PRESSURES AND ACCOUNTABILITY

10.1. Outline of chapter

This short chapter explores the impact of organisational pressures and accountability on the management of pain in the ED. Within the semi-structured interviews, staff were not explicitly asked about these issues, although staff were prompted to think of any organisational barriers to pain management. This theme emerged during analysis of fieldwork data and consideration of why pain may not be prioritised.

The theme summary is as follows:

Organisational pressures and accountability focus on safety concerns and waiting time targets, and do not incentivise pain management.

10.2. Other organisational pressures may limit improvements to pain management

Staff across all sites referenced staffing shortages and volumes of demand within a pressurised environment as the principal barriers to pain management. During the course of the fieldwork, all case study sites experienced high levels of demand and staff were under pressure to meet 4 hour ED targets and 15 minute ambulance / walk in turnaround targets, with staff observed to be conscious of the length of time patients had been in the department. Although prior to fieldwork sites were selected with similar rates of 'breach' of the 4 hour target, during fieldwork site 2 appeared to be under more pressure to hit targets than other sites, and were having higher levels of breaches. Staff reported how this pressure to meet waiting time and turnaround targets may over-ride the impetus to provide pain management:

> *S2S15: Do I think that's… yeah I think the people under pressure, I think a sister is going to get some embarrassing questions, in a bed meeting, one of you had 3 breaches and you know one of you left the department at 4 hours 10 minutes, couldn't you have got them out, so you know I think decisions are bad around those cases and I think that some of my senior nurse colleagues would quite willingly take a patient that is in pain and could get pain relief to a ward to avoid a breach. (Semi-structured interview, Case Study 2, Senior Nurse)*

> *02S1: But I suspect when there's a queue at triage because it's busy in the evenings, although we might have 2 or 3 nursing staff at triage, it [pain management] again becomes a low priority because priority is to hit the 15 minute ambulance and walk-in turnaround. (Semi-structured interview, Case Study 2, Consultant)*

10.3. Accountability as an incentive to improve pain management.

During fieldwork, it became clear that there were few incentives for staff to prioritise pain above other concerns, particularly where staff were not held accountable for pain management decisions. Whilst staff talked about accountability regarding ambulance turnaround targets ("16 minutes? We're going to get shot!" S3M, observation) and 4 hour wait targets, staff did not talk about the implications of not dealing with pain management appropriately.

The question of accountability, and how staff were held accountable for their pain management was not asked directly within fieldwork. However, during analysis this theme was notable by its absence. Staff had no clear view of the goal of pain management, but also no standard by which they would be judged. However, whilst staff did not talk about accountability in terms of getting in trouble if pain management were suboptimal, there was a clear difference in staff awareness of the need to manage pain appropriately.

At sites 1and 3 (post pilot), there was evidence of processes for patient complaints and internal audit results being fed back to staff, awareness that inadequate prescribing decisions may be questioned (e.g. prescribing paracetamol for severe pain being deemed unacceptable), and that audit may provide a reflection of their performance. In contrast, staff at site 2 did not appear to receive feedback on their performance, were unaware of any audits and there was no mention of being held accountable for decisions regarding pain management. Whether this awareness of pain management performance was due to knowledge that performance would be audited, or due to the higher profile of pain management at these two sites is unclear, but there was a notable absence of concerns of accountability at site 2.

10.1. Other concerns mean 'it's very easy to do nothing'

Other disincentives to manage pain centred around safety concerns associated with analgesic prescribing decisions, as well as concerns around drug-seeking behaviour and were seen across all sites. Concerns around drug-seeking behaviour influenced staff in their decisions around prescribing, as they were wary of prescribing for pain that was not 'genuine'.

Potential side-effects and interactions with other drugs of some of the commonly used analgesics in EDs led to concerns about over-prescription of analgesia, with the 'do-nothing' option, or under-prescribing potentially seen as the safer option. In the following observation, language barriers between the patient and nurse led to her prescribing cautiously due to being unable to obtain a full medical history:

> *(Observing in triage, ENP had been speaking to the patient's relative who was acting as a translator on the phone. She kept trying to ascertain how much pain the patient had, and*

where it was). After [the patient] left I ask what the drugs she gave him were, she [ENP] said "just some co-codamol, I've given him co-codamol because paracetamol seems a little bit mean sometimes, I didn't want to give him ibuprofen because it's a bit risky if you don't really know his history. He didn't have anything broken, he can move around OK". (Observation, Case Study 3, Visit 5)

Staff spoke in particular of the need to exercise caution around the prescription of morphine, particularly in older people, and the difficulties in titrating morphine to provide sufficient pain relief in safe doses. This nurse explained how safety concerns govern titration of morphine, with the potential adverse effects of over-analgising being less acceptable than pain:

03S7: Most of the time I will titrate it to pain, rather than give the full dose. I would wait a minute or two if the morphine is given intravenously as it acts very quickly, then will look at their respiratory rate. I sometimes settle for the patient being in a bit of discomfort but not pain-free if I think a little bit more may tip them over into side-effects. I always try to give morphine with IV paracetamol so they have something quick and safe. I would rather have them well but in a bit of pain than pain-free but having to reverse the effects and start again. (Semi-structured interview, Case Study 3, Nurse)

Given the potential for severe adverse events from providing too much analgesia, and the lack of consequences from not providing enough, there are incentives to under-treat pain. One consultant summed up the difficulties as follows:

S3S5: It's very easy to do nothing. The downside is a lot of people don't get what they need. (Informal conversation, Case Study 3, Consultant)

10.2. Summary of findings

Organisational pressures and accountability focus on safety concerns and waiting time targets, and do not incentivise pain management.

- There appeared to be a lack of pressure on staff to manage pain, with little organisational focus on pain management, knowledge of targets for pain management, or enforcement of pain management targets. This contrasted with the strong focus on waiting time and ambulance turnaround targets and other concerns for which staff are held accountable.
- Concerns around patient safety and drug-seeking behaviour may lead staff to under-prescribe analgesia.

11. PATIENT EXPECTATIONS OF PAIN MANAGEMENT

11.1. Outline of chapter

The results discussed so far have focussed largely on data from staff interviews, observation and documentation, with little reference to the patient voice. Within the fieldwork, patients were interviewed to understand their perspectives on the patient journey, how well they felt pain was managed and what aspects of care they found particularly good or poor. This chapter focuses primarily on data from patient interviews, but also uses staff interviews, observations and documentary evidence to understand what patients feel about pain management, how patient and staff perspectives of how pain management correspond or differ, and how misalignment of staff and patient views may impact upon how pain is managed.

The initial research question, (understanding how the management of pain can be improved in EDs) necessarily requires a definition of what is meant by good pain management (see introduction chapter 1). Outcomes such as time to analgesia, provision of analgesia, appropriateness of analgesia (generally measured in relation to particular pain scores) or adequate analgesia (as measured by reduction in pain score) were the most frequently recorded outcomes identified within the systematic review of interventions to improve pain management. The outcome measure of patient satisfaction was also reported, but was only accepted as a secondary outcome in selection of articles within the systematic reviews due to evidence that the relationship between analgesia and patient satisfaction was not straightforward (i.e. the literature suggested that patient satisfaction with pain management did not appear to be clearly correlated with provision of analgesia). Themes relating to patient satisfaction are explored within this chapter and discussed further within the discussion chapter.

The theme summary for patient expectations is as follows:

Patient expectations of pain management do not conform to the simplistic process of pain scoring and treating according to score that are set out within protocols and guidelines around pain management. Patients and staff appear to ascribe to a notion of what constitutes a 'good patient'; one who accepts responsibility for pain management and understands the demands that staff are under.

11.2. Pain can impair patient perceptions

The experience of being in severe pain appeared to limit patient's ability to remember sequences of events. Patients described their memories as a 'blur' (S3P7) due to their focus on the pain itself, rather than what was happening around them. In addition, the effects of analgesia itself

contributed to a lack of awareness of their external environment. Patients described the effects of analgesia 'knocking them out', particularly when pain had been preventing sleep prior to their arrival at the ED. They had limited awareness of time periods and limited capacity to advocate for themselves as dealing with their pain appeared to over-ride their ability to communicate and 'think straight'. (S3P6)

> *S3P9 […]At that point things began to merge into a sort of a, I don't know what you call it really, erm because I'm not sure how sedated I was, I was on gas and oxygen when I got into the ambulance, they may have injected me I'm not quite sure.*
>
> *I: Right so you don't know if you had any sort of morphine or anything in the ambulance?*
>
> *S3P9: No I'm not sure, erm I think erm I was still alert enough, I think if I had I'm sure they would have asked me if I was allergic or anything*
>
> *I: Right, yes*
>
> *S3P9: But to be honest at that point I would have probably agreed to anything (Semi-structured interview, Case Study 3, Patient)*

Due to the lack of awareness of time when in pain, patients in severe pain may not be able to accurately comment on the time they had waited for treatment when assessing time to analgesia. In the following example, a patient who was observed to have waited at least 3 hours for pain relief, was asked how long they had waited for pain relief. The patient responded:

> *S3P1: A good hour at least, I think. I mean I don't know timings. They're all a blur when you're in there. (Semi-structured interview, Case Study 3, Patient)*

11.3. Analgesia isn't everything

Patients wanted analgesia for their pain, but also valued being listened to, understood and reassured. Patients described how staff (sometimes) asked about pain, but expressed frustration at not always feeling listened to or understood. When describing how they felt pain management could be improved, patients expressed disappointment with communication and reassurance rather than delays to or lack of analgesia per se. These issues are explored below.

11.3.1. Communication can alleviate distress associated with pain

Communication appeared to help address the psychological aspects of pain and on some occasions to alleviate the distress associated with being in pain. The experience of being in pain left patients feeling vulnerable, which could be exacerbated by being left alone unaware of what was being done to help their pain. They valued communication as helping them understand what

was happening, and making them feel as though staff were caring for them and willing to help them on a path out of their pain. Reassurance that they were going to be seen and their pain addressed in particular appeared to enhance the patient experience and improve their 'headspace' (S2P20).

> *S3P7: Because I think, they were, it always seemed to me people were checking on me, people were saying you know oh we will get you sorted out, reassuring me, making sure that I didn't get into the state that I was in back at home, I didn't get back into that panic … I seemed to be more controlled*
>
> *I: Right and was that because the pain was better or the reassurance was better?*
>
> *S3P7: I think it was the reassurance really. It was the reassurance that help was coming, that it wasn't going to be like this forever, and I just thought, I can do this if I know that they are going to get me out of trouble but I can't face another night like this. (Semi-structured interview, Case Study 3, Patient)*

Providing patients with explanations regarding their underlying condition and how they could go about reducing their pain appeared to help ease the distress of the pain, and increase patients' feelings of control over their situation. In particular, providing an explanation for delay in provision of analgesia and managing patient expectations appeared to be important for patients. Whilst staff reported reasons for not providing particular analgesia that patients wanted due to side-effects, or a perception of lack of efficacy (e.g. Entonox being short-lasting) in patient interviews and observations, explanations did not always appear to be communicated to patients, contributing to patient's distress.

> *S1P8-I think it was too long. I think it was a good couple of hours more than they needed to. I'm not a complicated patient. I have no other physical problems. I have suffered from anxiety in the past, which obviously I still do a bit, but physically speaking wise, I'm not over weight, I don't have heart problems. I don't understand why they couldn't prescribe me diclofenac, I don't understand why it took them so long to administer the medication. (Semi-structured interview, Case Study 1, Patient)*

11.3.2. Analgesia as proof of being listened to

Patients appreciated speed of analgesia, particularly when in severe pain, and spoke positively about provision of analgesia at triage. Provision of analgesia also appeared to provide psychological benefit in terms of staff demonstrating that they had listened and understood the patient's pain by managing their pain appropriately. Patients explained how the process of being asked about their pain, listened to, and given pain relief according to their explanations made them feel cared for, and as though staff wanted to help. In particular, being asked and reassessed, then analgesia adjusted accordingly were seen as positive, as the process of

reassessment and adjusting analgesia demonstrated that staff were listening. Negative comments from patients stemmed from being 'left alone', 'ignored', not checked up on or reassessed.

> *S2P33: Erm as I say I think it's just more communication and you know just don't ignore, don't ignore people that are in the corridors on the trolleys, erm, you know they are in there, they are in there for a reason, they're not just, you know they don't want to be in there, but just, you know, 'Are you ok?' every now and again would be nice. (Semi-structured interview, Case Study 2, Patient)*

Patients did not express their satisfaction in terms of achieving a reduction in pain, but in terms of being able to cope better with the pain and, even when still experiencing pain, were satisfied when staff had shown commitment to helping by providing analgesia, combinations of different drugs and reassessing their pain. Missed opportunities for reassurance were observed within fieldwork, where patients who appeared to be in pain were left unattended and 'ignored' despite staff being in the vicinity and not always being involved in urgent duties. In the following extract from minutes of a clinical governance meeting at site 2, the visibility of staff perceived to be standing round whilst the patient was left in pain (ignored) prompted a patient complain which was flagged as an 'issue for reflection' within the meeting.

> *During a complaint meeting, the complainer had commented on his observation of a group of staff standing gossiping about their plans for the evening to see what they were having for dinner, this he found inappropriate. He had to wait 2 hours to see a doctor and he had had not had any explanation as to what he was waiting for and had not been offered analgesia despite saying on several occasions to staff he was in a lot of pain. (Documentation, Case Study 2, governance meeting minutes)*

11.4. Patients experiences are unique

Pain is a subjective experience and is perceived and understood differently by patients and staff. Patient descriptions of their experience of pain were not fully reflected in the descriptions of pain used by staff. Patients described understanding their own pain, having their own motivations for coming to the ED and had particular preferences for treatment, which were not always acknowledged by staff whose concerns appeared to be undertaking assessment in a time-pressured environment.

11.4.1. Patients know their own pain.

Patients' pain was an integral part of their attendance at the ED and often a principal motivation for attending. In interviews, patients described various aspects of the lived experience of their pain, how it affected their ability to function and how pain had evolved to make them seek help

within the ED. Within interviews, each patient described their own individual response to their pain:

> *S1P20: I could hardly talk, you know, because of the pain; it was such terrible, terrible pain (Semi-structured interview, Case Study 1, Patient)*
>
> *S1P12: I was struggling to sleep (Semi-structured interview, Case Study 1, Patient)*
>
> *S3P1: I mean, I was crying when I saw the triage nurse. I mean, to be honest with you, if I had been in the waiting room another 10 minutes, it may seem a bit melodramatic, but I feel I would have collapsed and cried, because I was in that much pain. Every time they were calling a name out I was begging that it would be my name, I was in that much pain. And when I went into the triage nurse, I said I am in that much pain, I cried. I literally cried. (Semi-structured interview, Case Study 3, Patient)*

During observations, it was noted that patient staff interactions at initial assessment in particular were short, and there was little time for the patient to communicate the lived experience of their pain, how it had affected them and how it led to their attendance at the ED. Staff questioning patients tended to be brief in their questioning and used questions directed towards aiding diagnosis rather than understanding underlying patient concerns. The interaction at triage was often documented using a pain score to reflect severity and short summaries that focussed on cues for diagnosis and did not necessarily reflect the experience or impact on function that patients had described. For example, the following extracts from 3 sets of anonymised patient notes at site 2 demonstrate the level of detail that was recorded about the triage interaction and the different focus of the staff from the patient:

> *Chief complaint.: Fall, left hip pain.*
>
> *Chief complaint: abdo pain – h/o IBS 14/40*
>
> *Chief complain: Abdo pain – colic in nature – pain radiating to back – hx Chrohns – has vomited brown fluid – pain 5/10 at triage (Documentation, Case Study 3, Triage notes)*

11.4.2. Patients have different motivations for attending the ED with pain

Pain was important to patients, sometimes all-encompassing, and being able to make staff understand their pain appeared to be important to patients. Whilst the concerns of staff and the departmental priorities focussed on diagnosing the cause of the pain, this was often not the principal motivation of the patient in seeking ED care. Whilst some patients within this sample were more concerned with understanding the cause of the pain and were reluctant to seek pain relief, most patients described their prime concern being to alleviate the pain.

S3P1: It was at that point I said, I'm not bothered about diagnosis or whatever, I'll just have something for the pain. I was crying, even if it's just entonox, whatever. I mean I appreciate the doctor's got to come up a diagnosis before they start hitting you with opiates, anything like that, I just wanted something to get rid of the pain. (Semi-structured interview, Case Study 3, Patient)

This disconnect that sometimes occurred between the concerns of the patient (sort out the pain), and that of the ED (find out what is wrong) were reflected by a consultant at site 2:

S2S6: Effective pain management, you know, whilst sometimes it gets overlooked as a top priority by assessing clinicians, I think actually it's often one of the top priorities of the patients attending. You know, 'why are you here?' 'I've got pains in my tummy' so one of the first things that we should be thinking about is if you've got pain, let's get rid of the pain. Let's see what we can do to get your pain settled down, and then we can look at what's causing the pain. So I think there is sometimes that disconnect. (Semi-structured interview, Case Study 2, Consultant)

11.4.3. Patients have valid preferences about analgesia

Patients had preferences for particular types of analgesia, or reasons for not wanting to take analgesia which were based upon past experience or from beliefs around use of analgesia. Although they wanted their pain to be reduced, this was not at any price and their personal experience of previous pain, side effects of analgesia (particularly codeine or morphine) which may affect them after leaving the ED, or beliefs around use of analgesia impacted upon their desire for analgesia. Patients described concerns about certain drugs affecting their sense of control, particularly where this may affect their function when discharged from the ED. Whilst staff expressed frustration at patients who refused analgesia whilst reporting pain, patients expressed frustration at staff who did not accept their preferences or concerns around particular analgesia that were borne of experience.

S1P8: The nurse, [HCA name], when she snapped at me, it was because I was asking for an alternative medication to codeine because codeine bungs you up, and I have problems with my bowels, so she would say 'one shot of codeine isn't going to bung you up'. That was literally how she spoke to me. And you see, the thing is, that irritated me because being bunged up would put pressure on my back, even if my back wasn't bad, so all I was doing was asking for an alternative. (Semi-structured interview, Case Study 1, Patient)

Staff expressed difficulties in understanding these preferences and appeared to question whether patients who refused particular types of analgesia had 'genuine' pain. Refusal to take a particular type of analgesia was regarded by some staff as a sign that the patient was not

actually experiencing the level of pain they reported and staff appeared reluctant to seek alternatives as a consequence.

Some preferences were based upon misconceptions or beliefs about analgesia which were sometimes, but not always, addressed by staff. Both staff and patients reported patient fears about analgesia masking pain, and patients being unwilling to take analgesia prior to attendance as they felt that the pain was necessary for diagnosis, or feeling that pain had a useful function that would prevent further damage (see Chapter 9). This concept of masking pain was only reflected by one member of staff, and during observations, staff were observed explaining the importance of pain relief to patients to attempt to dispel this notion. In the following extract from a semi-structured interview, a patient who described himself as 'not one of those people who take painkillers', had refused pain relief due to ingrained beliefs around pain management that were recognised and addressed by staff:

> *S3P8: Erm I think it were, it weren't co-codamol I think it were, erm I don't know he just asked me if I wanted anything and I just said I was alright and it were when I got seen he said we don't do it like that anymore, if you want pain relief you have pain relief, we don't need you to be in pain to tell us where is the pain.*
>
> *I: Right and did that make sense?*
>
> *S3P8: It did yeah, but I've been brought up where you have to feel the pain so you know where it's coming from so you can describe it better. (Semi-structured interview, Case Study 3, Patient)*

Similarly, patients reported preferences for particular analgesia which they felt were providing appropriate analgesic effect, yet staff reported viewing patients with preferences with suspicion and the request was viewed as evidence that the patient may be exaggerating their pain for the purposes of drug-seeking.

> *It always scares me when they ask for codeine, always scares me (Informal conversation, Case Study 1, visit 1, Triage nurse).*

11.5. Being a good patient

Both staff and patients appeared to subscribe to an implicit notion of what constitutes a 'good patient', i.e. one who takes responsibility for their pain, doesn't 'make a fuss', accepts the type of analgesia offered and understands the demands that staff are under. Patients demonstrated how they (subconsciously) tried to behave as a 'good' patient whilst in the ED.

11.5.1. Taking responsibility

Staff expressed frustration at patients who did not take responsibility for their care, by using services inappropriately and not attempting to manage pain themselves prior to attending the ED. The ED was seen as unsuitable for patients who had painful conditions that could be dealt with in primary care (e.g. back pain) or elsewhere (e.g. chronic pain). Staff questioned whether they should be providing analgesia for these patients, as they were 'rewarding them' (S1S6) for using the service inappropriately. Patients understood the need to demonstrate their pain, to validate and justify their presence within the ED, and expected staff to recognise the visible signs of pain without needing to explicitly state they were in pain. They described the severity of their pain, largely in terms of function, and used visual cues or known conditions to back up their claims. Again, as reflected in section 8.2.2, the concept of 'seeing is believing' was key, as staff being able to physically detect the pain reassured patients that they were deserving of treatment.

> *S1P11-It was terrible. I've never had pain like it, you know. Then when I saw the x-ray saying what had happened, I could understand why I was in that much pain. (Semi-structured interview, Case Study 1, Patient)*

Staff expected patients to take analgesia themselves prior to attending the ED and attempt to manage pain so that they didn't necessitate a visit to the ED, or at least deal with some of the pain prior to arriving at the ED. Similarly, staff felt that patients had to share some of the burden of responsibility for asking for analgesia whilst in the ED

> *S3S8: If a patient complains we get an email, everyone who is involved in the care of the patient gets an email and we are supposed to email back with a response. Sometimes they complain and they will say, 'I wasn't offered analgesia' and you just think 'well, did you ask for any?' (Semi-structured interview, Case Study 3, Senior Nurse)*

During observations, patients and carers frequently asked for analgesia during fieldwork, and many patients described in interviews how they requested analgesia whilst in the ED. Whilst patients appeared to accept some responsibility for asking for analgesia, particularly given the lack of resources in EDs, they were also wary of asking for analgesia, as perceived 'pestering' (S2P2) to be seen as non-responsible behaviours.

> *S2P2: If one person comes to you and you say 'can I have some painkillers?' and they go, and then 20 minutes later they haven't come back, but it's somebody else, you then feel that you're asking again, somebody else. And it's like, well should I ask them? Or you know, should I just wait for the other one to come back? Because it's pain, you are sort of wanting to get it dealt with. (Semi-structured interview, Case Study 2, Patient)*

11.5.2. Making a fuss

Staff spoke with admiration about patients who displayed stoicism in the face of their pain, although they felt some frustration at older patients who they felt hid their pain unnecessarily. Younger patients were perceived to have higher expectations of pain relief and be more attention-seeking than older patients, who were perceived as more willing to accept that staff were busy and be prepared to wait quietly. Good patients eased assessment of pain by 'admitting' their pain, when staff 'knew' they were in pain, yet not over-exaggerating or demanding much attention. One aspect of being a 'good patient' appeared to be doing what staff expected of them; not asking for morphine when they didn't have enough pain, and taking morphine when they did.

Patients understood the need to balance being a 'good patient', and recognising that analgesia may be provided to patients who were less stoical in their presentation of pain. This was reflected in observations, when patients who were in significant pain but not requesting help, or making noise, were left unattended until their turn to be seen by a doctor, whereas patients who were more vocal were seen quicker.

> *S2P33: Oh if I'd had made a fuss then yeah they probably would have, erm would have helped a bit more but erm I didn't make a fuss, you know my husband was with me so, erm you know I, we are both fairly quiet people, and you know we're not, neither of us are ones to make a fuss (Semi-structured interview, Case Study 2, Patient)*

This reluctance to 'make a fuss' may have accompanied an underlying belief that pain itself was of high enough priority to warrant disturbing staff who were busy with the business of the ED. One patient explicitly expressed this as follows:

> *S1P8: I wasn't in an A&E situation. You know what I mean, it was just immense pain'. (Semi-structured interview, Case Study 1, Patient)*

11.6. "They can only do so much": patient had limited expectations

Patients appeared to be accepting of some delay in providing analgesia, or inadequate relief of their pain due to limited expectations of how much staff could do to help them. Patients reported limitations to their expectations of pain management in the ED, due to workload pressures on staff, limitations of analgesia available and belief that staff needed the patient to be in some pain to be managed effectively. They appeared keen to demonstrate their understanding of the limits of staff capacity to manage their pain, justifying delays to treatment and reluctant to criticise staff who they perceived were 'doing a good job'. They appeared to trust staff to act as their advocates and do as well as they could in difficult circumstances and qualified their stories with

explanations of how they understood staff were under pressure, even when expectations had not been met:

FS: […] Do you think they [staff] could understand how much pain you were in?

S3P6: Erm I don't think they did because as soon as they found out nothing was broken, I mean obviously, it's understandable, it were busy, but I felt as though they just said 'right get out of bed, you can go home now'. (Semi-structured interview, Case Study 3, Patient)

S1P10 "Well obviously it could have been quicker, but I do understand the way things work" (Semi-structured interview, Case Study 1, Patient)

Patients had limited knowledge of appropriate levels of analgesia and appeared to accept receiving limited amounts of analgesia due to the belief that there was 'only so much they could have', assuming there to be a ceiling to the level of pain relief they could achieve. These beliefs that supported patients refusal of analgesia, such as the fear of analgesia masking pain, were also used to justify inadequate analgesia due to a belief that pain needed to be present as "your body's way of telling you not to do something" (S3P8). Patients also reported a belief that staff needed to understand the cause of the pain or need to assess any damage prior to being able to offer stronger analgesia

When patients were asked how they would have responded to the CQC survey response of whether they felt staff did everything they could to control their pain, patients replied "yes, completely", despite reporting some negative experiences, long waits for treatment or remaining in pain. Even when reporting negative experiences, patients asserted their understanding of the pressures that staff were under and in particular, a reluctance to criticise the NHS.

S3P1: I wouldn't expect for every doctor in the A&E to come to my cubicle and dope me up with opiates etc etc but I do feel I was in that much pain that they could have done a little bit more. It's difficult because I don't want to use the term 'slag off the NHS' because they're wonderful. I mean, I've worked for the NHS for 30 years and I know what pressures they are under and it's a hard one to call but I did say, can I please at least have some entonox, just to try and, you know. (Semi-structured interview, Case Study 3, Patient)

11.7. ED generated pain

Although this research did not specifically address the issue of procedural pain (see introduction), interviews revealed a common theme of pain associated with ED tests and examinations. When describing their journey through the department, patients often reported the period when they experienced the most severe pain to be associated with ED tests and

examinations, with x-rays in particular causing significant distress. One patient who had not wanted pain relief during the ED visit felt that the doctor examination itself caused him significant pain. Patients with fractures or suspected fracture described the pain associated with movement as 'excruciating' and 'unbearable' and were particularly frustrated by staff reluctance to provide Entonox within the ED to provide short term relief. Whilst staff recognised the pain associated with x-ray in particular, and encouraged analgesia prior to x-ray, patients were observed being sent to x-ray prior to receiving analgesia.

11.8. Summary of findings

Patient expectations of pain management do not conform to the simplistic process of pain scoring and treating according to score that are set out within protocols and guidelines around pain management. Patients and staff appear to ascribe to a notion of what constitutes a 'good patient'; one who accepts responsibility for pain management and understands the demands that staff are under.

- Analgesia isn't everything: patients wanted their pain to be managed, but also wanted to be listened to, understood and reassured. The provision of analgesia and reassessment of pain appeared to demonstrate to patients that they were being cared for. Communication and reassurance appeared to help patients cope with the distress associated with their pain.
- Patients understood their own pain and the impact their pain had on their own function, had their own motivations for going to the ED and particular preferences for treatment. Whilst staff reported the rhetoric of pain being individual, in practice they felt they could judge or understand patient's pain according to their behaviour and clinical signs. Documentation and communication of pain by staff did not explicate patient experiences.
- Both staff and patients appeared to subscribe to an implicit notion of what constitutes a 'good patient', i.e. one who understands the demands that staff are under, takes responsibility for their pain, doesn't 'make a fuss' and accepts the analgesia offered. Patients recognised the conflict between being a 'good patient' and not being too demanding, and recognising that analgesia may be provided to patients who were less stoic in their presentation of pain.

- Patients reported limitations to their expectations of pain management in the ED which included: fear of analgesia masking pain, workload pressures on staff and limitations of analgesia available. The latter two beliefs were also echoed by staff.
- Patients reported significant pain associated with undergoing tests and procedures within the ED.

12. MEASURING PAIN MANAGEMENT USING THE PAIN SCORE.

Pain scoring is strongly advocated within interventions to improve pain management, and at an organisational level as a means to assess patient's pain, measure improvements in pain and document assessment of pain. The systematic review of interventions to improve pain management (section 3) showed that current measures for assessing how well pain is managed centred largely on the provision of analgesia, (per se or as proposed within guidelines), time to analgesia, or on measures relating to scoring of patients' pain (using the 0-10 verbal pain score or numerical rating scale), including documentation of pain score, reduction in pain score or appropriate analgesia given. The review identified eighteen studies that used pain score either as a stand-alone intervention, or as part of a multi-faceted intervention. The chapter concluded that increasing visibility and access to pain scoring tools improved documentation of pain but there was no evidence of a corresponding improvement in access to analgesia. Pain scoring was commonly used within interventions and was seen as an inexpensive, simple and accepted method of improving pain management. However, there was little discussion within the articles as to why improvements in documentation of pain scoring may not necessarily translate into improvements in provision of analgesia.

The pain score emerged as a theme throughout both staff interviews and observation. Pain scoring was not mentioned directly within the staff interview schedule, but was used as a prompt in questioning about how pain is assessed. Given the importance of the pain score as a tool for communicating pain within audit and guidance as a key tool for the assessment of pain, and lack of understanding of how its use can be translated into improved provision of analgesia, the theme was explored in order to understand staff perceptions of its use and how it is used in practice.

Conflicting purposes of the pain score led to staff lacking confidence in the pain score and facing conflict between the need to record pain to ensure patient flow and accountability of pain management, and recording pain to reflect the patient's report. Mandating documentation of pain may improve assessment and awareness of pain but is not essential to assessment, and may lead to conflict where triage category and treatment decisions audited in relation to pain scores. Consideration of the score as an objective and auditable measure leads staff to ascribe external meaning to the subjective patient score.

12.1. Staff have little confidence in the pain score as a measure of pain.

Improvements in documentation of the pain score was cited by senior staff as central to improving pain management in order to meet standards set by RCEM. The inclusion of pain score within documentation, or mandating pain score at triage may improve the documentation of pain but the lack of translation into provision of analgesia may be due to a lack of staff confidence in the score. Some ED staff appeared to use the pain score because this was expected or mandated, and expressed frustration at the requirement to obtain and record pain scores which they perceived patients did not understand. Staff appeared sceptical about the utility of the pain score as an approximation of the patient's pain, as they did not feel that patients were able to accurately understand how to use the score, and the score was perceived as oversimplifying descriptions of pain.

12.1.1. Patients don't understand the pain score

Despite patients and staff within this fieldwork using similar reference points in formulating a pain score, staff did not believe that patients understood how to use the pain score. Staff and patients both reported using their own past experience of pain (e.g. "Never known pain like it") and notional perceptions of what constituted pain that was 'as bad as it gets' (e.g. childbirth, dying), to formulate a score.

Patients within this fieldwork usually described their pain using terms of functionality, such as 'I could hardly move', 'I was struggling to breathe', but also stated pain scores of between 5 and 10 (or 15), usually rating pain as severe (7-10). Whilst staff often reported that patients 'always said 10', patients within this sample who described their pain as 'excruciating', 'horrific', 'hellish' then rated their pain as 7 or 8. Although there were some differences in how pain scores were defined, there appeared to be some consistency in how patients rated their pain, with the definition of what they would consider to be 'bearable' or 'manageable' rated between 4 and 6.

However, staff described how patients were unable to understand the concept of the pain score sufficiently to provide useful estimates of their pain. Staff recognised that pain was subjective and difficult to assess but considered there to be a disconnect between staff and patient perceptions of what particular scores equate to. Whilst some patients were perceived as exaggerating for the purposes of receiving particular analgesia, or quicker treatment, most patients were felt to be 'genuine' , but unable to accurately articulate their pain due to a lack of knowledge of 'real pain' to use as a comparator.

S3S8: Well if it's a 10, if it's not a 10 you can see, you know, they're not in childbirth. If they are a 10 they are tachycardic, pale, sweaty, rolling around in agony. Some people can't figure it out; they just can't accurately record what it is.(Semi-structured interview, Case Study 3, Senior nurse)

Staff appeared to have an implicit notion of what specific scores equated to, accompanied by an approximate knowledge of how scores translated into the categories of 'mild, moderate, severe' on which recommended treatment decisions were made. Patients did not have the same point of reference (i.e. pain requiring particular analgesia), and as such were not reporting pain according to the same rules. For example, the patient in the quote below scored her pain as a 6, which would be classified as moderate-high pain by staff following RCEM guidelines, yet the patient was not concerned enough about her pain to want painkillers.

(Observation at triage)

21:45 Triage patient, concerned about a lump in her throat that gave her difficulty swallowing.

Nurse: Pain score out of 10?

Patient I would say about 6 it's not that painful

Nurse: Would you like any painkillers?

Patient: No, I don't like taking painkillers (Observation, Case Study 3, Visit 5)

12.1.2. Reductive process of pain scoring does not capture pain experience

During observation of patient handovers and triage interactions, the pain score documented did not appear to reflect the complex nature of the pain experience, and was often documented without any patient input. Patients used a variety of terms to describe their pain and, given the brief nature of the patient handover or triage interaction, staff spent little time probing or clarifying their pain levels. Where the patient was not asked the score, or was unable or unwilling to formulate a score themselves, staff translated descriptions of pain, such as 'agony', 'sore', 'really painful' into what they perceived to be an appropriate score that would 'fit' the mandated pain score box within the triage documentation.

Observation. Paramedic handover. M 65, fall. Paramedic reads out observations and safeguarding information. The doctor at triage asks for the pain score. Paramedic says "he aches everywhere but for a pain score?" in a questioning voice, looking at the doctor. They both look at the screen and the doctor writes '2' in the box. The paramedic looks at it and nods in agreement. (Observation, Case Study 3, Visit 6)

At site 1, where the documentation of the score was mandatory, the handover process for ambulance patients observed often made no mention of pain, and the nurse co-ordinator at triage often wrote up the triage notes after the patient had left the area. The pain score was therefore based on 'eyeballing' (S1S15) the patient, as this nurse who had just written up triage details for 4 patients who arrived in quick succession explained:

> *(Observation, informal conversation with nurse co-ordinator at co-ordinators base.) I asked her how she decides what pain score to put. S1N2: "I make it up. It's my best guess from what paramedics tell me, and what they look like, and what their observations] tell me". (Observation, Case Study 1, Visit 2)*

Similarly, in observations, staff appeared uncertain as to how to document more complicated pain than the one-dimensional pain score would allow, such as fluctuating pain (e.g. pain coming in waves, worsening on movement etc.). Staff also lacked clarity over whether pain should be recorded 'at that time' (i.e. the time of the assessment), 'at its worse' (e.g. prior to pre-hospital analgesia) and made their own judgement at the time of documentation.

> *(Observation at ambulance co-ordinator station) 17:10 Handover. Patient with history of anxiety-related chest pain. Reads out observations. "When she's not in pain, it's 1, when it's high, it's 7". Consultant enters '1' in the pain score box. (Observation, Case Study 3, Visit 5)*

12.2. Staff document their own judgement of pain score where they perceive the pain score to require external meaning

Patient reported pain scores were often not taken at face value but documented using staff judgement along with visible descriptors and behavioural and physiological indicators of pain, due to the discrepancy between the patient's estimate of the score and the staff judgement of what they perceived the score should be. Inconsistencies in how pain was documented both between sites, and between staff were evident throughout fieldwork. During semi-structured interviews, participants explained how they would decide upon a pain score at a theoretical level, also elaborating on how specific pain scores were decided in informal conversations after observation of pain scores being documented. Whilst some staff were observed to document the patient reported score, others documented their own formulated score, based upon a combination of factors which may include: assessment of physical signs and symptoms, patient behaviour, patient reported pain score and patient descriptions.

For example, this nurse co-ordinator explained how she had decided on a brought-in patient:

(Observation, informal conversation with triage co-ordinator)

FS: How do you arrive at the pain score that goes in the 'initial pain score' box?

S1N1: I gave her (pointing to the form) a 3 because she was laughing and joking.

FS: Do you ask the patient for a pain score?

S1N1: I'm not going to ask that in the corridor. In majors you just have to go with what you see in the corridor. She told the paramedics she was in pain.

FS: Will she get any pain relief?

N1: No, not with a 3. (Observation, Case Study 1, Visit 3)

The reluctance to document patient reported pain scores appeared to be due to staff concerns about consequences of documenting 'incorrect' scores; where the score required external meaning, staff felt compelled to document their own judgement of the 'correct' score. In particular, concerns around consequences of assessing triage category or providing analgesia according to misleading patient reported scores appeared to guide how pain was documented.

12.2.1. Pain score as a discriminator in triage

The pain score was described within interviews and informal conversations as an important discriminator and 'central' to the triage process, guiding urgency of management. Patients at all sites were observed being given a high triage category due to the existence of pain.

(Observation in Majors section) I looked round Majors and introduced myself to a couple of the nurses (one of whom I had spoken to before). They immediately told me about a patient with a shoulder injury: "he was in a lot of pain. Yes, we upped his triage level to a P2 as he was in so much pain. He was shaking with pain". They were quite animated and nodding with agreement as they told me. (Observation, Case Study 1, Visit 4)

However, observations and informal conversations suggested that, due to concerns about patients over-estimating or exaggerating their pain scores, leading to triage categories inappropriate to the level of care participants considered justified or manageable by the department, staff documented pain scores that accorded with their own judgement of an appropriate triage category. Judgement of triage category was undertaken based upon other clinical factors relating to perceived urgency of the condition and the availability of beds in the department, alongside judgement of pain. This meant that the pain score documented may have been lower than patient report where staff perceived patients not to have a high level of need, as in the following example:

Triage co-ordinator explaining how pain scores are coded: "If they say they are a 7, that would put them in the triage category of 'immediate, pre-alert', so we code as a 4 if the

patient isn't really unwell so as not to increase the triage score." (Observation, Case Study 1, Visit 1)

Conversely, the pain score input may be higher than that reported by the patient more urgent care was deemed necessary, but no other obvious triage discriminator was used:

(Observation of nurse co-ordinator completing the triage assessment form for a brought-in patient)

FS: How did you decide on his pain score?

S1N1: I put it as a 7 to make sure he was a category 2, as the injury was a bite, which didn't meet the criteria for a 2 and would probably go into the system as a category 4, which needs to be seen within 3 hours. If I know they have to come in as a P2 then I will get them to come in as a P2. […]. In some categories, the only way to do it [increase the priority] is to up their pain score. (Observation, Case Study 1, Visit 3)

Staff were also observed to provide pain relief prior to documenting triage pain scores, in order to lower the triage category due to concerns about levels of demand within the department, and 'leave room for patients with life-threatening conditions in resus' (Nurse, informal conversation, site 3).

(Observation: Speaking to nurse co-ordinator about clinical priorities and targets) She told me about a patient she had just seen who had a pain score of 8/10, and was a category 2 patient. (Pat A) She had prescribed her IV paracetamol to try to bring her down to a category 3; "I'm looking to bring her down to a 6, get her down to a category 3. I'll enter her down as category 3 on her triage form as soon as she has had her IV paracetamol.' ((Observation, Case Study 1, Visit 2)

This awareness of the impact of pain score upon triage category meant that the pain score documented at triage did not always reflect the patient's level of pain at triage, but was reflective of concerns around patient flow in the department at the time of documentation.

12.2.2. Pain score as a guide for treatment decisions

ED staff reported how the pain score was used in theory to guide treatment decisions based upon analgesia guidelines (i.e. allocating treatment according to pain score), but described how other concerns led to staff making treatment decisions based upon their own assessment of the patient's pain, rather than patient report (see 9.6). When making prescribing decisions, staff considered other factors such as: prior analgesia given, interactions with other medications, allergies and patient preference, safety concerns and practical considerations such as availability of appropriate analgesia or staff to administer analgesia. Assessment of analgesic requirements therefore appeared to be made independently of the patient-reported score and, where the pain

score was mandated, staff documented a score that reflected the analgesia they considered appropriate or viable, rather than the patient report.

In the following example, the patient was showing many of the visible signs that staff use to judge pain, and reported a pain score of 5, yet had a pain score of 2 documented in her notes as the pain was not perceived to be acute, and the nurse could not give any medication appropriate for a '5'.

> *(Observation, sitting in triage) 21:33. Female patient presenting with abdominal pain. Describes how she has been to the GP earlier and had blood tests. Says she has never been in this much pain, stabbing pain and uncomfortable. Keeps bending over. The nurse asks her a number of questions about her pain. The patient says she has been having pain around 6 months, but this is worse and not touched by painkillers. She took co-codamol at 20:15. She reports a pain score of 5 when asked how bad it is at the moment out of 10.*
>
> *Patient is clutching her stomach, got a sick bowl and is shaking, bending forward. Waves of severe pain. She walks round the room, clutching her stomach and taking deep breaths. Describes it as coming in waves. The nurse asks whether anything triggers the pain, but she says not. The patient gradually straightens up, reports that it is easing and starts breathing more normally then sits back down whilst the nurse types up her triage notes. The nurse documented a pain score of 2, allocated triage category 3.The nurse accompanied her out of the room.*
>
> *When she returned, the nurse explained that she put her in a room in minors. She said she made the judgement about her pain score and what to do with her based partly on her having pain for 6 months. "Because she has had co-codamol, the only other thing I can give her is ibuprofen, which will irritate so she'll have to wait for the doctors to see her." (Observation, Case Study 1, Visit 3)*

Concerns about drug-seeking behaviour also appeared to lead to staff down-grading patient reported pain as high scores would require prescription of opioids.

> *Observation. Chatting with nurse in minors who had expressed concern about a patient asking for codeine) I asked why the previous patient hadn't been given codeine and she said "you can't give codeine for a 3/10, which is why I coded him as a 3" (Observation, Case Study 1, Visit 1)*

12.3. Using the pain score to understand changes in pain requires documentation of patient report

Staff did not appear to share a collective understanding of the purpose of the pain score and subsequently documented pain differently depending upon their perception of the purpose of the score. There appeared to be two main interpretations of the purpose of the score: to evaluate patient's pain in order to guide management of the patient (triage category allocated, analgesia administered), and to evaluate patient's pain to understand changes in pain whilst in the department. The former, discussed in 12.2, considers the score as an absolute measure, and the documentation of direct patient report was seen as potentially inappropriate. The latter purpose, however, considers the score as a relative measure and therefore requires patient report to be documented.

During observations, there was evidence of the pain score being used to communicate improvements in pain following treatment, or to communicate severity of pain; for example, from paramedics reporting the effectiveness of pre-hospital analgesia to the triage co-ordinator as 'was 8/10, gone down to 5/10.'(Observation, Site 3). However, this use of the patient reported score as a relative measure to enable staff to detect changes in patients pain appeared to be less well understood. One exception that stood out was the following overheard conversation summarising one consultant's explanation as to why a pain score should be used in site 2, (where the score was not mandated at triage, but should be documented at assessment).

> *Observation. A staff nurse, an agency nurse and a consultant were standing by the staff base, discussing a patient in pain who the agency nurse had just been to see. The consultant was writing a prescription for the patient.*
>
> *[Consultant] asked [Agency Nurse] for the pain score. [Agency nurse] laughed, saying she didn't know because she hadn't asked. The staff nurse turned round and pointed out 'that's what you're supposed to do'. The agency nurse said she was going to say '9' because the patient was in a lot of pain and crawling about on the floor. The consultant interrupted, saying that she had to ask the patient. The agency nurse argued that the patient would say 10, as they always do. The consultant replied "but that's ok because you can measure it and then you can ask them again later and see if the pain relief is working. The score to us is meaningless but it means something to the patient, you can see if it goes down that way." The nurses nodded as if to say this made sense, looking interested. (Observation, Case Study 3, Visit 3)*

This acceptance of documenting a patient-reported score that was 'meaningless' to staff was at odds with many conversations about the pain score, in which staff expressed frustration at

having to document a score that they considered to be erroneous, being either over-exaggerated or under-reported.

12.4. Mandating documentation of pain may be useful, but not essential for raising awareness and communicating pain

The inclusion of the pain score within triage or documentation was felt to help raise awareness of pain, and potentially prompt action. The score appeared to be useful as a nudge, rather than a guide, particularly when it was a mandatory part of the assessment process, and documentation of high levels of pain were observed to make staff question why patients had not received analgesia. One nurse described it as 'difficult to ignore' and although staff may not believe the reported level of pain, the documentation of some pain meant that staff may feel obliged to attempt to manage it, or justify why they have not.

> *S3S8: It's good that they do pain score on here (pointing to the computer) because it forces you to consider it. (Informal conversation, Case Study 3, Senior Nurse)*

Pain severity did appear to be an important factor in treatment decision-making, though this was more often articulated through terminology other than the pain score, with requests for analgesia based on descriptions of patients such as 'in a lot of pain', 'in agony' or 'rolling around'. The decision to provide analgesia did not necessarily incorporate a specific pain score. For example, the junior doctor in the following observation explained her prescribing decision:

> *[Observation in majors, F2 comes out after reassessing a patient]*
>
> *I explained about my research and asked whether the patient was in a lot of pain. The F2 shrugged and said 'moderate'. I asked what made her say that. She replied "He is non-weight-bearing, he is in a bit of pain when he is lying there, and it hurts on movement. He's just waiting to go in for x-ray". I asked why she decided to give him oramorph. She replied: "He had already had codeine, but he's not in quite enough pain for IV morphine." I asked how she assessed how much pain he was in. She shrugged and said "I've not assessed it numerically" (Observation, Case Study 1, Visit 3)*

The documentation of pain appeared be considered key to auditing performance, particularly in meeting RCEM standards which required assessment of severity of pain. Whilst imperfect, the use of the pain score was advocated at all sites by staff responsible for audit, and could provide some measure of pain management performance that was not captured elsewhere.

12.5. Mandating the documentation of pain score will not engender change alone

Whilst mandating the pain score may be useful in increasing the profile of pain, it is not essential for the assessment of pain, and encouraging its use may not improve pain management if there is no provision to act on pain scores documented. This was particularly evident at site 1 where documentation of pain score was mandated, and staff always assessed pain at triage, yet rarely asked patients for their pain score.

The documentation of pain had been integrated into the triage system for a number of years, and staff appeared confident in their ability to estimate and document appropriate scores for patients. In contrast, the documentation of pain score at site 3 was relatively new and staff were still getting used to the process of having to document a score. Here, staff were observed to document the patient reported score more often, perhaps due to lower awareness of the consequences. Whilst aware that they could be held accountable, and that pain management could be audited, they did not appear to have the same ingrained awareness as staff at site 1 who were audited biannually, with audit results reflecting 'appropriateness of analgesia'.

At site 2, there was little evidence of the pain score being used at triage, or within observations. The pain score had been introduced into the computerised triage system temporarily, but was described as a measure that 'added no wisdom' (s2S6) as other barriers to pain management had not been addressed (e.g. access to PGDs or analgesia in triage). The value of mandating the score was questioned, as staff could not see any obvious benefit.

The value of the pain score appeared to be in guiding staff to undertake assessment; as a reminder to assess pain severity and highlight a need for analgesia, but should not be considered an accurate proxy for patient pain level.

12.6. Summary of findings

- Inconsistency in documentation of patient-reported score or score formulated by staff may be due to a lack of collective understanding of the purpose of the pain score.
- ED staff faced conflict between the need to record pain to ensure accountability of pain management, and recording pain to reflect the patient's report.
- Mandating documentation of pain assessment may improve assessment and acknowledgement of pain, particularly where patients do not have obvious pain. This may lead to conflict where triage systems or treatment decisions are audited based upon patient reported scores.

- Inconsistencies in recording may impact upon audit results where pain score is used to determine management (i.e. different expectations depending upon whether patients have mild or moderate pain)
- The use of pain score as a discriminator in triage systems may not increase prioritization of patients in pain, but alter how staff document pain to validate their management decisions.
- Pain score may be central to documentation of pain, but does not appear to be central to the assessment of pain
- Using pain scores as a basis for audit or research may be inappropriate due to inconsistencies in how scores are recorded.
- Pain scoring alone may raise awareness but may not lead to change in management without other processes being enabled.

13. DISCUSSION

13.1. Outline of chapter

This thesis combines the findings of a systematic review of interventions to improve pain management in the ED with empirical findings from 3 case studies of EDs, with the aim of understanding how pain management can be improved within EDs. The following chapter summarises the specific unique contribution to knowledge resulting from this thesis, then brings together the findings from the systematic reviews and case studies along with wider literature to discuss the barriers and enablers to pain management within the ED, and implications for improving pain management. The chapter is split into the following sections:

- Summary of key findings of this research
- Discussion of key findings in relation to the wider literature
- Strengths and limitations of the thesis
- Consideration of areas of uncertainty: researcher effects, reflexivity and transferability of findings.
- Summary of unique contribution to knowledge
- Implications of the research in relation to the initial propositions set out within the introduction.
- Implications for research and further research needed

13.2. Summary of findings

The systematic review of interventions to improve pain management in the ED identified a range of interventions but no particular intervention that could be recommended for use in practice, partly due to the risk of bias within the study designs used. Interventions identified aimed to modify behaviour around different aspects of pain management, including assessment of pain, knowledge of pain management principles and introducing multifactorial initiatives to improve provision of analgesia and speed of delivery of analgesia. These interventions appeared to be underpinned by a wide range of underlying theories of how pain management could be improved, suggesting a need for improved understanding of the factors that affect pain management. These were addressed within the empirical phase of the research, using ethnographic methods within three case studies.

The findings from the multiple case studies suggested that barriers to pain management were complex and multifactorial but centre around a core finding that ED staff identified pain

management as distinct from the core work of the ED, and as such, not considered a high priority. This implicit distinction of pain management from core clinical priorities meant that pain management was not included within ED training or education, nor was it considered one of the core maxims of the ED for which staff were accountable, despite a high prevalence of pain within the ED. Because pain was not a subject that was widely talked about, staff had limited awareness of their own performance, particularly if unaware of external audit or feedback. Inconsistencies in knowledge may be reinforced by a reliance on collegiate and experience-based learning, and lack of definition of what is meant by good pain management. Processes within the EDs relied on patients advocating for their own analgesia (particularly when EDs had inadequate early assessment and provision of analgesia), yet patients who were attempting to act as 'good patients' did not always recognise that staff wanted them to take responsibility for their own analgesia. Due to conflicting priorities, and without any imperative for EDs to improve, this conceptualisation of pain management as outside the sphere of the core role of the ED may limit improvements in the management of pain.

The findings from the multiple case studies also revealed differences in how pain management was managed and prioritised between the three EDs. Findings suggest that the framework of beliefs in which EDs operate, that enable inadequate pain management to be perpetuated, can be challenged by changing processes and actively enabling staff to improve pain management. Structural and workforce barriers to pain management that create delays in pain management may be altered by improving assessment and administration of analgesia earlier in the patient journey, and ensuring that the processes for assessment, reassessment and provision of analgesia are reinforced through facilitating access and creating reminders. By integrating the processes of pain management into the functions of the ED, pain management may become recognised more as a core priority and generate a change in culture around the management of pain.

Perpetuation of poor pain management may be compounded by a lack of accountability for pain management that stems partly from limited knowledge of performance, or performance targets, but also lack of opportunity for measuring the quality of pain management. Pain is difficult to monitor and measure due to reliance on a measure that has little external validity (pain score).

The use of pain scores was considered key to understanding and assessing pain management in the ED. However, the reductive processes of pain scoring and treating according to score set out within current RCEM guidelines did not appear to conform to patient expectations of pain management. Whilst patients valued being asked about pain, and given analgesia, they also valued being listened to, understood and reassured. Patients wanted staff to understand their individual patient agendas, which did not always appear to fit with staff expectations for patients to take pain management according to guidelines. Similarly, the dual and contradictory purposes of the pain score may lead to ED staff facing conflict between the need to record pain

to ensure accountability for pain management, and recording pain to reflect the patient's experience. This requirement to ascribe meaning to patient reported scores and make the subjective process of pain scoring fit the objective requirements of treatment guidelines and audit may have encouraged staff to document their own assessment of patient's pain, whilst limiting the utility of the score as a tool to help improve pain management.

13.3. Overview of the wider literature on barriers and enablers to pain management in EDs

The literature search undertaken prior to the primary research reported here revealed a lack of empirical research exploring the barriers and enablers to pain management in the ED (chapter 4). In order to put the findings of this thesis in context, an update of the search for empirical research was undertaken. The broad literature search that was undertaken for the systematic review of interventions to improve pain management (see chapter 3) was repeated in May 2017 (and updated in September 2017). Any articles pertaining to staff or patient views of pain management, were identified. These were then reviewed to include any studies that reported empirical data on staff or patient views of barriers and enablers, including qualitative and quantitative studies.

A total of 20 articles included some data on some aspect of staff views of barriers or enablers to pain management in the ED. Eleven studies used qualitative methods (interviews and focus groups), one of which provided an abstract only (Jennissen et al. 2011). One article reported the use of participant observation in addition to semi-structured interviews (Gorawara-Bhat et al. 2016) but provided no details of how the observation took place, or how this contributed to results. Nine articles reported cross-sectional surveys of barriers to pain management , four of which used a modified version of the survey questions reported by Tanabe & Buschmann 2000, which was formulated based on research outside the ED (Tanabe and Buschmann 2000). The remaining four quantitative articles reported physician responses to a predefined list of potential barriers to pain management.

Characteristics of the studies and summary of relevant findings are reported in Appendix 8. Articles reporting qualitative methods were from Australia (3), USA (5), Canada (1), UK (1), Netherlands (1) Only 4 of these specifically addressed enablers and barriers to pain management as the primary research question (2 from Australia, 1 Netherlands, 1 USA), of which only the Australian studies took a whole ED approach (i.e. looking at the whole population rather than just patients with known painful conditions)

Research exploring the patient perspective of pain management within the ED was addressed in fewer articles, with only 6 articles using qualitative methods to explore some aspect of patient experience of pain management in the ED identified (e.g. perception of pain score) (Goransson et al. 2016), (Graham 2002), (Jangland et al. 2016), (McCarthy et al. 2016), (Schultz et al. 2013), (Smith et al. 2015) Only 1 study of US patients directly addressed patient views of the experiences of pain management in the ED, although this had a specific focus on opioids (Smith et al. 2015).

13.4. Discussion of key findings in relation to the wider literature

Within this section, the main findings reported within section 13.2 are explored in more depth and discussed in relation to the wider literature. This aims to provide an insight into how the findings of this research contribute to current understanding of pain management in adult EDs, and how the current knowledge base has been expanded.

13.4.1. ED staff identify pain management as distinct from the core role of the ED

The findings of this thesis suggest that, although considering pain management to be important, staff identified pain management as distinct from the core role of the ED, and operated within a framework of beliefs around how pain was managed and prioritised that allowed deficiencies in pain management to be perpetuated. ED staff revealed a lack of belief in pain as a clinical priority, with pain being a secondary, rather than primary concern for ED staff, and pain management was observed to be prioritised where it contributed to core priorities relating to patient flow. Staff perceived that pain was being dealt with as well as could be expected in the context of poor staffing levels, high workload and the busy, stressful environment in which EDs were operating, and had low levels of perceived control over their pain management practice, given other priorities that needed dealing with.

Whilst no other studies have been identified that reflect the finding that poor pain management may be perpetuated because staff implicitly identify pain management as distinct from the core role of the ED, other studies of staff views of barriers and enablers to pain management do reflect staff views within this fieldwork of pain not being considered a top priority, and the environment of the ED as a barrier. Medical and nursing staff within interviews and focus groups reported a perception that the ED is for 'sick' people, with pain not seen as a top priority as it does not kill or affect treatment decisions (Berben et al. 2012) (Bergman 2012) (Bennetts et al. 2012) (Gauntlett-Gilbert et al. 2015). Similarly, the environment was widely referenced as a barrier in each of the qualitative studies identified, portraying the busy, noisy, pressurised environment of the ED with heavy workload, surges in demand and wide range of tasks that take up staff time as a principal barrier to pain management {} (Berben et al. 2012) (Bergman

2012) (Bennetts et al. 2012) (Chafe et al. 2016) (Gorawara-Bhat et al. 2016) (Russo 2010) (Shaban et al. 2012). Cross sectional quantitative studies focused on the responsibility of caring for other acutely ill patients, lack of time to adequately assess and control pain workload and higher priorities as significant barriers to pain management within the ED ((Ali et al. 2014) (Thomas et al. 2015) (Duignan and Dunn 2009) (Tsai et al. 2007) (Pretorius et al. 2015) (Tanabe and Buschmann 2000) .

The finding from this thesis of pain management being identified as distinct from the core role of the ED does challenge previous conceptualisations of the environment as a barrier, suggesting that it is not the environment that is the barrier so much as the low impetus to deal with pain within this environment that is the barrier. The acceptance of high workload and competing priorities as unmodifiable barriers to pain management that was reported widely within both fieldwork and wider literature implicitly suggests pain management not to be a core priority; staff did not have time to manage pain as their resources were otherwise engaged in work that was of a higher priority, aligned with the core role of the ED, as detailed below.

Although no studies have been identified that explore how pain management aligns with the work of the ED, wider literature exploring the role of the ED does suggest that pain management may not fit in with the culture and identity of staff within the ED. The core role of ED work has been described as prioritising diagnosis, flow and 'saving lives' above caring functions, (Fry 2012) (Nugus et al. 2014) (McConnell et al. 2016) with a focus on moving patients through the department as quickly as possible (Nugus et al. 2014) (McConnell et al. 2016) (Muntlin et al. 2010), and pressure to "process patients rapidly in the face of limited temporal, spatial and staff resources" (Nugus et al. 2014). ED staff viewed the purpose of their role as one of saving lives, 'fixing' patients and being needed primarily to deal with emergencies and acutely ill patients (Nystrom 2002) (Elmqvist et al. 2012), (Gauntlett-Gilbert et al. 2015) . The environment of the ED was described as having a 'medical-technical' focus, where nursing caring functions were afforded less value than those related to medical and technical skills (McConnell et al. 2016), and patient flow was prioritised above empathetic caring more associated with pain management (Fry 2012). Within this environment, pain management, implicitly considered a caring task ("it doesn't kill"), may not be perceived as essential to ED duties. Using Checkland et al's concept of 'sensemaking'[2] (Checkland et al. 2007), presenting workload volume and priorities relating to flow as barriers to pain management allows ED staff to legitimise their actions around pain management. Thus prioritising the management of pain above moving patients through the department may be perceived as jeopardising flow and counter to the 'core work' of the ED.

[2] Checkland et al explain staff reports of barriers as constructs formed by participants to make sense of the situation in which they found themselves (and reinforcing their own ideas of identity). (Checkland et al. 2007)

13.4.2. EDs can encourage prioritisation of pain by enabling processes for pain management

A number of structural, process and workforce barriers that increased the effort and time required by staff to provide pain management were identified within the fieldwork. These barriers may not directly prevent pain management from being carried out, but may make the tasks associated with pain management more difficult and therefore feasibly less likely to be prioritised. The use of multiple case study design highlighted how, although EDs faced common contextual barriers to pain management, and other conflicting priorities, each site differed in how they organised and made changes to processes and workforce to overcome these barriers and enable pain management. Undertaking to integrate pain management into the functions of the ED and increase the priority given to pain management appeared to help engender a 'culture of pain management' in which pain management became a more integral function of the ED. This culture also incorporated good teamworking, and a 'horizontal hierarchy' in which pain management was the responsibility of the whole team.

Although other studies have not identified specifically how individual EDs may be able to alter their structures, processes and workforce to support pain management and help to develop a culture in which pain management is integrated more into the work of the ED, other studies have explored the influence of culture on pain management. Cummings, who found that paediatric procedural pain management is dictated not only by individual beliefs and attitudes, but by a wider culture in which 'rituals, values and behaviour are bound together' ((Cummings 2013) p30) concluded that practice environment and organisational culture had an impact on paediatric procedural pain management. Studies of staff views of barriers to pain management suggested that the volume of patients in pain in the ED may lead to a culture in which ED staff normalise and experience desensitisation to pain, showing a lack of empathy towards patients with pain (Bergman 2012) (Shaban et al. 2012) (Berben et al. 2012). The findings from this fieldwork did not wholly support this view, but suggested that the structures, process and culture did not always enable staff to prioritise pain, rather than that staff lacking empathy. Attitudes and demonstration of empathetic caring were observed to be broadly similar across all sites but differences in pain management appeared to be dominated by the culture of the department, and the degree to which staff felt enabled and encouraged to manage pain. Differences in attitudes appeared to be due to differences in understanding the importance of encouraging pain management, or of how they as an individual could play a role in pain management.

The importance of teamwork in enabling pain management was supported by the wider literature, with lack of teamwork and shared perspective on pain management highlighted as barriers within staff interviews in USA and Netherlands (Berben et al. 2012) (Bergman

2012).Organisational support and 'buy in' from staff for improvements to pain management were highlighted as enablers for pain management within staff interviews within Australian EDs involved in the National Emergency Care Pain Management initiative (Shaban et al. 2012) (Bennetts et al. 2012). These Australian studies, alongside other studies of interventions that used diagnostic analysis of barriers to pain management in the ED prior to developing interventions (reported in Chapter 4), also recognised the importance of overcoming process and structural barriers in order to improve pain management, and the need to develop multi-factorial initiatives to address multiple barriers (Iyer et al. 2011) (Perron et al. 2007) (Berben et al. 2012) (Bennetts et al. 2012).

13.4.3. Improving organisation of pain management may improve patient flow

Findings from observation within case study fieldwork suggested that improving the organisation of pain management so that processes incorporate minimal handovers of care, and administration of analgesia early in the patient journey may improve patient flow by integrating pain management into normal processes. In particular, the use of nurse-initiated analgesia at initial assessment appeared to be beneficial to patient flow by ensuring patients had started on the pain ladder, and potentially reducing the workload associated with obtaining medical prescription for analgesia further into the patient journey.

The requirement for physician sign-off of analgesia as a barrier was reported by staff within this fieldwork and echoed by studies of staff views of barriers in Canada and Australia (Chafe et al. 2016) (Shaban et al. 2012). Staff within these studies also reported expansion of nurse-initiated analgesia as an enabler to good pain management and by countering problems associated with the need to find a clinician to obtain prescriptions. Studies suggest that interruptions and break-in tasks for medical staff working in the ED can lead to increased cognitive load and worse patient outcomes, suggesting that streamlined processes including increased nurse initiation of analgesia may be beneficial to staff as well as patients (Westbrook et al. 2010) (Chisholm et al. 2001). The impact of nurse-initiated analgesia on further workload has not been identified elsewhere, although studies show that triage nurse initiating of other tasks that would otherwise be undertaken by medical staff (e.g. x-rays and diagnostic tests) improved patient flow and decreased overall time in the ED (Rowe et al. 2011). The established use of pain protocols incorporating NIA in triage may explain the contrasting findings of Mitchell et al (Mitchell et al. 2009), who found no association with time to analgesia and ED crowding, in contrast to range of other studies (e.g. (Pines and Hollander 2008), (Barrett and Schriger 2008), (Hwang et al. 2007), (Mills et al. 2009)) but reported significantly lower time to analgesia than these other studies. This supports the theory that a change in processes may overcome some of the barriers associated with increased workload and crowding.

13.4.4. Knowledge gained from experience may perpetuate entrenched practices

Findings from fieldwork suggested that entrenched practices may be unchallenged, and pain management variable between departments due to staff reliance on knowledge gained from colleagues and experience, rather than formal ED based training or education. Staff revealed how they rely on pain management guidance from staff within other settings, where pain management is considered part of their core work (e.g. acute pain clinics, palliative care). Pain management was not widely talked about or evaluated in the ED, with staff lacking understanding of how well pain was managed within their ED, although this varied between ED case study sites. ED staff appeared to have limited knowledge of protocols or guidance, beyond knowledge of the pain ladder, and relied on tacit understanding of patients' pain management requirements that they had built up through experience. Evidence of knowledge deficits within this fieldwork included staff having different ideas about certain drugs or principles relating to pain management (i.e. they were judged as deficient against each other, rather than against a specific standard).

Bennetts et al reflected the findings of this fieldwork, reporting that staff felt a lack of clear protocols or guidance helped to reinforce a culture of learning through peer experience rather than evidence-based learning (Bennetts et al. 2012). Fry similarly reported nursing confidence and self-efficacy in pain management were gained from practice, and that lack of experience and knowledge make pain management more difficult in cognitively impaired older people with long bone fracture within the ED. (Fry et al. 2015) Inadequate staff knowledge of pain management principles was one of the highest ranking reported barriers within cross-sectional surveys of staff views of barriers to pain management for ED nurses (Louriz et al. 2016) (Tanabe and Buschmann 2000) (Tsai et al. 2007) (Pretorius et al. 2015), and qualitative studies of staff views reported knowledge deficits as generating uncertainty and barriers in pain management (Berben et al. 2012) (Bennetts et al. 2012). Other research in the ED has similarly reported significant variation in knowledge of pain management principles and attitudes to pain amongst both nursing staff (Moceri and Drevdahl 2014) (Tsai et al. 2007) (Tanabe and Buschmann 2000) and medical staff (Lemoyne et al. 2011) (Wu et al. 2016).

The need for education and training in aspects of pain management as an enabler to pain management was highlighted in a number of qualitative studies (Bennetts et al. 2012) (Berben et al. 2012) (Shaban et al. 2012) (Jennissen et al. 2011) (Pretorius et al. 2015) (Gorawara-Bhat et al. 2016). This finding of strong support for knowledge and education contrasts slightly with the findings of this study, as staff within this fieldwork did not reflect this strong desire for education and guidance, with the exception of some staff at site 3 post-pilot, perhaps as a consequence of the renewed focus on improving pain management within the department. This

supports the finding that staff did not perceive a need to improve their pain management, but considered barriers to pain management to be largely outside their control (i.e. due to the environment). Given the prevalence of pain within the ED, the lack of education or training in pain management is perhaps surprising, but reflects the low priority given to pain management within the vernacular of the ED, and lack of recognition that pain management may need to be improved.

13.4.5. External feedback may help challenge embedded beliefs

The use of observation and interviews within the three case study sites revealed a perception amongst some staff that pain was managed as well as possible, seeing little opportunity for improvement. Fieldwork suggested that external feedback, including patient complaints and audit and, crucially, staff knowledge of external feedback may enable staff to understand their own performance by allowing them to see outside their own sphere of work and challenge their beliefs. However, importantly, audit and feedback may act as a precursor for change by challenging beliefs, within a context that was responsive to change. Similarly, fieldwork suggested that commitment to change at a departmental level may be greater when coming from an understanding of the need to change, rather than from the need to be seen to change.

Studies of staff views of barriers and enablers to pain management in Australia suggested a similar lack of knowledge of performance, reporting ED doctors in particular to have high levels of confidence in their own ability and lack of belief in the need to change (Bennetts et al. 2012) (Shaban et al. 2012). Shaban also reported that ED staff felt their hospitals were doing a good job, were surprised by audit results and saw feedback as an opportunity to alter staff perceptions and act as a motivator for change (Shaban et al. 2012). Some of the studies of interventions identified within Chapter 3 reported that pain management performance had improved on the basis of pre-intervention audits (Williams et al. 2012) (Shaban et al. 2012), suggesting that understanding performance was a precursor for change. The findings of this thesis explicate these findings beyond the existing literature by revealing that beliefs around performance appeared to be maintained due to: lack of discourse around expected standards of pain management, staff seeing only their own sphere of work, and an understanding that seeing analgesia given equated to pain being managed well.

Findings indicating the need for organisational support and understanding of the need for engagement for change are supported by findings from the Australian pain management initiative, with Bennetts et al reporting that staff felt changes to pain management were more effective when initiated within the ED, rather than imposed at an organisational level (Bennetts et al. 2012). The different motivations of ‘want to’ and ‘ought to’ motives seen within case study sites are characterised by Weiner’s theory of organisational readiness for change, and differences in response to external audits between the three sites suggests different levels of

organisational readiness to change in response to external feedback (Weiner 2009) (Herscovitch and Meyer 2002).

13.4.6. Patients can help by being a 'good patient'

Findings from the fieldwork suggested that patients and staff ascribed to an implicit notion of what constitutes a 'good patient', characterised as a patient who accepted responsibility for pain management and understood the demands that staff were under. ED staff needed patients to be 'good patients' to ease their flow through the department, and enable staff to reduce their pain. Due to underlying concerns about drug-seeking patients, staff also needed patients to demonstrate their candidacy for treatment by having visible or known cause of pain, or displaying behavioural or physiological symptoms commensurate for treatment. Tied in with this conceptualisation of a good patient was the notion that patients should not act as a 'barrier' to pain management, but should accept pain management as recommended within protocols or guidance, and not refuse analgesia. However, patients within this fieldwork revealed several reasons for their reluctance to take analgesia, prior to attendance and at the ED, some of which were due to possible myths surrounding pain management, such as fear of masking pain and the need for pain to aid diagnosis.

Whilst no other studies have been identified that reference the concept of a 'good patient' with respect to pain management in the ED, other studies using ethnographic methods undertaken within the ED have discussed similar constructs of 'good patients', deserving of treatment within the ED (Jeffery 1979) (Fry 2012) (Nystrom et al. 2003), mainly judged by the concept of legitimacy for attendance. McConnell similarly reported the theme of 'worthiness' in her review of literature around patient-centredness in the ED, in which 'patients were valued for their legitimacy for treatment within the ED', with staff holding collective beliefs about which patients were worthy of ED care (Fry 2012) (Hillman 2014). Whilst the definition of 'good patients' within this study referred principally to patients taking responsibility for their pain management and understanding the demands staff were under, these were driven by similar concerns of "delivering safe and effective care for those who needed it" (McConnell et al. 2016)(p40) that drove other conceptualisations of 'good' patients; good patients allowed staff to focus on their role and enable patient flow, bad patients exaggerated their needs, or made a fuss and disrupted the running of the ED.

The theme of patient responsibility identified within the fieldwork as part of conceptualisation of 'good patients' was also identified by Fry within her ethnography of ED nurse triage nursing practice, with nurses expecting patients to take control and responsibility for their own care prior to arriving at the ED. (Fry 2012) However, whilst Fry reported nurses perceiving patient use of painkillers prior to arrival as legitimising the attendance (proving the existence of pain), nurses within this fieldwork, and within other studies of staff views of barriers to pain

management (Shaban et al. 2012) reported patients to be reluctant to take painkillers prior to attendance, for fear of masking pain and therefore reducing their candidacy for treatment. This concept of 'candidacy', described as a construct for negotiating access to healthcare for vulnerable groups, (Dixon-Woods et al. 2006) emerged as patients appeared to seek proof of their own candidacy (seeking a clear cause of their pain, as 'proof' of their pain), and were aware of the need to demonstrate this to staff.

Other studies of staff views of barriers to pain management in the ED also identified that staff expect patients to accept the level of analgesia that they (staff) had judged to be appropriate (Bergman 2012) (Berben et al. 2012) and that patient refusal of analgesia was a source of staff frustration (Bennetts). Patient reluctance to take analgesia was also reported as a barrier within cross-sectional studies (Pretorius, Duignan, Tanabe). These cross-sectional studies also reported staff belief that medication should not be provided until a diagnosis was made, with two studies reporting this the highest ranking barrier (Duignan, Tanabe), although others ranked it lower, suggesting there to be some cultural influence on beliefs. (Tsai, Pretorius). Staff within this fieldwork reported that patients demonstrated a fear of masking pain, but did not appear to share this belief themselves.

13.4.7. Patients and staff do not share understanding of responsibility for recognising pain.

The unique combination of staff interviews, patient interviews and observation also demonstrated a conflict between patient and staff views of what constitutes a 'good' patient, particularly with regard to patients requesting analgesia. Observation revealed that processes relied on escalation of patients with severe pain outside of normal processes, which required either (usually) nursing staff advocating for patients, or for patients to advocate for their own analgesia. Patient interviews revealed that patients may find asking for pain relief difficult when experiencing severe pain, and that patients were also reluctant to 'hassle' staff, and attempted to 'keep quiet' in order to behave as a good patient with respect for the high workload of staff. However, findings from observation and staff interviews showed that the processes of the ED relied on patients requesting pain relief, particularly at reassessment, and this lack of patient self-report was interpreted by staff as either lack of need, or lack of patient responsibility in advocating for their own pain relief, and appeared to result in patients being left waiting for analgesia. Patients expected staff to recognise their pain, yet staff expected patients to inform them of their pain. Patients and staff both recognised that patients who 'made a fuss' were more likely to receive analgesia, which may discriminate against patients whose desire to behave according to expectations is higher.

This finding has not been identified elsewhere within the wider literature, partly due to a limited number of studies on patient views of pain management in the ED. However, other studies

indirectly support this finding that patients are reluctant to request their own pain relief. In particular, patients with a high degree of concern about being a 'good patient' and social desirability may be more reluctant to advocate for their own analgesia, as studies demonstrate social desirability to be associated with not complaining. Studies of patient desire for analgesics in the ED show that higher proportions of patients desire analgesics than receive or request them (Todd et al. 2007) (Allione et al. 2011). This reliance on patient prompting may impact negatively on older people, who were shown in studies of hospital inpatients to be more likely to list pain relief as one of their top priorities of care, experience higher levels of pain, yet be less likely to request pain relief (Lin 2000), (Reeves and Bruster 2009). Nurses in a qualitative study on managing older patients in the ED similarly identified that older patients were more reluctant to report pain, and struggled to verbalise pain. (Gorawara-Bhat et al. 2016) Smith et al found that patients underreported pain due to concerns about being judged by staff as being drug seekers (Smith et al. 2015).

13.4.8. Analgesia isn't everything: patients have wider expectations for pain management

The findings of this fieldwork demonstrated that the reductive process of pain scoring and documenting pain within ED notes did not encapsulate the patient's wider experience of pain. Whilst staff necessarily tried to understand patient's pain in quantifiable and communicable terms that would facilitate treatment (ascribing a pain score), patients understood and expressed their pain in more complex terms. The combination of patient and staff views within this fieldwork revealed inconsistencies between staff and patient conceptualisations of appropriate pain management. Whilst staff focused on the provision of analgesia per se as demonstrating good pain management by enabling pain levels to be reduced, positive patient experiences involved addressing the distress associated with pain and were characterised by good communication, staff showing commitment to help and providing reassurance. Patients appeared prepared to accept being in pain more if they were able to understand and cope with their pain.

Whilst other studies have not specifically identified the different expectations of pain management between patients and staff, other studies do suggest that patients and staff have different concerns. Smith et al reported that ED patients within qualitative interviews valued communication and empathy in pain management interactions. A review of qualitative studies on patient satisfaction in the ED likewise reported that patients placed more emphasis on the lack of 'caring' behaviour than on the unnecessary delays in pain relief, whereas staff valued the 'medical-technical' skill and efficiency (Gordon et al. 2010). Similarly, studies in the surgical setting identified that nurses view their role in pain management to be synonymous with administration of analgesia (Twycross 2002) (Francke et al. 1997).

Smith et al reported that ED patients wanted physicians to try to understand the functional impairment caused by their pain and what the pain means for them, rather than focussing on the 0-10 pain scale (Smith et al. 2015). Studies outside the ED also suggest that the one-dimensional score does not account for the complex factors that patients consider in reporting pain, (de C Williams et al. 2000) and the 'superficial interaction' (Watt-Watson et al. 2000) of asking pain scores as a proxy for pain assessment may lead staff to be perceived as lacking empathy and understanding. (Watt-Watson et al. 2000). Whilst the fieldwork suggested that mandating the use of the pain score may improve assessment, excessive focus on producing a score may detract from the purpose of the score; i.e. understanding and assessing the patient's pain.

The concept of distress caused by pain being addressed separately from the physical pain itself is supported by Body & Foex who discuss how current approaches to pain in the ED rely on addressing 'nociception'[3], rather than on the suffering that determines the well-being of the patient (Body and Foex 2012). In their survey of ED patients, Body et al argue that physical pain and suffering should be considered as different entities. Patients with moderate or severe pain did not all report that their pain was causing distress, and patients with pain reported wanting the ED to ease their suffering through diagnosis and reassurance as well as pain relief. (Body et al. 2015) This corresponds with the findings of this research that, although analgesia was important, other aspects of pain management were important to patients.

13.4.9. Conflicting priorities for the pain score

The combination of observation and interviews used within this study revealed that the pain score documented was variably recorded according to patient report, or according to staff judgement of an appropriate score, using a combination of belief in the patient report, physiological signs, behavioural signs and presence of a 'known' painful condition (with the pain score being considered more as an absolute than a relative measure). Concerns about accountability and appropriateness of pain management appeared to lead staff to feel compelled to ascribe external meaning to the patient reported score and record a more 'accurate' score than that reported by the patient, in an attempt to make the subjective process of pain scoring fit the objective requirements of treatment guidelines and audit. Fieldwork suggested that the dual and contradictory purposes of the pain score may lead to ED staff facing conflict between the need to record pain to ensure accountability of pain management, and recording pain to reflect the patient's report and enable improvements in pain to be recorded, which may limit the utility of the score as a tool to help improve pain management.

[3] Defined as: "the sensory nervous system's response to harmful or potentially harmful stimuli" (Body and Foex 2012)

The finding that staff conceptualised the pain score as an absolute rather than relative measure and that the dual and contradictory purposes of the pain scores led to ED staff facing conflict been reporting patient reported scores and a score which they feel has some external validity appears to be unique to this thesis. However, the findings around ED staff judgement of pain, and staff reluctance to report patient reported scores due to concerns about accountability are reflected within the wider literature. Bergman reported that ED staff in their USA study lacked belief in patient reported scores, and only undertook the scores only due to enforcement (Bergman 2012). Berben also identified staff concerns about the impact of intertwined triage and pain assessment, with high pain scores resulting in triage categories that were considered to be inappropriate by staff, suggesting that the need to seek external validity for the score reported within this thesis was reflected in other settings (Berben et al. 2012).

The finding that staff value their own judgement of pain over that reported by the patient is well-documented within the wider literature. Other studies of staff views of barriers to pain management in the ED reported that staff were similarly unwilling to accept patient report, particularly when visual signs of pain were not apparent (Shaban et al. 2012) (Gorawara-Bhat et al. 2016), with pain assessment being based on subjective assessment, rather than validated pain scores due to patients not understanding how to use the score (Bergman 2012) (Berben et al. 2012). Similarly, in the pre-hospital setting, practitioners treated according to presumed diagnosis where reported pain scores did not accord with their own clinical observations (Iqbal et al. 2013). Other studies also demonstrated how the process of assessment of pain score led staff to attempt to formulate a score with some level of external validity, rather than accepting the score as a subjective measure used to record changes in pain.

In a qualitative interview study of pain assessment at triage, Vuille et al similarly reported discrepancies between patient self-assessment and evaluation by ED triage nurses and found that nurses believed that patients did not share the same frame of reference for judging pain levels, and gained knowledge of how to judge differing pain levels with experience (Vuille et al. 2017). This finding was reflected in a qualitative interview study of Swedish ED patients who also reported concern at their own ability to express appropriate pain scores due to subjectivity of pain, difficulty in rating fluctuating pain, missing details of settings or history of pain and difficulty in imagining what maximum pain would feel like (Goransson et al. 2016). Quantitative studies validating the use of pain scores in the ED consistently reported inconsistencies between staff and patient estimates of pain scores, and variation between staff (e.g. (Baharuddin et al. 2010) (Barrett and Schriger 2008) (Mills et al. 2009) (Marquie et al. 2003) (Modanloo et al. 2011) (Pierik et al. 2017) (Puntillo et al. 2003)), reporting ‘overestimation’ or ‘underestimation’ of pain level, suggesting an implicit belief in the existence of an objectively ‘correct’ score that represents the pain the patient is experiencing.

Although the use of staff judgement in formulating pain scores is widely reported, there is less evidence to suggest how this is actually documented. Cummings et al also noted that nurses documented pain scores without asking paediatric patients or their parents, using their own judgement of the child's pain (Cummings 2013) Chisholm investigated discrepancies between physician pain assessment and that documented on the medical record, reporting that physicians similarly documented pain assessment without asking about pain (Chisholm et al. 2008). Audit data from RCEM in 2012 reported proportions of fracture neck of femur patients with pain score documented as severe[4] ranged between 8% and 60% between EDs (Personal communication, RCEM, 2012). It seems likely that this variation was not due to variation in levels of pain between populations, but variation in how pain scores were documented.

There is some uncertainty within current guidelines as to whether the pain score should be documented based upon patient report, or a combination of patient report and staff judgement. Recent guidelines from the USA have altered the wording relating to assessment of pain, to suggest lesser influence of patient report within the pain score (partly in response to the opioid crisis), and UK guidelines suggest "the experience of the member of staff triaging will help in estimating the severity of pain" (France et al. 2014). Given this ambiguity, and variation in audit results, it appears likely that the inconsistencies noted within this fieldwork are representative of a wider phenomenon.

13.4.10. Limited expectations for pain management may explain high patient satisfaction

Patients within this fieldwork appeared to have low expectations of care and be willing to accept delays in analgesia, or insufficient analgesia due to beliefs that reinforced under-provision of analgesia, and an understanding that the pressures of the ED limited staff' ability to manage pain as well as patients might like. Patients used mitigating circumstances of busyness and lack of time, as well as beliefs reinforcing the acceptability of presence of pain, to excuse shortcomings in their management of pain. Similarly, Jangland reported "patient's excuses and loyalty to busy staff" as hindering improvements to care in a study of abdominal pain patients' experiences across the acute care episode. (Jangland et al. 2016). In the pre-hospital setting, Iqbal et al reported that patients accepted inadequate analgesia due to mitigating circumstances of time, resources and scope of ambulance practitioners' practice(Iqbal et al. 2013).

High levels of satisfaction may be explained by expectations of care, rather than reflection of the actual experience of care (as measured by other outcomes such as provision of analgesia or time to analgesia). Williams et al suggest patient satisfaction to be linked to notions of 'duty', i.e. what patients think a service should and shouldn't do, and the notion of 'culpability', which excuses staff from not doing their duty due to the existence of mitigating circumstances.

[4] Including only EDs who had obtained pain scores for >90% of the patients audited.

(Williams et al. 1998) Patients may therefore declare feeling that staff did everything they could for their pain, due a belief that there was little that could be done. There was also some question as to whether patients in fact believe that pain management is part of the 'duty' of the ED (what patients think a service should and shouldn't do), or whether this is the duty of the patient.

Previous quantitative studies of pain management in the ED noted unexpectedly high levels of patient satisfaction with pain management in the ED despite delays to treatment, high proportions of patients not being given analgesia when requested, and high levels of moderate to severe pain upon discharge (Todd et al. 2007) (Kelly 2000c) (Barlow and Hwang 2012). Studies examining the correlation between patient satisfaction with pain management and provision of analgesia, reduction in pain score, time to analgesia and communication showed mixed results, though there was evidence of some correlation between reduction in pain score and patient satisfaction with pain management (Bhakta and Marco 2014) (Fosnocht et al. 2005a) (Jao et al. 2011) (Shill et al. 2011) (Stahmer et al. 1998) (Taylor et al. 2016)), suggesting that whilst patients may have a high level of satisfaction overall, reduction in pain does lead to increased satisfaction. This may reflect the findings within this fieldwork that being given analgesia and feeling as though staff were trying to help may lead to patient satisfaction, despite the continued existence of pain. A more consistent positive relationship was reported between patient satisfaction with pain management and communication measures, (defined as feeling as though staff made it clear that the treatment of pain was important to them), which reflects findings from this fieldwork that communication, reassurance and being listened to resulted in positive patient experiences. ((Bhakta and Marco 2014) (Jao et al. 2011) (Taylor et al. 2016)

13.5. Summary of unique contribution to knowledge.

The individual contributions to knowledge arising from this thesis and highlighted throughout this discussion section are summarised briefly below:

- ED staff implicitly identified pain management as distinct from the core role of the ED, and operated within a framework of beliefs around how pain was managed and prioritised that allowed deficiencies in pain management to be perpetuated.

- Barriers to pain management were multifactorial but EDs may be able to alter their structures, processes and workforce to overcome these barriers, support pain management and help to develop a culture in which pain management is integrated more into the work of the ED

- Early provision of analgesia through nurse-initiated analgesia at triage has potential to reduce workload relating to pain management elsewhere.

- High levels of confidence in pain management performance may be perpetuated by limited awareness of expected standards of pain management, limited awareness of individual or departmental performance and lack of knowledge of external feedback.

- Staff and patients both implicitly understood the need for patients to act as 'good patients', accept responsibility for analgesia, understand the demands staff were under and accept analgesia when indicated.

- However, patients expected staff to recognise their pain whilst staff expected patients to inform them of their pain, due to current processes relying on patients or carers advocating for their own analgesia.

- Staff and patient conceptualisations of appropriate pain management differed, with staff focussing on provision of analgesia, but patients also needing distress associated with pain to be addressed via communication and reassurance.

- Patients had low expectations of care and used mitigating circumstances of staff busyness and lack of time to excuse shortcomings in their pain management.

- ED staff conceptualised the pain score as an absolute rather than relative measure of pain and documented their own judgement of pain level or patient report variably. The dual and contradictory purposes of the pain scores led to ED staff facing conflict been reporting patient reported scores and their own judgement.

13.6. Strengths and limitations of the thesis

13.6.1. Strengths

Systematic review of interventions

The systematic review of interventions to improve pain management in the ED provided a comprehensive narrative synthesis of existing literature and identified no evidence to support the uptake of any single intervention within EDs, due to risk of bias within existing studies. The narrative synthesis developed a theoretical framework of the rationale underpinning interventions that highlighted how different interventions sought to address different barriers to pain management.

Context specific empirical research

The empirical qualitative research is one of only two studies identified that specifically aimed to understand the barriers and enablers to pain management for all adult patients in the ED (i.e. not limited to known painful conditions), and is the only study reported within the UK. Although the ED undertakes similar work within different countries, there are contextual differences which may affect how pain is managed, such as the impact of private health insurance in USA or Australia (Fry 2012), and the strong focus on the 'opioid crisis' in the USA. This makes this UK based qualitative research unique and important.

Use of multiple case study design

The multiple case study design of the empirical work combined the use of observation, semi-structured interviews with staff and patients and documentary analysis to provide a more in-depth understanding of the barriers and enablers to pain management than offered within existing qualitative studies of staff interviews or focus groups alone. The use of non-participant observation within multiple sites revealed differences in processes and structures between EDs that may not have been evident to staff who did not see outside their own sphere of practice. Similarly, the combination of observation and interviews revealed differences between what staff espoused and practiced, revealing in particular how perspectives of different roles differed and staff did not always see beyond their own field of experience. This highlights the importance of using multiple data sources, and particularly the importance of using observation as well as interviews.

Inclusion of patient views

Measuring patient experience is important in guiding service improvements and is seen as a central outcome for the NHS (de Silva 2013). This study offered important insight into what patients want from pain management, and helped to explain previous research reporting high

satisfaction with pain management, despite other pain management outcomes being suboptimal. The integration of both staff and patient views in the ED provided a unique perspective of pain management in the ED and enabled comparison of the understanding of pain management of both perspectives, and where dissonance of two perspectives causes problems.

13.6.2. Limitations

Researcher triangulation

The fieldwork was undertaken by one researcher, which may be considered a limitation due to the limited field of vision which a single researcher provides. The use of more than one researcher in fieldwork may have allowed different dimensions of pain management to be identified due to the different lens through which each individual interprets the data being collected or observed. However, the collection of data by one researcher across all three sites reduced the likelihood of differences between sites observed being due to observer bias had different researchers undertaken fieldwork in different EDs.

Limitations to hours of observations and participant recruitment

Although efforts were made to ensure fieldwork took place every day of the week at each site, fieldwork only took place between the hours of 8am – 11pm. This was largely for practical reasons but may mean that the fieldwork missed particular aspects of pain management at night that did not arise during the day. The number of hours of fieldwork were dictated by availability of funds and time, rather than achieving full saturation of themes across all three sites (see below). This was particularly the case for site 3, where the pilot was expanded into a full case study site, but the number of hours fieldwork was lower overall than at the other sites.

Interviews were limited to staff working within the ED itself and did not include staff at a managerial level, who may have provided different insights into pain management. Similarly, although the sampling strategy aimed to include a range of different staff, nursing staff were more difficult to access than medical staff and there was only one support nurse recruited for semi-structured interview (although others participated in informal interviews). Patients were difficult to recruit, particularly at site 2, where only 5 patients were recruited despite 22 patients being approached.

Saturation within fieldwork

Saturation of themes (thematic saturation) within qualitative research is reached when new data no longer helps to provide new insights, and emerging concepts have been fully explored (Bryman 3rd ed, p700) Although saturation was reached for the main cross-cutting themes that were developed from the fieldwork, saturation of themes was not reached for all sub-themes and differences between cases may not have been evident from the data. That is not to say that

differences did not exist, but that there was not sufficient data to explore differences between sites for sub-themes. Themes that emerged during later fieldwork visits, principally in relation to the organisational context of the EDs and the relationship of the ED within the wider Trust, were not explored in as much depth as other themes. This was particularly the case at site 3, where fewer hours fieldwork were undertaken. Whilst the findings from this site were useful in terms of understanding structural and process barriers, there was less opportunity to explore cultural and organisational barriers at this site than may have been possible with more resource.

Using a measure of patient satisfaction as a proxy for good pain management

Case study sites were selected based on CQC survey patient results from the question of 'feeling that staff did everything they could to help control their pain'. The disconnect between patient experience and patient satisfaction discussed in section 13.4.1 questions the validity of this measure, as it relates to patient expectations of what staff *could* possibly do. Whilst the measure may be a function of expectation more than experience, it may still be a useful relative measure to assess differences between departments, assuming patient expectations do not differ significantly between departments. As populations for sites 1 and 2 in particular were similar in terms of deprivation, age and ethnicity, (and CQC data was already adjusted for these variables, as they are known to affect patient satisfaction) it is unlikely that differences in patients feeling that 'staff did everything they could to control their pain' was due solely to differences in patient expectations.

13.7. Reflection on the use of theory within this research

The methodology used within this thesis was based upon naturalistic, qualitative methods in order to develop theories around barriers inductively within the ED, rather than building on theories developed deductively from other contexts (see section 5.3). However, the influence of existing theories within the data collection and analysis of data, and the role of formal and informal theory must be recognised. (Davidoff et al. 2015) This study was not guided by formal (high level) theory but aimed to use exploratory case study design to identify theoretical constructs (programme theory) to inform future development of interventions to improve pain management.

Theories can give different 'lenses' through which to look at problems, provide a framework for understanding data and provide researchers with constructs and language which can help to guide analysis to enable them to make sense of the data and help to generalise beyond the immediate to the general (May et al. 2015) (Reeves et al. 2008). However, the use of theory in qualitative and case study research can be considered limiting and pre-ordained theoretical perspectives may bias and limit findings (Eisenhardt 1989). Eisenhardt states that "theory-building research is begun as close as possible to the ideal of no theory under construction, and

no hypotheses to test" (Eisenhardt 1989). As she later acknowledges, this 'clean theoretical state' is almost impossible to achieve and the use of a priori constructs can be used to help with the initial design of the theory-building research.

Within this thesis, the themes identified within the initial literature review and narrative synthesis formed a broad conceptual framework on which the topic guides were developed. This broad conceptual framework was used to guide initial data collection, and developed during the process of fieldwork and analysis to enable new and emerging concepts to be explored. However, due to the lack of empirical and inductive research underpinning the existing research framework, care was undertaken to ensure that the conceptual framework did not constrain findings.

Similarly, although analysis of data was carried out initially without reference to a preconceived framework or formal theory, the influence of knowledge of formal theories on this inductive process must be recognised. Prior to undertaking the analysis, I considered using a number of theories or determinant frameworks to guide the analysis, in particular the theoretical domains framework (TDF), which has been used successfully in the ED for other conditions (Tavender et al. 2014) (Tavender et al. 2015). Again, I made the decision not to use any formal theory or determinant framework due to concerns that this may constrict analysis to the framework and repress additional themes that do not fit in.

However, my prior knowledge of some implementations science theories and frameworks, may have influenced my analysis and the terms by which themes were formed (Nilsen 2015). .Reflection of the TDF, for example, helped draw my attention to the lack of 'reinforcement' within the ED. Thus, although the case studies used a broadly inductive approach, the influence of existing theories must be acknowledged.

13.8. Researcher effects

Due to the busy nature of the ED, where people are constantly coming and going from different parts of the ED, and from different departments, the presence of one researcher appears unlikely to have had a significant impact upon staff behaviour. Some evidence of researcher effects was seen during the pilot (see 14.1.2.2), and throughout fieldwork, where my presence would prompt discussion about pain, or staff appeared to ask the patient for a pain score to demonstrate to me how they asked patients about pain. Occasions where my presence appeared to have had an impact upon staff were noted within reflexive notes, but were infrequent.

Also, the impact of my presence may have been reduced due to low staff awareness of how they *should* behave when pain management was being observed. The 'Hawthorne effect', which is

commonly used to describe researcher effects, refers to the tendency for people being observed to act in a way that is socially expected, (i.e. use gold standard treatment) (McCambridge et al. 2014). However, the lack of gold standard or knowledge of what the expected norm of pain management should be means that staff were unlikely to have acted differently in order to meet social expectation. Given the finding that pain management was not a high priority within EDs, it is particularly improbable that staff would have altered their behaviour and prioritised pain management over other priorities that may have eased patient flow in order to meet social expectations.

13.9. Transferability

The likely transferability of the findings from the empirical research to other contexts or settings requires an understanding of the context in which the research took place. The context of the findings includes three EDs in England where the fieldwork took place, and the staff and patients who participated in semi-structured interviews. Some description of the EDs has been provided within the descriptive overview of cases, although details were limited due to concerns about anonymity of sites. EDs were NHS EDs within busy urban areas, with high levels of deprivation and may have limited transferability to children's EDs or smaller, rural EDs. Case study sites were operating within a context of high workload and pressure to prioritise patient flow, and may be less transferable to sites where there is less pressure to focus on patient flow, although prioritisation of flow within EDs is not unique to the UK.

Interview participants included medical and nursing staff, and patients who attended the EDs with pain. Details of interview participant's characteristics are described within the methods chapter.

Given that different cultures have different focus on pain management, with a greater focus on opioids in the USA and more proactive prioritisation of pain in Australia, this limits the transferability of findings to other settings outside the UK.

13.10. Reflexivity

Evolving understanding of pain management

Over the course of the fieldwork my personal theory around pain management changed as I gained a wider understanding about what guides professional and patient perspectives of pain management. As highlighted within the introduction, my perspective at the outset of the research was based upon the existing research which reported primarily professional perspectives of pain management, assuming a positivist paradigm. These assumptions were necessarily based on professional understanding of how pain could be improved, and how staff

could deliver what they perceived as improved pain management to patients. Broadly speaking, under these assumptions, my understanding was that staff needed to document how much pain patients were in using an 'objective' pain score, then provide analgesia (or non-pharmacological methods) to reduce the pain score in a timely manner. However, over the course of the research I understood that, whilst professional perspectives were guided by how they could deal with pain within the context of their other work, and by the guidelines set out by their professional organisations, this did not necessarily match the perspective of the patient and that the perception of the importance of the pain score in pain management within the literature did not appear to be reflected in practice.

These preconceptions changed subtly and it was only when noticing a feeling of dissonance when I realised that staff were talking about the pain score as a necessity in improving pain management that I realised how my perception had changed.

Managing preconceptions

Throughout the course of the research, I questioned any underlying assumptions I may have had about pain management that arose from my own personal experience, and that of friends and family who shared their stories of pain management both within the ED and elsewhere. I needed to maintain awareness that I was more likely to pay attention to findings that resonated with these personal experiences[5].

Writing down reflections after each fieldtrip helped me to analyse data as I went along, but also provided an opportunity to be reflexive about my findings, what this meant and how actions or situations could have been interpreted differently. I attempted to be open to interpreting situations differently particularly at sites 1 and 2, due to preconceived ideas about whether the department was a 'good' or 'poor' department. As I had selected departments based upon their performance in a patient survey, I felt I had a vested interest in confirming site 1 as good, and site 2 as poor and therefore guard against making interpretations that confirmed my prejudices. This applied not only to selecting which data to record, but in interpreting data at the analysis stage. Where situations arose that did not match my preconceived ideas, I was mindful of asking why I was surprised at findings, and what this meant. The nature of the observation data in particular means that the 'evidence' I documented had already been filtered and interpreted prior to documentation; it is impossible to document the 'reality' that other people may notice. This meant that I had to exercise caution in over-interpreting, when interpreting data where evidence from interviews differed from data from observations.

[5] The main findings that resonated with my own experience are as follows; pain experience is individual and cannot always be judged by an outsider, people demonstrate pain in different ways, physiology will not necessarily reflect pain levels, people admire stoicism with regards to pain.

I had expected to find differences in staff attitudes to pain management between sites, with staff at site 2 less caring towards patients than at site 1. I found this was generally not the case and addressing my preconceptions made me consider why I hadn't found the difference in attitude expressed in semi-structured interviews that matched the observations. This led me to consider what explained differences in performance, despite similar attitudes, and led to the development of the themes around culture and lack of awareness of performance.

Ensuring results are grounded in data

My thoughts and reflections about the data varied constantly throughout the research process, and my level of certainty and confidence in my findings wavered, leading me to return to my data, reconsider and reanalyse until I felt confident that my findings were an accurate representation of the data. Supervisory sessions helped me to understand my reflexivity and ensure that my findings were grounded in the data. Having an ED consultant as a supervisor meant that I was conscious of making unfounded statements, or of appearing judgemental of ED staff in how I reported my findings. Similarly, sharing an office with 2 ED consultants (and the wife of another) meant that I had a sounding board for ideas, but also an opportunity to test initial theories. Having a social scientist as my other supervisor helped ensure that I also adopted a critical view of ED staff, and was not overly influenced by the perspectives of colleagues.

Reflecting on feedback from PPI group

Meetings with the PPI group provided excellent opportunities for reflexivity. During fieldwork, I met with two members of the PPI group who had read through some of the anonymised observation notes and interview transcripts and provided me with feedback on their thoughts about what they had read. At this point I had undertaken the majority of my fieldwork and had started formulating my initial themes. Their reaction to my field notes and interviews was of shock at the lack of priority given to pain, at how patients were not listened to and staff formulated their own judgements about pain. In response to their reaction, I found myself defending the staff at the EDs where I had undertaken the fieldwork, explaining how staff are having to deal with pain management in the context of high volumes of workload and difficulties in assessing individual's pain. At this stage I realised how my opinions had changed over the course of the fieldwork; tempered by a greater understanding of the context in which staff were working. My emotive reactions to events that I considered unacceptable were diminished during later fieldwork visits as I made fewer notes, and lost my initial 'naïve' stance. I had also noticed that over time, I was writing down less and less, and appeared to be normalising staff behaviour regarding patients in pain that previously had surprised me. By reflecting on my own reaction to observations of patients in pain, I could reflect on how staff may react to these observations that were part of their everyday life.

13.11. Implications: How can the management of pain in EDs be improved?

Within this section of the discussion, the implications of the results discussed within the previous section are considered in relation to the aims and objectives (see 1.2). Prior to discussing which interventions, or components of interventions may help EDs, the question of what is meant by good pain management is addressed, as this is key to understanding how pain management can be improved.

The findings of this thesis have implications for both recommendations of how pain management may be addressed within EDs, and in how outcomes related to pain management research should be defined. Importantly, the findings of this thesis have challenged some of the initial propositions laid out at the outset of the research, particularly in relation to existing conceptualisations of measuring quality of pain management. These are addressed first within this section, followed by discussion of which interventions may be useful in improving pain management in UK EDs, based on the findings of this thesis.

13.11.1. Redefining conceptualisations of oligoanalgesia

Wider conceptualisation of quality of pain management may include measures of communication and reassurance

Initial assumptions within this thesis considered how pain management could be improved from an organisational perspective, seeking to understand how pain could be improved from the perspective of a cohort of patients attending an ED and using outcomes based upon initial positivist assumptions laid out within the introduction (i.e. assuming there were measurable outcomes such as provision of analgesia, which interventions could seek to improve). Importantly, the combination of staff and patient views within the fieldwork revealed that improving the management of pain did not necessarily mean the same thing at ED management level, staff and patients. Quality of pain management is currently measured at ED level, using auditable measures such as time to analgesia, provision of analgesia, prescription rates of particular types of analgesia. Individual staff performance may differ according to role and may be more difficult to measure; medical staff may be more interested in how to safely achieve optimal analgesic effects for their patients (what to prescribe), whilst nursing staff concerns centred around how to understand when patients were in pain, and how to provide analgesia whilst ensuring patient flow within the department (how to administer).

The patient interviews and observation of patient staff interactions revealed that patient perspectives do not necessarily adhere to the measurable outcomes defined within the systematic review of interventions, or within the wider literature around oligoanalgesia. Whilst

patients did value the goal of expedited analgesia, the normative definition of provision of analgesia as defined within guidelines did not fit the subjective experiences of patients. Whilst staff described how well they managed pain in terms of how often or how quickly they gave analgesia, for patients, good pain management involved reducing pain levels, particularly where pain was severe, but obtaining reassurance that the pain would be dealt with, and the cause of the pain addressed were also important. Not all patients desired analgesia and appeared prepared to put up with some pain if they perceived the alternative to be worse (side-effects, inability to function).

This suggests that the assumption of mutuality set out within initial assumptions, in which staff want to alleviate pain and patients want their pain minimised, may not apply directly within the context of the ED, as minimisation of pain was not a concern for all patients. Conceptualisation of pain management should therefore move beyond process measures, such as provision of analgesia, and time to analgesia, but incorporate other measures of patient experience.

Current patient reported outcome measures are inadequate

Quality of pain management is currently defined principally using process measures (i.e. measuring whether staff have acted to try to measure pain or provide analgesia), rather than on patient reported outcome measures that suggest patients have had their pain managed appropriately. Current patient outcome measures include patient satisfaction, and reduction in pain score, both of which are problematic. Whilst there is some value to using patient satisfaction measures as a measure of quality, this should be considered as a relative rather than absolute measure due to the link between patient satisfaction and expectations for care (i.e. patients may still report high satisfaction despite experiencing poor care). However, the use of patient satisfaction as a relative measure can help to capture improvements in patient experience, or differences between EDs.

Although designed as a universal tool to capture pain severity, the pain score is less useful as a measure of reduction in pain within the ED than when used within, for example, clinical trials of analgesia, due to the low level of reassessment (i.e. lack of recording of subsequent scores) and the consideration of the score principally as an absolute measure which leads to staff documenting their own score, rather than patient report. Similarly, findings suggested the pain score to be an inadequate measure of patient experience of pain, as patients described their pain in wider terms of function, and the score did not account for fluctuations in pain.

Define oligoanalgesia according to patients wanting their pain to be managed

Previous research defining oligoanalgesia, and reporting interventions of pain management are largely retrospective and focus on process-related outcomes (e.g. analgesia administered, time to analgesia). Studies have consistently concluded that pain management is not managed

adequately, with patients waiting longer than guidelines suggest for pain management, and significant proportions of patients with pain leaving the ED with moderate or severe pain (defined as pain score 5+). (Todd et al. 2007) (New Zealand Emergency Medicine Network and The Shorter Stays in Emergency Department National Research Project Group 2017) (Doherty et al. 2013) (The College of Emergency Medicine 2013) (Thornton et al. 2017). However, the estimates of patients in moderate to severe pain reported in the literature may over-estimate the proportion of patients for whom pain is problematic and analgesia is required, particularly given how studies rely principally on reporting of pain prevalence according to pain score (using the score as an absolute measure). Staff within the case study fieldwork reported aiming to get the patient comfortable, with a minority saying pain-free, and patients within this sample reported wanting pain to be reduced to a 'manageable' level, which they defined as a pain score of 5 or 6. Patients reporting pain scores of 5 or 6 may therefore consider their condition comfortable, and not desire further analgesia.

Overall reporting of the prevalence of 'oligoanalgesia' as a term to define a problem requiring a solution, should perhaps be defined for patients for whom pain is a problem, particularly given how patients reporting low levels of pain frequently did not report suffering with their pain (Body et al. 2015). The inherent assumption that patients not receiving analgesia despite reporting pain equates to poor pain management does not account for preferences that patients may have for taking medications that they do not perceive to be of value, or for definitional variation in recording pain. Assessing staff according to the level of analgesia given to patients who are suffering with pain and want their pain to be managed (e.g. analgesia, reassurance) may be more appropriate than including patients for whom analgesia is not desired. Importantly, focus on these high numbers of patients with reportedly unresolved pain, who are not suffering, may detract from the patients who are suffering with severe pain and not receiving the analgesia they require.

Need for improved definitions for quality of pain management.

Uncertainty around what is meant by "good pain management" may hinder improvements in pain management, as staff had low levels of awareness of guidelines or expected standards of pain management and were often unaware of their own performance at an individual or departmental level. Feasibly, critical reflection of performance will be more difficult when staff have no known standard for how well pain should be managed, or outcomes with which to measure pain management.

13.11.2. Challenging the use of the pain score as a measure of pain management

The pain score was central to many of the interventions used within the systematic review of interventions to improve pain management reported within chapter 3. Results of the case study fieldwork challenged the assumption that pain scoring was central to accurate assessment and management of pain. Whilst the mandating of pain score as a method of documenting assessment may be useful in terms of raising awareness of pain and increasing the profile of pain management, wider concerns around how the pain score is formulated and documented questions the value of the pain score as a tool to improve pain management.

Pain scoring may not translate into action.

The findings from the case studies suggest that documenting pain score may not translate into analgesia (as reported within the systematic review of interventions to improve pain management), because staff do not trust the patient reported pain score sufficiently to use it to make treatment decisions, and that mandating pain scoring will not translate into action unless staff are enabled to provide analgesia in response to the score. Documenting patient pain scores does not require staff to take action to reduce the pain score, as staff do not necessarily believe that the score represents a need for pain management.

Pain score should be used as a relative measure, not an absolute measure.

The use of the pain score was advocated originally in order to provide a method of objectively communicating patient pain severity across settings (Joint Commission on the Accreditation of Healthcare Organizations 1999). However, whilst it may be useful as an indicator for measuring changes in pain severity, it should be judged only as a relative measure for repeated observations and not used as an absolute measure of severity to guide analgesia or triage requirements.

The pain score should be accepted as an imperfect, one-dimensional score that can be used to reflect whether a patient is experiencing pain, and whether treatment is effective in reducing pain severity. There is little value in considering the pain score as an objective measure of what is fundamentally a subjective experience, and the consideration that staff can successfully judge an ‘accurate’ score belies the experience of patient who do not demonstrate pain in a ‘typical’ way.

Interpreting audits and research based on pain scores should be undertaken with caution

Given that recorded pain scores are unlikely to be consistently documented using patient-reported pain score, and that scores that are documented are unlikely to have been entered by

the same person[6], the value of using the pain score to measure improvements in pain within retrospective studies, including audit, is questionable, particularly given how the literature suggests significant differences between how different staff assess pain. Similarly, the inability of the single measure of pain score to record fluctuations in pain, or take account of temporary reduction in pain due to pre-hospital analgesia may explain the frequent recording of patient pain scores being higher at discharge than admission.

Accountability requires a measure of patient experience that can be accepted by both patients and staff, and that is not instrumental in decision-making relating to patient flow.

13.11.3. Which interventions can be used to improve pain management?

This section addresses how interventions may be used to improve pain management, at a departmental level.

Multifaceted interventions may be required to counter multiple barriers

The conceptualisation of pain management as distinct from the core work of the ED that was identified within this thesis suggests that undertaking any single intervention to improve pain management is unlikely to produce significant improvements in the management of pain. The need to change the culture of pain management suggests that any interventions to improve pain management should be multifaceted and address the range of barriers that have been identified within this thesis, in order to integrate the management of pain into the core work of the ED. Broadly speaking, interventions need to be implemented at an organisational level but target staff beliefs and improve staff understanding of patient perspectives. Interventions may help by streamlining processes (making it easier to provide analgesia), improving knowledge (helping staff understand how to provide analgesia safely and understand patient perspectives) and feedback (helping staff understand the need to improve). Importantly, due to the prioritisation of tasks that enable flow in the ED, interventions need to be compatible with the wider work of the ED and need to enable patient flow in order to be adopted and maintained.

Whilst some variation in pain management may be due to non-modifiable structural factors (e.g. lack of space to administer analgesia at initial assessment, size of department increasing handovers), changes to processes could be undertaken to counter structural problems (e.g. improving communication, changes to workforce roles). EDs are likely to have their own process and structural barriers that will need addressing before pain management can be enabled, although there may be some universal lessons around process and structural barriers from the case study analysis (e.g. minimise handovers, ensure analgesia is easily available).

[6] initial pain scores being entered at triage by triage staff, subsequent scores entered at reassessment by staff within other areas of the ED

Ideally, EDs should undertake their own diagnostic analysis of factors EDs that affect pain management in order to address departmental specific process and structural barriers.

In the systematic review, many of the interventions developed to improve one aspect of pain management (e.g. education, pain scoring) did not appear to translate into improved outcomes for pain management such as provision of analgesia or time to analgesia. Given the importance of enabling processes in the management of pain, interventions undertaken in isolation, such as educating staff about appropriate analgesia, or mandating documentation of pain score, are unlikely to benefit patients unless staff are empowered to administer analgesia efficiently. Change may be more likely to occur when the range of barriers are addressed, and when change in culture takes place, in order to address underlying beliefs, and increase understanding of the importance of pain management.

Mandated pain assessment at initial assessment

Mandating assessment of pain at initial assessment may reduce inequalities of care due to reduced reliance on staff recognising pain, or on patients advocating for their own pain relief. As patients sometimes cannot (or are unwilling to) advocate for their own pain relief, and staff do not always recognise patient's pain, assessment of pain at initial triage or ambulance handover is essential, but should be accompanied by action to try to manage reported pain. Mandating assessment and documentation of pain appeared to ensure patients had their pain assessed in some way, whether this was recorded using patient-reported pain score or a rapid judgement from staff.

Mandating documentation of whether patients have been asked whether they are in pain, and need their pain to be managed may be more useful than documenting pain score in terms of translating assessment into improved analgesia. Whilst staff may be apprehensive about believing particular pain scores that did not match their own interpretation of the score, and therefore be reluctant to act upon documented scores, there may be more impetus to respond to a more straightforward request for pain management. Given how treatment decisions did not appear to be based upon pain scores in practice, a lack of documented pain score is unlikely to impact upon the management of patients.

Where pain scoring is mandated, staff should be made aware of the purpose of the score, and encouraged to document a wider definition of pain that accounts for prior treatment given, fluctuations in pain score, or explanations to justify their treatment decisions, rather than modifying patient reported score. Measures to hold staff accountable for pain management should be based on whether staff have documented patient's pain score, but not assume the score to have any external validity on which management of pain could be assessed. A possible solution is requesting staff to use functional descriptions of pain alongside the pain score that

may help patients define their pain score and explain their pain, but also help staff understand how the pain score may need to translate into action.

Nurse initiated analgesia at initial assessment

The findings of this thesis suggest that nurse initiated analgesia at initial assessment has potential to be beneficial in reducing time to analgesia by ensuring patients have started on the pain ladder at initial assessment, and potentially reducing the workload associated with providing analgesia further into the patient journey. Further expanded nursing roles may also be effective interventions for pain management. Given the level of trust between established medical and nursing staff observed during fieldwork, there could feasibly be an increased role for nurse prescribing of controlled drugs for severe pain using PGDs for other analgesics (e.g. morphine, diamorphine), which were not used at the case study sites. The findings of this thesis suggest that increasing nursing PGDs would be acceptable as nurses currently hold a central role in decision-making around pain management, and formalising this decision making may cut a step out of the process of pain management. PGDs and triage training require regular updating, which also offers nursing staff opportunities for ongoing education.

Senior doctor triage appeared to offer less potential for earlier analgesia due to continued reliance on nursing staff to cannulate and administer the analgesia prescribed by the doctor.

Formalise processes for reassessment

Reassessment of pain was widely reported by ED staff to need improvement and there were few examples of interventions to improve reassessment, with the exception of changes to documentation to encourage reassessment and act as a reminder. Given that existing processes focus on new, undiagnosed patients and that reassessment does not appear to enable patient flow, there is a need to formalise processes for reassessment and reduce the reliance on patients asking for further pain management. Current ad-hoc procedures for reassessment may be improved by recognising and formalising the role of junior nursing staff in assessing patients in pain, as part of their role in undertaking observations, and alerting staff to the need for further analgesia. Improved PGDs for nurses in the ED ward may also make it easier for nursing staff to react to patient need for analgesia at reassessment.

Encourage patient involvement

In the absence of procedures for staff to improve processes for analgesia, staff should be explicit about the currently implicit expectation that patients need to advocate for their own analgesia. Patients need to be reassured they can request more analgesia and encouraged not to tolerate pain due to misunderstandings about analgesia. Staff should be encouraged to explore reasons for patient refusal, and not consider refusal as a sign of not experiencing pain.

Improving knowledge and awareness of pain management.

Staff should be encouraged to understand that patient experiences of pain do not align with the concept of pain scoring and receiving analgesia recommended within guidance, but have valid wider concerns around their pain management that require communication and reassurance.

Provision of formalised, evidence based education and training within the ED setting may help increase staff confidence in safely providing effective analgesia within the ED and decrease reliance on colleagues. In particular, improved knowledge of pharmacology and use of adjuncts may decrease current reliance on personal preferences and empower nursing staff in particular to address safety concerns and request further analgesia for patients with persistent pain where adjuncts may be an option. Enhanced training in clinical competencies such as cannulation and nerve blocks for different staff groups may enable pain management when EDs are busy.

Importantly, ongoing provision of training and education may help to ingrain knowledge and raise the profile of pain management within the ED to help establish a change in culture, which is particularly important given the high levels of turnover of staff and reliance on agency and locum staff within EDs.

Guidelines or protocols

Findings suggest that staff had little awareness of guidelines or protocols. Development of simple, clear protocols for nursing and medical staff that provide evidence-based recommendations for pain management may help counter knowledge deficits if disseminated appropriately and visibility of guidelines may help increase the profile of pain management. However, treatment recommendations should not be based upon pain scores, and measuring adherence to protocol should not assume external validity for pain assessment.

Develop measures to improve accountability

Holding staff accountable for their decision making in pain management may improve the profile of pain management within the ED by making staff understand that pain management is core to ED work. However, due to the subjective nature of pain, measures to ensure accountability are necessarily difficult and do not have external validity. Attempts to provide objective judgement of pain (i.e. using the pain score) encourages staff to alter patient report and therefore reduces the validity of the score. Instead, measures of accountability should consider whether patients have been asked about pain, offered analgesia and encouraged to take analgesia if experiencing pain and distress related to pain. Outcomes should also address timeliness and reassessment in order to understand whether pain has improved.

13.11.4. Implications for research

The findings of this study have a number of implications for future research in this area:

- The differences observed between how staff reported processes for pain management, and how pain management was undertaken in practice calls into question the usefulness of single-responder surveys to understand how health services are delivered.

- Patient self-report of timing or understanding of events is unlikely to be accurate for patients in severe pain.

- Future research into interventions for pain management should consider carefully which outcomes to report. Whilst studies may report a change in processes used (e.g. use of pain documentation), this does not always translate into patient-oriented outcomes such as reduction in pain or reduction in time to analgesia. Research into effective interventions should consider the mechanisms by which interventions may work and develop or use outcome measures that are appropriate for these mechanisms.

- Process outcomes that may be more meaningful to patients than provision of analgesia per se, may be time to effective analgesia (e.g. (Doherty et al. 2013). However, effective analgesia should be defined using outcomes relating to patient function, or if reduction of pain score is used, this should be defined by the patient as effective.

- A stronger theoretical framework for interventions combined with more robust evaluation designs such as multicentre RCTs, may enable EDs to understand how and why an intervention works, and under what conditions they may succeed. Studies with a design with limited external validity (such as before and after studies reported within the systematic review) should place more emphasis on reporting design processes and feasibility of the intervention rather than reporting effectiveness to allow a better understanding of the contexts and mechanisms of how interventions may work.

- Future research should use prospective designs and incorporate qualitative methods to explore methods of improving pain management in more depth. Over-reliance on quantitative retrospective studies and assumptions based on positivist paradigms has resulted in a wide evidence base which offers little insight into how pain management can be improved, with interpretation of studies based on speculation rather than understanding.

13.12. Further research

This thesis has identified a number of areas that would benefit from further research and improve understanding of how pain management within the ED can be improved:

- Further research is needed to improve understanding of which outcome measures are relevant to patients and to develop outcomes that capture the patient experience, yet are appropriate for use by staff in the time-pressured environment of the ED. In particular, there is a need to develop outcome measures that enable staff to understand patients pain in terms of their need to have their pain managed using terminology that is meaningful to both patients and staff. The development of a scale that does not need translating into action should make it easier for staff to understand which patients need more analgesia and enable ED staff to be held accountable.

- Further research exploring the impact of early assessment and pain management on outcomes such as patient flow and patients and staff experience.

- Further research into the impact of providing improved feedback to staff is needed. Understanding complexities of patient stories that lie behind patient complaints about pain management may enable staff to understand the complexity of patient needs and provide motivation to change practice.

- Improved understanding of knowledge deficits affecting pain management for nursing and medical staff would be useful in order to develop tailored education for ED staff.

- This thesis identified barriers to pain management at an organisational level but did not address prevalence of barriers, or enable understanding of which barriers contribute most significantly to patients remaining in pain within the ED. Further research exploring the impact of different barriers on individual patient experience through observing patient journeys may be useful in understanding which barriers impact most on different patient groups, and in understanding which interventions may need prioritising.

- This thesis did not explore the assumption that adequate pain relief exists, but concentrated on the methods for improving administration of analgesia. However, staff spoke about difficult patients as those with severe, intractable pain and within both observation, and patient interviews, there were patients whose pain was not resolved within the ED despite staff persevering and using different modalities of analgesia to reduce pain. Further work is needed to understand whether interventions can be developed for the subset of patients for whom severe pain is not currently being

resolved in the ED. It is feasible that the assumption of adequate pain relief existing for ED patients is not wholly appropriate, but that adequate pain relief could be provided for the majority of ED patients.

13.13. Conclusions

Findings from case studies suggested that ED staff conceptualised pain management as distinct from the core role of the ED, and operated within a framework of beliefs around how pain was managed and prioritised that allowed deficiencies in pain management to be perpetuated. Pain management was not considered one of the core maxims for which staff were accountable and staff had limited awareness of their own performance. Attempts to objectify assessment of pain using pain scores to guide pain management encouraged staff to alter patient report and reduced the validity of the score as a measure of change in patient's pain. The reductive processes of pain scoring and providing analgesia according to score set out within current guidelines did not conform to patient expectations/conceptualisations of pain management. The three case study EDs differed in how they altered processes and workforce to address structural barriers to pain management and prioritised how pain was managed.

This thesis found no evidence to support implementation of any particular intervention to improve pain management but suggests multifaceted changes may help by developing a culture in which pain management is integrated into the core work of the ED. EDs may improve pain management by altering processes to actively enable pain management, particularly at initial assessment. Improved communication and reassurance may improve patient experience.

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APPENDIX 1: SEARCH STRATEGY

Medline

Searched Medline (R), in process and other non-indexed citations and Ovid Medline (R) 1946-4 December 2012

- Emergency medicine {Including Related Terms}
- Emergency Medicine/
- Exp Emergency Service, Hospital
- Exp Emergency Medical Services
- Emergency Department.mp
- ED.mp
- Or/1-6
- Exp "Anesthesia and Analgesia"/
- Exp Analgesia
- ExpAnalgesia,Patient-controlled
- ExpPainPerception
- ExpPainManagement
- ExpPainMeasurement
- ExpPain
- (analges$ or pain$ or narcot$ or opioid$ or oligoanages$).ti
- Or/8-15
- 7and16

Cochrane.

Searched in trials. Start – December 2012:

(pain* or analges* or opioid* or narcot*):ti, ab, kw AND (emergency*):ti, ab, kw

Web of Science via Web of Knowledge

Title = (analges* or pain* or opioid* or narcot*) AND Topic=(emergency). Dates searched: start

– 4 December 2012

Embase

See Medline for search strategy. Dates searched: 1974 – 4 December 2012

Cinahl

(Ti Pain* OR Ti analges*) AND (Tx emergency). Exclude Medline. Dates search: Start – 4 December 2012

Grey literature

OpenGrey (http://www.opengrey.eu)

04/12/12 (pain OR analgesia OR analgesics OR opiate OR narcotic) AND (emergency OR ED)

APPENDIX 2: PRISMA STATEMENT

15. SECTION/TOPIC	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	Title
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	Abstract
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	1
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	1
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	1
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	1
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	1
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Appendix 1
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	1-2
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	2
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	Appendix 2
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	2
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	N/A

Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	2
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	2
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	N/A
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	2
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	2-3
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	4
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	N/A
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	N/A
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	N/A
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	N/A
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	10
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	11
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	12

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit: **www.prisma-statement.org**.

APPENDIX 3: SYSTEMATIC REVIEW OF INTERVENTIONS TO IMPROVE PAIN MANAGEMENT IN THE ED: CHARACTERISTICS OF INCLUDED STUDIES.

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
Pain scoring tool alone							
Baumann (2007) USA	I: Introduction of templated chart with pain assessment scales for physicians. This included two additional physician prompts (0-10 pain scale, 8 pain descriptors) for pain severity at history and reassessment as well as descriptors of pain. Duration: Introduced March 25 2004 C: Standard non-templated handwritten charts	Inclusion: Patients aged >8 attending ED with chief complaint of traumatic or non-traumatic pain Exclusion: NR Mean age: I = 37.8, C= 41.4 p<0.001 % male I=45, C=50 (NS) Also reported triage category, site of injury.	Setting: Urban tertiary care hospital, 47k attendances p.a. Timing: C; 14 days (Mar 10-March 23 2004); I 11 days (May 10-20 2004) Interval: 6 weeks	Pre-specified: DPS (pain severity noted by physician), RDPS, DPS (nurses at triage), AA	N=768 v 474 DPS: 314/768 (41%) v 272/474 (57%) p<0.001 RDPS: 103/768 (13.4%) v 89/474 (18.7%) p=0.01 AA: 493/768 (64%) v 310/474 (65%) Also reported provision of any analgesic for discharged patients, differences in descriptors of pain and % of pain documented by different staff groups.	Study design: B/A Blinding: ED staff members blinded to study and primary data abstractor blinded. Included decoy variables Recruitment: NR Data collection: Prospective. Charts independently reviewed by 2 reviewers. Agreement noted. Other:	
Jadav, MA (2009) UK	I: Introduction of computerised record system with mandated pain score. New staff were trained on use of age-appropriate pain scales and pain scoring tools placed around department.	Inlcusion: Children <=11 with long bone fracture, partial or full thickness burns.	Setting: DGH, 77k attendances p.a. Timing: C: NR I: Oct 2005-March 2006	NR	N=187 v 163 AA 136/187 (73%) v (NR)/163 (66%) p=0.1639 AAA (opiate) 69/187 (37%)	Study design: B/A Blinding: None Recruitment: NR Data collection: Retrospective Single abstraction of data	Control published in different paper. Two separate audits used

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	Introduced October 2005 C: Pre intervention audit	Exclusion: Head, chest or abdominal injury, developmental delay or neurological disorder. Patient characteristics: NR	Interval: None		v16/163(10%) p<0.001 DPS: 23/31 (74%) v 158/163 (97%) p<0.001	from ED records.	for outcomes of AAA and DPS
Kaplan, CP (2008) USA	I: Incorporation of pain scale into paediatric ED emergency medical record. WBPFS placed adjacent to vital signs section. PI presented brief didactic program on analgesia and pain documentation to all physicians working in paediatric ED during study periods. C: Pre-intervention audit.	Inclusion: all patients aged 3-20 presenting to ED Exclusion: Patients unable to perform WBFPS, patients with severe developmental delay, acute mental status changes, intoxication, cardiopulmonary instability, analgesia for fever. Age: 11 v 11 % male 57 v 47 (p=0.008)	Setting: urban tertiary care hospital Timing: 30 days pre intervention, 30 days post intervention. Study period June-Sep 2004. No details as to when intervention implemented.	Pre-specified: Physician DPS, AA, TTA (from triage to administration), AA for WBPS>6	N=462/372 TTA median 42 v 53 Physician DPS 34/462 (7%) v 142/372 (38%) (p<0.001) AA for WBFPS >=6 10/(NR) (42%) v28/(NR) (42%) TTA not clear.	Study design: B/A Blinding: Staff members except investigators unaware of study Recruitment: NR Data collection: Retrospective. Review of electronic medical record. Abstracted data on objective criteria. Other. .	Rate of analgesia only available for those with pain score documented and >6.
Nelson, BP (2004)	I: Intervention involved addition of the JCAHO mandated verbal numeric pain	Inclusion: Patients presenting with	Context: Suburban	Pre-specified: AA (oral or parenteral	N=521 v 479	Study design: B/A Blinding: ED staff and	Also showed that patients

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
USA	scale (0-10) to medical record. The standard triage form was altered to include pain scale in vital signs section. C: Pre-intervention audit	renal colic, extremity trauma, headache, opthalmologic trauma, soft tissue injury Exclusion: NR Pat char: age: 31.4 v 33.4, p=0.09, % male 60 v 57, p=0.3. % admitted.	university based ED. 65k att p.a. Timing: 2 day period before study intervention v 2 day period 2 weeks after study intervention	analgesia). TTA. Statistics: Chi sq for % and t test for continuous.	AA 25% v 36%, p<0.001 TTA (mean) 152 v 113 (mean difference 39 mins, CI 7-84)	patients masked to study intervention. Recruitment: Consecutive Data collection: Retrospective. Data extracted from medical records on patient demographics, triage, medication times, pain scale. Other	were more likely to receive analgesia if they do not receive a diagnostic workup.
Rogovik, AL (2007) Canada	I: Pain scale added to the patient chart. The physician responsible was asked to assess the pain score when interviewing the child. Pain scale not mandated. C: No pain scale. During control phases patients were interviewed by experienced research assistant to ascertain data for control (1 page assessment form containing WBS for 3-7 and VAS 7+)	Inclusion: limb or clavicle injury, 3+ Exclusion: Children w/o guardians, patients with underlying chronic conditions, predisposed to limb pain, developmental delay or autism, taking analgesics or anti-inflammatories on regular basis, triage score of resus, multiple organ trauma Pat char: NR (only reported as totals)	Context: NR Timing: 4 phases, pain score added to phases 1 and 3, not 2 and 4 August 2004-Feb 2005	Pre-specified: AA (physician), TTA.(physician), AAA (definition of appropriate analgesia NR) Statistics: T test, kruksal-walis, chi sq	N= 179 v 131 AA 33/179 (18%) v 32/131 (24%), p NR TTA (physician) 2.23 (1.22-3.51) v 1.72 (0.87-3.24), p=0.18 AAA 22/162 (14%) v 24/118 (20%), p=0.13 Also analgesia prescribed on discharge.	Study design: Crossover Blinding: None. Physicians gave verbal assent but not aware of aims of study. Recruitment: Consecutive. Informed consent and patients assent obtained Data collection: Prospective. Unclear. Analgesia details collected from patient chart. Other: 4 crossover time periods used to reduce seasonal variation and minimise hawthorne effect.	Study may be inadequately powered to detect statistically different changes in analgesia and TTA due to small numbers receiving analgesia

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
Thomas, SH (2004) USA	Two mechanisms for using VAS as tool for ongoing monitoring of patient pain levels: I1: Patient in the 'tabulation' group had initial VAS (T0) followed by q12-min assessments (total of 11 during 2h) which were entered into a table placed in the ED chart. I2: Patients in the 'graph' group had same interventions as those in the 'tabulation' group as well as a standard graph of their VAS scores placed at head of ED stretcher. Study period lasted 120 minutes – final assessment done at T120. C: Patients assessed using standard VAS score at ED presentation (T0) and at 2 hours (T120). (Unclear as to whether this is standard practice)	Inclusion: All patients 18+ triaged to intermediate acuity area of ED, regardless of whether or not had initial pain Exclusion: potentially life-threatening illness or injury, incapable of participating in study Pat char: Median age 48 v 48 v 44, p=0.25 %male 47.4 v 56.6. v 50 (p=0.42). Also ethnicity, initial VAS (NS)	Context: Urban academic ED, 70k attendance p.a. Timing: June-August 2002	Pre-specified: RedPS (reduction in VAS of 13mm), AA (VAS>5.5), AA within 30 mins. Also Pat sat (response to 'my pain assessment and treatment were adequate). Statistics: Kruskal-Wallis test for VAS comparison. Chi sq for categorical outcomes	N=100 v 100 v 100 AA for VAS > 0 55: 7% v 58.7% v 63.0% p=0.69 AA within 30 mins 3.3% v 3.2% v 26.0% p<0.0001 Red PS: Figure NR, statistically similar at T120. (p=0.45 for all patients, p=0.17 for those who had pain at initial evaluation). Pat Sat scores 3.7 v 4.1 v 4.2 (p=0.002) Also reported % patients for whom physician saw VAS at T0 and T120.	Study design: RCT Blinding: Patients and physicians blinded to null hypothesis. Recruitment: Random. Data collection: Prospective. Data collected by single investigator. Patients and physicians asked for level of agreement with statements about the utility of VAS. Physicians asked to indicate if they had seen the T0 and T120 assessments. Other: No details of randomisation or recruitment process.	
Blankenship (2011) USA	I: Computerised physician order entry (CPOE) using order sets related to presenting complaint, providing standing orders for pain medication and pain dosing. All staff underwent hour long training program before CPOE implementation. Implemented November 2009. C: Written nursing pain protocols. Physician orders written on paper order	Inclusion: Any patients aged 18+ presenting to ED with pain-related complaint. Exclusion: Incarcerated persons, mental disabilities, acute psychiatric illness, multisystem	Setting: Urban academic ED. 39k attendances p.a. Timing: C: Jan-Apr 2009 I: Jan-Apr 2010 Interval: 2 months	Pre-specified: TTA median (registration to administration), AA Statistics: descriptive. Chi-sq for categorical and t test for continuous.	N=646 v 592 AA 355/646 (55%) v 346/592 (59%). P=0.139 RAA: 69/646 (10.5%) v 104/592 (17.6%). P<0.001 Median TTA 86m v 89m p=0.149 (95% CI of difference -16-24 mins)	Study design: B/A Blinding: RAs not aware of specific outcome measures of study. Recruitment: Patients asked if they would be willing to complete brief survey regarding their pain. Recruited between 8am-midnight, 7 days Data collection:	

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	sheet on patient's chart	trauma or pregnancy. Pat char: Age 42.9 v 44.1 (p=0.433) % male: 44.6 v 37.3 (p=0.14) Chief complaints comparable.				Prospective. Data extracted from paper-based nursing documentation for control, from electronic record for post group. Other: NR	
Day, F (1995) USA	I: Physicians given option of using Emergency Department Expert Charting System (EDECS). Provides examining physician with list of essential items to log and suggests appropriate tests and treatment, using clinical guidelines Aims to improve quality of documentation and appropriateness of testing and treatment. Developed using local experts. Physicians given 30 minutes training and advised use of EDECS encouraged but optional. Implemented May 1993 C: Pre-intervention – all charting done by hand.	Inclusion: patients aged >16 with acute low back pain. Exclusion: Continuous pain >3 months, back surgery in past 2 yrs, known systemic disease, suspected renal colic. No patient characteristics reported	Setting: NR C: May-Nov 1992 I:May-Dec 1993 Interval: None	Pre-specified: AA, AAA (defined as acetaminophen, ASA or NSAID) Statistics:	N=103 v 259 AA: 41% v 30% AAA: 83% v 79% Also reports contraindications	Study design: B/A Blinding: NR Recruitment: Random sample of patients meeting inclusion criteria. Random sample of 103 patients used Data collection: Manual extraction of data from patient log for control. All EDECS data stored electronically and extracted. Other: ITT analysis (202/259 used ECEDS.	Does not relate solely to pain management.
Protocol alone							
Clere (2001) France	I: Protocol for intravenous acute pain management. Duration: Coverage: Tailored:	Inclusion: All patients attending ED. Exclusion: NR Pat char: NR	Context: Timing: 3 months prior to intervention, 3 months post	Pre-specified:% AAA (IV analgesia) Statistics: NR	N=1,839 v 1,984 AAA: 82/1839 (4.5%) v 102/1984 (5.1%), p<0.01	Study design: B/A Blinding: NR Recruitment: NR Data collection: Retrospective then	French article with English abstract.

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	Other: C: Pre-protocol					prospective Other	
Eisen, S (2007) UK	I: Paediatric pain management protocol. Introduction of pain scoring chart (adapted from Wong Baker) with corresponding analgesia protocol. C: No protocol	Inclusion: Children aged 4-16 years with painful conditions such as trauma, headache, abdominal pain and head injury Exclusion: NR Patient characteristics: NR	Setting: Univerisity hospital. Timing: NR Interval: NR	NR	N=115 v 116 AA (initial assessment) 24% v 51% (p=0.001) DPS 0% v 71% (p<0.001) Mean TTA (time to prescription) 40m v 15m (SE1.79) p<0.001)	Study design: B/A. Blinding: NR Recruitment: NR Data collection: NR Other:	Letter only
Ender, K (2010) USA	I: Introduction of clinical pathway, in checklist format with instructions for triage, monitoring, medication administration and timing of assessments and interventions. Coverage: NR Duration: ED physicians and nurses were in-serviced on the pathway over 4 week period. C: Pre-pathway	Inclusion: Patients aged 3-18 with SCD presenting with VOC pain Patient characteristics: NR	Setting: Urban, tertiary care ED. Timing: Control Feb-July 2009, 4 week intervention bedding in period, 6 month follow-up.	NR	N=68. TTA 74 v 42mins (p=0.02) Time to first opioid 94 v 46 mins (<0.01) AAA (keterolac) 57% v 82% (p=0.03) redPS: No change (no further details) Also reports time to subsequent assessment of pain score 110 v 72 min (p=0.02), % admitted	Study design: Prospective cohort study Blinding: NR Recruitment: NR Data collection: NR Other Study design: Prospective cohort study.	Abstract only

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
Goodacre, SW (1996) UK	I: Introduction of analgesic protocol. Results of pain management audit presented at staff meeting prior to protocol being circulated through department to all staff. Implementation period NR C: Pre-protocol. No further details.	Inclusion: acute skeletal injuries. Exclusion: Patients with significant head injuries, referrals from other hospitals, admissions w/o fractures and patients with injuries >12hrs old Patient characteristics: NR	Setting: NR Timing: Control NR. Intervention data collected for 1 month after protocol introduced	NR	N=200 v 200 (100 fracture clinic, 100 orthopaedic admissions in each group) AA: Fracture clinic 9/100 v 31/100, Orthopaedic admissions 61/100 v 78/100 AAA (IV opiates) orthopaedic admissions: 9/100 v 37/100	Study design: B/A. Blinding: None Recruitment: Consecutive Data collection: NR Other: .	
Morrissey, LK (2009) USA	I: Introduction of clinical practice guidelines for sickle cell pain drawn up by multidisciplinary team. Included ED and admission order sets and nursing management plan. Included guidelines with algorithm to assist and evaluate decision making for analgesics and patient controlled analgesia : Introduced 2002, revised 2006. Guidelines drawn up in-house.: C: Pre-guidelines. No further details	Inclusion: All patients seen in Children's hospital ED and subsequently hospitalised with ICD9 diagnosis code 282.6 (SCD) where pain was primary reason for admission Exclusion: NR Pat char: Age: 12.3 v 13.6 p=0.54, % male 53% v 51%, ns	Context: Children's hospital. Timing: C: 2001, I: 2003-2006	Pre-specified: NR Statistics: Fischers exact test for comparison of gender, t test for comparison of age. Subjects included in both B/A excluded from comparison of patient characteristics	N=51 v 212 DPS: 29/51 v 211/212 (p<0.001) AAA (adequate opioid dose by weight) 27/51 v 165/212 (p<0.001) Median (IQR) TTA: 80 (30-215) v 65 (28-120), p=0.003 Also reports % with first analgesia within 1 hr, PCA used, time to PCA.	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Retrospective. Data abstracted from charts included time of ED triage, use of pain scale, presence of CPG order sets etc. Other	

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
Educational intervention alone							
Jackson, SE (2010) USA	I: Educational intervention with 3 sections: review of physiologic assessment for elderly patients, analgesic administration and appropriate documentation. Educational sessions included a review of PM policy, standardised assessment tools and documentation process required at the hospital. Coverage: 85 registered nurses working within ED between Sep-Oct 2006 C; Pre-intervention. No details given	Inclusion: Patients aged 65+ with hip fracture admitted to ED Exclusion: NR Patient characteristics: NR by group.	Setting: NR Timing: C – Jan-Aug 2006 I: Jan-July 2007 Intervention Sep-Oct 2006	Pre-specified: TTA, RDPS after treatment Statistics:	N= 151 v 151 TTA (% within 60 mins) 46/110 v 55/110 (p=0.223) AA: not reported by group RDPS within 60 mins of tx, 38/55 v 42/94 p=0.004 Pain assessment level not reported by group	Study design: Before and after Blinding: NR Recruitment: Intervention recruited consecutively. Not clear for control Data collection: Retrospective (pre) prospective (post). Data collection by chart audit by single researcher Other: .	No details of why 110 given analgesia rather than 151. No breakdown of other results by group
Jones JB (1999) USA	I: A 4 hour educational program consisting of 3 lectures and quizzes on pain management skills presented to ED residents by 2 ED faculty members 4 weeks into 2 month study period. Coverage: All resident physicians asked to participate in pain management survey of patients who presented to ED with acute painful condition during study period. 90% attendance at education programme. Developed after results of initial survey C: Pre-intervention. No details given.	Inclusion: acute, painful conditions. Exclusion: Pain medication taken within 4 hr, requiring immediate resuscitation, suspected cardiac pain, potential surgical abdomen pain. Patient characteristics: Age 42 v 45, % male 67 v 64 NS Mean VAS at	Setting: tertiary care teaching hospital ED, 42k attendances p.a. Timing: 1 month prior to and 1 month post educational programme. (No dates)	RedPS (within 30 mins) Patsat: Global assessment of treatment: reporting Tx moderately or completely effective at reducing pain Statistics:	N=54 v 72 RedPS: 21.83 (95%CI 17.26-29.41) v 40.53 (35.82-45.23) p<0.0001 Patsat - 30/54 (56%) v 68/72 (94%)	Response rate to surveys 54/60 v 72/80 Study design: B/A Blinding: Attempted to keep significance of survey from staff. Recruitment: Convenience sample Data collection: Other	

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
		baseline 76.7 v 80.3 (p>0.1)					
LeMay, S (2009) Canada	I: Educational intervention involving three 20-30min capsules on pain mgt, offered during working hours. Info based upon responses to Pain Management Experience Evaluation (PMEE) and PNKAS survey which was done at baseline, to address areas where nurses were weakest. After attendance at capsule, received 2-3 page summary and pain scale. Coverage: Total intervention period lasted 5 months - all nurses given chance to attend all 3 sessions. Each capsule repeated 9 times. All nurses invited (n=50) Attendance at 1,2,3 was 30, 31,21 with 27 attending more than one. Tailored: Education tailored to address the information needs of nurses according to the PMEE and PNKAS scores. Developed in house with nurse clinician specialist C: Pre-education	Inclusion: Children triaged in ED with diagnosis of burn, fracture, laceration, sprain or acute abdominal pain in past month (considered to generate moderate to severe pain) Exclusion: NR Pat char: NR Reports nurse characteristics.	Context: paediatric university teaching hospital. 65k attendances p.a. Timing: Baseline, T1 (intervention), T2 (1 month post-intervention), T3 (6 months post intervention). No details given.2	Pre-specified: DPS, AA, Nurses' knowledge of pain mgt (using PNKAS), documentation of pain, use of pharmacological and non-pharmacological interventions. Statistics: T test for PNKAS scores, chi sq for PMEE.	N=150 v 104 v 119 DPS: 89/150 (59.3) v 84/104 (80.8) v 106/119 (89.1) p<0.001 AA: 40/150 (26.7) v 21/104 (20.2) v 43/119 (36.1) p<0.01 Also use of Non-pharmacological interventions 25/150 (16.7) v 21/104 (20.2) v 43/119 (36.1) p<0.01 Baseline: N=42. T2 N=21 Mean score on PNKAS 28.2 v 31.0 (Max score 42)	Study design: B/A Blinding: NR Recruitment: 150 patients randomly selected from 5 lists of patient charts with the different inclusion diagnoses. For T2 and T3 only charts of nurses who participated in intervention selected. Data collection: Retrospective. PMEE data collected from patient charts. PNKAS questionnaire completed by nurses. Other	Trend in increase in PNKAS score at T2 between nurses who attended a pre-intervention workshop on pain mgt
Sucov, A (2005) USA	I: Educational intervention consisting of education and reminders to staff about essential nature of pain control for all fractures. Discussed literature and initial practice patterns in pain management, Emphasised poor pain management as medical error. Global	Inclusion: All patients with long bone or extremity fractures as primary diagnosis.	Context: 3 affiliated EDs (Adult, paediatric and community) Timing: Oct-Nov 1998 v Jan-Sep 1999	Pre-specified: NR Statistics: t test, chi sq for cat and cont variables. Logistic regression model for incorporation received pain therapy as	235 v 1219 AA: 54.5% v 84.0% (p<0.001) Multiple logistic regression – post-intervention patients 5.62 times more likely to receive pain	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Retrospective. Data extracted using standardized extraction	Different hospital-wide initiatives existed between sites that dictated style and

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	reminders sent to ED staff and follow up lecture performed. Data on group and individual performance shared at single group session in Feb 1999. Pain control lecture presented to medical staff in Aug 1999, emphasising need for analgesic admin to pats w fractures. Occasional ED specific feedback provided to staff in general but not to individuals. Duration: Education conducted at EM faculty retreat December 1998. Global reminders to all staff placed in EDs March 1999. Pain control lecture Aug 1999 C: Pre education	Exclusion: NR Pat char: NR		independent variable.	therapy than during pre-intervention) 95% CI 4.08-7.76, p<0.001	forms. Convenience sample checked for inter-rater reliability. Exclusions reported. Other	adequacy of pain assessment more than this intervention. JCAHO guidelines came out at end of intervention.
Protocol as part of multifaceted intervention							

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
Boyd (2005) Australia	I1: Introduction of formal pain scoring by nursing staff at triage using pain tool, after departmental teaching programme on pain assessment techniques. Programme consisted of pre-reading manual on pain relief and assessment, pain assessment and management workshops and MCQ test. Coverage: 95% completion rate for all registered nurses involved in triage. I2: Nurse initiated protocol driven analgesia provision at triage after performing pain score. C: Pre-intervention - no formal pain scoring and physician initiated analgesia.	Inclusion: Paediatrics within triage category 3, 4 or 5 with peripheral limb injuries. Exclusion: NR Pat char: NR	Setting: Urban ED, 43,000 attendances p.a. Timing: Three two-month periods between Feb-Aug 2002, 2 months control, 2 months following introduction of pain scoring and teaching programme, final 2 months following introduction of nurse initiated analgesia.	Prespecified: AA, TTA .	N= 151 v 140 v 126 AA: 31/151 (20.5%) v 32/140 (23%) v 43/126 (34%) I1 v C p=0.04, I2 v C p=0.004 Mean TTA 138 v 94 v 47 I1 v C p=0.13, I2 v I1, p=0.03, I2 v C p=0.0001	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Prospective data collection Other: NR	All analgesia given in I2 provided by nurse at triage. 2 month sampling period straight after interventions.
Campbell (2004) USA	I: Introduced a pain management protocol for patients presenting to triage for non urgent pain. Intervention developed in-house. Includes nurse assessment, use of 0-10 pain score, medications, reassessment at 1 hour, physician contact if pain score still >4. Separate protocol for paediatrics, using WBFS. Structural changes made to ED (including changing location of narcotics box). Protocol developed locally. Had local champion ("pain police"). Presented previous audit to staff.	Inclusion: Patients with non-urgent pain. Exclusion: suspected sickle cell crisis, renal colic, pelvic pain, uncomplicated trauma Pat char: NR	Setting: Level 1 trauma centre, 92,000 attendances p.a. C: 3 months in autumn 2000 I: 4 days during August 2001	NR	No data	Study design: B/A Blinding: NR Recruitment: Consecutive for pre-, convenience for post. Data collection: Unclear Other: NR	Had significant physician buy-in. Nursing staff already attended triage training which incorporated pain management training. Monitoring of nursing pain

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	New nursing staff educated on new protocol and pain management at monthly staff meetings. Feedback given to nursing staff Made available to all nursing staff and physicians. No existing nursing staff attended. Implemented April 2001 C: Pre-protocol. No details given.						assessment tool took place July-Nov 2001
Decosterd, I (2007)	I: Development and implementation of pain management guidelines. Guidelines developed in-house. Guidelines addressed recognition of pain, pain assessment using VAS or RS, treatment and reassessment of pain. One month implementation period reinforced with didactic sessions covering evaluation and treatment of acute pain. Coverage: Guidelines distributed to ED staff and discussed during formal ED rounds, staff meetings, staff shift change meeting times. Pocket sized guidelines produced and posters placed around ED. Informal discussion on case-by-case basis encouraged. Hotline available Duration: One month implementation period	Inclusion: All patients with acute or recent pain (<3 months), with pain in ED Exclusion: acute life-threatening disase, injury requiring immediate transfer to ICU or operating room, altered mental state, Mean age: 44 v 46 % male: 52 v 55 (NS)	Context: Adult ED in tertiary care teaching hospital. 32k visits p.a.	Prespecified: Patients VAS. Statistics:% and CI.	N=249 v 192 AA: 99/249 (40%) v 120/192 (63%). Median (IQR) TTA 1.6h (0.6-2.8) v 1.0h (0.5-2.0) p=0.16 RedPS (CI) 2.1 (1.7-2.4) v 2.9 (2.5-3.3) Pain documentation and pain reassessment recorded separately for physician and nurse. PatSat (% satisfied with pain treatment) 13% v 69% Appropriate prescribing also reported	Study design: B/A Blinding: None Recruitment: Consecutive. Verbal consent. Data collection: Prospective Other: Includes consort diagram of patient selection. 10% of data entered into MS Access database checked at random. No double checking of data collection.	No other programme for improving PM occurred during study period. Observation occurred during control and intervention period (reducing hawthorne effect)

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	C: Pre-guidelines.						
Fosnocht, DE (2007) USA	I: Triage pain protocol initiated by nursing personnel for patients presenting with isolated extremity or back pain. Allowed nurse to initiate analgesia at time of triage and before physician evaluation. Use of VAS to measure pain intensity. 15 minute nursing in-service given by PI at start if trial period and 1 month into trial period. Monthly nursing quality assurance audits performed and feedback given to nursing staff as whole and individually regarding enrolment of eligible patients C: Pre-protocol. No details given.	Inclusion: Patients presenting with traumatic extremity or back pain. Exclusion: <18 yrs, unable or unwilling to complete study, use of protocol or other analgesic medications within 6 hours of presentation Patient characteristics: NR	Setting: Urban university ED, 30k p.a. Timing: 12 month control, 2 months trial, 4 month intervention data collection. No dates.	Pre-specified TTA, AA, RedPS compliance with pain protocol Statistics: Means , with comparison of effect size using 95% CI. TTA - Mann-Whitney	N=471 v 112 Mean (95% CI) TTA 76 (68-86) v 40 (32-47). Median TTA 65 v 26, p<0.001 AA and RedPS not reported adequately between groups.	Study design: B/A Blinding: Research Assisstant blinded to study objective collected all data. Recruitment: Convenience sample – 08:00-00:00, 7 days. Data collection: C – retrospective, I – prospective. Other: Nursing chart audit of all ED patients used to determine % of eligible patients enrolled into TPP	No details of patients not enrolled or excluded from protocol. Protocol used in 70% of eligible patients. Individual nurse compliance varied between 8% and 96%
Gawthorne, J (2010) Australia	I: Implementation of pain management guidelines (developed in house) Intensive education sessions included training on guidelines, results of literature review and feedback from audit. Pain management education added to ED medical and nursing orientation programme. Sessions rotated to include all staff. ED nursing staff all given PCA accreditation. Poster displays of guidelines in ED. Duration: Education sessions conducted Dec 2005 and Feb 2006, held on alternating days to maximise coverage	All patients meeting hospital trauma criteria. Exclusion: None Patient characteristics: male 43% v 43%	Setting: NR Timing: Control Jan-June 2005, Intervention Apr-June 2006. Intervention started Dec 2005.	NR	N=100 v 100 (50 intubated, 50 non-intubated in each group) AA: Intubated 16/50 v 34/50 (p=0.0002) Non-intubated 43/50 v 50/50 (p=0.006) Median TTA for non-intubated patients 38m v 14m (no statistics) DPS for non-intubated patients 34/50 v 40/50 (p=0.17)	Study design: B/A Blinding: None Recruitment: 50 intubated and 50 non-intubated patients selected at random from all trauma patients recorded within the control and intervention period. Data collection: Retrospective Other:	Guideline, not mandatory protocol Pilot study so small numbers

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	Guidelines developed by in-house project group (including nursing and medical reps from ED and other trauma services), following review of literature C: Pre guidelines review				AAA (morphine & midazolam infusion) for non-intubated patients: 8/50 v 18/50 (p=0.02) AAA (multimodal) for non-intubated patients:15/50 v 30/50 p=0.002		
Hawkes, C (2008) Ireland	I: Introduction of nurse-initiated analgesia protocol and audit of provision of analgesia for children. Discussion with staff nurses and physicians regarding protocol. Identified problems with pain score and lack of roles. Made changes to pain scoring system (from Wong Baker to Alder Hey Triage Pain Score). Triage nurse now responsible for recording pain score of every child. Nurse in paediatric waiting area responsible for making sure children get analgesia matching pain score Results of audit and outline of protocol given to nurses and physicians working in ED. ED consultants also mentioned changes during teaching sessions. Nurses given laminated cards. Poster in waiting room C: Pre-audit and revised protocol	Inclusion: Paediatrics (age 1-16) Exclusion: Pat char: median age: 8 v 9.75 % male 57 v 60	Setting: University hospital trauma centre, 50k attendances p.a. Timing: NR	Pre-specified: NR Statistics: NR	N=95 v 145 N=93v126 if exclude patients with prehospital analgesia DPS: 0/126 (0%) v 28/145 (19%) AA for major fractures 8/18 (56%) v 11/18 (61%), p=0.735 AA for other diagnoses: 26/75 v 43/108. Median TTA for fractures 54 v 7, p=0.004 Median TTA for other diagnoses 14 v 16, p=0.794	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Retrospective Other	
Kuan, SC (2010) Ireland	I1 and I2: Educational intervention and implementation of CEM guidelines. Held brief didactic sessions for doctors	Inclusion: Patients with a pain complaint.	Context: Tertiary referral centre in urban/suburban	Pre-specified: DPS at triage. AA for severe pain.	N=50 v 50 v 51 AA: 17/50 v 23/50 v 25/51 p=0.393	Study design: Before v after Blinding: NR Recruitment: NR	Audits were carried out – but that is

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	and nurses and presented the College standards and stressed assessment of pain at triage (using pain score), early treatment and re-evaluation after treatment. Pain treatment protocol in form of analgesia algorithm introduced and displayed in key clinical areas. Intervention implemented 4th Jan 2006. Unclear when didactic sessions held. Other: Audited performance 1 week (I1) and 4 months (I2) after. C: Pre-protocol (no existing protocol)	Exclusion: NR Age: 37.5 v 36.5 v 38.0 %male 68 v 50 v 52 % with pain 43 v 52 v 45. Difference NR	area. 40k attendances p.a. Timing: C: Tue 3rd Jan 06, I1: Mon 9th Jan, I2: Mon 16 May 2006 (1 week after, 4 months after intervention)	Reassessment of pain relief for patients with severe pain. Statistics: Fishers exact test for categorical data. Multivariate Poisson analysis to determine factors predicting AA.	DPS: 36/50 v 40/50 v 48/51 p=0.01 Median TTA: (IQR) 62 (23-222), 83 (58-155), 88 (17-203) Reassessment done 10/17 v 6/23 v 1/24 p=0.001	Data collection: Patient chart review. Data items collected recorded but no details as to how. Unclear whether retrospective or prospective. Other:	what is reported here. Concludes that found improvement in analgesia for patients in moderate pain – not reflected in statistics.
Muntlin, A (2011) Sweden	I: Intervention consisted of 2 parts: 1) 1.5 hour education session for registered nurses about acute abdominal pain. Optional but necessary if nurse wanted to give morphine 2) Protocol for nursing assessment and nurse-initated IV opioid. Study protocol developed and validated in house. Included nurse triage and assessment of need for analgesia. Patient to be offered analgesia if pain intensity 4-8 and reason recorded if analgesia not offered. Nurse initiated IV opioid analgesia offered according to protocol. Pain score taken before ED visit completed. Regular pain intensity rating measured at triage, before analgesia, after analgesic, before discharge and recorded on study protocol	Inclusion: Patients with ongoing abdominal pain lasting no more than 2 days, 18 yrs or older Exclusion: Patients with abdominal pain due to trauma, in need of immediate care, or with pain intensity of 9-10 excluded Pat char:% male 32 v 47v 36. No significant differences	Context: University hospital, 52k Timing: Feb-Aug 2009. Phase A 1-baseline, Phase B –during intervention, Phase A2 – post intervention (no details as to time period)	Pre-specified: Pain intensity, frequency of received analgesic, TTA. Statistics: one way ANOVA and chi sq used for TTA and frequency of analgesia. Kruksal Wallis and Mann Whitney used for patient perceptions.	N=50 v 100 v 50 AA: 23/50 (46%) v 65/100 (65%) v 23/50 (46%) p=0.002 TTA median (SD) 1.8 (1.7) v 1.0 (1) v 1.7 (1.3) p=0.001 Ten items of patient satisfaction reported. Half reported significant differences Reporting of pain score unclear	Study design: (B/A) Quasi-experimental design with ABA phases (baseline, intervention, baseline return) Blinding. None. Patients and RNs all informed of study. Recruitment: Consecutive. Data collection: Prospective. Phases A1 & A2 – data extracted from electronic patient health record. Phase B - data obtained from study protocol. SCQIPP items re patient perceptions of quality of care Other: Full details of	

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	47/50 RNs took part in the education session. C: Pre-intervention, and phase A2 after withdrawal of nurse-initiated opioid protocol	reported. Also % swedish				patients included provided.	
Odesina (2011)	I: Education and nurse-initiated evidence based clinical pathway. Mandated educational intervention about sickle cell pain/organ damage conducted after assessment of ED nurses' knowledge, attitude and self-reported practice. Staff received education on newly developed pathway and PCA pump training. Mock drill and revisions followed before pilot phase. C: Pre-intervention	Inclusion: Adults with SCD Exclusion: NR Pat char: NR	Context: Surburban healthcare centre ED Timing: 7/08-5/09 and 4/10-7/10	Pre-specified: NR Statistics: NR	N=44v66 Median TTA (SD) – 67(48.1) v 37 (29) Time to assessment post-opioid administration (SD) – 113 (118.4) v 24 (17) % receiving PCA 0/44 (0%) v x/66 (31%) Sickle Pain-KAPNS scores m (SD)= 22.3 (6.5) v 30.9 (4.6)	Study design: B/A Blinding: NR Recruitment: NR Data collection: Sickle Cell Action Team conducted retrospective and prospective chart audits of ED patient visits using modified SCH form. Other	Abstract only. Unclear why more in intervention group when intervention follow-up was shorter than for control.
Santervas, YF (2010) Spain	I: Programme to improve pain management with 4 components: distribution of pain assessment scales (FLACC for <4, WBF for 5-7, VAS for 8+), inclusion of new item in computerized clinical history form in emergency services (presence or absence of pain, pain intensity), distribution of new guide for assessment and treatment of acute pain, training programme about assessment and treatment of pain in emergency services for medical staff.	Inclusion: Patients aged 3-18 diagnosed at discharge with abdominal pain, chest pain or headache Exclusion: Under 3, pain lasting more than a fortnight, language barrier Pat char: NR (only	Context: Urban children's hospital Timing: C:July 2007, I Jan 2008.	Pre-specified: NR Statistics: NR	N= 150 v 150 Pain assessment undertaken 45/150 v 149/150 (p<0.005) Patients with pain given analgesia 4/17 v 22/57 Total number of patients given analgesics having remission or improvement in pain.	Study design: B/A Blinding: NR Recruitment:: Random Data collection: Retrospective. Randomly reviewed first 50 files each of patients with diagnosis of abdominal pain, chest pain or headache for both time periods Other: NR	

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	Took place during Aug-Dec 2007. C: Pre programme	totals). Reports NS.					
Somers, LJ (2001) UK	I: Introduction of paediatric pain protocol (July 1998) with 3 elements. 1) Education programme introduced for medical and nursing staff, reinforced by poster in the dept. Advice from pain specialists and 2 paediatric A&E sisters sought to encourage use of opioids where indicated. 2) WBFS to be used for children aged 4+. Scores of 3-5 should lead to immediate medical review 3) A&E doctor asked to made immediate assessment and prescribe appropriately when a child found to be in significant pain. No nurse prescribing available at time of study. Teaching done by registrars and consultants to SHOs and nurses, particularly those less familiar w paediatric analgesia. C: Pre-protocol	Inclusion: Children under 16 presenting with painful injuries to the minor injuries area Exclusion: NR Pat char: Age - 7.9 v 8.2 p=0.63, % male 59.7 v 58.6 p=0.864	Context: Minor injuries area of A&E dept of DGH Timing: C: May-June 1998, I July-Aug 1998	Pre-specified: TTA Statistics: t test, chi sq. Kaplain-Meier survival curves for probability of TTA (log rank test)	N=129 v 133 % 4+ receiving analgesia within 30 mins 33/97 v 54/103 p=0.003 % <4 given analgesia within 30 mins prior to intervention 19/32 v 17/30 For children aged 4+ post intervention curve above that of pre-intervention group up to 170 mins (p=0.013)	Study design: B/A Blinding: NR Recruitment: NR Data collection: Retrospective A&E card review Other: NR	
Steinberg, PL (2011) USA	I: Implementation of protocol of ketorolac and morphine as first line analgesia agent for renal colic. Tailored: Staff allowed to make suggestions about study design and protocol. C: Chart review pre-protocol	Inclusion: Patients age 18-65 with symptoms consistent with renal colic, documented renal or ureteral stone on CT scan.	Context: NR Timing: NR	Pre-specified: Time to effective analgesia (defined as 2 point reduction on 11 point scale). Secondary endpoints: other. Statistics: Categorical	50 v 44 TTA 37 (+-42) v 43 (+-54), p=0.55 TTA (effective) mean 72 (+-63) v 37 (+-42), p=0.003. (Median 54 v 25)	Study design: B/A Blinding: None Recruitment: NR Data collection: Retrospective for control, prospective for intervention. Data extracted from electronic record using	

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		Exclusion: abnormal renal function, intolerance to NSAIDS and opiates, prior Tx for renal stone within 30 days Pat char: mean age: 46 v 46, % male 74 v 59. NS Pain score at triage NS.		data used Fischers exact test. Continuous used t test. Sample size calculation undertaken.	Also reports appropriate prescribing. Combination analgesics 54% v 82%, p=0.005. Significnat increase in dosage of ketorolac and morphine in post period (p=0.49, 0.0013 respectively)	standardised chart. Other	
Vazirani (2012) Australia	I1: Triage template adjusted to require use of NRS. I2: Educational intervention: physicians and nurses received didactic 60 min presentations reviewing poor delivery of analgesia in EDs, reasons to mandate pain scores, previous studies and success in improving timely analgesia, reasons why timely analgesia important. Educational intervention took place over 1 week Other: Further follow up at 12 months. C: Pre-intervention, pain scoring optional.	Inclusion: All patients attending ED Exclusion: None Pat char: Median age: 44 v 45 v 44 v 43 % male: 54 v 56 v 53.3 v 54.6 Also reports triage score. Move towards lower acuity.	Context: Adult tertiary referral major trauma centre. 59k attendances p.a. Timing: 3 consecutive 8 week phases (C, I1, I2) October 2008 – April 2010, with 1 week gap between phases 2 and 3. I4 – 8 week follow-up Feb-Apr 2010	Pre-specified: TTA, AA, DPS (at triage), distribution of pain scores. Calculated subset receiving intravenous opioids. Statistics: TTA – Median & IQR. Kruskall-Wallis	N= 8,743 v 8,462 v 9,043 v 9,380. AA % 35.7 v 39.3 v 36.6 v 33.8. P value NR DPS: 72.6% v 93.3% v 92.2% v 93.4% P value NR Median TTA (IQR) 123 (58-231) v 95 (45-194) v 98 (45-191) v 78 (45-143) P value NR Results stratified by pain score, severity, triage category.	Study design: Before & after, 4 stages Blinding: Nurses not informed of study until after final phase Recruitment: Consecutive Data collection: Unclear whether retro- or prospective. Information extracted from ED info system on times of triage, analgesic administration, patient demographics and triage score Other	No further staff interventions about analgesia undertaken during follow-up but other quality improvement projects underway.
Wong, EML (2007) Hong Kong	I: New triage pain management protocol enabling nurses to administer oral paracetamol. VAS laminated chart added to standard triage procedure and education given.	Inclusion: Minor isolated single limb injury, 18+, category 4 triage acuity.	Context: University hospital, 450 patients per day Timing: 2 month	Pre-specified: NR Statistics: Various	96 v 199 RedPS -9mm v -13mm, p=0.36 DPS: 18/96 (19%) v 161/199	Study design: B/A Blinding: None Recruitment: Convenience - presenting between 9am-6pm Mon-Sat	Waiting time to see doctor increased – significantly more doctors

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	Nurses received 2-hr education session about concept of pain mgt, new protocol and logistics of study. Tailored: Protocol developed in house, used local experts and tested feasibility on pilot 15 patients C: Standard triage care consisting of triage assessment and routine triage interventions.	Exclusion: Cognitive impairment, unstable vital signs, history of substance abuse, dementia, hepatic disease, chronic pain syndromes, previous Tx with an analgesic for same injury. Pat char: Mean age: 44 v 41, p=0.2, % male 57 v 52, p=0.17. Mean VAS at triage NS	pre test period, 3 month intervention implementation, 2 months post test. No further details.		(81%) (p<0.0001) Mean TTA for whole group unclear.	Data collection: Prospective. Patients consented. Patient self-completion data collection chart for demographics, times, VAS etc. Other: Exclusions reported	available for pre- period than post. This could affect results.
Yanuka, M (2008) Israel	I: Developed and implemented analgesia protocol that incorporated standardization of analgesia medications and an educational intervention (aimed at physicians involved in treatinng minor-to-moderate injuries and renal colic in the surgical ED) to promote better analgesic practice. Protocol expanded selection of available analgesics and specified analgesics for different pain scores. Education involved structured teaching sessions on principles and techniques of ED analgesia. Included 2 hour didactic small group lecture and 1 hour	Inclusion: Patients suffering from minor-to-moderate trauma (sprains, long bone fractures (excl femur), lacerations requiring suturing, 1st or 2nd degree burns) or renal colic Exclusion: Patients <18, those with	Context: Large tertiary university-affiliated hospital, 130k p.a. Timing: C: June-Dec 2001. Timing of intervention phase NR	Pre-specified: NR Statistics: Binary data used %, continuous used means & SD.	N=1000 v 700 AA 343/1000 (34%) v 693/700 (99%) TTA mean (SD) 69 (54) v 35 (43). Mean difference 34 (29-39) RedPS: 4.5 (2.0) v 4.3 (3.00) Mean difference: 0.0 (-0.3-0.3) PatSat (5cm VAS) 3.4 (1.2) v 4.0 (1.3) Mean difference 0.6 (0.5-0.7)	Study design: B/A Blinding: NR Recruitment: Convenience sample. Data collection: Prospective. Data collected by single anaesthiologst. Other	

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	case-based discussion 25 surgical, orthopaedic and emergency residents in trauma-surgical section underwent session within 1 month. Author performed care quality follow up, including daily spot checks of at least 5-10 patient charts and repeated personal conversations w orthopaedic and surgery residents. Support given to ED staff by senior emergency physician who was also anaesthiologist experienced in pain management.	impaired mental status or cardiorespiratory instability or those who refused to assess pain using VAS Pat char: mean age 37 v 36, ns. % male 61 v 60 ns. Initial VAS 6.9 v 6.8 ns					
Interventions developed following diagnostic analysis of barriers to pain management in individual department.							
Corwin (2012)	I: Development and implementation of pain management policy. Policy includes use of pain scales, area for pain documentation added to chart, pain as 5th vital sign, treatment guidelines, pain reassessment and discharge plans. Triage based clinical pathway implemented to allow nurses to alert physicians to patients requiring pain medication and up-triage those in severe pain. Disseminated via education programmes to professionals and to patients and parents via brochures, handouts and posters: Tailored: Multidisciplinary committee set up in Sep 2008 to develop policy	Inclusion: All patients presenting in pain. Exclusion: Medically unstable patients Pat char: Mean age 15.5 v 16.9, % male 42% v 46%. NS Also mean pain score at triage, type of pain. NS	Context: Urban tertiary paediatric ED Timing: C: July 2008, I July 2009. Intervention implemented Jan 2009	Pre-specified: primary: rates of analgesic administration for patients in moderate or severe pain,. Secondary: TTA, % of patients in moderate or severe pain experiencing decrease of >2/10 from triage to discharge, documented reassessment of pain, patient satisfaction Statistics: T test for	N=103 v 109 % people with pain score >=4 given analgesia in ED 34% v 50% (p<0.0?) Median TTA 97 v 57. NS Pain reassessment by physician 6% v 76% p<0.0? Pain reassessment by RN 75% v 82% NS Decrease in pain score at discharge 46% v 40% NS Patient satisfaction (1-4, 4 very	Study design: B/A Blinding: None. Recruitment: Prospective. Convenience sample - 10am-midnight. Patients consented. Data collection: RAs followed patients from triage to discharge. Data from direct observation (patient satisfaction, demographic details, procedural analgesia details) or from patient chart (all other variables) during ED stay. Objective variables extracted from charts.	

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	based on preintervention data. Intervention structured around areas of poor performance, feasible changes, and existing guidelines. Other: C: Pre policy			continuous, chi sq for proportions.	satisfied) 3.48 v 3.54, NS	Other	
Crocker (2012) USA	I: Implementation of protocolized pain management intervention protocol "Comfort Zone". Involved process to create team approach to address pain, anxiety and discomfort – involved protocols, education and changes in attitude towards pain control. Used WBFPA and parental pain scores at triage to recommend analgesia. Extensive nursing and physician education provided regarding implementation of pain protocol.. Developed in house. Other: C: NR	Inclusion:Patients aged>30 days with painful condition, injury or procedure. Parent/guardian and patient had to agree to participate and be able to understand and respond verbally to survey questions Exclusion: NR Pat char: Median age 5 v 6 % male 53 v 61	Context: Childnren's hospital. 70k attendances p.a. Timing: NR	Pre-specified: Pat sat (Overall satisfaction, targeted pain assessments, individual satisfaction item scores) Statistics: Wilcoxon rank sum tests	N=531 v 263 Patient recalled pain scores during ED visit. 5.07 v 4.01, p<0.001 Reports all parent questionnaire responses. No significant differences Patient recalled pain scores at discharge – not appropriate?	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Prospective. Patient satisfaction survey around clinical management of pain in ED gathered at discharge. Data collected by single staff or 2 working in tandem with patient & carer. Other	Pain scores collected retrospectively after discharge. Unbalanced comparison groups due to H1N1 virus during the end of the study.
Doherty (2012) Australia	I: National multidisciplinary working party set up to develop intervention. Each site had a project lead who attended 4 2-day training workshops over 18 months, focussing on project management skills, leading change, implementation science theory and practice, clinical evidence updates.	Inclusion: All patients with abdominal and pelvic pain and injuries (ICD codes S00-S09, T00-T35, T66-T98)	Context: 55 EDs from all states and regional and metropolitan areas. Mix of adult and paediatric EDs. Timing: Two year	Pre-specified: % DPS median TTA, appropriateness of ED pain management Statistics: Chi-sq for trend across all time points in DPS or TTA. Kruksal Wallis for	N = 14499 patient datasets collected over 7 time points of both waves combined. TTA median (IQR) 61 (23-122) v 41 (15-95), p<0.001) DPS: 41% v 64% (AI: 22%, RI	Study design: Step-wedge design with departments randomly allocated to one of two phases (wave 2 6 months after wave 1). Blinding: NR Recruitment: 55/127 hospitals recruited. Patients	Although 6 months worth of data was collected for wave 2 (prior to the intervention being

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	Project leads led change process in their own departments based upon local needs and identified enablers and barriers. Leads encouraged to develop project plan, gain ethics approval, undertake clinical audits, feedback audit data, identify local enablers and barriers review and refine local pain care processes and initiate supportive hospital policy. Local interventions included education, clinician leadership, new clinical guidelines and policies. No details of individual interventions.. C: Pre-intervention baseline data. Data was also collected for sites who were in phase 2 who did not have the intervention implemented for the first 6 months, but this data was excluded from some of the analysis.	Exclusion: Intracranial injury (ICD code S06) Pat char: NR by group. All age groups well represented. Waves 1 and 2 matched for % DPS at baseline.	study overall, with two phases. Details NR	difference in median TTA at different time points.	56%), p<0.001 AAA (appropriate parenteral narcotic) 93.6% v 80.2% RedPS for patients with severe pain – no significant difference.	recruited consecutively. Data collection: Hospitals entered data into online data collection form for 60 patients at 7 different time points (baseline and 3 monthly intervals for 18 months). No details of how 60 patients selected. Other	implemented), this data was excluded from the analysis.
Iyer, SB (2011) USA	I: Quality improvement team identified key drivers to decrease opioid delivery time, conducting interviews with key stakeholders, expert consensus and review of patient cases. Also studied existing processes for pain assessment and management. Set minimum standard to any child presenting with pain. Used PDSA cycle methodology to decrease TTA. Four main drivers identified and addressed within 'orthopaedic evaluation process'. Included measures	Inclusion: isolated long-bone extremity fractures, receiving at least 1 dose IVOs. Exclusion: Patients with critical illness/injury requiring emergency stabilisation	Setting: Urban paediatric academic medical centre ED. 140k attendances p.a Timing: C: Jan - Sep 2007, I: Oct 2007-July 2009	Pre-specified: TTA (% patients who received first intravenous opioid within 45 mins of arrival) Parent satisfaction (% rating childs pain management as excellent) Statistics: Fischers exact test for parent satisfaction.	N=387 v 615 TTA: (% patients with 1st dose within 45 mins) 20% v 70% Parent satisfaction: 54% pre 2007, 77% since 2007 (p=0.0073)	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Retrospective. Automatically extracted from electronic medical record each week. Parent satisfaction from standardised telephone customer satisfaction survey. Other:	Patients selected on grounds that received 1 dose IVO Control included strong protocols. Focused on patients with severe pain as a model as

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	to improve staff communication and handoffs (triage nurse identified patient and alerted care team). Early physician order entry implemented to ensure patient seen quickly. Implemented October 2007 C: Pre-protocol (includes some of the testing of the PDSA cycles used in the final intervention).	Mean age: 9.2 v 9.2 % male: 65 v 64 Ethnicity % white 75 v 73					staff would have buy-in for the project. Control period includes time when initial changes were being tested within the department.
Kelly, AM (2000a) Australia	I: Content: Implementation of changes to analgesia practice following a review of all stages of provision of analgesia. Strategies implemented were: 1) routine nursing observations to include reporting of pain 2) Change in culture of ED recognising PM is high priority for patients 3) move to titrated IV opioids as preferred method of admin of narcotic analgesia 4) development of nurse managed, titrated IV narcotic analgesia policy including incremental narcotic dosing, flexible dose ordering, mgt of reassessment of pain and dosing intervals by nursing staff and analgesia ordering by doctors by way of multi-increment stamp. Tailored: Review undertaken by MDT in-house Other C: Pre-review	Inclusion: Patients admitted (stay>4hrs) with admission diagnosis of long bone fracture Exclusion: NR Patient characteristics: NR (reports groups comparable for age and sex)	Setting: NR Timing: C – 1993, Post: 1997. Intervention started 1994	NR	N=79 v 83 AA: 65/79 (82) v 62/83 (75) AAA (IV narcotic only administered) 7/79 (9) v 45/83 (54) p<0.001	Study design: Before v after. Blinding: NR Recruitment: Random sample of eligible patients in each year selected Data collection: Data collected retrospectively from medical records by trained RA. Collected demographic details of patient, type, route and amount of analgesia administered during ED phase of management. Other: Single reviewer	Long period after implementation to take account of 'honeymoon period' Protocol suggests move towards IV narcotics.
Kelly, AM	I: Nurse-managed, titrated narcotic	Inclusion: Patient	Setting: NR	NR	N=63 v 65	Study design: Before v	Long period

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
(2000b) Australia	analgesia protocol C: Pre-protocol	admitted with diagnosis of renal colic Exclusion: NR Pat char: NR. States comparable for age and gender	Timing: C – 1993, Post: 1997. Intervention started 1994		AAA (IV narcotic administered alone or in combination) 7/63 (11) v 62/65 (95) p<0.001	after. Blinding: NR Recruitment: Random sample of eligible patients in each year selected Data collection: Data collected retrospectively from medical records by trained RA. Collected demographic details of patient, type, route and amount of analgesia administered during ED phase of management. Other: Single reviewer	after implementation to take account of 'honeymoon period' Protocol suggests move towards IV narcotics
Perron, N (2007) Switzerland	I: Multifaceted intervention involving education and organisational changes. Intervention objectives to include pain assessment as 5th vital sign, increase use of pain medications, promote availability of medical and nursing staff and increase awareness towards pain mgt. Educational intervention delivered to all physicians, nurses and medical assistants. 3 h training on pain assessment and mgt for physicians and nurses and distribution of written recommendations on acute pain assessment. Sessions included role playing and feedback. Nursing staff meeting reviewed ways of improving pain mgt then included regular monitoring of pain intensity and history	Inclusion: All patients aged 18+ admitted to walk-in clinic Exclusion: NR Pat char: NR (only totals reported)	Context: Walk in clinic (patients triaged to ED or WiC). 15k attendances p.a. Timing: C: Jan 2004, I1 (4 months post) June 2004 (first 2 weeks), I2 (14 months post) April 2005 (first 2 weeks).	Pre-specified: NR Statistics: Descriptive statistics, cross-tabulations and linear trend tests.	N= 653 v 337 v 419 DPS (VAS) 48/653 (7.4%) v 177/337 (52.5%) v 180/419 (43.0%) p<0.001 RDPS 3/653(0.5%) v 2/337 (0.6%) v 217/419 (51.8%) p=0.04 AA 113/653 (17.3%) v 61/337 (18.1%) v 115/419 (27.4%) p<0.001 PatSat - do you think staff did everything to relieve you from pain? Yes, definitely. 157/331 (47.4%) v 94/165 (57.0%) v	Study design: B/A Blinding: NR Recruitment: Consecutive Data collection: Retrospective. Research nurses reviewed medical files. Extracted data on VAS, pain history and treatment etc. Postal patient questionnaires undertaken 4-6 weeks after visit including overall assessment of pain medication and attitude of healthcare professionals towards pain Other: Data collection consistency checked	

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	documentation in medical records Organisational changes included availability of VAS in Feb 2004 to all healthcare professionals working at medical outpatient clinic. Medical file modified with introduction of rubrics for pain as 5th vital sign and pain history. Jan 2005 interpersonal continuity in nursing care implemented with identification of single responsible nurse for each patient. Duration: Feb and Oct 2004 and March 2006 for education. Tailored: Intervention developed after needs assessment undertaken by MDT to identify problems with pain management in house. C: Pre-intervention				88/178 (49.4%) p=0.64 Reports type and route of medication given. Also patient reported outcomes from questionnaire and other patient satisfaction measures..		
Williams (2012)	I: Development and introduction of evidence-based paediatric pain management guideline. Informed by staff survey on attitudes to pain management. Completed July-December 2008, reviewed August 2011 Guideline introduced via email, electronic noticeboard, education sessions and poster. Education session presented synopsis of research project, summary of findings from pilot study, education around pain management	Inclusion: Diagnosis of abdominal pain, age 2-16 Exclusion: NR Pat char: Mean age: 9 v 8.4 p=0.39, % male 54 v 43 p=0.154	Context: Tertiary referral paediatric ED. 47k p.a. Timing: 2 months before and 2 months after trial of guideline.	Pre-specified: AA within 30 minutes Statistics: Non parametric tests for continuous data. Chi sq and RR for % people receiving analgesia. Demographic data – t tests.	N= 80 v 80 DPS: 25/80 (31%) v 38/80 (48%), p=0.035 RDPS – numbers too small. Median TTA from triage: 10.5 v 12.0 p=0.57 AA within 30 mins: 64% v 67% Survey of pain knowledge scores (max 36) median 13 v 29, p=0.000. Response rate	Study design: B/A Blinding: NR Recruitment: NR Data collection: Retrospective. Chart audit using NICS audit tool. Staff survey of medical and nursing staff. Other: Data checking undertaken	

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
	principles and discussion time. Duration: Trial of guideline 6 month period form March 2009 Coverage: Education sessions attended by 85% nurses, few medical staff. Tailored: Guideline developed by multidisciplinary team in-house. Other: C: Pre guideline				53% v 39%		
Tanabe (2012) USA	I: Development of site-specific multidisciplinary teams to set up and implement and evaluate analgesic protocols. Implementation of protocol including nurse-initiated analgesic protocols. One site included a champion. Teams met up, provided feedback to staff and revised protocols following discussion of barriers. Site 3 experienced organisational change and turnover, leading to fewer QI meetings. C: Pre-intervention.	Inclusion: Adults with chief complaint of VOC Exclusion: No English, unable to provide f-u contact information. Pat char: Site 1,2,3 –mean age 35 v 31 v 31, % male 49 v 42 v 39. Visits per patient: 9.7 v 26.0 v 5.5 (p<0.001)	Context: Academic medical centres, 2 urban, one mixed urban/rural. Combined 169k visits p.a. Timing: C 10 months at sites 1&2, 3 months site 3.Project implemented Oct 2007-Sep 2009.	Pre-specified: Primary – TTA, redPS (arrival to discharge) Statistics: Means and SDs reported for normally distributed data, medians and IQRs for skewed. Ordinary least sq regression for utilization, study period, site. (more details provided). ANOVA for difference in number of ED visits per patient per site. T test for patient satisfaction scores.	Site 1 n=99 patients, 959 visits, Site 2 n=31 patients, 807 visits, site 3 n=212 patients, 1169 visits. Median TTA (IQR) Overall 76 (49-139) v 92 (56-159). Site 1 75 (48-138) v 86 (55-128), site 2 62 (44-88) v 67(45-101), site 3 143 (68-254) v 127 (73-244). Increase in TTA p<0.001. Median difference: overall 10 (6-15), site 1 5(-3 – 12), site 2 6(1-12), site 3 -5 (-20 – 10). Mean redPS -3.6 v -4.1 (p<0.01) Median redPS: overall -1 (-1-0), site 1 -1(-2-0), site 2 0 (0-1), site 3 -1(-2-1). Decrease in pain score from arrival within 45	Study design: Multisite prospective longitudinal cohort study with 3 EDs. Pre-post implementation design Blinding: NR Recruitment: Patients recruited consecutively by RA. Consented to being followed up for 3 years. Data collection: Retrospective/Prospective for different outcomes. Undertook 10 interviews per quarter per site. Interviews took place 7-14 days after ED visit. Patient satisfaction with pain management recorded. Times, pain score and medication retrieved from medical record. Other: Checked inter-rater	N.o. visits, study period or interaction were not significant predictors of TTA. Difference in pain score was not significant. when site differences taken into account. Site 1 had highest degree of acceptance.

Reference	Details of intervention (I) and control (C) (Content, duration, coverage, tailored, other)	Participants (inclusion, exclusion, patient characteristics)	Setting (context, timing of study)	Outcomes (pre-specified, statistics used)	Results (N= C v I)	Methods/quality (study design, blinding, recruitment details, data collection, other)	Other notes
					mins to discharge p=0.021 (Hodges-Lehman) Patient-reported satisfaction with attempt to manage pain in ED 3.4 v 3.2. (1 – outstanding, 10-worst). Also reports change in analgesic agents and routes but does not specify which are considered more appropriate.	reliability of key outcome variables for selected sample.	
Stalnikowicz, R (2005) Israel	I: Results of 1st phases presented at staff meetings and discussed with physicians and nurses. Following intervention designed: 1) VAS template includedin patient chart as 5th vital sign. 2) Admitting nurse instructed to assess VAS on admission for each paitent and reassess 30-60 mins after Tx 3) Illustrated posters for pats encouragingpain control hung in ED 4) Protocol for pain mgt developed and posted 5) Several nurses appointed as 'pain trustees' to promote protocol 6) Standing orders for use of some analgesics (dipyrone, acetaminophen) written for VAS upt to 7 and most nurses of ED authorised by head nurse to implement these orders	Inclusion: Patients aged 12+ presenting to ED for acute pain related to orthopedic conditions (fractures, sprain, strins) Exclusion: Head injury Pat char: Mean age: 33 v 30, % male 71 v 56. NS. Also % non-jewish, education status	Context: N/A Timing: C: 3-4 week period in 2002. 3 month intervention then 2nd phase. No further details.	Pre-specified: % patients with documented VAS, % patients receiving analgesia, TTA (from admission), difference between patient and staff VAS. Statistics: t test for continuous, chi sq for categorical variables.	70 v 70 % receiving analgesia x/70 (70%) v x/70 (82%) Mean TTA 80 v 58 (p=0.047) VAS assessment by doctor, nurse, patient reported but not reduction in VAS.	Study design: B/A Blinding: NR Recruitment: Random. No details. Data collection: Prospective. Physician, nurse and patient recorded VAS. 41 patients from first phase of study asked to rate agreement with statements about Tx for pain. Other	

Abbreviations: WBFS – Wong Baker Faces Score

VAS – Visual analogue scale

NRS – Numeric rating scale

ED – Emergency Department

NR – Not reported

FLACC – Faces, Legs, Activity, Cry and Consolability

APPENDIX 4. METHODS, INSIGHTS AND KEY LEARNING POINTS FROM PILOT STUDY

15.1.1. Pilot methods

15.1.1.1. *Site selection*

The location of the pilot site was selected as the site was geographically accessible and there were existing close links with ED consultants at the site, who could facilitate access to the department and members of staff. Convenience and ease of access enable a prolonged relationship between the researcher and site than is generally possible at the case study sites that have been selected upon other criteria. (Yin 2003). Details of the characteristics of the site are provided within chapter 6.2.

The pilot was undertaken over a 5-month period between September 2014 and January 2015. It involved an initial orientation visit with the Principal Investigator for the site and 3 further fieldwork visits which included direct observation, informal conversations with staff and formal semi-structured interviews with staff and patients. The pilot aimed to undertake a subset of interviews to reflect the recruitment strategy set out in the protocol. Interviews were audio-recorded where possible and transcribed verbatim. Where interviews were not audio-recorded extensive notes were made and written up immediately after the interview.

15.1.1.2. *Details of pilot fieldwork visits*

Observation

I.D.	Day of week	Month	Time	N.o. hours observing
1	Tuesday	September	14:00-19:30	4
2	Tuesday	November	14:00-17:00	3
3	Thursday	November	10:00-19:30	6
4	Thursday	January	15:00-18:30	3
Total				16 hours

15.1.1.3. *Pilot staff Interviews*

Face-to-face semi-structured interviews were conducted with 7 members of staff at the pilot site. Two of these were shorter interviews carried out within the main area of the ED and not audio-recorded. The rest were carried out in private areas of the ED and audio-recorded.

Date	ID	Role	Length of experience in ED	Time at this ED	Ethnic origin	Gender
14/08/14	01S1	Nurse	17 years	17 years	WB	F

		consultant				
02/09/14	01S2	F2	1 month	1 month	WB	M
02/09/14	01S3	F2	7 months	1 month	WB	F
02/09/14	01S4	Registrar	3 years	7 months (6 months, then break, then 6 week)	WB	M
18/11/14	01S5	Consultant	6 years as consultant	3 years	WB	M
18/11/14	01S6*	F2	3.5 months	3.5 months	WB	F
27/11/14	01S7*	Nurse	9 years	9 years	WB	F

*Shorter interviews carried out whilst the member of staff was still working within the department.

15.1.1.4. *Pilot patient interviews*

There was only one patient recruited into the pilot study. This was carried out as a telephone semi-structured interview, conducted 13 days after the patient was in the department.

Date	ID	Age	Gender	Condition	Ethnic origin	Length of time since ED visit
10/12/14	S1P1	(50-60)	M	Back pain	WB	13 days

15.1.2. Insights and key learning points from pilot

The pilot provided useful experience, particularly in undertaking non-participant observation. Details on the insights and key learning points relating to the pilot objectives are detailed below.

15.1.2.1. *Identifying key locations to undertake observation.*

The pilot ED was a large department, consisting of several different distinct zones, each of which had its own role and staff groups. The process of pain management involved staff and patients in the following areas; reception, waiting room, triage room, minor injuries room, ambulance co-ordination base and the majors area (which consisted of 3 separate wards, each of which had its own team of staff). There were also a number of other areas connected to the ED, such as x-ray, plaster room and a clinical decisions unit where people waited whilst awaiting test results or other treatment decisions. Whilst observing patient journeys through the department, particular areas appeared to be key to the initial assessment of pain (reception, triage and ambulance co-ordination base) whilst others were key to ongoing management (triage, ambulance co-ordination base, minor injuries and majors). The observation of patient journeys was made difficult by the specification made within the NRES application that observation would take place only in public areas, which precluded observation within private areas such as the triage room, or patient bays. This limited the scope of information available from the pilot data and was identified as an area that would need to change in future research sites. (See 5.7 below).

The process of following patients from arrival until discharge was longer than anticipated and involved long periods of time when the focus of observation was on the patient (even when there were no patient-staff interactions) rather than the staff. This led to a change in focus, with a move away from following patients (particularly when patients within private areas could not be accessed), to selecting locations where most decisions around pain management were carried out (e.g triage, staff bases) This would allow for more data relating to understanding what other priorities and roles staff considered when deciding when and how to deal with the patient and what prompts staff into thinking about or acting on patient reports of pain, rather than data pertaining to individual patients.

15.1.2.2. *Identifying how to manage the process of undertaking observation.*

Research shows that participation in research can influence participant behaviour (McCambridge et al. 2014), and there were a number of occasions where my presence and informal interviewing may have had a direct or indirect impact upon the process of pain management. There were two occasions one afternoon where my questioning of the lead nurse about patients who were in pain appeared to prompt her to assess or fetch their analgesia. Later that afternoon, upon returning to the staff base after conducting a short interview, this same nurse was engaged in discussion with a doctor about the use of synthetic opioids. They then addressed me and commented that I was 'causing pain debates'. However, these observer effects were felt to be insufficient to have any true impact upon the setting, and were likely to be short-lived but needed to be acknowledged within data collection and reflections. Whilst unwittingly prompting the nurse to provide pain relief was not felt to be detrimental to the research, a less obtrusive questioning style would be more appropriate in future to gain a more accurate picture of usual practice.

Another negative effect of researcher effects was revealed in the patient interview, who reported that he remembered me walking past and looking at him on different occasions, thought I was a doctor and wished I would come in and sort out his pain. My presence clearly impacted negatively upon his experience and a clearer, more overt stance as an observer should be taken in future observations, paying attention to not making eye contact with patients, particularly given that there were a number of staff who did not wear uniform and I was therefore not as distinguishable from other staff as anticipated.

15.1.2.3. *Testing approaches to accessing the field.*

EDs are known to be busy environments but the level of difficulty involved in talk to staff without approaching them whilst they were undertaking other tasks was significantly greater than anticipated. Although I was introduced to some members of staff by the PI on the initial visit, this was only to a small proportion of the staff within the department and therefore the majority of staff being observed knew nothing about my research (except for the posters placed in the department). The ED environment is fast-moving and people frequently did not respond to my presence, which would have created an opportunity to introduce the research and ask questions. During observations, there were many opportunities where informal conversations

with staff would have allowed clarification or explanations of observed events, yet by waiting until staff were less busy and therefore more able to talk, these opportunities were often missed as staff then moved elsewhere in the department or changed shift. As staff were rarely doing nothing, a more assertive approach to addressing staff when they were involved in tasks that didn't involve immediate patient care (e.g. when they were reviewing notes or fetching medications) was necessary, along with some sensitivity as to when were appropriate times to approach staff. Particular times of the day (e.g. start of morning shift) also tended to be less busy and therefore appropriate times for carrying out introductions and speaking to staff.

15.1.2.4. *Identifying what to include in data collection*

The data collection from observation included observation of staff actions and interactions with other staff and patients, along with informal conversations with staff. The initial aim was to collect data on all aspects of the pain management process, including:

- Patient and staff interactions when assessing (and reassessing) pain
- Patient and staff interactions when negotiating analgesia
- Staff interactions when discussing pain relief and patients experiencing pain
- Patient journeys for patients experiencing pain

Within this pilot, all interactions and conversations that involved pain management (e.g. staff talking about a patient in pain, or patients asking for pain relief) were recorded initially. However, during the process of observation it emerged that other external factors, such as staff hierarchy and team-working, may have an impact upon pain management and subsequent observations paid attention to other interactions where pain itself may not be the focus. The need to be open and receptive to new ideas when observing became clear, along with the need to change the focus when new theories emerged. However, due to the lack of structured data collection, some data felt ad-hoc and of limited value; research events were being recorded without any clear purpose or understanding of their potential value. However, as time went on it became clear that this was a natural part of the process of collecting observational data, and that one of the benefits of undertaking a pilot is to identify 'gaps and wastage' in data collection (Sampson 2004).

Due to a lack of access to the patient whilst in private areas, the data did not allow an understanding of how pain was managed within these areas, the interactions that led to analgesia being prescribed or how data from anonymised patient notes reflected the conversations taking place between patients and staff. This limitation led to an amendment to the REC to enable observation within all areas of the ED, subject to verbal consent to observe from the patient within the triage room. (See 5.7)

Describing and mapping the department was complex, due to the size of the department and the number of areas associated with the ED. A copy of a map of the department in the waiting room containing details of fire

exits was requested from the Estates department to allow a more accurate map of the department to be produced than would otherwise be possible using my sketches of the department.

15.1.2.5. *Assess how to record and collect data*

Reeves et al recommend a framework for describing observational notes, using nine observational dimensions (space, actor, activity, object, act, event, time, goal and feeling) (Reeves et al. 2008). The fast-moving nature of the ED meant that the description of the setting and actors involved at each observation was difficult to achieve, as was achieving any level of detail on describing all nine dimensions for a single observation. The process of describing the setting is a more complex task than, for example, observation taking place on a more bounded setting, such as an outpatient clinic or inpatient ward. Even when focussing on one of the ED wards, it was difficult to describe the environment accurately due to the constant shifting of patients on the ward and number of bays available. At the start of the pilot, details as to how many bays were full, and the staff present were logged at each observation event. However, due to the constant movement of both patients and staff, this became impossible and changed to referencing the department as 'busy' or 'quiet'. Also, describing the actors involved was more problematic than anticipated as staff roles were not always distinguishable from their uniform. This could be overcome by ascertaining staff roles at the beginning of the observation session, and again at each staff changeover, where possible.

Pope et al emphasise the importance of writing up detailed and highly descriptive accounts of what was observed (Pope and Mays 2000), including concrete descriptions of events (rather than impressions) but also write more reflexive notes in a separate diary. Initially, both notes and reflections were written up into a single document, but in later site visit these were separated out so that the actual observations were more clearly defined from the reflections. It is also important to distinguish between primary observation, where the researcher notes what actually happened and secondary observation, which are interpretative statements of what happened according to another source. (Gill and Johnson 1997) The process of writing up observations was considerably lengthier than anticipated, inevitably taking place after the event, so that it was difficult to distinguish primary observations from secondary observations, without using specific notation to distinguish these. Important details about patients (e.g. age, analgesia received) and timings were often missing from my notes and there was no opportunity to retrieve them later. Similarly, by avoiding the use of descriptions which may potentially identify individual patients, the notes were unclear as to which patient was being referred to within descriptions of patient/staff interactions. A proforma was developed for logging basic patient details, giving each patient a code to be referenced within the notes.

The amount of detail required to provide 'thick description' which would improve the external validity of the data was greater than I anticipated. The initial write-up of the description of the setting lacked a number of key details and re-reading of the notes later in the pilot showed further details were required to give a richer picture of the context. For example, the following extract from the start of the initial observation visit omits a number of important details, such as: who was present, how many members of staff were in the staff base,

what they were doing, how the local collaborator framed the question, what body language people used when responding to me, and whether people showed interest in the subject:

> *"[Local Collaborator] showed me round the bays and introduced me to some of the staff in the staff bases. He asked whether they would be interested in taking part in a short staff interview. One of the F2s said yes."*

This example of 'thin description' is partly a reflection of the volume of data being collected, and initial lack of focus of what was being observed, and improved to some degree during the following visits. However, the process of reading the observation notes and reflections when writing up the pilot highlighted the inadequacy of much of the description and a need to provide further detail in future fieldwork by writing up regularly, and ensuring the field notes were typed up immediately after site visits.

15.1.2.6. *Test recruitment strategy for staff interviews*

The recruitment strategy aimed to collect a purposive sample of staff including senior and junior clinical staff, nursing staff and managers with different levels of experience. The recruitment strategy used within this pilot was ad-hoc, involving asking people who were present on the day of the fieldwork visit if they were able to take part in an interview. This approach risks over-recruiting staff who were particularly keen or interested in the subject, and recruiting staff who were less busy. As a consequence, no interviews with nurses were undertaken during the pilot, as they were too busy to take time out for interview. Approaching staff on the day (rather than writing in advance) was felt to be an appropriate approach as previous studies have indicated staff are more likely to agree 'there and then' than arranging an interview in the future. {13377, p461) However, whilst this may suit consultants and other staff who have time set aside out of the department (office time, training time etc.) the recruitment strategy needed to enable other staff to undertake the actual interview out of working hours, potentially via telephone.

15.1.2.7. *Testing data collection instruments for staff interviews*

The topic guide is an important tool in steering the discussion in interviews and helps ensure that relevant issues are covered systematically {15950}. The initial topic guide led to participants spending considerable time describing the process of pain management within the ED (i.e. routes into the department), rather than steering participants to talking about their attitudes and beliefs about pain management. This led to a lot of repetition of information that was more factual than insightful. Early in the pilot, the wording of the initial questions was changed to focus more on how the participant viewed their role in pain management, as this was felt to provide richer information about how staff see their role within the wider department, and how they prioritise pain management. Questions were also introduced around what participants felt the aim and benefits of pain management were as this was felt to capture information about attitudes towards pain management which were not captured within the initial topic guide. Questions relating to different patient

groups were moved nearer the end of the interview schedule, so as not to spend too much time focusing on the 'difficult' patients rather than thinking of other potentially more modifiable barriers.

15.1.2.8. *Testing the recruitment strategy for patient interviews*

The protocol for full cases stated that interviews with a maximum diversity sample of 10-15 patients would be carried out, to reflect factors that may affect pain management (e.g. age, gender, condition).

Discussions with the local collaborator suggested that the clinical decisions unit (CDU) may be the best location for recruiting patients, as patients here should have their pain under control sufficiently to be able to explain the research and take down their details to arrange an interview at a future date. The CDU was considered a private area as it had swipe card entry and could not be accessed by members of the public. The nurse on CDU appeared unwilling to engage in the research and recruit patients on my behalf so patients were not recruited from here during the pilot. Nursing staff on the ED ward then identified patients in pain, allowing me to hand out information sheets to relatives of patients who were in pain, asking them to contact me if they were interested. After this produced no response, during the final fieldwork visit a nurse was asked to identify any patients with a painful condition and approach them on my behalf. The nurse identified patients who gave permission for me to introduce myself, explain the research and request contact details for potential future telephone interview. Patients were left with the information sheets and consent forms along with stamp addressed envelope which could be returned to me after going through the forms by telephone. One patient was identified who agreed to providing his contact details, and he was interviewed by telephone. A proactive approach whereby contact details were obtained after introductions from ED staff was decided as a better approach than offering information sheets to patients without obtaining contact details.

15.1.2.9. *Testing data collection instrument for patient interviews*

Despite recruiting only one patient, some changes were made to the interview schedule following the pilot. Data from observations indicated that it was important to find out how pain was managed from first arrival in the ED and during their stay in the ED. Questions were made more specific and the schedule was refined to probe further into particular aspects of pain management. In addition to adding further prompts around exactly how pain was assessed and managed, the survey question that was used in selecting the sites was added (Did you feel staff did everything they could to control your pain?). This was added partly to improve understanding of what contributes to patient satisfaction with pain management, but also to help understand the value of using this survey question in site selection. (See appendix 6 for interview schedules)

APPENDIX 5: CASE STUDY SITE SELECTION

15.3. CQC survey of Emergency Departments in England

The care quality commission (CQC) alongside the Picker Institute produced Patient Experience surveys of nearly 40,000 patients from NHS Acute Trusts with major emergency departments in England and Wales in 2004, 2008, 2012 and 2014. (Picker Institute 2008) Exclusions included patients attending a Minor Injuries Unit or Walk-in Centre, and those attending to obtain contraception or due to miscarriage. The surveys differed slightly each year, but one question in the 'pain' domain was included in all four surveys for patients who were in any pain while in the ED; 'Did you feel staff did everything they could to help control your pain?' Respondents could respond "yes completely", "yes, partly" or "no". In 2004, 2008 and 2014, this question had been preceded by questions asking whether they asked for pain medication and how long it took them to get pain medication after they asked for it, and an additional question had been added to the 2004 questionnaire (while you were in the ED, how much of the time were you in pain?).

For the 2008, 2012 and 2014 data, the CQC also provided an age and gender standardised 0-10 score (0-100 for 2008) that weighted the different answers for each question and aimed to "enable organisational performance on a survey question to be summarised readily and compared across organisations". The scores are compared to the 'expected' score for the Trust given their age sex distribution and highlighted as 'better', 'about the same' or 'worse' in comparison to other Trusts.

15.4. Royal College of Emergency Medicine (RCEM) Fracture Neck of Femur data

The RCEM produce regular audits that measure a range of processes relating to pain management for two painful conditions: fracture neck of femur (#NOF) and renal colic. The data are in the public domain at a national level but not for individual sites. Data were requested for individual sites from the RCEM, who subsequently released data in December 2014 on the fracture neck of femur audit 2012 for individual hospitals to this study in order to help with site selection. Trusts provided audit data on up to 50 patients with fracture neck of femur. The audit contains a number of measures relating to pain management, including provision of pre-hospital analgesia, recording of pain scores, proportion of patients offered analgesia within 20, 30 and 60 minutes (also broken down by patients with moderate or severe pain) and documented re-evaluation of analgesia. The RCEM quality standards for fracture neck of femur relating to pain include patients with moderate or severe pain receiving appropriate analgesia within 60 minutes and overall proportions of patients receiving appropriate analgesia within 60 minutes. (The College of Emergency Medicine 2013) Due to the potential level of subjectivity involved in defining 'moderate' or 'severe' pain, the overall proportion of

patients receiving analgesia within 60 minutes was selected as the outcome measure that would be considered in site selection.

15.5. Critique of the data sources

The response rate for the CQC survey was 34% overall (2014), introducing the possibility of non-response bias. Patient satisfaction is also affected by factors such as age, gender and ethnicity (Crow et al. 2002) and there is a possibility that patients responded positively in the pain domain because they had had an overall positive experience. Data on the pain domain question and the overall ED satisfaction measure for all patients in pain were entered into SPSS and showed a strong correlation. (Pearson coefficient 0.764, p= 0.001). This may be due to a positive pain experience leading to a high overall satisfaction, or because high overall satisfaction led to positive experience with the pain domain being reported.

The CEM fracture neck of femur audit data reported small numbers of patients so estimates of size of effect have a high degree of uncertainty. Audit data was not returned for every ED so was not available for all sites (see below). The management of fracture neck of femur frequently involves specific protocols and accounts for only a small proportion of the pain management workload within the ED and may be not be an appropriate proxy for measuring overall pain management experience in the ED (Clinical Effectiveness Committee 2010) (The College of Emergency Medicine 2013)

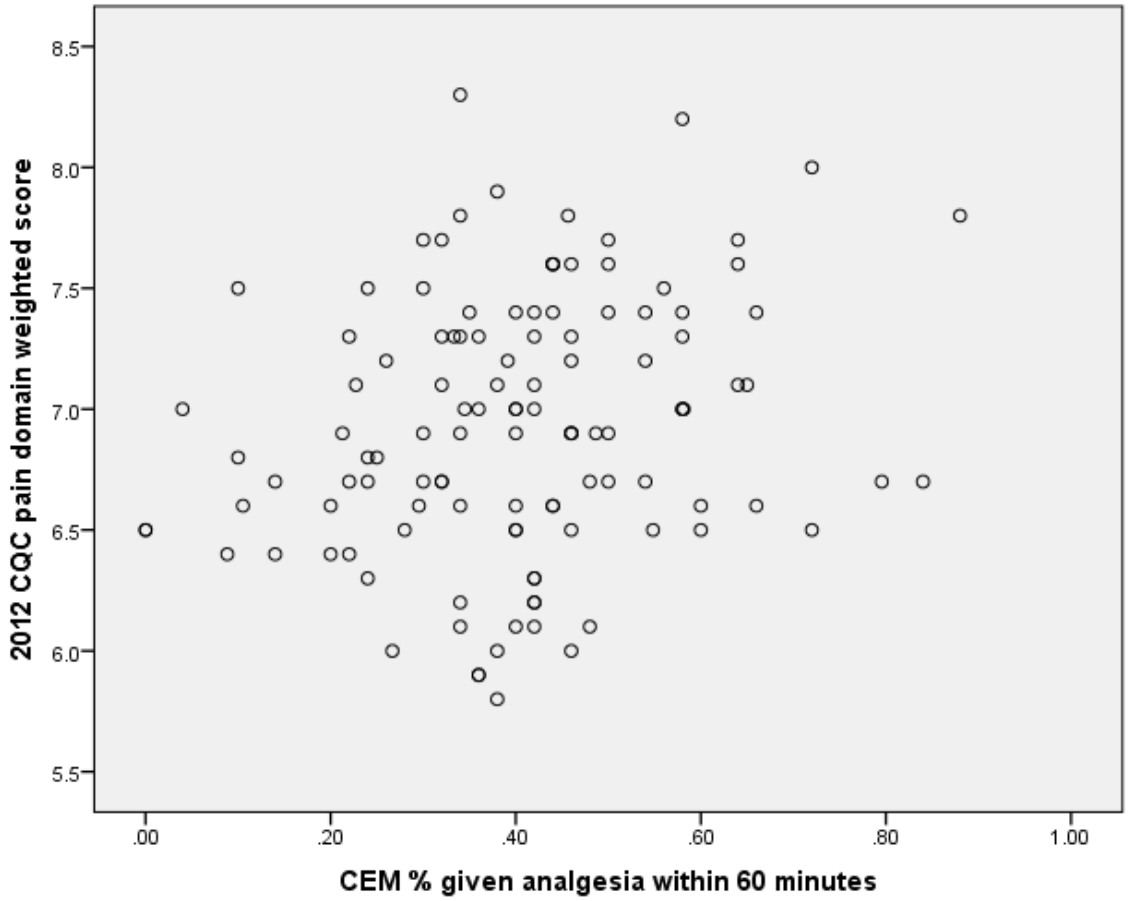
15.6. Combining data sources

The possibility of variation in results being due to random effects must be considered when using a single variable for site selection. The CQC survey measured the same outcome at different time periods (2008, 2012, 2014) and results could be used to suggest whether departments had improved, deteriorated or performed consistently. However, differences in outcomes could also be due to random variation and perceived changes in performance could be due to regression to the mean, described as “the name given to the tendency of any extreme situation, score, outcome, or event to be followed by one that is less extreme simply because fewer extreme random factors happened to influence things the second time.” (Geddes 1990) Any variation in performance in EDs may therefore be due to random variation rather than any systematic differences between them. As the effects of regression to the mean can be countered to some degree by the use of multiple measurements, the site selection strategy involved more than one data source (Barnett et al. 2005).

The CEM audit data was matched to the data for CQC scores for 2012. Results for the CEM audit were available by individual hospital, whereas results for CQC scores were available by NHS Trust, which may cover multiple hospitals with type 1 EDs. Trusts were excluded due to no audit data being available (n=9) or where there was >1 return from hospitals within an NHS Trust, but it was unclear which of the individual hospitals within the Trust the CQC data related to (n=20). A total of 118 Trusts were included. Bivariate

(Pearson) correlation was undertaken on the CQC 2012 score and the % patients receiving analgesia within 60 minutes from the CEM #NOF audit. There was evidence of a weak positive correlation between the CQC score and the % patients receiving analgesia within 60 minutes (Pearson coefficient 0.228, p= 0.014), indicating that there is some relationship between the pain management processes for #NOF and overall patient experience of pain management in EDs. Similarly, there was a moderate positive relationship between the CQC patient survey score for 2012 and 2014 (Pearson coefficient 0.444, 2-tailed significance 0.000), again suggesting that there is some (weak) level of consistency in the score as a measure of performance.

Figure 1: CQC pain domain weighted score v CEM % given analgesia within 60 minutes.



15.6.1. Timing of case selection

A phased approach was used to recruit case study sites, with the aim of recruiting an ED with good pain management, followed by an ED with poor pain management in order to identify patient, professional and organisational factors affecting pain management and differences between EDs. Sites were recruited consecutively once the majority of the data collection had taken place at the previous site. This was partly in consideration of the evolving nature of the research, which may lead to site selection criteria being altered during the course of the research (i.e. if an important variable came to light that hadn't previously been considered) but also due to the practicalities of obtaining research governance approval at a site and then

delaying access to the site, as NIHR portfolio sites required recruitment of first participants within 30 days of research governance approval.

The process of identifying suitable sites started in 2014, in parallel with the pilot study fieldwork. The pilot site is referred to within this thesis as site 3. A summary of top and bottom performing hospitals using CQC and RCEM audit data is presented in Table 21, and a description of how this data was used in site selection is detailed below.

Table 22: Site selection criteria: top and bottom performing hospitals using CQC and RCEM audit data.

Trust name	2012 Score (centile)	2014 quintile (score)	CEM audit 2012 % (quintile) (N=50)	Other comments	Invited to participate
Top performing hospitals. B denotes Trusts highlighted as performing better than expected by CQC survey.					
A1	1 (8.3) B	2 (7.7)	3 (0.34)		
B1	1 (8.2) B	1 (8.0)	2 (0.58)		
C1	1 (8.0) B	2 (7.6)	1 (0.72)	Recruited prior to 2014 data.	Recruited. Site 1
D1	1 (7.9) B	1 (8.0) B	3 (0.38)		
E1	1 (7.8)	1 (7.9)	1 (0.88)	Invited.	
F1	1 (7.8)	1 (8.3) B	3 (0.34)		
G1	1 (7.8)	2 (7.8)	N/A		
H1	1 (7.8)	1 (8.0)	3 (0.46)		
I1	1 (7.7)	1 (8.4) B	1 (0.64)		
J1	1 (7.7)	1 (8.2) B	3 (0.5)		
K1	1 (7.7)	1 (8.1)	N/A		
Bottom performing hospitals. W denotes Trusts highlighted as performing worse than expected by CQC survey.					
A2	5 (6.2)	5 (6.4) W	0.42 (3)		1st wave. No response
B2	5 (6.5)	5 (6.4) W	0.4 (3)		1st wave. No response
C2	5 (6.5)	5 (6.3) W	0.4 (3)	N=45 for CEM audit. CQC inadequate	1st wave. No response
D2	5 (6.5)	5 (6.5) W	N/A	Trust merger. 2 EDs. Don't recruit	DNR
E2	5 (6.1)	5 (6.6)	0.34 (5)	13%> 4 hours. Don't recruit.	DNR
F2	5 (5.9) W	5 (7.0)	0.36 (4)		2nd wave. No response
G2	5 (6.0)	5 (6.6)	0.46 (2)		2nd wave. Yes - reserve
H2	5 (6.0)	5 (6.8)	0.38 (3)	CQC inadequate	2nd wave. No response
I2	5 (6.5)	5 (6.6) W	0.46 (2)	20% >4 hours. Don't recruit	DNR
J2	5 (6.3)	5 (6.9)	0.24 (5)		2nd wave. No response
K2	5 (6.4)	5 (7.0)	0.22 (5)	25%>4 hours. Don't recruit	DNR
L2	5 (6.5)	5 (6.8)	0.28 (5)		2nd wave. Recruited. Site 2

15.7. Selection of site 1: recruitment of a case with potentially good pain management.

The first main case study site was selected in July 2014 prior to the 2014 data for individual sites being available, so was selected using only 2012 data. Four of the top 10 performing EDs were highlighted as performing better than anticipated from the CQC ED patient survey and were considered for recruitment. The top 2 sites were invited to take part, and the first to respond was recruited.

15.8. Selection of site 2: recruitment of a case with potentially poor pain management.

The poorer performing site was selected in 2015, by which time further ED survey data was available from the 2014 CQC ED patient survey, as well as the RCEM data. In order to improve the chances of getting a 'poor' site, a shortlist of all Trusts that were in the bottom 20% for both 2012 and 2014 was drawn up (n=12). (See Table 21) Trusts with a higher than 10% breach of the 4 hour waiting time target were excluded as it was felt that the departments would be under too much pressure that would make the practicalities of undertaking research difficult (n=3). Similarly, Trusts with more than one ED that had recently merged were excluded, as it was not clear to which ED the data related (n=1). Of the 8 remaining EDs identified, there were three sites in the 'worse than expected' category, all of whom had similar CEM #NOF audit results. These were all invited concurrently. A letter of invitation was sent to the clinical lead of each department, followed up by an email and telephone call to ascertain whether there was any interest in the study. As there was no interest after follow-up phone calls within 4 weeks of the initial contact, there was no further attempt to recruit them. Initial email invitations were then sent to the remaining 5 sites, with follow-up phone calls. There were two positive responses at this stage and the site with the lowest CEM #NOF audit result was selected (Site K).

15.9. Selection of site 3: recruitment of an improving site.

The initial protocol stated that one of the case study sites would be an ED that had recently improved performance, to provide insights into what had led to improvements in pain management. Due to differences in overall scores between 2008, 2012 and 2014, possibly due to a change in wording of the questions, the results from the CQC data did not identify any clear improving sites.

However, in February 2016, an audit of pain management in the ED undertaken at the pilot site had been sent to me by the PI at that site, and recommendations accompanying the audit suggested that efforts to improve pain management had been undertaken since the period of the pilot data collection. A pragmatic decision to expand the pilot site into a full case study site was taken, and this site was considered a potentially improving

site. In addition, the opportunity of exploring how changes being undertaken within the site to improve pain management were being embedded and used was felt to be useful in exploring how potential barriers or enablers to pain management.

Given the potentially unreliable nature of the data sources, the selection of cases was considered important but not vital to the aims of the research. Even if the results of the CQC survey and CEM audits were random and due to sampling error, the selection of three sites would allow an in-depth exploration of the enablers and barriers to pain management within 3 EDs.

APPENDIX 6: SUPPORTING DOCUMENTS FOR FIELDWORK

Documents included:

- Invitation letter for sites
- Information sheet for sites
- Observation poster
- Observation research information leaflet
- Staff information leaflet
- Staff interview consent form
- Staff topic guide v1 (pilot)
- Staff topic guide v2
- Patient invitation letter
- Patient information leaflet
- Patient interview consent form
- Patient topic guide v1 (pilot)
- Patient topic guide v2
- Letter of approval from REC
- Letter of approval from REC (resubmission)

Fiona Sampson
NIHR Doctoral Research Fellow
Health Services Research
School of Health and Related Research
University of Sheffield
Sheffield
S1 4DA

Name

Address

Date

Dear [Name]

Re: IMPEDE study – Improving the Management of Pain in Emergency Departments

I am writing to ask for your help with a research study looking at improving the management of pain in Emergency Departments. I appreciate how busy you are and would like to thank you for taking time to read this letter.

Pain is a presenting symptom in over 70% of visits to an emergency department, yet the under-treatment of pain within emergency departments is a well-recognised and widespread phenomenon. I have been funded by the National Institute for Health Research to undertake a doctoral research fellowship to explore factors affecting pain management within emergency departments. As part of this research I will be undertaking case studies within three emergency departments in England to understand how pain is managed differently between departments, and what factors contribute towards pain management. I am writing to ask you if your hospital would be one of the case study sites.

If you agree to participate I will undertake the following research within your department:

- Spend some time within your department (3-4 days) observing how people who present with pain as a key symptom are managed within the department, and understanding the patient journey. I may ask to look at any pain management protocols, pain audits that you use or look at some anonymised notes to see how pain is recorded.
- Undertake interviews with a sample of around 8-12 members of staff within the department, including senior and junior clinical staff, nursing staff, managers and receptionists to ask for their views as to how pain is managed and prioritised. These may be done within the department or by telephone at a later date.

- Identify up to 15 patients with painful conditions to interview either within the department after discharge, or by telephone at a later date.
- Carry out a focus group with staff and patient representatives to consider what aspects of pain management work well and do not work so well within your department, and to explore the feasibility of implementing interventions to improve pain management.

Taking part in this research will involve some of your staff in a small amount of extra work (e.g. taking part in interviews and focus groups, helping identify patients to interview). There are a number of benefits for your department in taking part in this study:

- As part of an NIHR CRN portfolio study, NIHR accruals will be registered for every member of staff and patient recruited into the study.
- Raising the profile of pain management within your department
- Providing a forum to discuss how pain is managed and share lessons with other departments

The information I obtain from this research will remain completely confidential and the identity of your ED will not be named in any report or publication. I will feed back a summary of findings to your department which you may find helpful in reviewing your pain management practices.

The enclosed information sheet tells you a bit more about the study. If you have any questions about the research please feel free to contact me at the number or email below.

Many thanks for your time in considering this research.

Yours sincerely

Fiona Sampson
NIHR Doctoral Research Fellow
Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk

Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Further information for Emergency Departments

Study design

This is a mixed methods study involving a systematic review of the literature for interventions to improve pain management in emergency departments, three case studies of emergency departments (involving observation, staff and patient interviews and focus groups) and a national survey of emergency departments to identify pain management interventions and strategies in use.

Confidentiality

All of the information you give me will be kept strictly confidential. All data will be handled in accordance with the Data Protection Act 1998. All consent forms, printed interview and focus groups transcripts will be kept in a secure locked filing cabinet in the University. All personal details and information that may identify a person or department will be removed.

What are the possible problems and disadvantages of taking part?

I do not anticipate any problems arising from your participation in this study. Participation in interviews and focus groups will involve a small amount of staff time. Some staff time will be required to help to recruit up to 15 patients to interview and to anonymise a small sample of ED notes for the researcher to look at.

What are the possible benefits of taking part?

This is an NIHR CRN Portfolio study, which means you will have access to infrastructure support and NHS service support costs. Participating in this study may help you to understand and improve how you manage pain within your department.

What will happen to the results of the research study?

The results of the study will be written up in the form of a report and medical journal articles. I will send you a copy of the final report or a summary of the research findings, as you wish.

Who is funding and organising the research?

This project is being carried out by Fiona Sampson. Fiona is a researcher at the Medical Care Research Unit at the University of Sheffield. This is an independent research unit that has a long history of carrying out research into the National Health Service. The project is funded by the National Institute for Health Research. The study has the required ethical approval from NRES Committee Yorkshire & The Humber – South Yorkshire.

What do I need to do now?

If you wish to take part, please sign the attached form and return it to Fiona Sampson below. If you wish to discuss this further, then contact Fiona for more details.

THANK YOU FOR YOUR TIME

Contact: Fiona Sampson, NIHR Doctoral Research Fellow,
Telephone: 0114 2220687. **Fax no:** 0114 2724095. **E-mail:** f.c.sampson@sheffield.ac.uk
Address: Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA

Research in this Emergency Department

A researcher from the University of Sheffield is undertaking research at this emergency department as part of a project looking at how pain is managed in emergency departments. The researcher will be observing and taking notes on the way that doctors and nurses manage patients who are experiencing pain whilst they are in the emergency department.

Do I have to take part?

If you would prefer not to be observed, please tell a member of staff or the researcher. The researcher will move to another part of the department and destroy any data relating to you.

How about confidentiality?

All of the information that is recorded by the researcher will be kept strictly confidential. They will not record any details that would allow anyone to be identified.

What do I do now?

If you are happy to take part in the research then please carry on as normal. If you want to know more about the research, please take a leaflet from the reception desk.

If you have any concerns about this research, please contact a member of staff in the department.

Research information leaflet

Research taking place within this department

A researcher from the University of Sheffield is undertaking a research study in this Emergency Department looking at how pain is managed within emergency departments. This leaflet provides more information about the study. Please ask the researcher or a member of staff if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of the study?

People who come to the emergency department are often in pain. People often find that they are not given enough pain relief or that they have to wait too long for pain relief. This research is being done to try to understand why emergency departments do not always manage patient's pain very well and whether anything can be done to improve this.

What will happen to me if I take part?

If you take part in the study you do not have to do anything 'out of the ordinary'. The researcher will be observing what happens in the emergency department and taking notes on the way that staff and patients deal with getting help for patients who are experiencing pain. They will not record any names or details that could identify anybody. The researcher will try to keep as low a profile as possible so that staff can deal with each other and with patients in the way that they normally would.

Do I have to take part?

If you do not want to take part in the study, please tell the researcher or a member of staff. The researcher will move to another part of the department and will destroy any data that relates to you. This will not affect your healthcare in any way.

What are the possible problems and disadvantages of taking part?

We do not anticipate any problems from you taking part in this study. If you do get upset by this research taking place, please tell the researcher or a member of staff.

What are the possible benefits of taking part?

The information we get from this study may help us to understand how to improve the management of pain in emergency departments and help staff in emergency departments understand how they can offer pain relief to their patients in future.

What if I wish to complain?

If you have any concerns about this research you should speak to Fiona Sampson (details below) or to a member of staff at the emergency department. You can also contact your local Patient Advice and Liaison Service. If you wish to complain, or have any concerns about how you have been approached or

treated during the course of the study, you can use the normal National Health Service complaints procedures. If I see any incidents that I judge to be unacceptably poor care I will report this to [name], who is the principal investigator for [name of hospital]

Will the information collected be kept private?

Yes - all of the information we gather will be kept strictly confidential. All data will be handled in accordance with the Data Protection Act 1998. The notes taken by the researcher will not record the names of patients or members of staff and care will be taken not to record any information that may identify individuals.

What will happen to the results of the study?

The results of the study will be written up in the form of a report and medical journal articles. Please contact Fiona Sampson at the address below if you would like to receive a copy of the final report or a summary of the research findings.

Who is funding and organising the research?

This project is being carried out by Fiona Sampson, who is a researcher at the Medical Care Research Unit at the University of Sheffield. This is an independent research unit that has a long history of undertaking research into the National Health Service. The project is funded by the National Institute for Health Research. The study has the required ethical approval from [name]

What do I do now?

Thank you for considering taking part in the research. If you would like to participate, please carry on with your activities as normal.

If you have any concerns or would like any further information about this project please contact:

Fiona Sampson, NIHR Doctoral Research Fellow, Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA

Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk

Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Staff information leaflet

Invitation

You are being invited to take part in a research study. Before you decide whether to take part it is important for you to understand why it is being done and what it will involve. Please take time to read the following information and discuss it with others if you wish. Ask the researcher if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

What is the purpose of the study?

Pain is a very common symptom for people who come to emergency departments but people often find that they are not given enough pain relief or that they have to wait too long for pain relief. The aim of this study is to look at why emergency departments do not always manage people's pain well and whether anything can be done to improve this.

Why have I been chosen?

You have been chosen to take part in this study because you work within one of the Emergency Departments that have agreed to be a case study within this research. We would like to talk to you about your views and experiences of managing pain within the Emergency Department. We will be interviewing around 8-12 members of staff within this department and a similar number in a further two case study sites.

Do I have to take part?

It is completely up to you whether or not you take part. Taking part is entirely voluntary. If you decide to take part you are still free to withdraw at any time and without giving a reason. You do not have to take part in this interview just because your department has agreed to be involved in this research.

What will happen to me if I take part?

If you decide to take part, you will be given a copy of this information sheet to keep and be asked to arrange a time when you can undertake the interview. You will be given a consent form to sign to say that you are happy to undertake the interview. You will be interviewed at a time convenient to you, preferably in a meeting room within the hospital. The interview will last about 30 minutes.

The researcher will record the interview to get an accurate record of what has been said. You will be able to instruct the researcher to stop the recording at any time you wish. A research secretary will type up the interview so that we have a written record of the interview. Only the researcher and research secretary will have access to the interview recordings and typed transcripts. We will give you a copy of the interview

transcript if you would like it and you will be free to tell us to exclude any information you have given us. What you say will be kept completely confidential and no other member of staff within this emergency department will have access to your interview recording or transcript

What are the possible problems and disadvantages of taking part?

We do not anticipate any problems arising from your participation in this study. You may choose not to answer any particular questions in the interview if you do not wish to do so.

What are the possible benefits of taking part?

Whilst there are no direct benefits to you, the information we get from this study may help us to understand how to improve the management of pain in emergency departments and help emergency departments understand how they can offer pain relief to their patients in future.

Will my taking part in this study be kept confidential?

All of the information you give us will be kept strictly confidential. All data will be handled in accordance with the Data Protection Act 1998. All consent forms and interview transcripts will be kept in a secure locked filing cabinet in the university. The interview will be transcribed onto paper but the written transcript and any other notes relating to the interview will not have your name on them or any details that will make it possible to identify you in any way. Although your words may be quoted in the research report or publications, care will be taken to remove any information that may identify individuals. The audio recording of your interview will be destroyed at the end of the research.

What will happen to the results of the study?

The results of the study will be written up in the form of a report and publications which will be read by health professionals and health service managers involved in the management of patients within emergency departments. The results will also be written up in the form of a doctoral thesis which will be submitted to the University of Sheffield. Please contact the researcher at the address below if you would like to receive a copy of the final report or a summary of the research findings.

Who is funding and organising the research?

This project is being carried out by Fiona Sampson, who is a researcher at the Medical Care Research Unit at the University of Sheffield. This is an independent research unit that has a long history of undertaking research into the National Health Service. The project is funded by the National Institute for Health Research. The study has the required ethical approval from NRES Committee Yorkshire & The Humber – South Yorkshire.

What do I do now?

Thank you for considering taking part in the research. If you would like to participate, please fill out the consent form and return it to the researcher.

If you have any concerns or would like any further information about this project please contact:

Fiona Sampson, NIHR Doctoral Research Fellow, Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk

Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Staff interview consent form

Site and staff ID number:

Name of Researcher: **Fiona Sampson**

Please initial each box

I confirm that I have read and understand the information sheet, dated 18/07/12 for the above study and have had the opportunity to ask questions.	☐
My participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected.	☐
I understand that information from the interview will be audio recorded by the researcher	☐
I agree to the use of anonymised quotations from the interview in published materials	☐
I agree to take part in the above study.	☐

Name of participant	Signature	Date
Name of researcher	Signature	Date

If you have any concerns or would like any further information about this project please contact:

Fiona Sampson, NIHR Doctoral Research Fellow, Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA

Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk

Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Staff interview topic guide v1 (Pilot)

Introduction. Reminder about confidentiality etc.

Can you start off by telling me a bit about who is involved in managing patient's pain within this department (roles, not names – prompt to describe patient journey)

Can you tell me a bit about your role in managing patient's pain?

Can you tell me about how you feel pain is managed and prioritised within this department? (Prompt – education, priorities, profile)

Are there any patient groups who you feel are particularly easy/difficult to manage? (prompt – explain why)

What do you feel are the barriers to managing pain within the ED?

Are there any barriers that you feel are specific to this department?

What do feel helps or facilitates the management of pain within the ED?

Is there anything about that happens within this department specifically that you feel helps the management of pain?

Any other comments?

Thank you for your help with this research.

Fiona Sampson, NIHR Doctoral Research Fellow, Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA

Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk

Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Staff interview topic guide v2

Introduction. Reminder about confidentiality etc.

Firstly, can you tell me about your current role_____ how long in role_____ how long worked in ED_____ how many other EDs _____?

Your role in pain management

Can you tell me about your role in assessing and managing patients in pain?

assessing pain/ use of pain scores?

how do you decide what analgesia to give?

reassessment of pain?

Can you talk to me about what you feel is the aim of pain management?

benefits of providing good, timely pain relief?

Pain management in this department

How do you feel pain is managed within this department? (Ditto prioritised)

is pain a high priority?

training, education, profile

What do you perceive as the barriers to improving pain relief in the ED (this ED/general)?

Professional (staff roles) / organisational / patient

What do you think are the facilitators to providing good pain relief in the ED (this ED/general)?

Professional (staff roles) / organisational / patient

Patient / staff groups

Are there any patient groups who you feel are particularly easy/difficult to manage?

Are there any staff groups who you feel have different ideas or priorities around pain management?

Other

Any other comments?

Feelings around CQC survey - accurate reflection of pain management within EDs?

Summarise key points

Thank you for your help with this research.

Fiona Sampson
NIHR Doctoral Research Fellow
Health Services Research
School of Health and Related Research
University of Sheffield
Sheffield
S1 4DA

Dear [patient]

Research study – we would love to hear your views.

I am writing to ask for your help with a research study. The study is being carried out to help to understand how pain can be managed better within the emergency department.

I am a researcher from the University of Sheffield and would like to talk to patients from each of three emergency departments who are involved in this study. We are asking you as you have visited the emergency department with a condition that is usually painful.

The interview should take between 15 and 30 minutes and will ask about how your pain was managed at this emergency department; what you feel worked well and what didn't work so well. The interview can be done either by telephone or face-to-face, depending upon what you prefer. I have enclosed an information sheet for you to read that explains the study in more detail along with a consent form for you to sign if you do want to take part.

Your care will not be affected by whether or not you choose to take part in this research.

Please do not hesitate to contact me (details below) if you need any more information about this study.

Many thanks for your time in considering this research.

Yours sincerely

Fiona Sampson, NIHR Doctoral Research Fellow
Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk
Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Patient information leaflet

Invitation to take part in a research study

We would like to invite you to take part in a research study. Before you decide whether to take part, we would like you to understand why the research is being done and what it would involve for you. **We will go through the information sheet with you and answer any questions you may have**. This may take up to ten minutes.

Why is this research study taking place?

People who come to emergency departments are often in pain. People often find that they are not given enough pain relief or that they have to wait too long for pain relief. This research is being done to try to understand why emergency departments do not always manage people's pain very well.

Why have I been chosen?

You have been chosen to take part in this study because you were in pain whilst you were in the emergency department. We would love to hear your views of how your pain was managed whilst you were in the emergency department. We will speak to around 15 patients at this emergency department.

Do I have to take part?

It is completely up to you whether or not you take part. If you decide to take part you are still free to withdraw at any time and without giving a reason. **This will not affect the standard of care you receive**.

What will happen to me if I take part?

You are being asked to take part in a short interview. We will ask your views on how your pain was managed whilst you were in the emergency department. The interview will take around 30 minutes. It will take place either in a private room in the hospital, in your own home or by telephone. It is totally up to you.

The researcher will record the interview to get an accurate record of what has been said. You will be able to tell the researcher to stop the recording at any time. The interview will be typed up by a member of the research team afterwards. We can give you a copy of the interview transcript and you can ask us to take out any information that you are not happy with.

What are the possible problems and disadvantages of taking part?

We do not think that there will be any problems for you in taking part. If you get at all upset by anything that we talk about, you can choose not to answer certain questions. You can also stop the interview at any time.

What are the possible benefits of taking part?

The information we get from this study may help us to improve how emergency departments help patients in pain in future, although this may not benefit you directly.

What if there is a problem?

If you have any concerns about this research you should speak to Fiona Sampson (details below) or to a member of staff at the emergency department. You can also contact your local Patient Advice and Liaison Service or speak to a health professional you feel you can trust (e.g. your GP). If you wish to complain, or

have any concerns about how you have been approached or treated during the course of the study, you can use the normal National Health Service complaints procedures.

Will the information I give be kept private?

Yes - all of the information you give us will be strictly confidential. Only the research team at the University of Sheffield will be able to access the interview recordings and typed transcripts. Although your words may be quoted in the research reports, we will take care to make sure that there is no information that could link the quotes to you.

The written transcripts and any other notes about the interview will not have your name on them or contain any details that will make it possible to identify you in any way. All paper copies of consent forms and interview transcripts will be kept in a secure locked filing cabinet in the university. Typed up interview transcripts will be kept only on password protected computers belonging to the university. The audio recording of your interview will be destroyed at the end of the research. All data will be handled in accordance with the Data Protection Act 1998.

What will happen to the results of the study?

The results of the study will be written up in the form of a report and medical journal articles. Please contact Fiona Sampson at the address below if you would like to receive a copy of the final report or a summary of the research findings.

Who is funding and organising the research?

This project is being carried out by Fiona Sampson. Fiona is a researcher at the Medical Care Research Unit at the University of Sheffield. This is an independent research unit that has a long history of carrying out research into the National Health Service. The project is funded by the National Institute for Health Research. The study has the required ethical approval from from NRES Committee Yorkshire & The Humber – South Yorkshire.

What do I do now?

If you decide to take part, you will be given a copy of this information sheet to keep. You can then either:

- Sign a consent form and arrange a time for the interview.
- Give the researcher your contact details and they will call you in a few days time to arrange a time for the interview.
- Take the information sheet away and call the researcher yourself if you decide you want to take part.

Even if you have signed the consent form, you can decide you do not wish to take part at any time.

THANK YOU FOR YOUR TIME

Contact: Fiona Sampson, NIHR Doctoral Research Fellow,
Telephone: 0114 2220687. **Fax no:** 0114 2724095. **E-mail:** f.c.sampson@sheffield.ac.uk
Address: Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA
Study website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Patient interview topic guide v1 (pilot)

Introduction. Reminder about confidentiality etc.

Can you start off by telling me a bit about how your pain was dealt with when you were in the emergency department (prompt for people involved etc)?

Do you feel that your pain was managed as quickly as possible? (Prompt – why)

Do you feel as though staff did everything they could to manage your pain? (Prompt – all staff? Anything else that would have helped?)

Do you feel as though you were able to tell staff about how much pain you were in? (prompt – initially, at review)

Do you feel there any ways in which pain could be managed better within this department?

Do you feel as though there was anything in particular that helped the staff manage your pain well?

Thank you for talking to me and taking part in this research.

If you have any concerns or would like any further information about this project please contact:

Fiona Sampson, NIHR Doctoral Research Fellow, Medical Care Research Unit, University of Sheffield, Sheffield S1 4DA

Telephone: 0114 2220687. Fax no: 0114 2724095. E-mail: f.c.sampson@sheffield.ac.uk

Website: www.shef.ac.uk/scharr/sections/hsr/mcru/impede

Patient interview topic guide v2

Introduction. Reminder about confidentiality etc.

Can you start off by talking me through what happened to you when you were in the A&E department, starting with when you first arrived?

People involved Where

Can you tell me a bit (more) about how they asked if you had any pain?

Who? How? Pain score? Reassessed?

Can you tell me a bit (more) about how they gave you pain relief?

Who? How? Did you ask?

Did the staff check whether your pain relief was working?

Who? How long? Pain score?

Did you get more pain relief if you needed it?

Were there any particular times in the ED when you were in more pain than others?

Would you have needed extra pain relief?

Can you talk to me about the length of time it took to get pain relief?

Acceptable? Why? As quickly as they could

Did you feel that staff did everything they could to control you pain?

All staff? Anything else that would have helped?

[Yes, completely Yes, partly No] - explain

Do you feel as though you were able to tell staff about how much pain you were in?

Initially reassessment did they believe you?

Do you feel there any ways in which pain could be managed better within this department?

Was there anything that you thought was particularly good about how your pain was managed?

Anything else?

Thank you for talking to me and taking part in this research. If you have any concerns or would like any further information about this project please contact:

NHS
Health Research Authority
NRES Committee Yorkshire & The Humber - South Yorkshire
Millside
Mill Pond Lane
Meanwood
Leeds
LS6 4RA

Telephone: 0113 3050122
Facsimile: 0113 8556191

31 October 2012

Ms Fiona Sampson
NIHR Doctoral Research Fellow
University of Sheffield
ScHARR, 30 Regent Street, Sheffield
S1 4DA

Dear Ms Sampson

Study title:	**Improving pain management in adult emergency departments: a mixed methods study (The IMPEDE study)**
REC reference:	**12/YH/0396**
Protocol number:	**STH16570**

Thank you for your letter of 23 October 2012, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Vice-Chair and Ms Rhodes.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS sites

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Investigator CV		
Letter of invitation to participant	4.1.1	18 July 2012
Letter of invitation to participant	5.1.1	18 July 2012
Letter of invitation to participant	3.1.1	18 July 2012
Other: CV- Prof Steve Goodacre- Supervisor		30 March 2012
Other: CV- Prof Alicia O'Cathain		
Other: Covering Letter to ED's	1.1.1	18 July 2012
Other: ED Response Slip	1.3.1	18 July 2012
Other: Invitation Information Sheet for Sites	1.2.1	18 July 2012
Other: Letter From Funder- Draft Contract Letter		07 October 2011
Other: Interview topic guide - patients	4.5.1	29 August 2012
Other: Interview topic guide - staff	3.4.1	29 August 2012
Other: Patient interview contact details	4.4.2	11 October 2012
Other: ED poster	2.1.2	11 October 2012
Participant Consent Form: Staff Interview	3.3.2	11 October 2012
Participant Consent Form: Focus group	5.3.2	11 October 2012
Participant Consent Form: Carer interview	6.2.1	11 October 2012
Participant Information Sheet: Focus Group Information Sheet	5.2.1	18 July 2012
Participant Information Sheet: Staff Interview Information Sheet	3.2.1	18 July 2012
Participant Information Sheet: Patient interview	4.2.3	11 October 2012
Participant Information Sheet: Carer interview	6.1.1	11 October 2012
Participant Information Sheet: Observation	2.2.2	11 October 2012
Protocol	1	01 November 2011
REC application		31 July 2012

Referees or other scientific critique report		
Response to Request for Further Information		23 October 2012

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

Feedback

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

Further information is available at National Research Ethics Service website > After Review

12/YH/0396	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project

Yours sincerely

[redacted]

pp
Ms Jo Abbott
Chair

Email: nrescommittee.yorkandhumber-southyorks@nhs.uk

Enclosures: "After ethical review – guidance for researchers"

Copy to: *Mrs Jen Boston, Sheffield Teaching Hospitals NHS Foundation Trust*

NHS
Health Research Authority
NRES Committee Yorkshire & The Humber - South Yorkshire
Unit 001
Jarrow Business Centre
Rolling Mill Road
Jarrow
Tyne and Wear
NE32 3DT

Tel: 0191 428 3561

12 March 2015

Ms Fiona Sampson
NIHR Doctoral Research Fellow
University of Sheffield
ScHARR
30 Regent Street
Sheffield
S1 4DA

Dear Ms Sampson

Study title:	**Improving pain management in adult emergency departments: a mixed methods study (The IMPEDE study)**
REC reference:	**12/YH/0396**
Protocol number:	**STH16570**
Amendment number:	**Modified Amendment 2 - from Sub Amend 1**
Amendment date:	**26 February 2015**
IRAS project ID:	**103158**

Thank you for submitting the above amendment, which was received on 26 February 2015. It is noted that this is a modification of an amendment previously rejected by the Committee (our letter of 11 November 2014 refers).

The modified amendment was reviewed by the Sub-Committee in correspondence. A list of the members who took part in the review is attached.

Ethical opinion

Members asked that an additional sentence (explained further) be put in the protocol regarding what happened if there was a change in capacity to the participant.

You replied that if there was a change in capacity of a patient once the patient had consented, then they would leave the private area and not undertake any further observations on this patient.

The Sub Committee was satisfied with the response given to the issue raised.

I am pleased to confirm that the Committee has given a **favourable ethical opinion** of the modified amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved are:

Document	*Version*	*Date*
Covering letter on headed paper	Email from Fiona Sampson	26 February 2015
Notice of Modified Amendment	Modified Amendment 2 - from Sub Amend 1	26 February 2015
Research protocol or project proposal	Version 2	17 September 2014

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our NRES committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

12/YH/0396:	**Please quote this number on all correspondence**

Yours sincerely

pp

[redacted]

Dr Duane Mellor
Chair

E-mail: nrescommittee.yorkandhumber-southyorks@nhs.net

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Mr Gaurika Kapoor, Sheffield Teaching Hospitals NHS Foundation Trust*

NRES Committee Yorkshire & The Humber - South Yorkshire

Attendance at Sub-Committee of the REC meeting on 06 March 2015 via correspondence.

Committee Members:

Name	*Profession*	*Present*	*Notes*
Reverend Joan Ashton	Co-ordinator of Chaplaincy Services	Yes	
Dr Duane Mellor (Chair)	Assistant Professor in Dietetics	Yes	

Also in attendance:

Name	*Position (or reason for attending)*
Miss Kerry Dunbar	REC Assistant

APPENDIX 7: PARTICIPANT CHARACTERISTICS

Details of staff interviewees.

	Date	ID	Role	Length of experience in ED	Time at this ED	Ethnic origin	M/F	Recorded	Length of interview
1	14/08/14	03S1	Nurse consultant	17 years	17 years	WB	F	Yes	42m30
2	02/09/14	03S2	F2	1 month	1 month	WB	M	Yes	22m42
3	02/09/14	03S3	F2	7 months	1 month	WB	F	Yes	18m15
4	02/09/14	03S4	Registrar	3 years	7 months	WB	M	Yes	26m46
5	18/11/14	03S5	Consultant	6 years as consultant	3 years	WB	M	Yes	53m20
6	18/11/14	03S6*	F2	3.5 months	3.5 months	WB	F	No. Partial	10m
7	27/11/14	03S7	Nurse	9 years	9 years	WB	F	No. Partial	10m
9	13/1/15	01S1	Consultant	4 years	4 years	WB	M	Yes	51m46
10	13/1/15	01S2*	Nurse	N/R	N/R	WB	F	No. Partial	15m
11	13/1/15	01S3*	Locum cons	N/R	Locum	WB	M	No. Partial	15m
12	14/1/15	01S4*	Nurse (bank, cardio)	N/R	Bank	WB	F	No. Partial	15m
13	01/02/15	01S5	Registrar	6 years	6 years	WB	M	No. Full	35m
14	01/02/15	01S6	Consultant	20 years	20 years	A	M	Yes	50m
15	01/02/15	01S7	Nurse (NR)	2 years	2 years	WB	F	No. Full	15m
16	16/04/15	01S9	Sister (AFC6)	17 years	17 years	WB	F	Yes	40m56
17	16/04/15	01S10	ENP	>20 years	>20 years	WB	F	Yes	25m26
18	16/04/15	01S11	F2	1 year	1 year	WB	F	Yes	29m10
19	17/04/15	01S12	Staff nurse	11 years	11 years	WB	M	Yes	37m33
20	17/04/15	01S13	HCA (AFC2)	6 years	6 years	WB	F	Yes	26m18
21	06/05/15	01S14	Clinical lead	15 years	12 years	WB	M	Yes (Tel)	42m10
22	23/04/15	01S15	Registrar	3 years	8 months	WB	F	Yes (Tel)	34m17
23	21/04/15	01S16	F2	2 weeks	2 weeks	WB	F	Yes (Tel)	25m33
24	07/09/15	02S1	Consultant	8 years	8 years	WB	M	Yes	32m30
25	08/09/15	02S5	Consultant	14 years	14 years	A	M	Yes	31m33
26	17/9/15	02S3	F2	2 months	2 months	A	F	Yes (tel)	19m24
27	22/09/15	02S6	Consultant	14 years	5.5 years	WB	M	Yes (tel)	71m25
28	19/11/15	02S4	FY3	4 months	4 months	A	M	Yes	14m44
29	19/11/15	02S7	ENP	20+ years	20+ years	WB	F	Yes	45m57
30	20/11/15	02S8	FY3	2 months	2 months	A	M	Yes	14m11

31	19/11/15	02S9	Staff nurse	2 months	2 months	WB	M	Yes	17m15
32	13/03/16	02S15	ANP	17 years	3 years (+prev)	WB	M	Yes	53m11
33	05/04/16	02S16	Staff nurse	3 years	3 years	WB	F	Yes (Tel)	33m44
34	29/03/16	02S18	Registrar	7 years	5 years	W, E	F	Yes (Tel)	56m04
8	27/04/16	03S8	ENP	N/R	8 months	WB	F	No	30**
	07/7/16	03S9	Charge nurse			WB	M	Yes (Tel)	28m52
	13/07/16	03S10	Staff nurse			WB	M	Yes (Tel)	39m19
Non-recruited staff (consented initially but did not take part)									
		02S17	HCA						
		02S10	Nurse (agency)						
		02S11	F2						
		02S12	Senior sister						
		02S13	Senior sister						
		02S14	Nurse						

- Not full interview. Not recorded
- Interview took place over 2 hours, but included several long interruptions. Total interview time estimated at less than 30 minutes.

Details of patient interviewees and non-recruited patients

Date	ID	Age	Gender	Ethnic origin	Condition	Length of time since ED visit	Duration
10/12/14	S3P1	N/R	M	WB	Back pain	13 days	17m54
28/1/15	S1P3	58	M	WB	Foot injury	14 days	8m58
12/2/15	S1P5	N/R	M	WB	Fall on ice. Chest/muscular pain	11 days	25m16
12/2/15	S1P4	68	M	WB	Fall on ribs. Rib pain	11 days	14m32
21/04/15	S1P11	69	F	WB	Broken ankle, WiC	3 days	8m18
23/04/15	S1P8	N/R	F	WB	Sciatic pain	5 days	25m52
23/04/15	S1P12	N/R	F	WB	Abdominal pain	7 days	12m49
28/04/15	S1P6	47	F	WB	Ovarian cyst/abdo pain	12 days	17m19
22/09/15	S2P2	49	F	WB	Trauma	14 days	25m28
18/12/15	S2 P11	50	M	WB	Fall/back pain	28 days	8m56
14/03/16	S2P24	41	M	WB	Abdominal pain	9 days	10m58
20/04/16 (int)	S2P20	60	F	WB	Gallbladder/abdo	36 days	17m19
23/05/16	S3P4	30	M	B	Shoulder pain	0 days	11m39

08/06/16	S3P6	27	F	WB	Foot injury	17 days	13m51
29/06/16	S3P7	44	F	WB	Back pain	2 months	15m55
13/7/16	S1P20	66	F	WB	Rib pain	23 days	13m58
13/7/16	S2P33	55	F	WB	Fractured humerus	2 days	20m56
19/7/16	S3P8	20	M	WB	Cracked ribs/ collapsed lung	20 days	22m23
20/07/16	S3P9	M	66	WB	Hip fracture	20 days	25m30

Non-recruited patients for interview

Date recruited	ID	Age	Gender	Ethnic origin	Condition	
10/12/14	S3P2		F	A	Back pain	Gave info sheet. Didn't hear back
13/01/15	S1P1	83	F	WB	#NOF	Called her but she was in hospital after surgery.
14/01/15	S1P2	30	F	WB	Abdominal pain	Called 22/1/15. Said she wasn't well. Phone cut off, I left a message but didn't try again.
14/01/15	S1P7	22	F	WB	Injury	Patient looked at the information sheet in the waiting room, then said she didn't feel she had anything to offer or say. Everything was good.
14/01/15	S1P9	33	F	WB	Abdominal pain	Called 3 times, no reply. Left message
07/09/15	S2P1	68	M	WB	Limb problems/pain	Tried to call, bad line, called me back. Couldn't get through again – tried 3 times
08/09/15	S2P3	24	F	WB	Pregnant abdo pain	Called, left message, no response. Didn't try again as pregnancy.
08/09/15	S2P4	61	M	WB	Abdo pain	Tried 3 times, left message on answerphone
19/11/15	S2P5	73	M	WB	Abdo pain	Called 24/11 and 26/11. Spoke to wife – said his mind is going a bit. Don't recruit.
19/11/15	S2P6	62	M	WB	Pain right hip, other pain conds.	Called 6 times over 3 days. No reply.
19/11/15	S2P7	68	F	WB	Abdo pain	Called 24/11 – still in hospital. Called 3/12, said didn't feel 'right' –c all back next week. No reply.
20/11/15	S2P8	33	F	WB	Gallstones	No response – left message on 3 different days
20/11/15	S2P9	70	F	WB	Kidney stones	Called 6 times over 3 days. No reply
20/11/15	S2P10	46	F	WB	Abdo pain	Called, explained info sheet and consent form. Said she would like to do it. Sent consent form twice –didn't

						receive it.
20/11/15	S2P12	66	F	WB	Right flank pain	Called 24/11. Consented and said she had sent consent form back (didn't receive it). Called 08/12 – said she had had infected cannula and felt too poorly to do it.
20/11/15	S2P13	55	F	WB	Abdo pain	Called 6 times over 3 days. No reply
13/03/16	S2P20	60s	F		Abdo pain	Sent consent form 24/03. She returned it. Called 05/04 & 11/04. No reply – sounded like abroad ring tone.
14/03/16	S2P21	40s	F		?Appendicitis	Called 18/3. Just had appendix out – said she was ok for me to call next week. Called 24/03 no reply. Called 05/04 no reply. Do not recruit (time)
14/03/16	S2P22		M		?Appendicitis	Called 18/03. Spoke to wife – she said he was still in hospital doing some texts but asked me to call back. Called 23/3 – still in hospital. Called 05/04 no reply. Do not recruit (time)
14/03/16	S2P23	62	F	WB	Abdo pain	Sent consent form 16/03. She called 18/03 saying she was going away and didn't want to take part.
14/03/16	S2P26	30	F	WB	Kidney pain	Called 16/3. Still in hospital- asked to call again. Called 24/3 said to call next week. Called 05/04. Sent consent form and she asked me to text to arrange a time. Texted 12/04. No reply
14/03/16	S2P27	36	F	WB	Locked knee	Signed consent form in hospital. Called 24/03, 05/04, 11/04. No reply. Texted her. No reply.
14/03/16	S2P28	25	F		Acute on chronic pain	Sent consent form 23//03.Called 05/04. No reply. Called 12/04. Said she would send the form back in a couple of days and asked me to call back in a couple of days. No reply, left message.
14/03/16	S2P29	86	F	WB	Back pain	Called 18/3. Daughter said she's not too good at the moment and agreed when I said 'shall I leave it?'
27/04/16	S3P3	58	F	WB	Back pain	Patient called me, said she'd sent the consent form and would like to speak to me, but then never returned my calls.
23/05/16	S3P5	82	F	WB	Hip pain/fracture	Patient said she didn't want to take part.
21/6/16	S1P21	18	M	WB	Shoulder pain	Left message on pager. Didn't have his

						phone number. No reply
01/07/16	S1P25	M	77	WB	Severe right wrist pain	Sent consent form. Called him back and he said he didn't want to take part.
30/06/16	S3P10	F	48	WB	Leg pain	Said she didn't want to take part
11/7/16	S2P34	F	28	WB	Ovarian/abdo pain	Called 13/7
12/7/16	S2P30	F	20	WB	Dislocated knee	Signed consent form but didn't return calls.
12/7/16	S2P31	F	38	WB	# ankle	Signed consent form but didn't return calls.

APPENDIX 8: SUMMARY OF DISSEMINATION

Publications:

Sampson FC, Goodacre S, O'Cathain A. Interventions to improve the management of pain in Emergency Departments: systematic review and narrative synthesis. EMJ 2014 doi:10.1136/emermed-2013-203079

Conference contributions:

Sampson F, O'Cathain A, Goodacre S. Whose pain is it anyway? Qualitative research exploring how the 0-10 pain score is used in practice within the adult Emergency Department. American College of Emergency Physicians Research Forum, Washington DC, USA, October 2017

Sampson FC, O'Cathain A, Goodacre S. Are we measuring what we think we are measuring? Qualitative research exploring the use of the 0-10 pain score within the adult Emergency Department. Royal College of Emergency Medicine Annual Scientific Meeting, Liverpool, UK, October 2017.

Sampson FC, Drabble S, O'Cathain A, Goodacre S. Analgesia isn't everything: are we addressing patient expectations of pain management in the Emergency Department? Royal College of Emergency Medicine Annual Scientific Meeting, Liverpool, UK, October 2017.

Sampson F, O'Cathain A, Goodacre S. Whose pain is it anyway? Qualitative research on the use of pain scoring in the Emergency Department. Health Services Research Network, Nottingham, July 2017

Sampson FC, Johnson M, Goodacre S, O'Cathain A. Why is it so difficult to improve pain management in the Emergency Department? A systematic review of Emergency Department staff views. NIHR Annual Trainees Conference, Leeds, November 2016. (Poster Competition Prize Winner)

Sampson F, Goodacre S, O'Cathain A. Interventions to improve the management of pain in Emergency Departments: systematic review and narrative synthesis. College of Emergency Medicine conference, Exeter, UK, September 2014