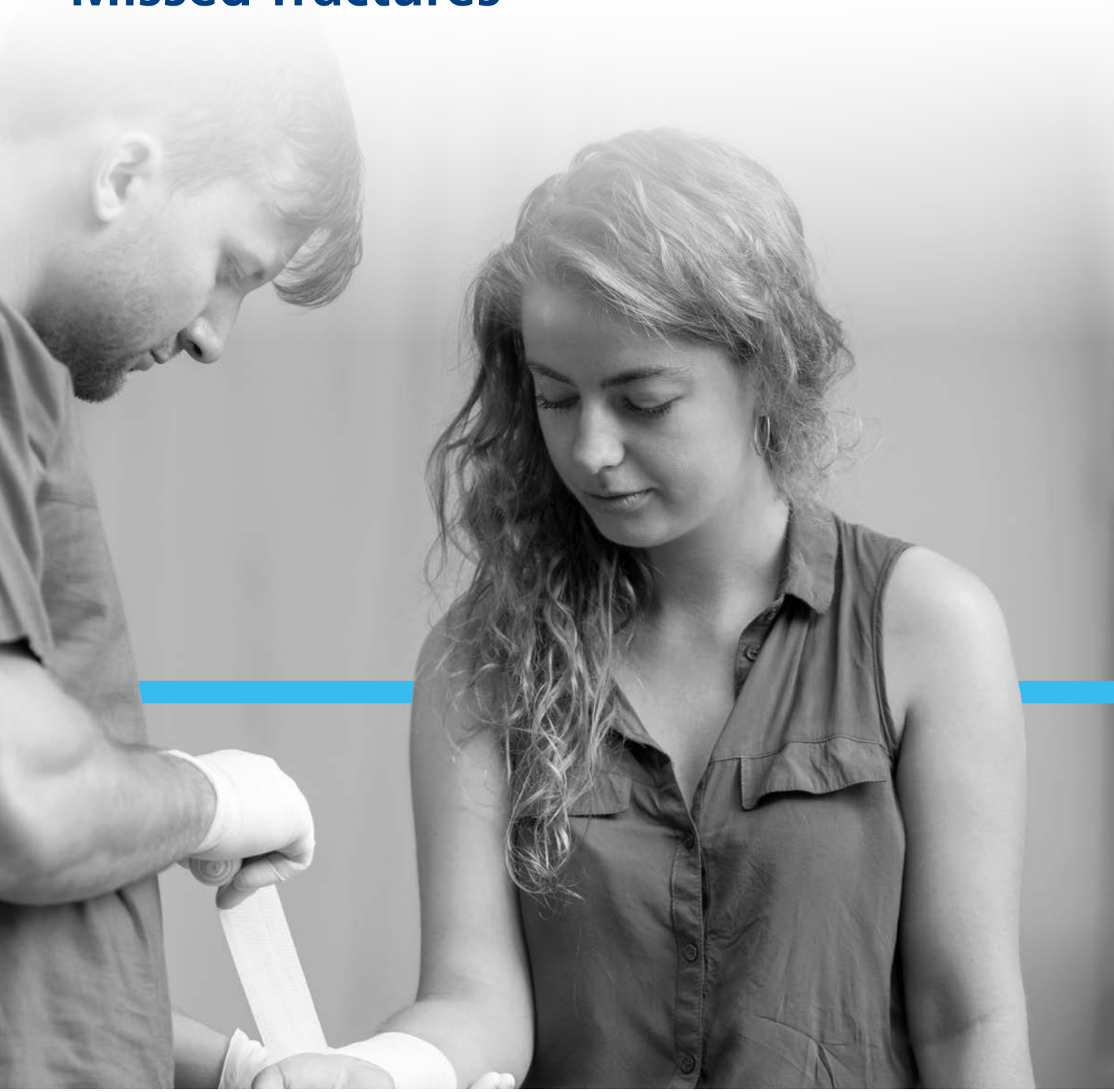
NHS Resolution

Clinical negligence claims in Emergency Departments in England

Report 2 of 3:

Missed fractures



Advise / Resolve / Learn

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NHS Resolution

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Foreword

For the past 10 years, Emergency Medicine (EM) as a specialty has occupied either first or second position each year in terms of the highest number of new claim notifications to NHS Resolution[1]. Each claim represents an episode of harm with associated financial cost to the NHS together with an immeasurable impact on patients, their families and the healthcare staff involved. The demand on emergency medicine is high and continues to grow year on year[2,3]. These claims are a valuable source of learning within the wider NHS[4].

Thankfully, while the figures for EM are high in the context of claims, they are very low in relation to overall activity in the Emergency Department (ED), with a claim occurring for only one in every 17,000 episodes of ED care.

Emergency Departments in England are very safe but clearly face unique challenges. They are the NHS's 'always open' service and must meet the health needs of a population that is both growing and ageing[5]. The needs of this patient population are increasingly complex[5]. Patients presenting to ED will often have comorbidities in addition to the problem they are attending for.

Despite this large and increasing demand on Emergency Departments the number of claims have risen broadly in line with the rising number of attendances to ED (17% rise in attendances, 23% rise in EM claims between 2010/11 and 2019/20, Figure 1). While this should be treated with caution due to the lagged nature of claims and the influence of the legal market (with claims overall peaking in 2013 due to legal reforms), the trend observed does not give reason to suggest a deteriorating picture in regards to either patient safety or claims risk in this area.

Every claim is an opportunity for learning, whether successful or not, and provides a unique lens through which to view the causes of harm; therefore it is important to consider claims both locally and nationally as a resource for improvement.

This report aims to provide clinical staff working in EDs with national learning from what NHS Resolution sees in claims across EM in England.

Given the full spectrum of care provided and the diverse patient group in EM it is not surprising that a range of themes emerged from this review. These are presented to the right in Table 1. However, there was a smaller group of consistent themes that occurred frequently and were associated with high levels of harm, namely: failings in the investigations process leading to missed or delayed diagnosis; and recognising and responding to both deteriorating and re-attending patients. Across these themes there was also an overarching issue with the provision of timely and appropriate senior review.

This report would not have been possible without input from the members of our Clinical Advisory Groups, none more so than Dr Cliff Mann OBE, GIRFT Clinical Lead for Emergency Medicine. Dr Mann sadly died in February 2021 and as an advocate for the speciality of Emergency Medicine and a leader in the NHS he will be sorely missed.

Helen Vernon
Chief Executive, NHS Resolution

Table 1. Key conclusions across three reports from Emergency Medicine series following a thematic review of NHS Resolution claims.

No.	Conclusion	Theme occurs in
1	Diagnostic errors including missing signs of deterioration, particularly for spinal and cerebral injury.	• high value and fatality related
2	Failures in the investigation process leading to missed or delayed diagnosis.	• high value and fatality related
3	Failure to recognise the significance of re-attendance to ED.	• high value and fatality related
4	Delay in accessing senior and specialty reviews, leading to missed therapeutic options.	• high value and fatality related • missed fractures
5	Communication issues impacting the escalation and handover of care and cross specialty team working.	• high value and fatality related • falls/pressure ulcers • missed fractures
6	Absence of standardised risk assessments.	• falls/pressure ulcers
7	Failure to deliver proactive nursing interventions in ED, leading to harm.	• falls/pressure ulcers
8	Inconsistent use of incident reporting and investigations as tools for learning from harm to make care safer.	• falls/pressure ulcers
9	Diagnostic error, specifically where early incorrect diagnosis prevented further investigation.	• missed fractures
10	Obtaining images to support diagnosis, including requesting, reporting, interpretation and follow up of images.	• missed fractures

The Royal College of Emergency Medicine (RCEM) welcomes these reports as learning opportunities to reduce the tragedy of preventable harm to individuals and their families as well as the staff involved. No clinician goes to work meaning to make a medical error. As specialty leaders and standard setters, we must use the stories and themes identified in these reports to focus our guidance and teaching and sharpen our advocacy for a better system of care modelled to deliver patient needs.

As well as making sure common errors are widely known about, we need to break down barriers in clinical pathways that can lead to difficult communication and delays. Emergency Departments are under pressure and fulfil every definition of an environment where there is a risk of making a mistake. It is of enormous credit to Emergency Department staff that for the most part they are so safe but as frontline clinicians we want the best care for everyone and know at times we fail.

The Emergency Department sees a greater range of clinical presentations than any other area of the hospital and the patients who present are unselected and most often unannounced. The work is high intensity both by patient volume and also often by severity and complexity. Job demands are high and frequently resources are lacking – despite Covid rules, Emergency Departments are still viewed as having elastic walls and end up holding patients until a hospital bed can be found often many hours later. Crowding is associated with patient harm and dilutes the staff resources to care for new patients. The risk of overwhelming the cognitive resources of the senior staff and demotivating all staff because they feel they cannot deliver the quality care they want to is real.

Reports like these have a responsibility to recognise the gap between what should be the standard of care and the operational pressures a service is working under in the real world. The responsibility for ensuring an adequately qualified staffed Emergency Department with the equipment needed and access to relevant inpatient specialties lies with those who plan healthcare services, but every clinician must look through a report like this. We must all think how we can eliminate patient harm by improving our knowledge and skills, teach others, advocate for better diagnostic pathways and safety net systems.

We must also get better at communicating risk and uncertainty realities to patients, so they feel involved and confident to return for review if things do not seem to be following the expected plan. We need to make sure we are following guidance that already exists, so we balance the hope of picking up atypical, rare but devastating diagnoses and the harms of over-investigation. RCEM is committed to doing everything it can to improve patient safety and reduce the use of resources needed to manage patient harm.

Dr Katherine Henderson
Royal College of Emergency Medicine President

For many patients the Emergency Department is the front door they pass through on a journey through health and care services. When things go wrong there, the impact can follow them on every step of that journey, and affect short-term and long-term outcomes. This set of reports is a valuable source of learning for health and care services, and for nursing, beyond the front door, as the themes identified here resonate more widely.

Every nurse and health care professional will have been involved in an instance when things have gone wrong for their patients; a mistake, an omission, a missed opportunity to intervene. In the majority of cases this will not go on to become a claim, but it is essential to learn from those that do.

Risk is inherent in all settings in which health care is delivered, and the need for robust, documented risk assessment is emphasised, not only to prevent harm coming to patients, but also to support staff in their practice. As this series of reports recognises, current risk assessments are all too often burdensome and time consuming, with duplicated information in a range of paper and electronic tools. A contemporary digital risk assessment as recommended in this series of reports requires true collaboration and co-creation to ensure that it reflects practice at all stages of the patient journey.

When harm does occur, the need for effective incident reporting is highlighted as essential for learning, but so too are failings in current processes, and the impact on those involved – patients, families and healthcare staff. This series of reports reference work being done in NHS England to make this process more effective, and recommends the inclusion of significant information currently lacking on the context in which incidents happen, including staffing levels, skill mix and patient acuity.

The third report in this series focuses on pressure ulcers and falls, which are recognised as nurse-sensitive indicators of quality care, and highlights a lack of proactive nursing interventions. While none of these reports explicitly examine staffing levels, they highlight other publications which have done so. The link between poor patient outcomes and the number of admissions managed by each registered nurse in the Emergency Department is in line with the strong evidence base which links nurse/patient ratios within in-patient settings.

The Royal College of Nursing (RCN) has published Nursing Workforce Standards[6] which apply across all settings, and are designed to support a safe and effective nursing workforce wherever care is delivered. Implementation of these standards within the emergency care setting would support the recommendation of this report for dedicated nursing time to deliver high quality nursing interventions.

Rachel Hollis
Chair of RCN's Professional Nursing Committee

Executive Summary

NHS Resolution is an arm's length body of the Department of Health and Social Care. Our purpose is to provide expertise to the NHS to resolve claims fairly, share learning for improvement and preserve resources for patient care. Annually NHS Resolution is notified of circa 11,000 clinical negligence claims with an estimated value of £4.5 billion.

RATIONALE

In 2020/21, clinical negligence claims associated with the Emergency Department (ED) accounted for 11% of the total number of claims notified to NHS Resolution and 5% of the total estimated value of all claims notified. In total the value of notified claims equated to £321.98 million including both estimated damages and the legal costs. The reported value of these claims is third next to obstetrics and paediatrics[7].

The impact of harm to these patients together with the volume and value of these claims have driven this deep dive into Emergency Department claims to identify common issues. Many who attend ED also have other health issues that may affect diagnosis and management and Emergency Departments provide open access to the public. These departments are often the only part of a hospital that many will see. They play an important part in caring both for those with acute illness and those with injury. Public expectation is high and increasing. Furthermore, this is a specialty that has seen a significant growth in demand with further demand anticipated in view of an increasingly ageing population and in the context where EDs are seen as a primary source of help.

We acknowledge the multi-faceted nature of emergency care; that ED claims include incidences of harm across a range of specialities and that claims are not restricted to care provided by Emergency Medicine teams. We also recognise that current coding systems do not always capture this detail. However, all claims allocated represent an incident of harm to a patient regardless of attribution and therefore these key messages apply to all emergency care settings and all emergency care teams rather than the Emergency Departments in isolation.

AIMS

EDs have a number of unique challenges and the Getting It Right First Time (GIRFT) report from NHS England and NHS Improvement[3] has provided an excellent analysis of the operational issues. This series of thematic analyses complements that report by exploring the clinical issues that contribute to compensation claims. By providing practical recommendations for clinical care, we aim to improve patient safety, which will help prevent harm and ultimately reduce the number and cost of ED claims.

METHOD

We undertook a thematic analysis of Emergency Department claims. A total of 220 claims were included in the analysis.

RESULTS

The complexity of this specialty required wider and more complex analysis than NHS Resolution has previously published. For this reason we are delivering the various themes as a series of reports, which include high value (in excess of £1 million) and fatality claims; missed fractures (report number 2); and hospital acquired pressure ulcers and falls (report number 3).

This report focuses on missed fractures.

Missed fractures occurred at sites throughout the body, with one injury emerging as a theme – hip fractures in older patients with a history of a fall. The following themes were identified as contributory factors to claims relating to missed fractures:

Diagnostic error, particularly early incorrect diagnosis of soft tissue injury.

Requests for imaging, reporting, interpretation and follow up.

Communication, team working and escalation.

Delays in care, including specialty reviews and missed therapeutic options.

RECOMMENDATIONS:

1. **Workforce:** The relevant Royal Colleges and professional bodies should continue to work together to develop and promote models that optimise use of the ED and imaging workforce to deliver accurate and timely fracture diagnosis. Providers should ensure that cross disciplinary training and supervision is provided.
2. **Models of care:** This report supports the aims of NHS England and NHS Improvement in developing care models that provide accurate and timely diagnostic pathways and that address the high demand on emergency care and imaging services.
3. **ED multi-disciplinary meetings:** The development of policy to support Emergency Medicine/radiology multi-disciplinary teams (MDTs), similar to those established within cancer care. NHS England and NHS Improvement should work collaboratively with the respective colleges in the development of consistent frameworks for MDTs and setting a national standard for their implementation within all EDs across England.
4. **Training and competence:** Given the cross professional group that is required to carry out interpretation of x-rays in an emergency setting there will naturally be variation in levels of experience, competence and expertise. A national training qualification for interpretation of emergency x-rays that was available to ED staff, radiologists and radiographers would provide the opportunity for standardisation and reduce the risk of error.
5. **Hip fractures:** The relevant Royal Colleges and professional bodies should continue to work together to prioritise accurate diagnosis of hip fractures, given the associated morbidity and mortality, the known risks for older people and the challenges in diagnosis of occult fractures. Providers must ensure that there is sufficient access to cross sectional imaging to support timely diagnosis for this patient group.

Chapter 1

Introduction

Since 2017/18, Emergency Medicine as a clinical specialty has been one of the specialities associated with the largest number of clinical negligence claims made to NHS Resolution, accounting for 11% of the total claims notified in 2020/21[7]. The estimated cost of these claims was valued at £321.91 million, including damages and legal costs[7]. This accounted for 5% of total NHS claim legal costs; the second highest number of any specialty and third in value only to obstetrics and paediatrics. Emergency care in England is generally very safe and the overall claim rate in proportion to Emergency Department (ED) episodes is very low: < 0.005% (~1400 claims for 23.8m; in major EDs the figure is closer to 16 million ED episodes per year or less than one claim for every 17,000 attendances).

There are a number of unique challenges in Emergency Medicine, including the requirement to provide care for undifferentiated acute and urgent aspects of illness and injury for patients of all age groups with a full spectrum of physical and psychological disorders. In addition, patients presenting at the ED are often characterised by multiple morbidities and polypharmacy with complex clinical presentations that require sophisticated diagnostic input and multidisciplinary care[8] connecting with almost every other inpatient speciality. Furthermore, the demand on ED and acute medical services is increasing[9].

This report complements NHS England and NHS Improvement's GIRFT for Emergency Medicine report (2021)[3]. Their report highlights the operational challenges EDs face to deliver optimum care and treatment, including: demand, activity, safe staffing and appropriate estate resource[3]. These issues contribute to the variation in outcomes identified by the GIRFT EM report (2021).

Summary of the key findings from the GIRFT EM report[3]

The GIRFT team visited a range of Emergency Departments (EDs) between 2017 and 2020, and observed a high level of variation – both unwarranted and warranted. Some of the variation they found was due to geographic, social and demographic factors. Some was also due to historical and funding issues. However, much was believed to be a result of system and operational processes, and a failure to meet the local demand for emergency care. Unfortunately, the EDs with the largest burden of deprivation and disease often had the poorest facilities and the fewest staff[3].

The GIRFT for Emergency Medicine report[3] focuses on giving providers accurate information to identify how best to meet the demand for emergency care from the catchment population. The GIRFT team developed some new metrics to interpret the data and some different ways of representing it. One such metric, the aggregated patient delay (APD), has already been adopted by NHS England and NHS Improvement's Model Hospital portal and some other metrics are also entering common usage. The Summary ED Indicator Table (SEDIT) that was developed is now available online and updated monthly, thus providing a readily available source of current and comparative information for all EDs.

Additionally, the Covid-19 situation has further stress-tested emergency care provision, throwing a national spotlight on many of the issues found in the course of GIRFT team visits to EDs over the past three years and making the case for change more urgent than ever before.

The key messages of relevance to ED claims were[3]:

- There is enormous unwarranted variation in Emergency Departments throughout England.
- There is variation in the four main GIRFT-EM domains of demand, capacity, flow and outcomes. Most of the variation in demand is due to geographical and demographic factors and is very difficult to change but variation in capacity is usually amenable to improvement.
- Flow and outcomes are dependent to some extent on the demand and capacity profile of an ED but the GIRFT-EM quadrants offer a graphical way of representing a considerable amount of ED data showing that there are many more factors at play.
- The GIRFT-EM SEDITs (Summary ED Indicator Tables) give a good oversight of the comparative metrics for every single ED in England and can be used to guide investment and improvement.

Background

NHS RESOLUTION AND CLAIMS COSTS

NHS Resolution aims to resolve and learn from clinical negligence claims, so that trusts and the wider NHS can learn from these incidents sooner to implement change and therefore mitigate future risk of harm and claims.

In 2020/21, NHS Resolution received 10,816[a] clinical negligence claim notifications[7]. Emergency Medicine accounted for 1,1517 notifications, which is similar to the previous year's claims notifications at 1,401[10]. As NHS clinical activity has continued to rise this represents a fall in claims proportionate to clinical episodes.

It is important to note that initiatives over previous years in other specialties, in particular orthopaedics, to improve safety have had some positive impact by reducing claims in those areas. This makes EM now appear high whereas the reality is that, despite increasing patient numbers visting EDs, the number of new notifications is fairly consistent (see Figure 1).

[a] Excludes data from general practice indemnity schemes.

Figure 1: ED attendances and EM claim notifications 2010/11 to 2019/20

* ED attendances (MSitAE data published by NHS England and NHS Improvement[11])

**EM claim notifications (volume of claims notified to NHS Resolution[10])

Figure 2: The total number of clinical negligence claims received in 2020/21, broken down by specialty from a total of 10,816

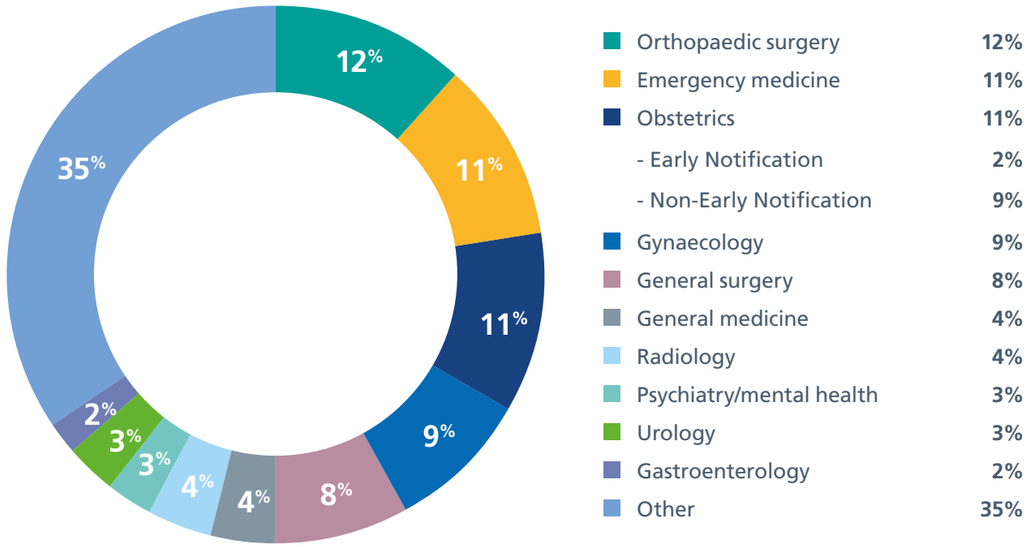
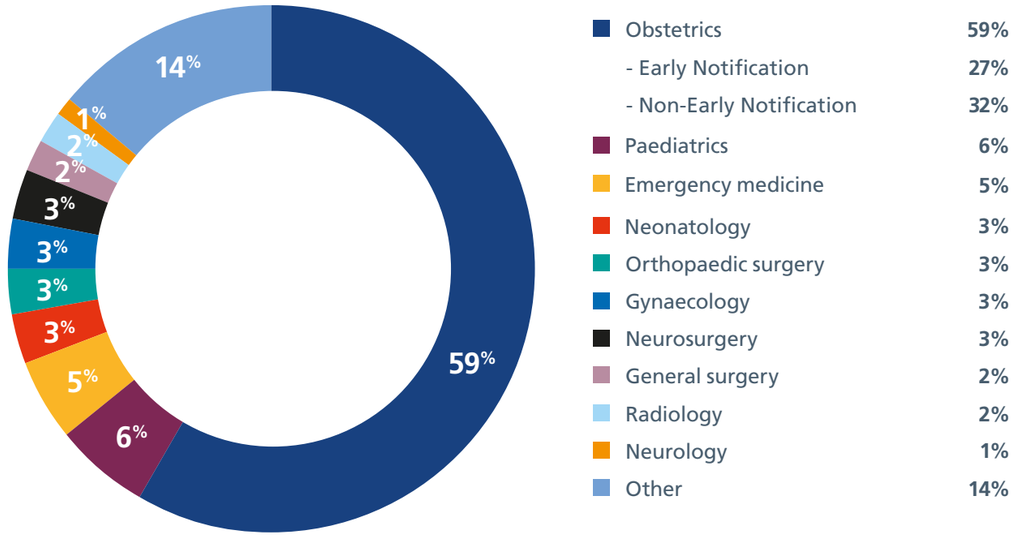


Figure 3: The total potential value of clinical negligence claims received in 2020/21, broken down by specialty from a total of £7,113.8 million



Source: NHS Resolution Annual report and accounts 2020/21 (both Figure 2 and 3[7])
These figures exclude data from our general practice indemnity schemes (both Figure 2 and 3)

Investigating claims related to Emergency Medicine within the ED provides an important vehicle to identify learning to share with EM services and the wider NHS. Moreover, the investigation aims to identify areas and priorities for research in ED system level organisation and care provision.

Once a claim is lodged NHS Resolution will investigate by obtaining witness statements and expert advice to establish firstly whether there has been a breach of the duty of care owed by the NHS trust to the patient and secondly whether that breach has caused an injury which means that the claimant is entitled to compensation. Forty-four per cent of claims resolve without compensation being paid.

Compensation is assessed and negotiated according to established legal principles. NHS Resolution aims at all times to keep cases out of formal litigation, which can be distressing for patients and clinical staff. Seventy-five per cent of claims resolve without formal proceedings and only 0.4% go to trial.

Human cost

Over and above the financial cost of claims, each successful claim represents a patient journey or experience where the NHS has failed to meet expectations or standards and patients have come to preventable harm or suffering. Patient outcomes and experiences are also highlighted as a major concern of the GIRFT-EM (2021) report[3]. Each claim is a human story and is inadequately captured in the collection and interpretation of data alone.

Although the effects of clinical negligence are primarily felt by patients and their families, the impact on staff involved can also be significant and long-lasting[12]. Clinical staff strive to provide the best possible care and the discovery that an error or omission, often made as part of a wider systemic failure, has caused a patient harm can have far-reaching consequences for frontline teams and individual staff members[12,13,14]. This can include short-term effects on practice, changes to area of practice and/or career as well as contributing to some clinicians leaving the profession completely[14]. The current difficulties with recruitment and retention of health professionals, particularly in acute specialties, underline the need to provide a supportive and compassionate environment for clinicians when they are involved in a clinical negligence case[12].

Nevertheless, there is a need for clinical accountability and a parallel 'system level' requirement to address weaknesses in policies and processes, practices, training and education, while striking a balance between accountability and a just and fair culture of learning[12]. This allows the greatest opportunity across the wider NHS to learn when things go wrong, and mitigate future risk.

Chapter 2

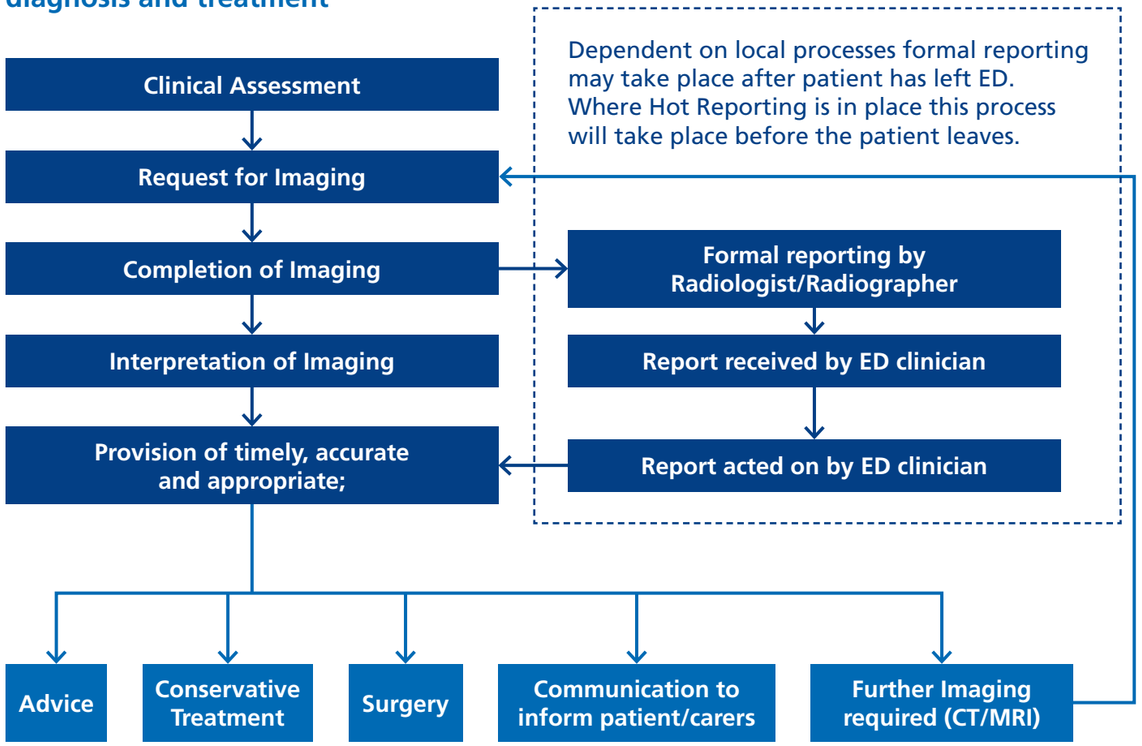
ED claims relating to missed fractures

In 2018/19 there were 1,147,822 Emergency Department (ED) attendances where the primary diagnosis was classified dislocation/fracture/joint injury/amputation[15 (Table 18)], which accounts for 5.1% of total attendances to ED.

In a very small number of cases the presence of a fracture will have been missed, and this can have significant litigation consequences. This chapter will explore 78 claims that relate to incidents of missed fractures that occurred between 2015/16 and 2017/18.

Accurate management of a fracture in the Emergency Department requires correct identification of the fracture and its extent. There are two main care pathways for the identification of fractures (Figure 4).

Figure 4: Care pathway for fracture diagnosis and treatment



The primary pathway relies on the EM clinician undertaking an initial clinical assessment and recognising the requirement for radiological investigation. Once the radiological investigation, most commonly a plain x-ray, has been completed the EM clinician is required to correctly interpret and act on the images.

There can be a second post-imaging care pathway where the images are formally interpreted by a radiologist or radiographer after the initial investigation. This provides an additional layer of diagnosis and a 'safety net' for patients where a fracture is present but not identified (missed) by the EM clinician.

Both of these pathways depend on accurate information being shared, received and acted on in a timely manner to ensure that the patient receives the appropriate treatment.

Failings at any stage of the primary pathway have the potential to cause a fracture to be missed. The consequences of missed fracture, delay receiving appropriate treatment and/or potentially missing an optimal treatment window, can range from short periods of pain and distress to longer-term loss of function and/or cosmetic change. In rare cases, there can be a tragic and avoidable loss of life.

What is a missed fracture?

In this report a missed fracture is defined as a successful claim with the following criteria:

- attendance at ED with a fracture that could have reasonably been identified and treated;
- a failure to identify and/or treat the fracture;
- this failure led to harm and/or loss for which damages may be recovered.

Caveat: This chapter does not consider acts or omissions by primary care or ambulance staff; our focus is solely for those patients that attended ED. All missed fracture cases involve EM staff and some cases will also include other specialities such as radiology and trauma, and orthopaedic surgery.

Clinical guidelines

There are a number of guidance documents that relate to the diagnosis of fractures in ED settings with general guidance on fracture management as well as injury-specific guidance. The focus of the guidelines is aimed at the assessment stage in ED, prior to requesting radiology for diagnosis.

The National Institute for Clinical Excellence (NICE) pathway for trauma includes the assessment and management of fractures, complex [NG37][16] and non-complex [NG38][17]. These guidelines cover a range of topics including pain management and safeguarding considerations as well as recommendations for imaging in a hospital setting that serve to define reasonable ED practice for our cohort. For example, NG38 states:

> "Use the Ottawa knee rules to determine whether an X-ray is needed in people over 2 years with suspected knee fractures.";
>
> "Use the Ottawa ankle and foot rules to determine whether an X-ray is needed in people over 5 years with suspected ankle fractures.";
>
> "Consider MRI for first-line imaging in people with suspected scaphoid fractures following a thorough clinical examination."[17] (Section 1.2).

In addition to the NICE pathways there are a range of guidelines to support diagnosis at specific injury sites relevant to this cohort of claims.

NICE guideline [NG41] Spinal injury: assessment and initial management[18] recommends an assessment process for indications for imaging in spinal injury. In suspected cervical spine injury, the guideline recommends the Canadian C Spine Rule[19] to determine if radiology is indicated.

The NICE guidelines for assessing thoracic or lumbosacral spine injury also recommend applying the C Spine Rule criteria with regards to age and mechanism of injury prior to radiology. There is also a general recommendation that where spinal injury is suspected imaging should be completed urgently and there should be immediate interpretation by a sufficiently trained healthcare professional as well as consultant radiologist level review, with further imaging arranged as required.

Hip fractures and threshold for imaging of older patients

NICE clinical guideline [CG124] Hip fracture: management[20] provides guidance where a hip fracture is suspected but not identified by x-ray. It recommends MRI investigation, or CT where MRI is unavailable or contraindicated. This approach is supported by trauma and orthopaedic surgery and emergency medicine standards:

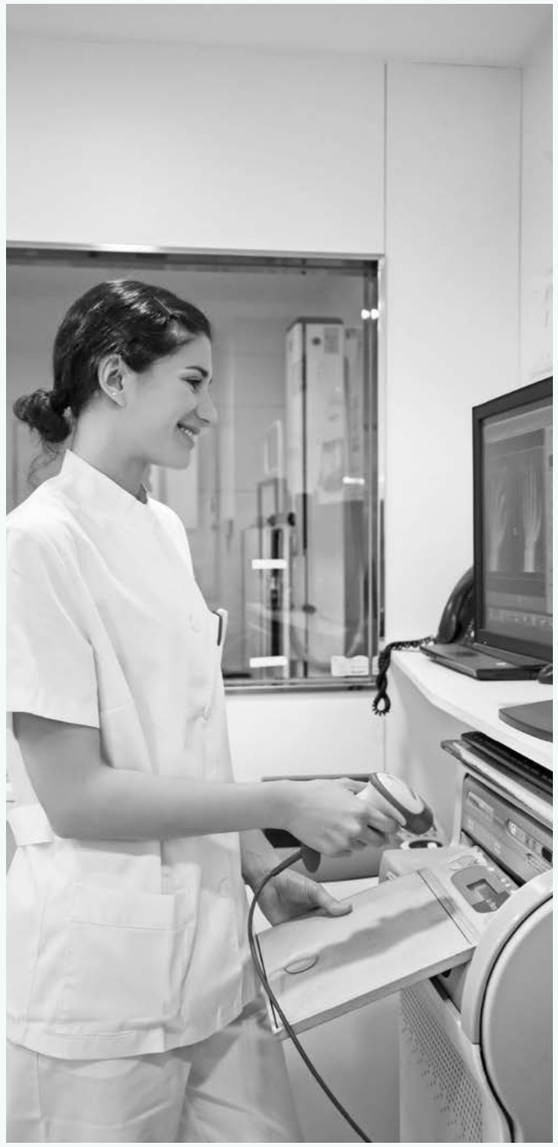
- The Royal College of Emergency Medicine (RCEM) recommends that for older patients there should be a very low threshold for radiological investigation. Specifically, when older patients have fallen, the risk of hip fracture is high and must be fully investigated.

  > "An older patient with pain in the hip following a fall must be assumed to have a fractured neck of femur until proved otherwise."[21] (Section 3 – Differential Diagnosis).

- British Orthopaedic Association standards for Trauma and Orthopaedics (BOASTs)[22,23] dictate that older or frail patients should have cross sectional imaging where a fracture cannot be excluded and that where further imaging is required it is provided in an appropriate timescale.

It should be recognised that these selected guidelines are not exhaustive and focus primarily on the activity of the ED clinician in completing an assessment, as opposed to the processes of imaging and interpretation.

There is a key limitation of these guidelines that is pertinent to this missed fractures investigation: advice is given for action when a fracture is suspected, but this is dependent on both suspecting a possible fracture and also accurate assessment. Clearly, this may not always be the case.



Standards for reporting x-rays

Standards for reporting of x-rays include NICE NG38:

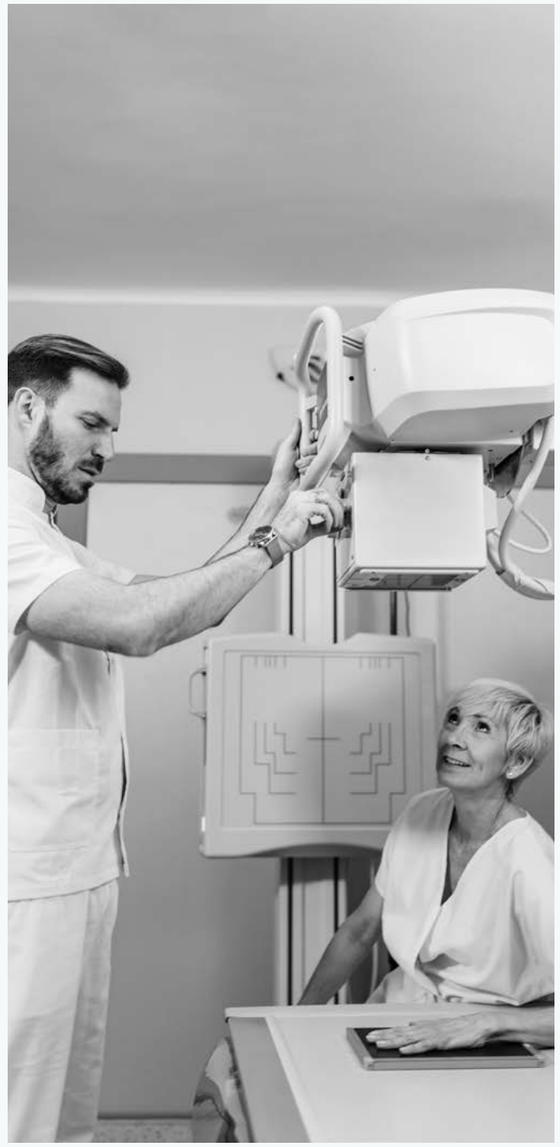
> "A radiologist, radiographer or other trained reporter should deliver the definitive written report of emergency department X-rays of suspected fractures before the patient is discharged from the emergency department."[17] (Section 1.1.9).

This recommendation is reiterated in the Royal College of Emergency Medicine's 'Management of Radiology Results in the Emergency Department':

> "All results of radiological investigations performed in the Emergency Department must be reviewed by a clinician, taking clinical scenario into account, and necessary actions taken."[24] (p.2).

The latter RCEM guideline also recommends robust systems for reporting and following up of patients that are discharged from the ED with a requirement to provide patients with the results of their investigations.

Caveat: NICE's own Resource impact report[25] acknowledges that there are resource implications of implementing its guidelines. It states that the use of MRI/CT as first line imaging in suspected spinal injuries will place demands on an already limited resource[25] (Section 3.2.2). It also states that for hot reporting there will be additional cost to provide this service out of hours[25] (Section 3.3.5). Hardy et al note that while national guidelines support immediate reporting, in practice this process is often delayed[26].



Chapter 3

Methodological approach and findings from a review of NHS Resolution claims data

Between 2015/16 and 2017/18 there were 78 successful (closed) claims in which the speciality was coded as 'Accident and Emergency' and there was a missed fracture. We have not included incidents in the same epoch where the claim remains open and/or incidents for which no claim has been made. In most cases claims must be brought within three years from the date on which the cause of action occurred or the injured person's date of knowledge, whichever is the later[27] (The Limitation Act 1980, Section 11(4)).

Due to the time lag that exists between incidents, claim reporting and claim resolution it is possible that the number of successful claims will increase in future and, furthermore, it is also possible that this cohort (n=78) may have inadvertently excluded claims with higher complexity/cost because these claims can have a longer incident to resolution time[b].

[b] For comparison, the average time from incident to claim reporting for this cohort was 348 days (range 773 days) and for all Clinical Negligence Scheme for Trusts (CNST) claims in the same period it was 792 days (range 8,334 days) (NHS Resolution data).

Cost of claims

The total cost of missed fracture claims was £1,118,972, including £469,611 paid in damages and £649,361 in legal costs (for both claimants and NHS Resolution). The table below sets out the average cost for these claims.

Table 2: Cost of missed fracture claims

	Average total cost per claim	Average NHS costs per claim	Average damages per claim	Average claimant costs per claim
Missed fracture claims (n=78)	£14,346	£1,535	£6,021	£6,790

The total annual cost of missed fractures is low as a proportion of the total cost of clinical negligence claims[c] in England and the operational budgets of the organisations that provide ED services. However, it is still an avoidable cost to NHS providers funded through their contributions to the Clinical Negligence Scheme for Trusts (CNST) and this funding could be used to improve NHS services.

Care pathway for fracture diagnosis

Figure 4 (Page 18) demonstrates the care pathways by which a fracture can be accurately diagnosed and treated. Errors or omissions can occur at any stage of the pathway leading to a fracture being missed. Missed fractures can be caused by an isolated error at any single stage of the pathway and/or multiple errors at different stages, including follow up.

[c] NHS Resolution total cost of new claims provision for 2018/19 was £8.3 billion. Average total cost per claim for CNST with incident date 2015/16–2017/18 was £65,629 (NHS Resolution data).

Case study 1

FAILURE AT MULTIPLE STAGES OF PATHWAY

The claimant attended ED following a fall in which they sustained injuries to the face, elbow and wrist. Appropriate x-rays of the wrist and elbow were completed and when interpreted by the ED clinician a diagnosis of no fracture was determined. This led to the patient being discharged without any follow up care. Two days after their attendance at ED, the x-rays were formally reported and a fracture was correctly identified. There was then a five-week delay in recalling the patient, causing an extended period of pain and suffering, stiffness and reduced function.

Decision to request imaging

Missed fracture claims are presented here in two groups; those in which an appropriate x-ray was completed and those where it was not.

Appropriate x-ray examinations were completed in 64% (n=50) of cases, with error occurring later in the pathway at interpretation or follow up action stage.

For the remaining 36% (n=28) an appropriate x-ray examination was not completed and therefore no fracture was detected. In almost all of these 28 cases the clinical examination erroneously diagnosed a soft tissue injury and therefore no further investigation was undertaken. In three exceptional cases the result of the clinical examination correctly suspected a fracture but not all appropriate x-ray views were taken, either because they were not requested by the ED clinician or the radiographer did not accurately fulfil the request.

For cases where the correct x-ray image was completed (n=50) the main point of error was the interpretation by the EM clinician of the x-ray images (n=43). The consequence of such errors was the discharge of the patient from ED without appropriate treatment or follow up care being arranged. Indeed, in several cases claimants were only able to access correct treatment when they re-attended ED with continuing symptoms.

The process of formal reporting of x-ray image by a radiologist or radiographer provides a safety net whereby any inaccurate/missed fracture diagnoses made during initial interpretation can be corrected.

In addition to access to appropriate information such as relevant history and clinical request details, this process is dependent on two key factors:

1. The clinical skill of the reporter in interpreting the x-ray;
2. A robust process that ensures the timely viewing and reporting of the x-ray, communication of this information to the treating clinician and action taken on any new or revised diagnosis.

Of the claims where an appropriate x-ray was performed (n=50), 48% (n=24) were cases of failings in the formal reporting process: 16 of these were as a result of reporter error and eight were due to a process delay meaning reporting was either not completed or not communicated in a timely manner.

In 13 cases further imaging, such as CT or MRI scan, was indicated by national guidance[d] but was not completed. In seven cases this was due to the ED clinician not recognising the need for further imaging and in the other six it was a process issue that resulted in significant delay in its completion. For example, in one case there was a delay in being able to provide a fracture clinic appointment. The ED consultant was unaware of the waiting time for fracture clinic. Had they been aware of the delay they would have recalled the patient based on a review of their x-ray.

[d] Indication for CT/MRI has been determined retrospectively by a review of claims correspondence.

As discussed previously, where an error occurs in these early stages of the care pathway it can cause a 'break in the chain', meaning that later stages are either delayed or not initiated.

In ten cases there was a failure to provide appropriate advice to patients; this mainly occurred where patients had not been cautioned regarding weight bearing/immobilisation. For example, in one case a tibial plateau fracture was recognised, but the patient was inappropriately discharged with incorrect advice.

Errors within the care pathway may occur in isolation or combination. The majority of errors occurred due to clinical judgement by the EM clinician. Almost half of all cases were related to an early incorrect clinical diagnosis meaning that no x-ray was requested at all.

Additionally, there were errors made in interpretation by the EM clinician and, to a lesser extent, in formal reporting. There were a smaller number of cases of system failure where information was not communicated, thus delaying diagnosis and treatment. For example, in one case a wedge fracture was identified when an x-ray was reported three days after attendance at ED, but the report was not received by ED so recall and treatment were delayed.

Table 3 shows the number of pathway errors identified for each claim. For the majority of claims (n=45) there were one to two errors.

Table 3: Number of pathway errors

Number of pathway errors identified	1–2	3–4	5–6	7–20
Number of claims	45	29	4	0

There was an average of three pathway errors per claim (mean=2.7, median=3).

Table 4 displays the total number of errors identified for each of the stages in the pathway described in Figure 4. The 'break in the chain' effect results in higher frequencies of errors towards the early stages of the pathway.

Table 4: Number of errors identified at each stage of pathway

Stage in pathway	Number of claims where a failure/ delay occurred
ED clinician interpretation	43
Clinical examination	25
Correct x-ray requested	24
Radiologist interpretation	20
ED clinician acts on advice	16
Correct x-ray completed	14
Further investigation	12
Appropriate advice given to patient (e.g. weight bearing status)	9
Correct CT or MRI requested	8
Orthopaedic clinician interpretation	8
Conservative treatment	6
Opinion forwarded	5
Radiographer interpretation	4
Surgery	3
Communicate diagnosis with patient/carers	1
ED clinician interpretation of CT/MRI	1
Orthopaedic clinician interpretation of CT/MRI	1
Radiologist interpretation of CT/MRI	1

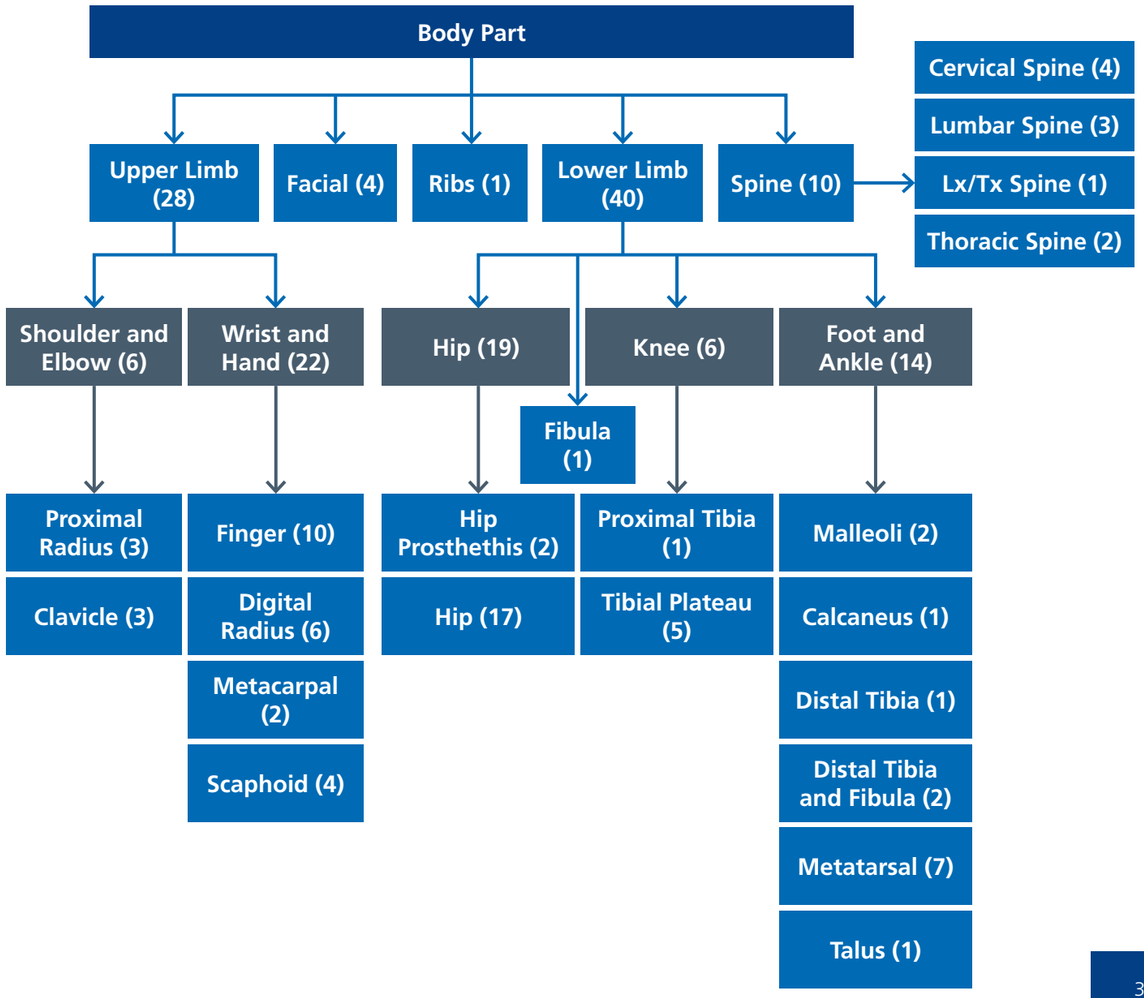
Patient demographics

The mean age of patients (n=77, one case of age not recorded) at time of incident was 51.3 years with a range of nine to 95 years. Twenty-six patients were aged 65 or over and were therefore in the ‘at risk’ group for fragility fractures. Eight patients were aged 18 years and under. There were 41 female and 37 male claimants.

Fracture site

Limb fractures were most commonly missed, particularly the lower limbs. Within the lower limb group, the hip was the single most common fracture site to be missed. With the exception of hip fractures, missed fractures leading to claims were not limited to any specific areas of anatomy (see Figure 5). General factors contributing to fractures being missed are explored below.

Figure 5. Location of missed fractures



Lower limb

Lower limb fractures (n=40) accounted for nearly half of all fractures with 19 occurring at the hip and 14 in the foot and ankle.

HIP FRACTURES

Native hip fracture

Seventeen fractures were native hip fractures, a common fracture site in older patients who have fallen: "Frequently, a fall that impacts the lateral aspect of the hip may strike the greater trochanter and fracture the neck of the femur"[28]. The mean age of patients in claims involving this fracture site was 80.6 years with a range of 64 to 95 (one patient was an outlier in the age group 45-50 years).

Correct diagnosis in this age group can be challenging due to inherent difficulties in clinical assessment, technical issues in obtaining high quality images and the fact that fractures can be obscured by demineralised bones and degenerative changes. With the exception of one patient, all had a history of falling. Given the demographic and history of this patient group, a hip fracture should have been suspected by attending clinicians, as per RCEM guidance[21] with a very low threshold for radiological investigation.

- In ten of the hip fracture cases an appropriate x-ray was completed and there was a failure by the EM clinician to diagnose the fracture.
- In six of these cases there was also a subsequent failure or delay in the interpretation by radiology or trauma and orthopaedics.
- In one case the correct x-ray was requested, but the x-ray was completed and reported for an incorrect site (the non-injured hip).
- In five cases no x-ray was completed; all of these patients were older and four had a history of falling (the exception was the outlier mentioned above; a pathological fracture with no history of falls/trauma).

Three of these cases were subject to serious incident investigations, in all of which it was concluded that the existing post-fall protocol was not followed due to lack of staff knowledge of the protocol; and in one case this was specifically attributed to the patient being in a surge area staffed by agency workers.

Hip prosthesis fracture

There were two cases of prosthetic fracture being missed. The first was a ceramic on ceramic total hip replacement. The patient had a history of rheumatoid arthritis and had undergone arthroplasty eight years prior to incident. The patient suffered a sudden onset of pain and attended ED. A hip x-ray was completed but neither the ED clinician nor radiologist identified the fracturing of the ceramic head of prosthesis. The patient was discharged and attended her GP on several occasions due to ongoing pain. Around six weeks after original attendance at ED, the patient attended a routine rheumatology appointment during which an opinion of the x-ray was sought from trauma and orthopaedics and the fracture was diagnosed. The patient underwent a washout, debridement and replacement of acetabular cup. After this incident it was recognised that a failure to compare x-ray with previous images (post-arthroplasty) was a significant factor in failing to identify the fracture.

In the second case, an ED clinician identified that a prosthesis was in two pieces (having fractured) but incorrectly concluded that the prosthesis was formed of two pieces by design and that there was no abnormality. The fracture was identified by the reporting radiologist but the initial error caused a delay in providing treatment. Again, comparing to previous imaging would have allowed a diagnosis or acted as a prompt to consult a specialist when the ED clinician is not familiar with the prosthesis imaged.

FOOT AND ANKLE

There was a range of fracture sites throughout the foot and ankle anatomy (n=14) including distal tibia and fibula, calcaneus, talus and metatarsals. Where a foot or ankle fracture is suspected the Ottawa ankle rule[29] is designed to support the diagnostic process by aiding "the efficient use of radiology in acute ankle and mid-foot injuries"[30]. In nine of these cases an x-ray was completed and therefore the rule can be said to have been followed.

- The three cases in which x-rays were not taken were all metatarsal fractures.
- In one case the ED clinician correctly identified the need for foot and ankle x-rays but the radiographer took a decision to only x-ray the ankle.
- In the remaining two cases the rule was not followed and x-rays of the feet were not taken; a patient attended with foot and ankle tenderness and mid-foot pain: fifth metatarsal tenderness was documented but only an ankle x-ray was requested. A metatarsal fracture was therefore missed. In the other case, upon first attendance to ED the patient was given a foot x-ray and no fracture was seen. With retrospective expert review it was determined that it was reasonable not to identify the fracture at this stage. However, the patient returned to ED with increased pain and swelling (the fracture had since displaced) and no x-ray was requested, contrary to Ottawa ankle rules.
- In the three cases where x-rays were not taken it is not clear whether the Ottawa knee rule was followed.
- In one case the patient was aged over 55 and so an x-ray was indicated.
- In the other two cases the specific relevant points of tenderness were not recorded; however, of note in regard to assessment of weight bearing: one patient used a Zimmer frame premorbidly and was assessed walking with this, which would not provide the opportunity to assess full weight bearing capacity in the injured leg.

KNEE

There were six fractures of the tibial plateau of the knee; in half of these cases appropriate x-rays were performed. Like the Ottawa ankle rule, the Ottawa knee rule is an aid to support efficient use of radiology[31]. It too has a high sensitivity for excluding fractures[32].

FIBULA

There was one case of a missed midshaft fracture to the fibula. In this case there were also foot and ankle injuries that were correctly investigated but because x-ray images were confined to these areas, the fibula fracture was missed.

Upper limb

There were 28 cases of fractures to the upper limb, predominantly in the wrist and hand.

WRIST AND HAND

Scaphoid

Scaphoid fractures occurred in four cases. The scaphoid is the most commonly fractured bone in the carpus, often the result of a fall onto an outstretched hand. It is more common in adolescents and young adults; older adults experiencing the same mechanism of injury may be more likely to sustain a distal radius fracture[33] (Chapter 13). It is recognised that diagnosing scaphoid fractures can be difficult because they may not appear on plain x-rays[34]. Diagnosis should be made based on a thorough history, clinical examination and multiple view x-rays, a scaphoid series, should be used. MRI should be considered as a first-line imaging technique[17].

There were four missed scaphoid fractures:

- In the first, an initial examination concluded that x-rays were indicated but a second examination did not and, therefore, no x-ray was completed. The patient later required surgery due to malunion of the fracture.
- Another patient sustained multiple injuries from a road traffic accident. Wrist x-rays were not completed and a scaphoid fracture was missed.
- One patient was x-rayed at the wrist but not with correct views for scaphoid. The ED clinician and reporting radiologist failed to identify the fracture from the image that was completed.
- In the final case, a patient appropriately had their wrist x-rayed and immobilised, but at a later date the plaster of Paris was inappropriately removed and the patient was misinformed that they had no fracture by a fracture clinic which was incorrect.

MRI was not used as first-line imaging in any of these cases.

Caveat: A 2019 survey of UK EDs by Snaith et al indicated that despite the published guidelines[17] x-ray continues to be used as first-line imaging for suspected scaphoid fractures and that there is inconsistency in the use of secondary imaging. It concludes that the management of suspected scaphoid fractures is challenging due to the number of competing pathways that rely on complex imaging, causing significant resource implications[35].

Fingers, phalanx and metacarpal

Twelve fractures occurred in fingers, affecting metacarpals and phalanges.

- In seven cases correct x-rays were taken but there was error in interpretation. There was a split between cases where the reporting radiologist correctly identified a fracture that had been missed but there was a delay in doing so, and cases where fractures were missed by both professions. These led to extended periods of pain and suffering and, in some cases, permanent limitation and need for additional surgery.
- In one case there was a long wait for a fracture clinic appointment and the ED clinician had advised that the patient must wait for this appointment. They eventually sought a private opinion and had surgery.
- In cases where no x-ray was completed there was a theme of injuries sustained from tools causing lacerations and fractures but in which only lacerations were investigated and treated. These led to infections and a need for additional surgery.
  - In one case a patient injured two fingers and assessment focused on only one finger, meaning a fracture was missed.
  - In the final case there were repeat opportunities to x-ray which were missed and led to an infection at the fracture site.

Distal radius

There were six cases of distal radial fractures. In only one case was a decision made not to x-ray due to the incorrect conclusion that a fall onto the outstretched wrist had caused soft tissue injury.

In the other five cases correct x-rays were taken.

- In one case the ED clinician reviewed a historic x-ray with a different injury and so provided the incorrect treatment.
- In all other cases there was a failure of the 'safety net': the process by which radiologists/reporting radiographers report x-rays and follow-up care is arranged as required. Delays occurred in some cases in reporting time and in others in arranging appropriate follow up.

SHOULDER AND ELBOW

Clavicle

Clavicle fractures were missed in three cases, two of which were failings of the 'safety net'.

- In one case the radiologist identified the fracture but there was a delay in reporting.
- In the second the radiologist reported that the fracture may not have been acute and as a result no follow up care was arranged.
- In the third case the fracture was correctly investigated and diagnosed. However, no information regarding the fracture was communicated to the patient/carers and appropriate immobilisation was not provided.

Proximal radius

There was one example of missed proximal radius fracture; a patient attended ED and underwent examination and x-ray; however, the fracture was missed and so the elbow was not immobilised. The patient eventually sought private care, where the fracture was correctly diagnosed.

SPINE, FACIAL AND RIBS

There were 15 missed fractures in total that occurred in areas other than the limbs.

Spine

Ten missed fractures occurred in the spine, including the cervical, thoracic and lumbar regions.

Where there is a risk of bony injury in the spine there is an associated risk of neurological damage that can have a serious and prolonged impact. There is only one case from this cohort where neurological signs and symptoms were seen; the patient attended ED with neck, head and shoulder pain.

Following a night out the patient lost consciousness on the journey home and attended ED upon waking. Tenderness over the left trapezius was recorded, but there was no cervical spine tenderness. It was also identified that the patient's behaviour was challenging and it was not easy to complete an examination. No imaging was completed. The next day the patient re-attended and was noted to have a reduced range of active shoulder movement caused by neurological deficit. At this stage x-rays and CT scans were completed and the patient was placed on an appropriate neurosurgical pathway, with treatment including traction and discectomy. The patient fully recovered from their neurological deficit and would have required the same interventional treatment in any case, but experienced an avoidable period of pain and distress.

In all other cases there were no associated neurological deficits.

Cervical spine

In three of the four cases of missed cervical spine fractures the Canadian C-spine rule appears not to have been followed.

- In the first example, a patient with epilepsy attended ED with neck pain following a seizure. There is no record of the extent to which, if at all, the patient had fallen during seizure. Such record would have indicated the presence of a dangerous mechanism for cervical spine injury. Equally, bilateral reduced active neck movement was recorded but actual range was not noted, meaning it was not possible to assess point three of the Canadian C-spine rule. No imaging was undertaken and diagnosis of neck sprain was made.
- One patient, who was older than 65, had fallen and therefore should have been imaged on this basis. This patient was advised that imaging was not needed and was provided with pain relief. Another suffered a bike collision and should therefore have been considered high risk, but no neck imaging was completed. This patient also suffered rib injuries that were appropriately investigated and treated.
- In the latter two of these cases the patient was discharged and sought private chiropractor care due to persistent pain. Imaging was provided by the chiropractor who correctly diagnosed fractures.

Thoracic or lumbosacral spine fractures

There were six cases of missed fractures occurring in the lumbar and thoracic spine.

- In the three cases where an x-ray was completed appropriately there were failures in the 'safety net'/follow up pathway.
- Two of the fractures were initially missed by an ED clinician, then appropriately identified by a radiographer/radiologist but the lack of a robust follow up process caused delay in treating the patient.
- In the third case an x-ray was taken that did not show a fracture, but given the presenting condition and history of spinal pathology further imaging should have been completed to confirm the diagnosis and this did not take place.

In the further three cases imaging was not undertaken. Of interest, the age of this group was mainly just below 65; the age at which they would have been placed in the high-risk indication group for imaging. In all cases there were opportunities and indications to x-ray that were not taken, resulting in delayed diagnosis.

One of the cases was subject to a local incident investigation in response to a complaint. This short form investigation noted the patient's history of a fall from stairs but does not recognise that this should have been an indication to x-ray; neither did it reference the care provided against any internal or external guidelines. Therefore, the learning from this incident to prevent reoccurrence was limited.

Facial

There were four cases of missed facial fractures.

- In one case an x-ray was requested but did not detail all required views. The result of this was that a fracture was missed and the patient was provided with only a routine maxillofacial appointment. This delay limited treatment options and the patient was left with a cosmetic deformity.
- In the further three cases, initial imaging was correctly undertaken but there were failings in the follow up processes post-imaging.
  - One facial fracture was missed by both radiologist and ED clinician and only identified one month later when the patient returned and was x-rayed again.
  - In another case a fracture was correctly identified and intended for referral to ENT but this referral was not made and the window for realignment was lost.
  - In the final case the ED clinician identified the need for further imaging (CT scan). They then incorrectly interpreted the CT and discharged the patient without follow up. The fracture was identified two weeks later when an ED consultant reviewed the CT scan.

Ribs

There was only one case of a missed rib fracture. In fact, rib fractures were identified; however, there was an under appreciation of the severity of injury. Following a patient's fall through a roof, a CT scan was undertaken, and some rib fractures were noted but the patient was discharged without advice or analgesia. They re-attended three days later and were again discharged, but then supported back from their car by a staff member due to high pain levels. A further CT scan was completed and the patient was admitted to hospital.

Harm

The previous section explored the original site of fracture. The following section explores the extent and type of harm that occurred as a result of the fracture being missed.

Table 5 displays the frequency of different types of harm. While many claimants will have experienced two or more categories of injury and indeed every claimant will have experienced pain/suffering to some extent, the table displays only the most significant or long term category for each claimant.

Table 5: Nature of harm

	Pain/ suffering	Loss of function	Additional procedure(s)	Cosmetic deformity	Fatality	Nerve damage	Prolonged recovery
Number of claims	61	5	5	3	2	1	1

For the majority of claimants (78%), the most significant harm was a period of pain and suffering. In nearly every case this related to the period of time between first presentation (where a fracture was missed) and the point at which the fracture was correctly identified and appropriate treatment could begin. In these cases, patients were able to access the same treatment and ultimately make a similar recovery as if their fracture had been identified in the first instance.

In eight cases (10%) there was a long-term loss of function or cosmetic deformity. This was often the result of a 'missed treatment window' where intervention could have successfully reduced a displaced fracture. By the time a fracture was identified bone healing had occurred in an uncorrected position and could not be remedied.

Case study 2 provides an example of cosmetic deformity resulting from a missed fracture.

Case study 2

COSMETIC DEFORMITY

The patient attended ED following a fall onto their face. They complained of pain, particularly when eating, and had bruising to their face. On examination a facial fracture was suspected and an x-ray was taken. The x-ray was reported as no fracture and the patient was discharged with no follow up care. Seven weeks later the patient was examined by their GP who identified ongoing swelling and made a referral to Oral and Maxillofacial Surgery. A further four weeks later the patient attended an Oral and Maxillofacial Surgery where it was identified that there had been a fracture and that it had healed in its current position. By this time it was not possible to carry out the surgery which would have corrected the position of the fracture and the patient was left with a permanent facial disfigurement.

Case study 3

FATALITY

An older patient attended ED following a fall at their care home. X-ray investigations were completed and reviewed by two EM clinicians who erroneously concluded that no fracture was present. But the patient had suffered a fractured neck of femur. The patient was discharged the following day. In the following five weeks the patient continued to attempt mobilisation, resulting in excruciating pain. At this stage their GP reviewed the x-ray and identified the fracture. The patient was admitted to hospital under the care of trauma and orthopaedic surgery for a hemiarthroplasty. Sadly, shortly after this their health deteriorated and the patient died. While this patient would have had significant morbidity and mortality risk factors following a fractured neck of femur in any event, it was recognised that the long delay in providing treatment had a significant impact on the outcome.

Chapter 4

Emerging themes and recommendations

Missed fractures can occur at sites throughout the body. In many cases these involve minor injuries where there is a delay in receiving appropriate treatment as a result of an early, incorrect diagnosis of a soft tissue injury. Distinct from this group are missed hip fractures which are major injuries with increased associated morbidity and mortality. Therefore this report makes four general recommendations in relation to missed fractures and a final specific recommendation for the subset missed fractures, hip fractures.

In reviewing this data the author has had the benefit of a retrospective lens on closed, successful claims. It is easy to identify individual incidents of error in care, as these will have been examined as part of a claim in determining if medical negligence has taken place. What is harder to determine from this data is the wider factors present including the known issues faced in the Emergency Department such as demand, capacity and outflow. These recommendations are made on the basis of the data reviewed with an acknowledgement of the wider factors that influence ED activity. A range of other publications including the GIRFT Emergency Medicine report[3] explore these wider issues.

A further challenge in making novel recommendations from this data is avoiding an exercise in statement of the obvious. By definition a missed fracture occurs when there is error or interruption in the correct diagnostic pathway. If EDs all had optimum workforces (sufficient in numbers, experience, competence and stability), optimum communication (intra and inter speciality) and access to optimum imaging and reporting, there would be limited opportunities for error to occur in this pathway. However, recommending such improvements would be accurate but not insightful or deliverable.

This report references a number of existing standards and guidelines. In many of the claims that were reviewed, following such protocols would have prevented error from occurring. Therefore, this report does not propose new or improved standards/guidelines but rather recognises that there are challenges in implementing the existing advice, which is likely due to the issues discussed above. Departments should ensure that any local policies and procedures support their use and these are established in induction training and are the subject of clinical audit. Where no such tool is available the practitioner must rely on their history taking and examination skills to guide decision making.

The following themes were identified as contributory factors to claims relating to missed fractures:

- Diagnostic error, specifically where early incorrect diagnosis prevented further investigation.
- Obtaining images to support diagnosis, including requesting, reporting, interpretation and follow up of images.
- Communication, team working and escalation.
- Delays in care, including specialty reviews and missed therapeutic options.

Contributing factors to claims relating to missed fracture included problems with history taking, clinical assessment and examination, competence of practitioner for clinical examination, ensuring EM clinicians hold the sufficient skills and knowledge, training, supervision and support.

Delivery of care should be modelled locally to support the provision of optimal emergency care and accurate and timely diagnostics.

Risk factors for fragility fractures and mechanism of injury are important considerations. When making a diagnosis of soft tissue injury without an x-ray investigation the clinician must be satisfied that they can rule out the presence of a fracture.

If they cannot they should seek advice or complete further investigation. EM clinicians should remain vigilant to the risk of fracture, particularly in all patients with a history of trauma and especially in older patients with a history of a fall.

A number of recommendations are presented with the aim of reducing the number of fractures being missed.

Theme 1: Workforce

The fracture diagnosis pathways described in this report rely on staff from EM, both medical and nursing, radiology, radiography and trauma and orthopaedic surgery. Each of these specialities face their own challenges in activity and resourcing. Equally, in each staff group there will be factors that create vulnerability to error in a fracture diagnosis pathway[36,37].

There are already many positive models of care that demonstrate optimal use of the workforce to support fracture diagnosis pathways, including the use of reporting radiographers[38] and of Emergency Nurse Practitioners (ENPs)[39] and Extended Scope Practitioner (ESP) Physiotherapists[40] in managing minor injuries in ED. These models utilise the more static elements of the workforce. This approach can support organisation memory, which can facilitate a learning culture and provide safer care[41,42].

Recommendation 1

National

- The relevant Royal Colleges and professional bodies should continue to work together to support and develop models that make best use of the ED and Imaging workforce in delivering optimal fracture diagnosis pathways. This includes consideration of cross specialty supervision and identifying opportunities for cross speciality agreement on the best way to deliver the many existing standards[43,44]. This report supports recommendation 5.10 of the independent review of diagnostic services[45] to increase the imaging workforce, including the requirement for a further 500 reporting radiographers over the next five years.

Local

- Providers should work with their 'Integrated Care Systems' (ICS) partners, other regional networks and GIRFT to identify examples of positive deviance[46] in making the best use of the workforce in fracture management pathways. They should ensure that cross disciplinary training and supervision is provided as required. Over the next five years providers should develop both advanced practitioner and assistant practitioner radiography job roles. This will enable them to meet the demands of reporting plain x-rays and to take on existing radiography workload respectively.

Theme 2: Models of care

While the pressures faced by EDs which were outlined in the introduction to this chapter continue to provide a challenge in delivering care, there are existing and emerging models which can support the safer and more effective fracture diagnosis pathways.

Same day emergency care (SDEC) and Community Diagnostic Hubs

SDEC and Community Diagnostic Hubs are models by which the NHS is aiming to improve the delivery of care by providing services at the best time and place for patients[47,48]. For emergency care this presents the opportunity to provide optimal diagnostics, reducing imaging delays in ED, separating emergency and elective diagnostic pathways and providing care away from acute hospitals in community hubs.

The 2020 independent review of diagnostic services[45] promotes the role of reporting radiographers in order to meet the workforce requirement that would result from reforming diagnostic services. In addition, it supports the provision of diagnostic services that can reduce the burden on acute hospital sites.

Reporting

Interpretation of imaging is a critical stage in achieving accurate diagnosis of a fracture. Any diagnosis and advice should be clearly communicated to patients and carers. This should include advice in cases where a diagnosis is unclear with a plan made for further investigation and interim treatment/management. GMC guidance[49] on consent makes provision for consenting for treatment including the fact the intervention may not achieve its treatment aim. Keeping patients informed of the limitations of imaging could help support patients and clinicians to make joint decisions in regard to an ongoing diagnostic and treatment pathway.

EDs must ensure that they employ robust processes to guarantee appropriate recall and follow up for patients that are discharged from the department. This demands good communication systems both between clinicians themselves and between clinicians and patients, and a workflow that allows tasks to be completed in a timely manner.

Safety nets

A standardised 'safety net' protocol would support trusts in ensuring that reporting takes place in a timely manner by a competent clinician, the appropriate information is shared with ED clinician and patient, and advice is acted upon[50].

Hot reporting

Hot reporting is an established practice in some organisations where x-rays are reported by a radiologist or, in some cases, radiographer before the patient leaves the ED[17] (Section 1.1.9). Hot reporting reduces error by removing the possibility of omission or delay in reporting that takes place at a later date[51].

It is clear from these claims and from the literature[26] that this is not a system in operation across all EDs, and in fact a delay in radiology reporting was the significant factor in a number of cases.

Remote reporting

Remote reporting is one approach that can support the provision of 24/7 radiology cover and thus expedite reporting/support a hot reporting model[52]. The provision of such service requires access to appropriate IT equipment, particularly appropriate display screen equipment and secure remote connection[53,54]. There must also be a consideration of working practices, culture and staff wellbeing in delivering a different model of care[55].

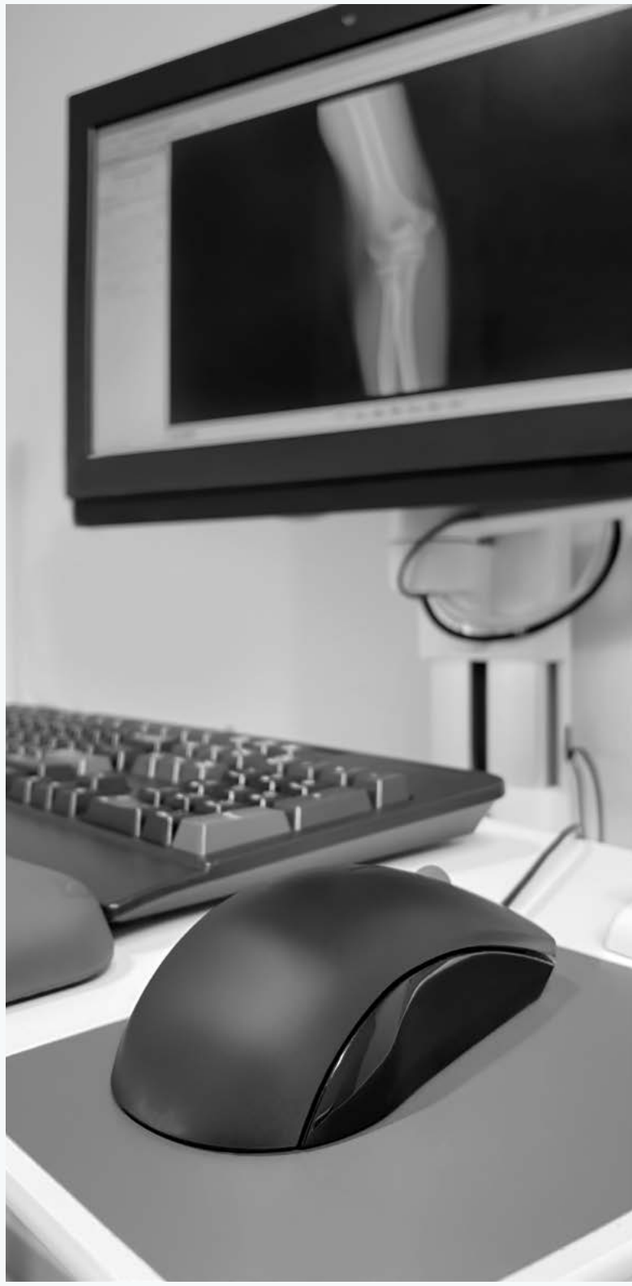
Recommendation 2

National

- This report supports the aims of NHS England and Improvement in developing care models that provide accurate and timely diagnostic pathways and that address the high demand on emergency care and imaging services[47,48].

Local

- Providers should consider the services which they provide directly and opportunities to work in partnership within their ICS to identify how the models of care detailed above can be delivered locally to provide the best emergency care and accurate and timely diagnostic pathways. This includes the provision of SDEC services at least 12 hours a day, 7 days a week in line with the timescales set out by the NHS long term plan[56]. There should be an increase in CT scanning capacity over the next five years. These changes will improve access to cross sectional imaging where scaphoid or hip fractures are suspected. As well as improving imaging capacity/access in the next five years, providers must have sufficient clinical governance processes to ensure that cross sectional imaging is used appropriately to support diagnosis in these two injury groups.



Theme 3: ED multidisciplinary meetings

The introduction of multidisciplinary review meetings for local EDs has the potential to improve outcomes as well as improve both patient and staff experience. A review of the introduction of multidisciplinary teams (MDTs) reported enhanced teamwork and addressing the risk of 'silo' working between health professionals, an improved communication between the different levels of healthcare workers which in turn reduced morbidity/mortality[57].

Regular multidisciplinary meetings between specialities, including ED senior clinicians and radiology/diagnostics should be held to discuss cases, build trusting relationships and support team building.

Review teams should be multidisciplinary to ensure that the full breadth of up-to-date clinical guidelines from across specialties relevant to the care provided are considered.

This approach is supported by the previously cited RCEM guidance:

"The Emergency Department and the Radiology Departments are encouraged to hold regular meetings to review requesting protocols, timeliness of reporting and volumes and trends of requests particularly with regard to non-plain film X-rays"[24] (p.2 Recommendation 8).

Recommendation 3

National

- The development of policy to support Emergency Medicine/radiology MDTs, similar to those established within cancer care[58]. NHS England and Improvement should work collaboratively with the respective colleges in the development of a consistent framework for MDTs and setting a national standard for their implementation within all EDs across England.

Local

- Providers must promote a culture of learning and collaboration to support clinical staff in working together to identify and address areas of development in a way that supports the best outcomes for patients and staff.

Theme 4: Training and competence

All clinicians with responsibility for the interpretation and/or reporting of x-rays should be competent and confident in their ability to do so. They should take part in regular training and case reviews in conjunction with the radiology department. When facing complex or challenging cases they should seek appropriate senior or specialist assistance. Where this is not immediately available they should ensure that patients are provided with interim information and advice and that sufficient plans for follow up are made.

Decision to request imaging: when requesting x-rays clinicians must be confident of the correct views to investigate the suspected diagnosis. If they are uncertain they should seek senior or other speciality advice. In addition radiographers must be able to clinically justify exposures and work with members of the MDT to share information and seek clarity where required[59].

Recommendation 4

National

- Given the cross professional group that is required to carry out interpretation of x-rays in an emergency setting there will naturally be variation in levels of experience, competence and expertise. A national training qualification for interpretation of emergency x-rays that was available to ED staff, radiologists and radiographers would provide the opportunity for standardisation and reduce the risk of error. This could be delivered in the next five years in line with the proposed changes to workforce and care models detailed previously.

Local

- Providers should ensure that there is sufficient local training to support staff in gaining and maintaining competence in interpretation. Staffing levels must allow clinicians to access senior review and specialist opinion where required.

Theme 5: Hip fractures

As previously discussed, missed fractures relating to the hip form a distinct group in terms of severity of injury and in proportion of injuries for all missed fractures in this cohort.

As set out in chapter 2, National guidance on hip fracture management[20] includes provision for further timely investigation, specifically cross sectional imaging, where a hip fracture is suspected but x-rays are negative. This is further supported by orthopaedic[22,23] and EM[21] standards also cited in chapter 2. In summary, there is a range of guidance that supports correct diagnosis of hip fractures including for patients where a fracture is not detected by plain x-ray.

This review of claims has demonstrated that there is a small cohort of patients in which hip fractures are still missed or diagnosis is delayed. Given the morbidity and mortality associated with hip fractures, any such error can have a significant impact on patients.

Recommendation 5

National

- The relevant Royal Colleges and professional bodies should continue to work together to prioritise accurate diagnosis of hip fractures, given the associated morbidity and mortality, the known risks for older people and the challenges in diagnosis of occult fractures.

Local

- There is sufficient evidence and guidance to support the accurate diagnosis of hip fractures[20]. Providers must ensure that staff have both the expertise and resources to apply these. Staff working in ED require sufficient training and support to make an accurate diagnosis utilising patient history and risk factors, clinical presentation, diagnostic imaging and access to specialist support where required.
- The GIRFT Radiology report[60] highlights the high demand for cross sectional imaging. It also advocates community diagnostic hubs and increasing reporting activity for radiographers as reflected in the first two recommendations of this report. Providers must ensure that there is sufficient access to cross sectional imaging to support timely diagnosis for this patient group.
- Providers should prioritise this patient group, highlighting the potential for misdiagnosis, the associated risks and the human and financial risks associated with clinical negligence litigation.

Conclusion

Although claims related to missed fractures are relatively low volume and low financial value, missed fractures present a real financial cost to the NHS and can have a serious and prolonged impact on both patients and the staff who treat them.

In recent years, there has been an increase in the availability of senior ED doctors[61] and also an increase in emergency cross sectional imaging, particularly CT[62]. By their nature, compensation claims always lag behind care and outcomes and therefore the impact of these improvements in senior ED and imaging access may not yet be reflected by a reduction in claims. We will continue to monitor our data to determine any temporal changes in rates going forward.

However, there are a number of emerging themes arising from these cases and we have presented a number of recommendations with the aim of improving safety and reducing harm and subsequent claims.

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Glossary

Available at: https://resolution.nhs.uk/glossary

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