Royal College of Physicians

National Hip Fracture Database (NHFD)

Facing new challenges

The National Hip Fracture Database report on 2020

In association with

BGS British Geriatrics Society Improving healthcare for older people

British Orthopaedic Association

Royal Osteoporosis Society Better bone health for everybody

Public Health England

Commissioned by

HQIP Healthcare Quality Improvement Partnership

Foreword

The COVID-19 pandemic dominated 2020, but while this caused our social behaviour to change immensely, hip fractures kept on happening. The National Hip Fracture Database (NHFD) therefore provides a window into our health service, and one through which anyone can look. Those on the inside are aware of this and have responded to this scrutiny.

However, as we look through this window we should do so in considered fashion. It has been said that 'unless you are very fortunate, you only find what you look for', so we should look at these findings with care. We should also remember that windows can be dressed so we should interpret these data within context. Anyone reading this report will be keen that injured older people living with frailty receive the best possible care and will be impressed by the clinically driven and caring nature of its contents.

The NHFD and best practice tariff have proved to be a potent force for beneficial change. However, in these times of competing priorities, and the appetite for system change, we should assume nothing. We should each play our part not just to treat patients today but support those parts of our system which will best help us to improve their treatment tomorrow.

Secondary fracture prevention will not depend on changing behaviour but responding effectively to a first fracture. Knowing whether bone health has been assessed after a first fracture is not the same as knowing that any required bone protection treatment has been provided and complied with. The proposed new KPI (key performance indicator) 7 is designed to address this issue.

Hip fracture data are an excellent indicator of the service provided for hip fractures, but unfortunately cannot be presumed to be a barometer of care for all injured frail people. As professionals there is no doubt that it is our aspiration to treat all patients with similar needs equitably, and this is quite rightly what those patients would expect. However, there is a natural tendency to perform to the target. To counter this we need to not just encourage good care for all, but monitor it. To this end it is welcome that the NHFD is evolving to capture more data on periprosthetic and other non-hip fractures of the femur.

The multidisciplinary team (MDT) is a cornerstone of modern medical management. To receive the benefit of the MDT the patient needs to be admitted promptly to the right place; wards have staff with the particular skills best suited to care for those patients they are expecting to admit. In general, the rate of admission to an appropriate ward within 4 hours is poor, the proposed new KPI 'zero' is designed to encourage this to change.

The NHFD is wonderful and should be cherished. It has made a major contribution to the transformation in attitudes to, and the care of, people with hip fractures.

Bob Handley
British Orthopaedic Association president and GIRFT clinical lead adult orthopaedic trauma

Report at a glance – key messages

All eligible trauma units in England, Wales and Northern Ireland regularly upload data to the NHFD. This report describes the care provided to the **63,284 people** who presented to **173 hospitals** in England and Wales following a hip fracture during 2020.

This report uses six NHFD key performance indicators (KPIs) to describe how the quality of care varies between hospitals and changes over time. The impact of COVID-19 on patient care and the organisation of trauma services are also described.

30-day mortality was **three times higher** for patients with COVID-19 than seen in those without the infection.

30-day mortality **rose to 8.3% in 2020** meaning that over 1,000 more people died during this first year of the COVID-19 pandemic than we would have expected had the mortality figure of **6.5%** we reported in 2019 been maintained.

We have **launched new casemix data quality run charts** and cross-tabulation tools to make it easy for local teams to review the data they provide.

Performance on most KPIs remained stable, or experienced small transient dips, during the COVID pandemic of 2020 – a testament to the resilience of hip fracture services.

Introduction

2020 will be remembered as the year that a virus pandemic brought the world to a standstill, stretching countries' economic and healthcare resources to their limits. We all lost patients, and many of us lost colleagues, friends or family members. This report serves as a testament to the determination and dedication shown by multidisciplinary teams around the country during this time.

Even the process of caring for and grieving for those with COVID-19 infection and other non-COVID-19 related health conditions required careful navigation of legally imposed barriers and restrictions.

Hip fracture is an ideal condition with which to audit, understand and improve the hospital care of older people living with frailty. It is the commonest reason for older people to need emergency anaesthesia and surgery, and during 2020 became the focus of attention as a marker of how emergency and elective orthopaedic surgery and rehabilitation services responded to the new challenges posed by COVID-19 and the recovery from this healthcare crisis.

Since the National Hip Fracture Database (NHFD) was established in 2007 it has pioneered a system of collaborative multidisciplinary care driven by continuous quality improvement (QI) that is the envy of countries around the world.

Anaesthesia, surgery, nursing and rehabilitation after hip fracture are so successful that clinical staff continued delivering them, even when conservative approaches were being considered for many other injuries, and in spite of the personal challenges they faced in doing so.

All trauma hospitals regularly upload data to the NHFD website. This report is less a presentation of the data for 2020 than an opportunity for us all to reflect on an extraordinary year.

The NHFD website is designed as a QI platform, making a wealth of data freely available to clinical teams, managers and the general public. The website data are always published as soon as possible, and in many cases are 'live' so that clinical teams can use them in their day-to-day clinical work.

This report aims to guide readers through the website's resources using links to specific information, graphs and tabulated data that are highlighted throughout. A glossary accompanying the report is available on the FFFAP website.

A message from the chair of the Patient and Carer Panel

On behalf of the Patient and Carer Panel of the Falls and Fragility Fracture Audit Programme, I'm very grateful to have this opportunity to say a heartfelt thank you to the many teams who, despite the risks to their own health and wellbeing, did everything possible to provide high-quality care for hip fracture patients during COVID-19.

The data in this report, and every individual patient they represent, are testimony to your professionalism, tenacity and commitment. They tell of your bravery and the personal and professional sacrifices you made in caring for people who would have been particularly vulnerable to the virus.

As COVID-19 took hold, and most of us took refuge in enforced isolation, you faced the virus head on. Many of you will have lost family, friends and colleagues, and some of you will still be on the road to recovery from the emotional and physical impact of caring for patients under intensely challenging conditions.

Whatever part you played throughout 2020, the difference you made resonates from every page of this report.

Julia Kay Ellis
Chair of the FFFAP Patient and Carer Panel

Summary report on 2020

Key resources for the reader

This report uses the set of six NHFD key performance indicators (KPIs) to describe how the quality of patient care varies between hospitals and changes over time.

These KPIs provide an accessible summary of an individual hospital's performance (Fig 1) in areas the NHFD has shown to be key to patients' experience and the effectiveness and outcome of the care they receive.

They are designed to complement the range of data on assessment, operative care, rehabilitation, follow up and outcome presented in the benchmarking tables, run charts and dashboards publicly available at www.nhfd.co.uk.

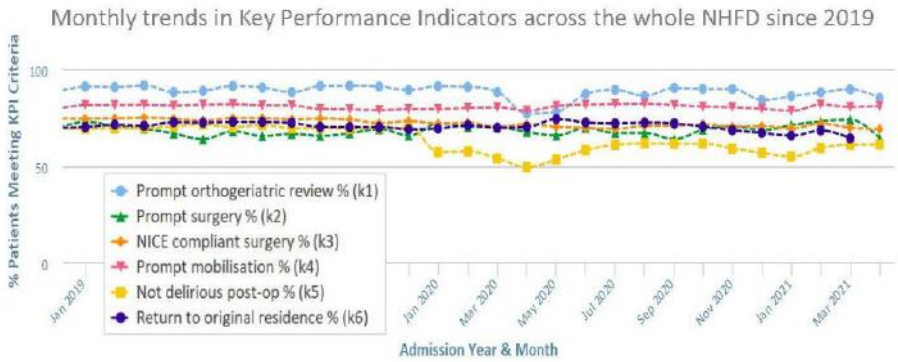


Fig 1. Hip fractures presenting in 2020: the proportion of all 63,284 cases which presented each week.

Key findings and recommendations

Learning lessons from the first wave

This section summarises key findings from the main body of this report on hip fracture care in 2020 and draws 11 recommended actions from those findings.

COVID-19

Monitoring the impact of the pandemic

In 2020 the NHFD recorded 3,730 patients as having COVID-19 either at the time of their presentation, or being diagnosed following admission. For these patients, 30-day mortality was three times higher than seen in those without the infection.

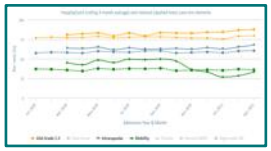
Overall, 30-day mortality rose to 8.3% in 2020 meaning that over 1,000 more people died during this first year of the COVID-19 pandemic than we would have expected had the mortality figure of 6.5% we reported in 2019 been maintained.

The impact of the COVID-19 pandemic was reflected in the NHFD's casemix-adjusted 30-day mortality run charts. These are updated quarterly and provide real-time information that hospitals can set against new COVID-19 run charts (available once logged into the database) that display the prevalence of this infection among the patients for whom they care.

Recommended action 1

Clinical leads should examine their mortality run charts as soon as they are released each quarter.

A rise in mortality towards the 95% control line should trigger a review of the unit's KPI run charts and a case note review, to identify actions on which local QI should focus to avoid further rise and the risk of the hospital becoming an outlier.



Data-driven quality improvement

Continuously improving the quality of NHFD data

Any national clinical audit must receive high-quality data if it is to be an effective driver for local quality improvement and the development of national policy. The NHFD has always achieved excellent case ascertainment and has launched new casemix data quality run charts and cross-tabulation tools to make it easy for local teams to review the data they provide to the NHFD and use on its website.

Recommended action 2

If mortality run charts show a major difference between crude and casemix-adjusted mortality, clinical leads should examine their casemix run charts to ensure the data they provide are complete and high quality.

If there are inconsistencies with data provided by other units, they should review the way these data are being recorded in patients' records and coded for the NHFD.

Key performance indicator 1

Will I see both an orthopaedic surgeon and a medical specialist after breaking my hip?

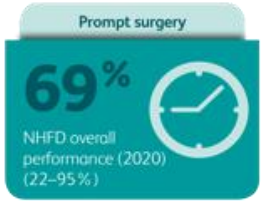
The COVID-19 pandemic led to major changes in where and how hip fracture services were delivered, with staff redeployment, isolation and illness particularly affecting orthogeriatric support in many units.

Prompt orthogeriatric assessment was affected in the first wave, but units rapidly re-established orthogeriatric support, with early data suggesting less impact in the second wave so that KPI 1 remained at nearly 90% over the year as a whole.

Recommended action 3

Clinical leads should examine their position regarding 'prompt orthogeriatric review' on the KPI 1 caterpillar plot for 2020.

If this is red, they should discuss this in their monthly governance meeting questioning how their orthogeriatricians are supported and whether there is a need for further investment in a service central to NICE guidance.



Key performance indicator 2

Will my operation be done today or tomorrow?

Changes in response to the COVID-19 pandemic meant that the seniority of staff in theatre increased slightly and use of spinal anaesthesia also increased. There was a transient increase in non-operative management at the start of the first wave, but this did not continue and KPI 2 was unaffected over the year.

Recommended action 4

Sites should examine their position regarding 'prompt surgery' on the KPI 2 caterpillar plot for 2020.

If this is red, at their monthly governance meeting they should discuss the reasons for delay in operation as submitted to the NHFD. These reasons should then be made the focus of a specific QI project before the next meeting.

Key performance indicator 3

Will my surgeon offer the operation recommended by NICE?

NHS guidance at the time of the first wave led to a small reduction in the number of people receiving total hip replacement, compounding an existing trend that was a response to recent trial data. Use of intramedullary nails continued to increase with less justification and means that KPI 3 fell by 3% over the course of 2020.

Recommended action 5

Clinical leads should examine their position regarding 'NICE compliant surgery' on the KPI 3 caterpillar plot for 2020.

If this is red, the surgical clinical lead should use their new NHFD fracture vs operation cross-tabulation tool to check the accuracy of the data they are providing.

They should also review their surgery run chart to identify a focus for local QI work – for example, to examine and protocolise implant choices for treatment of A1/A2 trochanteric fractures.

Key performance indicator 4

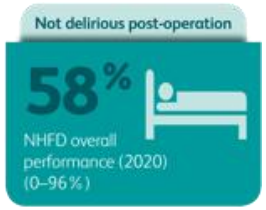
Will I be able to get out of bed by the day after my operation?

Public awareness of the risks of COVID-19 led to a huge collaborative effort by hospital teams, families, carers and other organisations resulting in average overall length of stay falling from 20 days to just 15 days at the height of the first wave. This effort ensured that a prompt start to rehabilitation was maintained, so that KPI 4 was unaffected by the first wave and maintained at 81% across the whole year.

Recommended action 6

Clinical leads should examine their position regarding 'prompt mobilisation' on the KPI 4 caterpillar plot for 2020.

If this is red, the physiotherapy lead should review the reasons submitted to the NHFD for failure to mobilise patients on day 1 post-op at the next monthly governance meeting. These data can then be used as the basis for a root cause analysis to identify issues on which a local QI project should focus.



Key performance indicator 5

Will you check that I do not become confused after my operation?

At the start of 2020 the NHFD made the criteria for KPI 5 more stringent, requiring the assessment to be performed within 72 hours of surgery. This led to a fall in KPI 5 attainment. Temporary disruption to orthogeriatric services during the first and second waves led to a further fall, but KPI 5 recovered between these waves to achieve figures that were better than those recorded immediately before the onset of the pandemic.

Recommended action 7

Clinical leads should examine their position regarding 'prompt delirium assessment; on the KPI 5 caterpillar plot for 2020.

Units that are at either extreme of the caterpillar plot should review the quality of 4AT assessments and consider specific training for the relevant clinical staff.

If the unit is red, then the orthogeriatric lead should review whether this reflects a failure to screen for delirium or whether rates of delirium are truly higher than those reported by units in which screening is routine. Any identified causes should be made the focus of a local QI project.

Key performance indicator 6

Will you check that I get back to live in my usual home?

Patients continue to view returning home as a priority. Collaborative working means that despite the pressures on hospital teams, community services and care homes through the course of 2020, hip fracture teams continued to record that 70% of people successfully returned to their usual home by 120 days.

Recommended action 8

Clinical leads should examine their position regarding 'return to original residence' on the KPI 6 caterpillar plot for 2020.

If this is red then the orthogeriatric clinical lead should consider the completeness of discharge information, particularly if rehabilitation is frequently provided by another organisation. The need for a 120-day follow-up should also be questioned as this has a role in improving both KPI 6 and the new KPI 7.

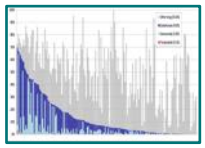
Supporting patients and carers

Keeping the patient at the heart of the work of the NHFD

The Patient and Carer Panel of the Falls and Fragility Fracture Audit Programme has developed new resources: Your hip fracture: all about your hip fracture and what to expect on the road to recovery and Hip fracture: a guide for family carers. These are freely available online and on the NHFD website.

Recommended action 9

All sites should consider how they might signpost these NHFD patient and carer resources in posters and in the written information that they should be routinely providing to patients and their families.



Developing new KPIs

Extending NHFD reporting to the earliest and latest stages of hip fracture care

The NHFD continues to record extreme variation in the quality of the care provided in different hospitals.

Rates of admission to an appropriate ward within 4 hours and of provision of preoperative nerve blocks both ranged from 0% to around 90%.

The use of injectable osteoporosis medication to prevent future fractures ranged from 0 to 67% in units around the country. Many units continue to provide no follow-up support to ensure that their patients are able to keep taking medication to avoid sustaining a further fragility fracture in the future.

Two new KPIs are proposed that will specifically challenge this variation in care.

Recommended action 10

Clinical leads should study their assessment benchmark table and their anaesthesia run chart to examine these aspects of the care offered in the earliest stages of patients' time in hospital.

The orthogeriatric clinical lead should also look at the bone protection table to consider how their approach compares with other units in their local networks.

They should also consider the follow-up they offer to support patients' persistence with medication, and any potential for links with local Fracture Liaison Services to improve the secondary prevention care and information their patients receive.

Periprosthetic and other femoral fractures

New data for the 2021 annual report

Universal acceptance of the value of orthogeriatric review for patients with hip fracture means that in 2020 this care was already being provided to the same proportion of the 2,606 people with periprosthetic femoral fracture.

However, in 2020 we found that orthogeriatric support was provided to less than one-fifth of people with shaft and distal femur fractures.

Prompt surgery and mobilisation can be less easy for many patients with these types of fracture, and figures for all three injuries fall short of those achieved for hip fracture.

Recommended action 11

Hospitals should ensure that patients admitted with non-hip femoral fractures receive the same prompt multidisciplinary care afforded to those with hip fracture, to allow them to benefit from the well-evidenced improved outcomes this brings.

To allow immediate weightbearing and the best chance of return to pre-fracture function, hospitals receiving patients with periprosthetic femoral fractures should ensure local and regional protocols exist to ensure such patients receive the prompt, specialist-performed surgery required.

Understanding hip fracture care in 2020

Case numbers

This report describes the care provided to the 63,284 people who presented to the 173 hospitals in England and Wales following a hip fracture during 2020, a slightly smaller number than in 2019 (65,646).

At the onset of the pandemic in March and April 2020 some hospitals contacted the NHFD to report increasing or decreasing case numbers.

However, once hospitals around the country had caught up with retrospective NHFD data entry there was little suggestion of a major change in total numbers of patients presenting with hip fracture during the first wave (Fig 2).

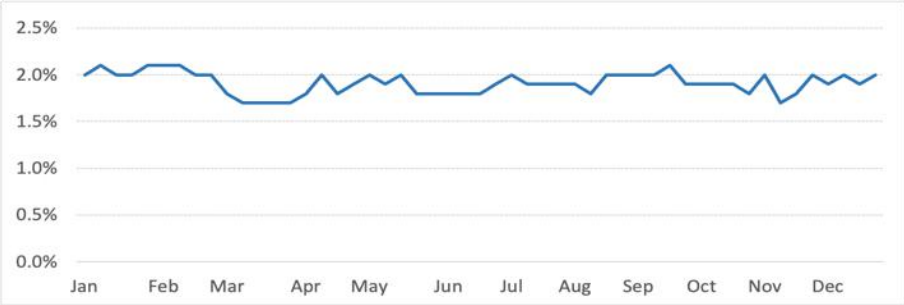


Fig 2. Hip fractures presenting in 2020: the proportion of all 63,284 patients who presented each week.

Case ascertainment

The NHFD typically receives data on more cases than are captured by Hospital Episode Statistics (HES) and Patient Episode Database for Wales (PEDW), so these sources cannot be viewed as a 'gold standard' for case ascertainment.

Instead, the NHFD comments on submissions in previous years, so hospitals can consider whether these indicate any shortfall in data entry in the current year.

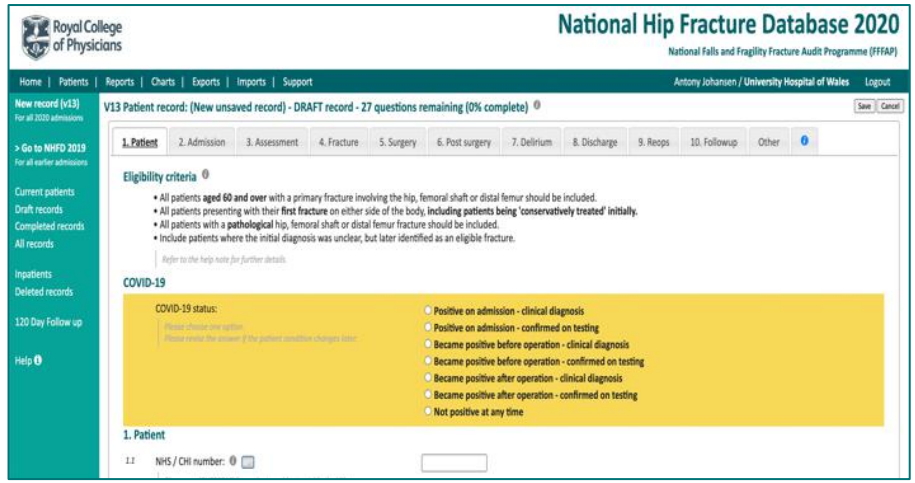
For this report, this is the number of patients submitted in 2020 compared with the number in 2019. This gives a sense of the extent to which some units diverted some or all of their work to other sites, hospitals or hospital trusts, and how new hospitals started providing hip fracture care in response to the pandemic.

COVID-19 – capturing data

In response to the pandemic the NHFD asked participating hospitals to record their patients' COVID-19 status from May 2020, with retrospective updating of COVID-19 status for earlier cases. We are grateful to those who captured and reported these data as they provide a unique picture of this aspect of the global challenge.

In the early phase of the pandemic access to reliable and accurate testing was less established, and to build a more accurate picture of the evolving impact of COVID-19 the NHFD allowed patients to be recorded as 'clinically positive but not on testing'.

Patients are categorised as 'positive on admission', 'positive preoperatively', 'positive post-operatively', or 'not positive at any time'.



Hip fractures represent a global public health challenge, and the impact of COVID-19 is likely to endure in all healthcare systems for the foreseeable future.

As the largest dedicated database of hip fractures in the world, the NHFD is uniquely positioned to support studies into outcomes of COVID-19 in this frail inpatient cohort, with several projects already underway that will add to the

growing portfolio of publications based on data from the NHFD and the Falls and Fragility Fracture Audit Programme in past years.

Reporting of COVID-19 status allows the NHFD to capture the incidence of the infection among the patients who were admitted during the pandemic and to report this straight back to the clinical teams in each hospital, using real-time COVID-19 run charts (Fig 3).

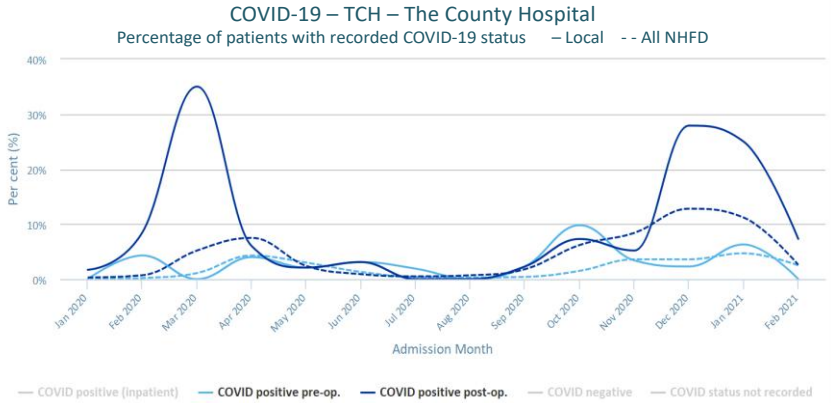


Fig 3. Illustration of the new COVID-19 run chart made available to local clinical leads.

These run charts allow the NHFD to take the local picture of COVID-19 infection into consideration when analysing and reporting on mortality rates.

During 2020, the NHFD recorded 3,730 patients with COVID-19 infection (Fig 4) but the true number of infections is likely to be substantially greater than this as data capture was incomplete, with missing data for one-third of cases.

Of these patients, 1,091 (29%) were positive on admission or before surgery.

In the remaining 71%, the diagnosis of COVID-19 was made after surgery, but unless this was substantially later it will not be certain whether the patient had contracted the infection before or after presenting with hip fracture.

If we are to define the impact of COVID-19 on care and outcome then the precise chronology of infection needs to be recorded, so for 2022 our next dataset update will need to include a new field: 'Date of earliest confirmed COVID-19 positivity'.

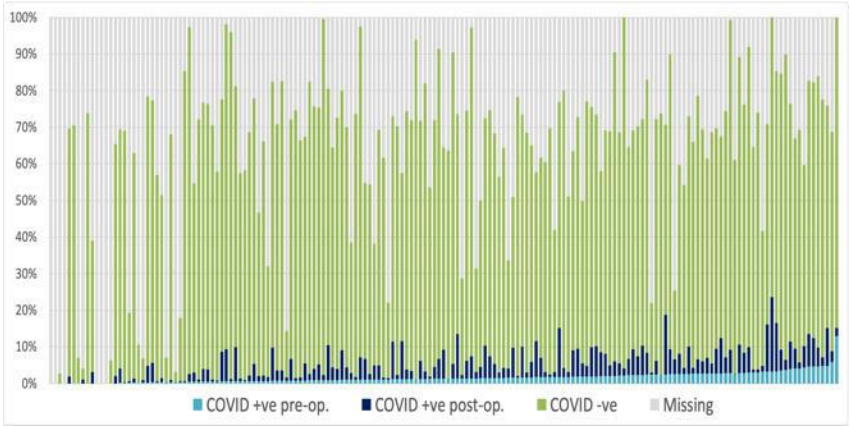


Fig 4. Variation in recorded COVID-19 status for patients from each of 173 different hospitals in 2020.

The rapidly developing pandemic meant that it was not possible to anticipate the way in which it might affect individual trauma services across the year.

In April 2020, we ran a questionnaire and responses from staff in 67 trauma hospitals were used to guide the development of the NHFD's annual 'facilities survey'.

The rollout of this survey was brought forward from January 2021 to October 2020, so that we could capture hospitals' experiences of the first wave of COVID-19.

We were delighted that 164 hospitals (95%) responded to this survey; their responses are available to download from the NHFD website and key findings of the survey are included at appropriate points throughout this report.

During March–May 2020 a total of 28 hospitals (17%) reported that they arranged to divert some or all new hip fracture admissions to a different site for surgery. In 13 of these this was to a different site in the same NHS trust, but in 11 it was to a new trust, and in four it was to a private hospital.

To help clinical teams mitigate the threat of future waves of COVID-19 we aim to explore health system factors which may have contributed to this variation, by integrating these individual patient data with those of the COVID-19 survey.

COVID-19 – patient characteristics

The first wave of the pandemic had a major impact on patients and staff in care homes: almost 40% of all patients who were COVID-19 positive on admission or prior to surgery were admitted from residential or nursing homes, compared with 17% of those admitted who were not positive at any time.

Compared with patients who remained COVID-19 negative, those who were COVID-19 positive at or following presentation with hip fracture were more likely to be male, suffer from cognitive impairment, have a higher American Society of Anaesthesiologists (ASA) grade (a classification of a patient's pre-anaesthesia medical comorbidities), or be recorded as malnourished / at risk of malnutrition on admission (Fig 5).

These factors are each also associated with other health problems that might put patients at greater risk of COVID-19 infection, but malnutrition is of particular importance as it is a modifiable risk factor and a potential target for intervention.

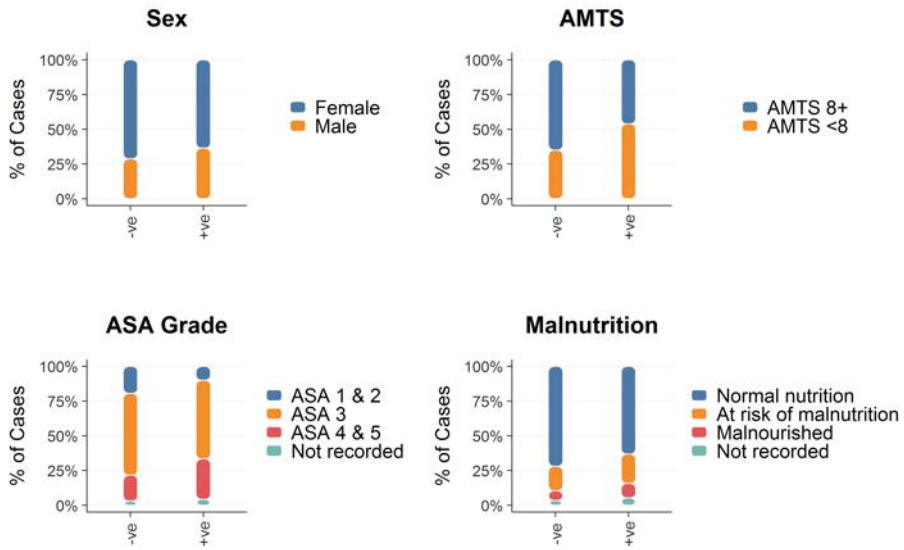


Fig 5. Comparison of patients who were/became positive in the first wave with those who were negative. AMTs = abbreviated mental test score; in which a score <8 suggests cognitive impairment

COVID-19 – length of stay

In 2019 we recorded means of 15.2 days for acute ward length of stay (LOS) and 19.3 days for trust LOS.

Fig 6. Run chart of how acute and overall length of stay (days) changed over the months since 2019.

These figures underwent rapid changes during the first wave of COVID-19, falling to 11.7 and 14.5 days respectively in May 2020 (Fig 6).

The momentum of rehabilitation was maintained at the onset of the pandemic, as ward teams, patients, families, carers, social services and other organisations all worked together in response to their concern that it would be safest to get patients out of hospital as quickly as possible.

Indeed, while staff redeployment reduced how many patients were seen by an orthogeriatrician, there was no reduction in the proportion assessed by a physiotherapist and successfully mobilised by the day after surgery.

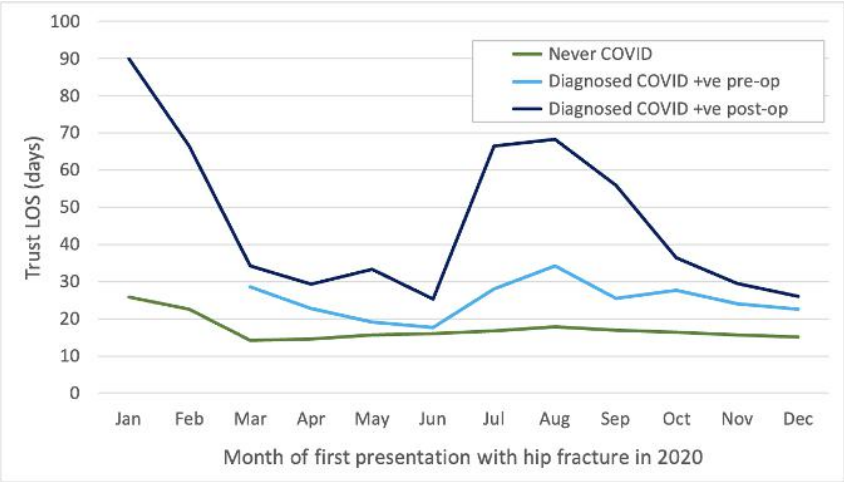


Fig 7. Run chart of mean length of overall trust length of stay across the NHFD since 2019.

The impact of this effort is most clearly shown for those patients who remained COVID-19 negative, for whom LOS halved at the onset of the pandemic and was maintained at a substantially lower figure across the remainder of 2020 (Fig 7).

People who were already infected with COVID-19 when they first presented with hip fracture unsurprisingly recorded longer LOS – figures that were around twice as long as those who remained free of the infection.

The picture is more complicated for people in whom COVID-19 infection arose following surgery. The very high LOS for patients who presented in January and February 2020 reflects the fact that these individuals must have already been in hospital for a prolonged period to still be there to acquire COVID-19 following the arrival of the first wave in late February. Similar considerations apply to the summer months prior to the arrival of the second wave.

As described previously in this report, updates to the NHFD dataset from 2022 will allow us to define the precise timeline of COVID-19 infection among hip fracture patients and will support further work in this area.

COVID-19 – mortality

Significant differences in patient characteristics make direct comparison of mortality between COVID-19 positive and negative patients complicated and are the subject of ongoing research linking NHFD with other national datasets, and work in other national audits, eg emergency laparotomy.

Our previous NHFD annual report showed that inpatient mortality was four times higher for patients who developed COVID-19 than it was for those who did not develop the infection.

The picture is similar when we consider 30-day mortality. This was three times higher if hip fracture was complicated by COVID-19 infection (Fig 8).

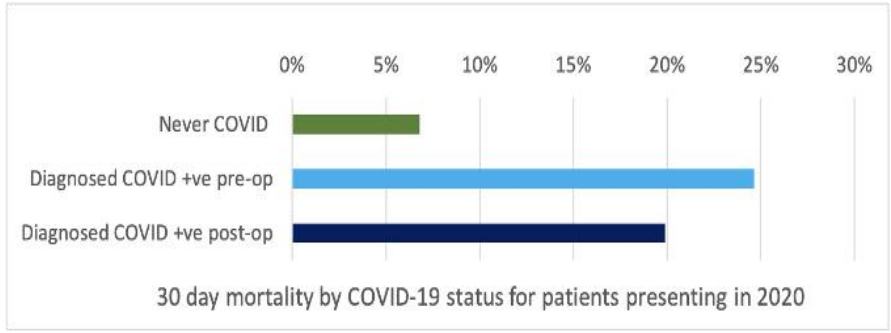


Fig 8. 30-day mortality and COVID-19 status for people presenting with hip fracture in 2020.

COVID-19 is likely to have a continuing impact on hip fracture mortality even after discharge from hospital, particularly as a substantial proportion of patients will require ongoing institutional care.

The excess mortality attributable to COVID-19 is likely to be even greater than that captured by the NHFD audit and is the subject of ongoing research using NHFD data.

These findings are consistent with those of numerous papers which have been published since the pandemic began, many of them performed using individual hospitals' NHFD data (Johansen and Inman 2020).

Casemix-adjusted 30-day mortality

This year's analysis of mortality within 30 days of hip fracture included a total of 62,619 patients from 171 trauma hospitals in England and Wales.

Overall, 30-day mortality rose to 8.3% in 2020 (8.3% in England and 7.4% in Wales). This figure implies that over 1,000 more people died during this first year of the COVID-19 pandemic than we would have expected if the mortality figure of 6.5% we reported in 2019 had been maintained.

Comparison of hospitals' mortality must take into account the potential impact of key factors such as the age, sex, ASA grade, fracture type, pre-fracture mobility and residence of the people who were admitted to each hospital.

In 2020 the NHFD pioneered a new approach to outlier analysis that allowed hospitals to monitor their casemix-adjusted mortality in real time.

The new casemix-adjusted mortality run charts are updated quarterly and run a few months in arrears to allow linkage to validated Civil Registration Data on mortality.

The charts are publicly available so that local clinical teams, health service managers and organisations such as the Care Quality Commission (CQC) all have immediate access to them.

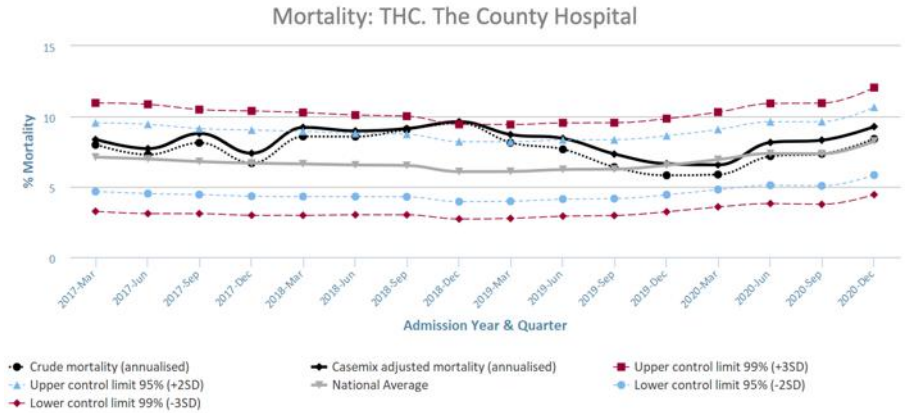


Fig 9. The 30-day casemix-adjusted mortality run chart for an individual hospital.

Crude mortality is casemix-adjusted using the same validated model (Tsang *et al* 2017) as in previous years, but this model is refined each quarter and the model coefficients updated accordingly.

Clinical teams should refer to our guide to casemix-adjusted mortality run charts which explains how to understand charts like the example illustrated in Fig 9.

Local teams therefore no longer need to wait for an annual report to find out whether their casemix-adjusted mortality is outside these limits, as they can see this each quarter and respond immediately.

NHFD's outlier policy explains how such findings are shared with local teams, chief executives, medical directors, the CQC and Welsh government and is summarised below:

Each quarter, the NHFD identifies all those hospitals in which mortality over the preceding calendar year is above the upper 99.8% control limit: a threshold which corresponds to three standard deviations (SD).

- Hospitals are notified the first time their mortality rises above this control limit, so that they can consider appropriate action, including examination of the quality of their data.
- Hospitals which remain above the control limit for two or more successive quarters trigger an 'alarm' and are formally considered as 'mortality outliers'.
- The run charts also identify hospitals with mortality above the upper 95% (2SD) limit. In any analysis of around 170 hospitals some will fall outside such a limit simply as a result of expected statistical variation, so clinical leads are made aware of this finding, but these hospitals are not managed as outliers.

Where there is an indication of poor performance we recommend that hospitals should consider a British Orthopaedic Association peer review (contact policy@boa.ac.uk for more information).

Outlier hospitals for 30-day mortality in 2020

Last year's annual report identified two hospitals as outliers for mortality in 2019. Both hospitals received our advice and support, and as a result both improved their mortality such that neither were outliers for 2020.

- Over the course of 2020, 10 hospitals moved above the upper 99.8% (~3SD) control limit for casemix-adjusted 30-day mortality. In three hospitals this occurred at the end of 2020 and the local clinical leads were notified so that they could take early action, as remaining above this limit in the subsequent quarter would lead to their hospital being identified as an outlier.
- Six hospitals' mortality run charts remained above this control limit at the end of 2020. Five hospitals (Chesterfield Royal (CHE); East and North Herts (ENH); Northern General, Sheffield (NGH); Queen Elizabeth the Queen Mother (QEQ); and York District (YDH)) had casemix-adjusted mortality that stayed above the upper 99.8% limit for three quarters, and one (University Hospital of North Durham (DRY)) for the last two quarters of 2020.
- Trends in crude mortality recorded by all six triggered an 'alarm' and all have been identified as 'outliers' for casemix-adjusted 30-day mortality.

One of these hospitals (CHE) had crude mortality that was over the 95% control limit, but moved above the 99.8% limit after adjustment, as local casemix data suggested that the hospital was dealing with an unusually fit population. This may accurately reflect the local population, but this hospital was advised to review the quality of its ASA data, something that previous annual reports have encouraged all hospitals to do on a regular basis.

The effects of COVID-19 have dominated changes in mortality figures in 2020, but all six outlier hospitals show a consistent trend of increasing crude- and casemix-adjusted 30-day mortality that preceded the start of the COVID-19 pandemic.

It is not possible for casemix adjustment to take account of this amid an evolving pandemic, with treatment options and outcomes for COVID-19 infection changing over the year. However, all six outlier hospitals provided excellent data on the prevalence of COVID-19 infection among their preoperative patients.

The COVID-19 run charts for three hospitals (CHE, DRY, NGH) suggest that the proportion of patients admitted with hip fracture who were already infected with COVID-19 was substantially higher than the average across the NHFD. This additional challenge may have contributed to the 30-day mortality reported by these hospitals and is not a factor over which these hip fracture teams would have had any control.

This consideration may be less true for COVID-19 infections which develop during patients' time in hospital. In five outlier hospitals (ENH, NGH, QEQ, DRY, YDH) the majority of COVID-19 cases were post-operative patients.

All of these hospitals were contacted by the NHFD, supported to review their data, and advised on how they should respond to their 'outlier' status.

Over the course of 2020 clinical staff in several other hospitals were made aware when their casemix-adjusted mortality was above the upper 95% (~2SD) limit. We have also congratulated staff in numerous other hospitals where mortality was lower than usual: falling below the lower 95% limit.

Data quality run chart

The NHFD has introduced a new data quality run chart (Fig 10) that will allow local clinical leads to see whether the casemix data they are providing are consistent with the data provided by other hospitals in the country.

Any substantial difference from the national picture should serve as a prompt for local clinical leads to review the way in which casemix data (in particular ASA grade and pre-fracture mobility) are being recorded by the clinical team and coded by local NHFD data collectors.

Fig 10. New run chart showing how casemix data for one hospital compares with NHFD means.

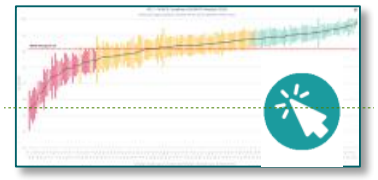
Key performance indicator 1

Will I see both an orthopaedic surgeon and a medical specialist after breaking my hip?

***Definition*:** Is the patient assessed by a consultant, staff or associate specialist (SAS), or specialist trainee geriatrician within 72 hours of presentation?

There is compelling evidence that comprehensive geriatric assessment (CGA) improves outcome: early orthogeriatrician review helps avoid delay in surgery, improves perioperative care and expedites rehabilitation and discharge planning.

There was huge variation in how likely a patient was to receive such care in 2020, with hospitals reporting figures that ranged from 1–100% of patients.



Teams should view the KPI 1 chart to compare their performance in this respect.

Staff in the hospitals identified in red on the KPI chart need to question why they were failing to provide care that is so crucial to outcome, and examine local arrangements for delivering the orthogeriatric support that was the central cost-saving recommendation of NICE CG124, and has underpinned improvements in hip fracture care since then.

The units at the extreme left of the KPI 1 chart include a small number in Wales which have yet to establish an orthogeriatric service, along with others where such support seems to have been compromised by the COVID-19 pandemic.

The 164 units (95%) which replied to the NHFD COVID-19 survey in October 2020 indicated that just five (3%) had no orthogeriatric support before or during the first wave of COVID-19, and that existing support was lost entirely in a further 14 (4%).

In 2020 there was an added factor of redeployment of geriatricians to care for the large numbers of older patients admitted to medical wards with COVID-19. This can be seen in the KPI run chart (Fig 11) which shows that 91% of patients were reviewed by a senior orthogeriatrician in 2019 but that this figure dropped to 77% in April 2020, and to 87% in the year as a whole.

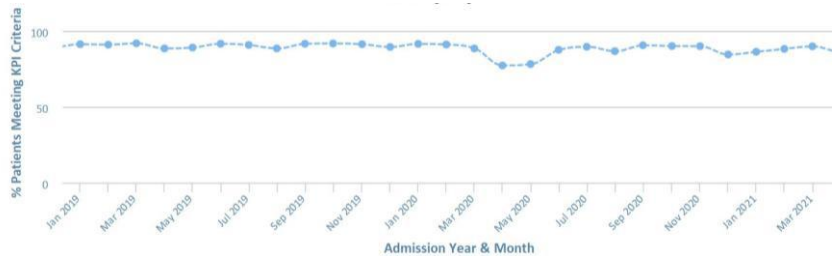


Fig 11. Run chart showing rates of prompt orthogeriatrician review (KPI 1) across the NHFD since 2019.

Normal orthogeriatric support was reduced during the first wave of COVID-19 in 71 units (43%) but was maintained in 53 (32%) and actually increased in 21 (6%).

The commonest reason for reduced support was staff redeployment (51 units) or increased orthogeriatrician workload (19 units), but orthogeriatrician illness was also reported as a factor in 16 units and a need for self-isolation in 30 units.

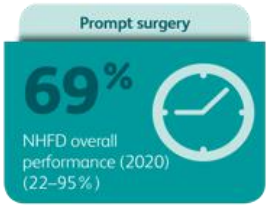
Of the units which reported a reduction in orthogeriatric support during the first wave, 27% reported that they had restored pre-COVID-19 levels by June, 22% by July and 17% by August. By the October 2020 survey, 17% of units stated that orthogeriatric support still remained below that of the 6 months prior to the first wave of COVID-19.

In spite of this, the deterioration in provision of prompt orthogeriatric review has not been repeated in later waves of COVID-19, possibly suggesting a more robust, well-prepared response in the later months of 2020.

Other models of care for orthogeriatric provision?

The success of NICE CG124 and Best Practice Tariff (BPT) in driving forward the orthogeriatrician's role has been reinforced by a recent paper (Griffin *et al* 2021) showing a large increase in patients' self-rated quality of life (EQ-5D-5L) at 120 days if they received the four elements of BPT primarily driven by orthogeriatricians.

This is a challenge for units that are unable to recruit an orthogeriatrician, but the NHFD continues to resist suggestions that units might improve the appearance of their service in terms of KPI 1 (and BPT eligibility) by using general practitioners, specialist nurse practitioners, or even virtual ward rounds instead. These would complement orthogeriatrician-led care, but their substitution would mean such units lose KPI 1 as a driver for local investment in oversight of perioperative medical care and rehabilitation and the continuity of care by experienced orthogeriatricians that was the central cost-saving recommendation in NICE CG124.



Key performance indicator 2

Will my operation be done today or tomorrow?

***Definition*:** Is the date of surgery the same day or the day following first presentation with hip fracture? This KPI is consistent with NICE CG124, rather than with the 36-hour figure used for BPT.

Reconfiguration of inpatient fracture services during the pandemic

During the first wave of COVID-19, 28 hospitals (17%) arranged to divert some or all new acute hip fracture admissions to a different site for surgery. In 13 of these this was to a different site in the same NHS trust, but in 11 it was to a new trust, and in four it was to a private hospital.

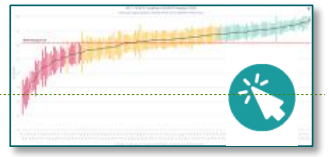
Despite these service reconfigurations and fears that stretched resources would lead to significant delays getting patients to theatre, the overall picture across the NHFD suggested that this was not the case.

Prompt surgery by the day following presentation (KPI 2), was provided for 68% of patients in 2019. This changed little in April 2020 and remained at 69% for 2020 as a whole (Fig 12).

Fig 12. Run chart showing rates of prompt surgery (KPI 2) across the NHFD since 2019.

In the COVID-19 survey in October 2020, a total of 69 hospitals (42%) reported that they had maintained pre-COVID-19 surgical capacity throughout the first wave. Of the remainder, one-third had returned to pre-COVID-19 activity by the end of June, another third by a later date, and one-third still remained at reduced surgical levels at the time of the NHFD survey in October.

Clinical leads in five units reported that they delivered surgery within 36 hours to all patients, with 11 units and 20 units reporting rates of around 95% and 90% respectively. Clinical leads in one-third of units reported that they were providing prompt surgery for less than half of their patients.



This is in keeping with individual patient data showing that the number of patients who received surgery by the day after fracture ranged from 22–95% in different units. This variation means that across the country 30% of patients did not receive their operation within 36 hours.

Variation between units was less marked than for KPI 1, but the KPI 2 chart highlights those units that should review their performance, as the proportion receiving prompt surgery was significantly below the national average.

Non-operative management during the pandemic

At the time of the first wave NHFD preliminary data suggested that around 4% of people received non-operative care in April 2020 – double the finding in recent years.

COVID-19 status data were very incomplete, but as the majority of these patients were not positive at any stage it appeared 'other pressures' might be encouraging non-operative pathways where these patients recorded much higher mortality than the 4% seen in COVID-19 negative patients who did receive an operation.

Fig 13. Run chart showing rates of non-operative management across the whole NHFD since 2019.

Such an approach would be inconsistent with the guidance from NHS England ('Guidance for care of people with hip and other long-bone fragility fractures during COVID-19 outbreak') which was in operation at that stage of the pandemic and the NHFD was asked to question units in which this might be happening.

A single month's data does not provide a reliable picture of local practice, as in a smaller unit just one or two patients might equate with 10% of all presentations. However, we contacted units where rates of non-operative care were unusually high in April 2020 to ask why this might be, and highlighted NHS England's guidance. Local teams reviewed their non-operative cases and reported back to us.

One unit, which reported modelling a formal protocol to avoid hospital admission of the poorest prognosis patients with hip fracture, was contacted and successfully supported to revise this approach.

It was reassuring to see the rate of non-operative care promptly reduce (Fig 13) so that it averaged just 2.5% across the whole of 2020 (*cf* 2.3% in 2019).

There was a slight increase in consultant surgeon and anaesthetist involvement in theatre (64% in 2019 and 66% in 2020). This may be in response to national guidance recommending consultant-delivered surgery to improve theatre efficiency during the pandemic or simply reflect redeployment of more junior doctors to assist on medical wards.

The presence of senior staff in theatre may have helped to avoid medical delays, particularly in respect of COVID-19 positive patients.

In their responses to the October 2020 survey, staff in 96 units (59%) reported that COVID-swab negative patients were never prioritised over COVID-swab positive patients, while this was reported as 'mostly' or 'always' happening in 22 units.

Furthermore, the NHFD dataset's list of reasons for delay to theatre have been expanded to include 'delay due to COVID' (Fig 14).

COVID-19 status was rarely reported as the cause for delay and the commonest reason for delay remained lack of theatre capacity. In terms of recovery following the first wave, 69 hospitals (42%) reported that they had maintained pre-COVID surgical capacity throughout the first wave. Of the remainder, one-third had returned to pre-COVID activity by the end of June, another third by a later date, and one-third still remained at reduced surgical levels at the time of the NHFD survey in October.

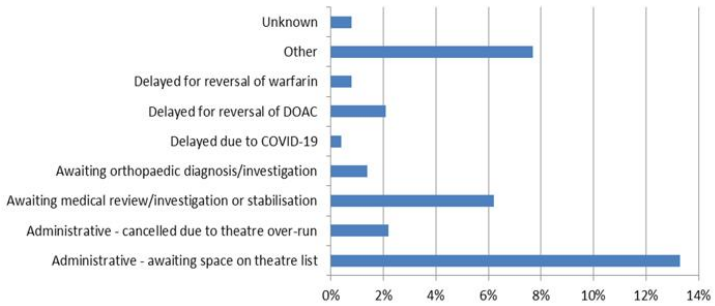


Fig 14. Principal reason recorded for individual patients failing to receive prompt surgery in 2020.

NHS England recommended non-operative management for most upper and lower limb fractures where possible (ie if removable casts or splints could be used to avoid admission and to minimise hospital visits), with urgent surgical treatment still recommended for patients with hip fractures, including for those who also had COVID-19.

Concern that theatre resources would be strained led to recommendations including consultant-delivered surgery to maximise theatre efficiency, and consideration of hemiarthroplasty in favour of total hip arthroplasty (THA) for intracapsular fractures. Measures were put in place to protect staff and patients from cross-infection, including the use of full personal protective equipment (PPE) and minimisation of aerosol generating procedures (AGPs).

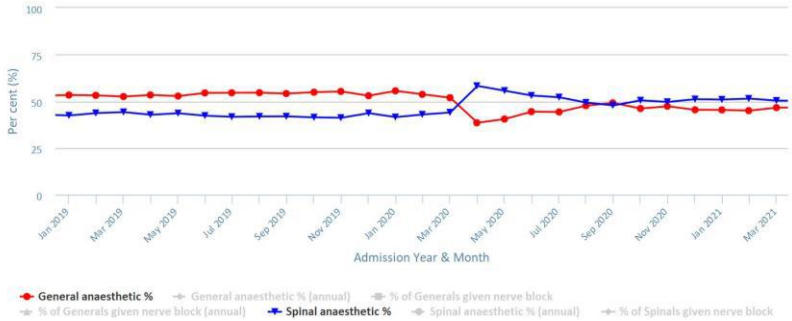


Fig 15. Run chart showing rates of spinal and general anaesthesia across the whole NHFD since 2019.

Concerns about AGPs will have encouraged the use of regional anaesthesia. As a result, 2020 was the first year in which the NHFD recorded spinal anaesthesia being used more often than general anaesthesia, with a peak in April at the height of the first wave and figures of 51% vs 49% respectively across the year (Fig 15).

Key performance indicator 3

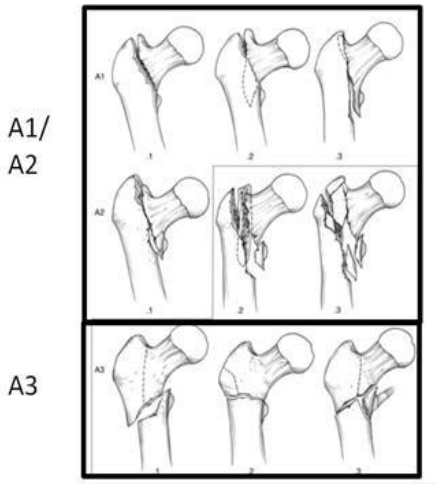
Will my surgeon offer the type of operation recommended by NICE?

***Definition*:** Does the patient receive the type of orthopaedic procedure that is recommended for their type of fracture in NICE CG124?

The National Institute for Health and Care Excellence guideline NICE CG124 and quality standard NICE QS16 place great emphasis on the type of operation and implant that should be offered for different fractures, reflecting the potential cost effectiveness of the different types of implant shown in a range of trials.

Four aspects of compliance with NICE recommendations have been combined into a single key performance indicator, KPI 3:

1. Patients with a subtrochanteric femoral fracture should be managed with an intramedullary (IM) nail fixation.
2. Patients with A1 or A2 trochanteric fractures should receive fixation with an extra-medullary fixation device, such as sliding hip screw (SHS) rather than with an IM nail.
3. Patients with a displaced intracapsular hip fracture should receive a cemented arthroplasty: either hemiarthroplasty or total hip arthroplasty (THA).
4. Cemented THA rather than hemiarthroplasty should be offered to patients with a displaced intracapsular hip fracture who normally walk independently out of doors with no more than the use of a stick, who are not cognitively impaired and are medically fit for anaesthesia and the procedure.



There is currently no NICE guidance on:

1. Optimal surgical fixation for unstable A3 trochanteric fractures.
2. Optimal management of an undisplaced intracapsular hip fracture between fixation and arthroplasty. However, a large multicentre trial is currently underway aiming to answer this question (WHITE 11 – FRUITI).

Trochanteric fracture surgical fixation choice and 120-day mobility

Delivery of aspects (1) and (3) of KPI 3 appears stable, but aspect (2) has continued to slowly decline from 77% in 2019 to 74% in 2020. This is in spite of the significant cost savings when using an SHS in place of an IM nail. Decisions not to follow NICE guidance appear to be based on personal preference, and local practice does not appear to be based on effective follow up of patients since 120-day mobility data was only recorded for 23% of all hip fracture patients in 2020.

Fig 16 shows 120-day post-fracture mobility in patients who prior to breaking their hip were freely mobile outdoors without aids and the surgical fixation option used, split into A1/A2s and A3 type trochanteric fractures.

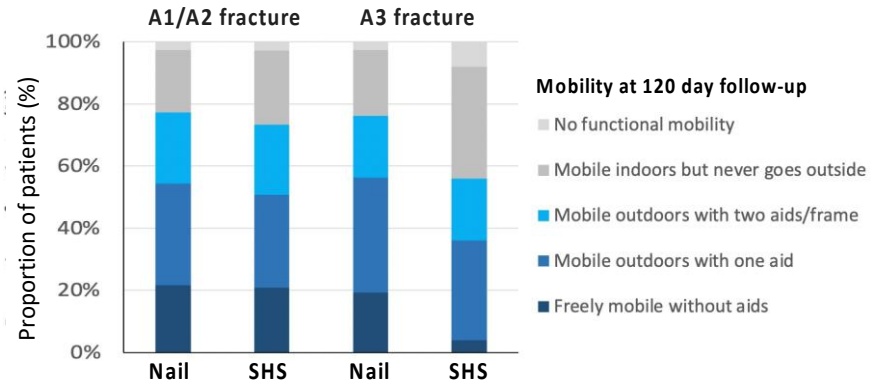


Fig 16. Mobility at 120 days after different operations for trochanteric hip fracture in people who were previously freely mobile outdoors with no aids.

This shows that people receiving an SHS for an A3 fracture recorded much poorer mobility than those who received IM fixation. No such difference was seen in the A1/A2 group; regardless of fixation method only 20% of people with A1/A2 fractures regained their pre-fracture mobility by 120 days.

Declining use of total hip arthroplasty (THA) in hip fracture

Most strikingly in 2020, the number of patients with a displaced intracapsular hip fracture who received THA fell to 25.3%, having been 33.4% in 2019 (Fig 17).

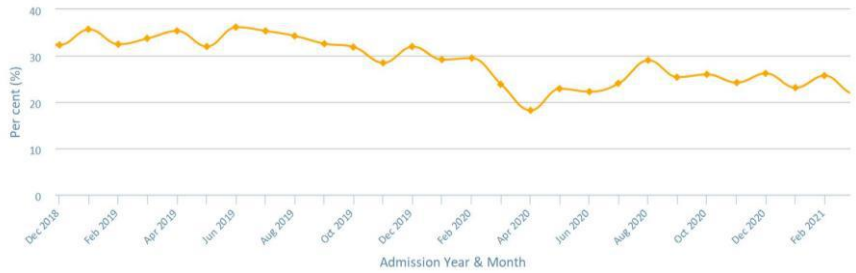


Fig 17. Run chart showing rates THA in patients meeting NICE eligibility criteria since 2019.

This downward trend started in September 2019 after the HEALTH trial reported clinical equivalence at 2 years following THA and hemiarthroplasty in independently mobile patients without cognitive impairment (HEALTH 2019).

The trend was exacerbated when, to maximise theatre efficiency during the first wave of COVID-19, NHSE guidance recommended the use of hemiarthroplasty for most patients requiring arthroplasty.

There has always been a mismatch between NICE guidance and the more complex picture of clinical decision making that is impossible to define using the limited dataset collected by the NHFD. Table 1 shows the breakdown of factors influencing the decision on THA eligibility for patients in 2020.

Table 1: Rates of THA and hemiarthroplasty set against criteria that define greatest fitness.

Operation Performed			THR	HEMI
Pre Fracture Mobility	**ASA Grade**	**AMTS**		
Freely mobile without aids	1	8	14%	86%
		9	56%	44%
		10	78%	22%
	2	8	36%	64%
		9	41%	59%
		10	55%	45%
	3	8	10%	91%
		9	14%	86%
		10	24%	76%
Mobile outdoors with one aid	1	8	0%	100%
		9	8%	92%
		10	21%	79%
	2	8	9%	91%
		9	10%	90%
		10	16%	84%
	3	8	4%	96%
		9	4%	96%
		10	5%	95%

This demonstrates that THA was used in 78% of people at the upper extreme of fitness, being medically most fit (ASA 1), least cognitively impaired (AMTS 10) and able to walk freely without aids. All other patient groups had a much lower chance of receiving a THA. The NHFD has never expected that the use of THA in those meeting the NICE eligibility criteria would achieve the >70% of other surgical run charts or the 100% that might be possible for the run chart of cementing of arthroplasties.

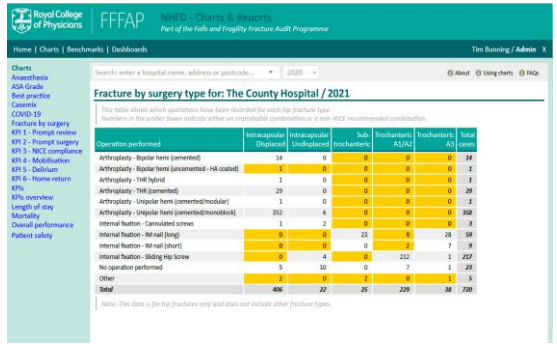
Teams can benchmark their practice against that in other units using the THA chart. This highlights the enormous variability between units, with THA rates varying from 0 to 70% of eligible patients in different units during 2020.

The KPI 3 chart allows units to review their performance against all four aspects of the NICE criteria. Those with significantly low figures should question why their practice does not follow NICE guidance and differs from that of their peers.

Ensuring consistency of data uploaded to the NHFD

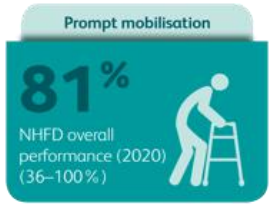
Any registry can only ever be as accurate as the data provided by hospital teams, and a recent paper (Maling *et al* 2020) highlighted how inaccuracies in the quality of the surgical data provided to the NHFD has the potential to affect national policy.

Table 2: Example of fracture type vs operation type cross-tabulation tool for one unit.



In response to this, NHFD has launched a new website facility available when users log in to the database. It allows hospitals to double-check the consistency of their data using a cross-tabulation that compares fracture type with operation performed. This will help to flag implausible combinations so these can be amended at source.

Local clinical leads should regularly use this facility to ensure that a consistent and accurate dataset is uploaded. Once this has been ensured the table will provide a mechanism for governance meetings to review the pattern of surgical care being provided, and to identify areas that local QI work should address.



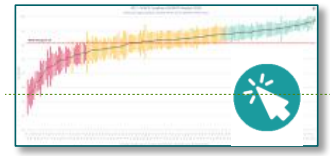
Key performance indicator 4

Will I be able to get out of bed by the day after my operation?

***Definition*:** Is the patient recorded to have been able to sit or stand out of bed by the day after their operation?

Prolonged bed rest compromises the dignity of older people. It also increases their risk of delirium, thromboembolism, hospital-acquired infection and pressure damage; leads to loss of muscle strength; and compromises their rehabilitation and recovery. Ward staff should all recognise the physical, psychological and nutritional benefit of hoisting a patient so that they can enjoy a meal sitting out of bed in a chair – this is why this form of care is one way of meeting the criteria for KPI 4.

The KPI 4 chart identifies those units in which performance was significantly above or below the national average of 81%, including some which reported that they were failing to get the majority of their patients out of bed by the day after their operation.



Such factors can only be addressed with a multidisciplinary approach and therapists need to be discussed in units' routine monthly clinical governance meetings and made a focus for local QI work.

Work using NHFD data from 2014–16 for over 135,000 people (Sheehan *et al* 2020) examined what patients' success in getting out of bed indicates. Prompt mobilisation was recorded for 79% and was associated with a doubling of their chance of discharge by day 30.

Later work showed prompt mobilisation to be associated with a 25% increase in recovery of outdoor walking and a 53% increase for indoor walking by 30 days. Benefits in terms of survival and recovery were seen in people with and without dementia, although those with dementia were less likely to mobilise early (Goubar *et al* 2021).

In 2020 achievement of KPI 4 remained fairly stable, but rates of successfully getting patients up continued to vary hugely between units. Some units reported that nearly all patients were able to sit or stand out of bed by the day after surgery, using a hoist if necessary.

In 2020 the NHFD introduced a new question to support such collaborative working. It asked clinical teams to identify and document the main reason why an individual patient is unable to get up by the day after surgery (Fig 18).

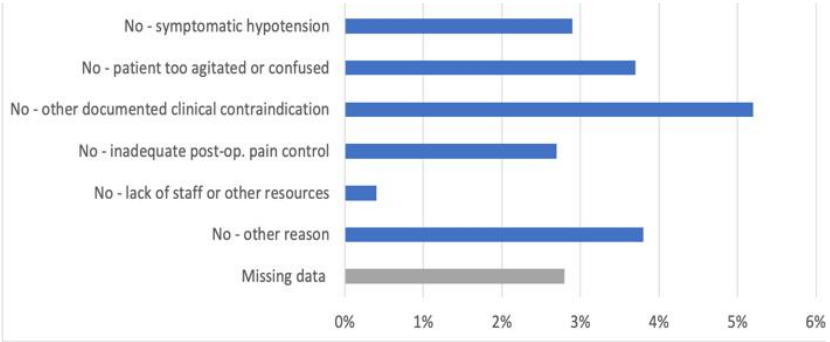


Fig 18. Principal recorded reason for patients failing to get out of bed by day 1 post-op.

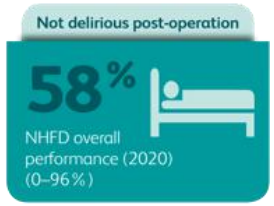
In 2020 sites reported that by the first day post-op 76% of people were able to get up with the help of physiotherapists and a further 5% with the help of other ward staff.

Symptomatic hypotension, delirium and poor pain control were each the main constraints in around 3% of other cases and should be a focus for local quality improvement in monthly governance meetings.

Replies to our COVID-19 impact survey in October 2020 identified that availability of physiotherapists or occupational therapists was a moderate or major challenge during the first wave in 30% of units. In addition, staff in 60% of units said that reduced ward therapist staffing had had no impact on their ability to discharge hip fracture patients, with only 10% saying this was a frequent occurrence.

The KPI 4 chart also identifies units that successfully got more than average numbers of patients 'up first day' through effective joint working and collaboration between physiotherapists and the rest of the multidisciplinary team.

This is something on which they must be congratulated. Teams in neighbouring units should use local networks to allow them to emulate this good practice.



Key performance indicator 5

Will you check that I do not become confused after my operation?

***Definition*:** Did the patient receive a 4A test (4AT) in the week after operation, that indicates that they did not develop postoperative delirium?

Delirium is the most common complication of any surgery and anaesthesia in older people and affects a quarter of people with hip fracture (2018 NHFD report). Since 2017 the NHFD has championed the use of the 4AT (Bellelli 2014) as a quick and simple examination of the four components of delirium.

This makes routine screening possible and improves understanding of a complication that often dominates patients' hospital stays, delays recovery, and can cause huge distress to them and to their families.

Published work using NHFD data from Ashford (Lisk *et al* 2020) examined whether the 4AT performed within one day of surgery could predict outcomes for 522 of 537 consecutive patients between January 2018 and June 2019. In total, 132 (25%) had a length of stay over 2 weeks, and 36 (6.8%) died in hospital.

People with a 4AT score ≥4 were over twice as likely to fail to get up by the day after surgery and three times more likely to have a prolonged length of stay, need to move to another residence or die as an inpatient. These associations persisted after excluding patients with dementia.

We would encourage teams to use 4AT as part of a care bundle on the day after surgery so it can serve as a measure of the quality of acute perioperative care.

The criteria for BPT allowed for 4AT assessment to be performed at any time during the week after surgery, but this does not ensure a consistent approach in different units. Therefore, from January 2020 the NHFD required the 4AT to be performed within 72 hours, to improve its use in benchmarking between units.

This change in definition led to a reduction in KPI 5 at the start of 2020, which can be seen between December 2019 and January 2020 in the KPI run chart (Fig 19).

Fig 19. Run chart showing rates of patients who were 'delirium free' on post-op 4AT (KPI 5) since 2019.

The transient fall in KPI 5 that was seen in April 2020 is a reflection of the disruption of trauma services at the start of the COVID-19 pandemic, and the effects on multidisciplinary working and orthogeriatric support at this time. In spite of this, 4AT assessment rates remained stable at 58% in 2020 (*cf* 60% in 2019) so that nearly two-thirds of patients were recorded as 'delirium-free' with a 4AT score <4.

This figure varied from 0% in one unit where 4AT was still not being recorded at all, to an improbably high figure of around 90% in several units that may wish to review how their staff are approaching the performance of this test.

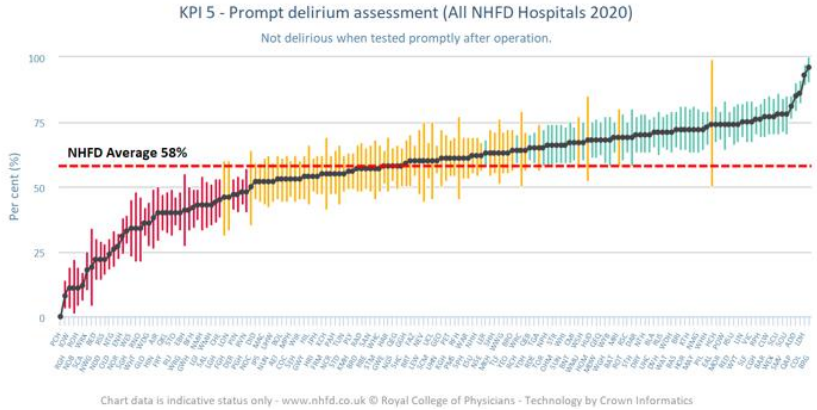


Fig 20. Caterpillar plot of variation in KPI 5 for all the different units in England and Wales in 2020.

Teams should examine their own figures in the online KPI 5 chart (Fig 20). Those units with performance significantly below average should consider making this aspect of care the focus of a local QI project.

Key performance indicator 6

Will you check that I get back to live in my usual home?

***Definition*:** Is the patient known to have been discharged to their original home or care home, or to be there at 120-day follow up?

Different patients may have very different perspectives on how quickly they would like to be discharged from hospital following a hip fracture. Some may be fearful of returning home – having lost confidence after their fall they may need prolonged rehabilitation if they are to successfully return home.

Some wish to return home as soon as possible and are reluctant to 'waste time' in hospital if they don't feel they are getting the intensive rehabilitation they need. In the face of the COVID-19 pandemic, patients, their families and those looking after them in hospital, care homes and the community all reconsidered their priorities.

NHFD data cannot tell us what should have happened, but they do give us a sense of what did happen. KPI 6 combines the total number of people returning directly to their original residence, with an additional figure – the number of others shown to have returned there by the time of 120-day follow up.

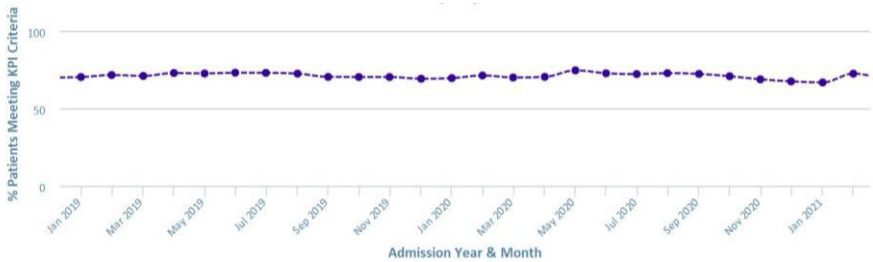
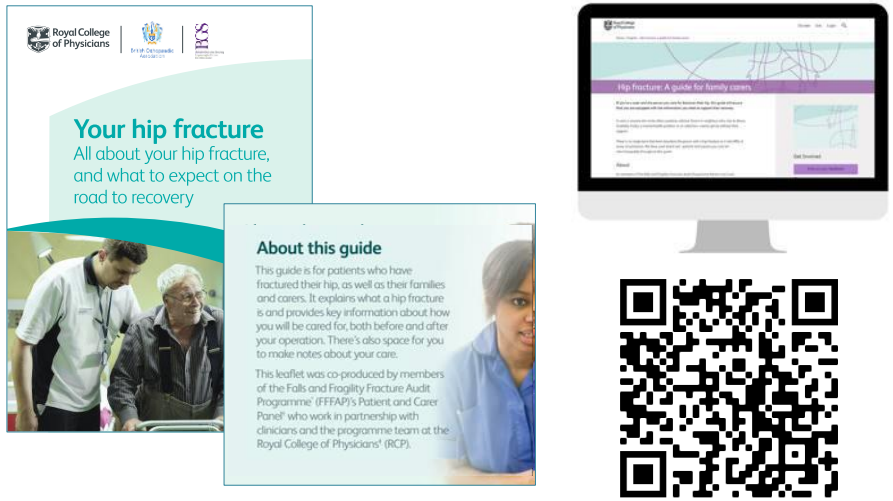


Fig 21. Run chart showing rates of return to original residence by 120 days (KPI 6) since 2019.

KPI 6 tries to profile the outcome of hospital care and community rehabilitation rather than to examine length of stay, and this remained remarkably stable over the course of 2020 (Fig 21). A sense of how unsafe the hospital environment might be for older people living with frailty led to all those concerned making unprecedented efforts to get them home as quickly as possible.

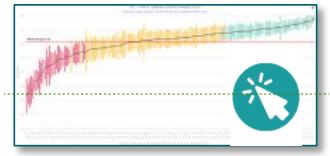
The Patient and Carer Panel of the Falls and Fragility Fracture Audit Programme (FFFAP) has developed key resources for patients (Your hip fracture care), and their carers and relatives (Hip fracture: a guide for family carers). These are available on the NHFD website so clinical staff can easily help members of the public find them.



Despite this collaborative effort, the first wave of COVID-19 was associated with only a slight increase in the proportion of people returning to their original home by 120 days. However, other factors – including the larger numbers of people who died as inpatients at this time, and potential difficulties in collection of 120-day follow-up data – mean that we should not over-interpret this finding.

In total, 70% of people returned to their original residence by 120 days after their hip fracture in 2020 but there was huge variation: from 41–90% in different units.

Teams should review this KPI 6 chart to see how they compare with other units. Staff in units where the proportion of patients who successfully returned home was significantly below average need to review why this was and to make these failings the focus of local QI work.



Secondary prevention of fragility fracture

The treatment people receive for one fragility fracture is not complete until something has been done to prevent the next fracture. Since inception, the NHFD and BPT have monitored and incentivised the provision of effective bone health assessment, and the provision and follow-up of medication to treat osteoporosis.

The rate of 'No action taken' rose from 3.3% of all patients in 2019, to 6.9% in 2020, perhaps reflecting pandemic pressures on orthogeriatric and densitometry services and bone clinics.

Guidance on the secondary prevention of fragility fracture requires that all patients are offered appropriate calcium and/or vitamin D supplementation before consideration of the more potent and effective bone protection most will need. To minimise data collection the NHFD does not require clinical staff to record this.

If a patient is offered only vitamin D and/or calcium then the reason why they were not offered a more effective form of therapy should be recorded, as this will allow such bone treatment to be made the focus of local QI work.

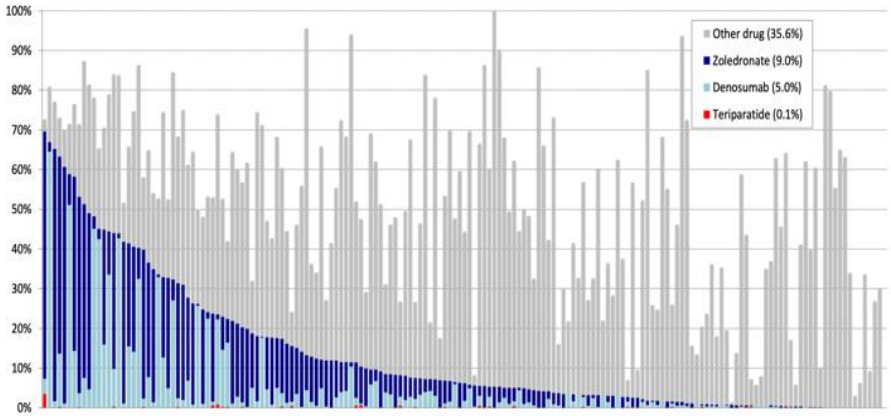


Fig 22. Rates of different forms of bone protection in people discharged from different hospitals.

The number of people started on oral medication fell slightly (from 37% in 2019 to 31% in 2020), but there was an increase in the number started on injectables (Fig 22). In total 1.5% were receiving injectables before their hip fracture (*cf* 1.2% in 2019), but 14.4% (*cf* 12.0% in 2019) were receiving this on discharge.

This figure excludes injectable treatments that may have been offered to a further 17.3% of patients who were referred for a bone density scan (DXA) or bone clinic assessment. Use of injectable medication varied from 0% to 67% in different units, and teams should benchmark their approach against that taken in other hospitals.

Since 2020 the NHFD has adopted the approach of the Fracture Liaison Service Database (FLS-DB), which has now collected data on over 300,000 people. Both audits now record the medication people were receiving before a fragility fracture, as well as that offered as secondary prevention (Table 3).

This improves our understanding of local practice and several hospitals have been notified that their practice appears inconsistent with that seen in other units. Individual teams can log into the database to review their data in the 'charts' section, and compare their approach with other units using this table of bone protection.

Table 3: Change in osteoporosis medication following presentation with a hip fracture, NHFD 2020.

	Bone medication on admission							
Bone treatment on discharge	Alendronate	Risedronate	Ibandronate	Zoledronate	Denosumab	1α/calcitriol	None	**Totals**
Alendronate	4.5%					0.4%	21.6%	**26.5%**
Risedronate	0.1%	0.6%					3.6%	**4.3%**
Ibandronate			0.1%					**0.1%**
Zoledronate	0.5%	0.1%		0.6%		0.1%	7.7%	**9.0%**
Denosumab	0.5%	0.1%			0.6%	0.1%	3.7%	**5.0%**
Teriparatide								**0.1%**
Alfacalcidol or calcitriol	0.1%					1.0%	3.7%	**4.9%**
On no treatment - pending DXA or bone clinic	0.7%	0.1%		0.1%		0.2%	16.2%	**17.3%**
Informed decline - patient decided not to take							0.4%	**0.4%**
Assessed - no bone protection needed	0.7%	0.1%		0.1%		0.2%	23.6%	**24.6%**
No assessment or action taken	0.1%					0.1%	7.5%	**7.8%**
Totals	**7.3%**	**0.9%**	**0.1%**	**0.8%**	**0.7%**	**2.1%**	**87.9%**	**100.0%**

For instance, BPT is paid on the basis that individual assessment will lead to patients being offered the secondary fracture prevention recommended by NICE.

Thirteen units (8%) were contacted to question why the majority of their patients were recorded as having been assessed but then offered no secondary prevention.

Five units offered no treatment after assessment to over two-thirds of people and one unit recorded this for 84%, figures which contrast markedly with the average figure of 24.4% (*cf* 22.7% in 2019) across the whole NHFD.

The NHFD team also supported a number of units in a review of the quality of their data, including some reporting rates of bisphosphonates prescription that seemed inappropriately high given the frequency of renal impairment in this population.

Other units recorded very high rates of alfacalcidol or calcitriol use and have been prompted to review these figures as it appears that they were misreporting use of vitamin D under the 'Alfacalcidol or calcitriol' field in the NHFD webtool. This field should only be used to record the use of activated forms of vitamin D.

Developing new key performance indicators

The FFFAP Patient and Carer Panel advises on all aspects of the work of the NHFD.

This means that while the NHFD examines standards that reflect NICE guidance, our existing set of six KPIs seeks to examine the quality of this care from the perspective of the patient, rather than simply measuring whether staff provide specific interventions.

We are now considering two additional KPIs that examine the earliest and latest stages of a patient's pathway following a hip fracture.

Key performance indicator 'zero'

Will you make sure I am comfortable after my hip fracture?

Proposed definition: Is the patient provided with a nerve block to relieve their pain, and admitted to an appropriate orthopaedic or orthogeriatric ward within 4 hours of presenting with hip fracture?

The emergency unit is not an appropriate environment for older people living with frailty with a hip fracture. Prompt admission to a bed under the care of an MDT on an orthopaedic/orthogeriatric ward is important for their comfort and reassurance, and will help avoid problems such as pressure ulcers and delirium.

In 2020 just 34% of patients were admitted to an appropriate ward within 4 hours (35% in England and 21% in Wales), but this varied from 1% to 87% in different units.

Nerve blocks are an excellent way to relieve the pain of a broken hip and avoid the excessive use of opioid painkillers with the side effects of sedation, delirium and constipation these can cause.

The use of nerve blocks has increased steadily. In 2020, a total of 60% of patients received blocks in the emergency unit or the ward while waiting for surgery, but this figure varied from 2% to 98% in different units.

We plan to develop a KPI 'zero' that combines these two measures:

- prompt consideration of a nerve block to manage acute hip fracture pain
- prompt admission to an appropriate orthopaedic or orthogeriatric ward.

This would have the aim of providing an indicator that will encourage attention to patients' first experiences, which often provide their longest-lasting memories after they present with a hip fracture.

Key performance indicator 7

Will I stay on bone strengthening treatment to avoid another fracture?

***Proposed definition*:** Is the patient provided with a suitable form of bone strengthening treatment and followed up to ensure that they are still receiving this protection at 120 days after their hip fracture?

Staff in trauma units are familiar with having to readmit patients with further fragility fractures of the hip or other bones, often within months of the first injury.

The huge variation in practice described above, means that many patients are not being assessed for bone protection, are not being provided with appropriate medication, or are not being followed up to support them in continuing to take such medication to avoid a second fracture. In developing KPI 7 we are seeking to challenge units to ensure that the care they offer is not confined to the surgery and rehabilitation after this injury but extends to the avoidance of the next.

To help patients stay on bone strengthening medication, they can be actively signposted to the Royal Osteoporosis Society (ROS) Specialist Nurse Helpline for information and support with concerns arising before 120-day follow-up. ROS nurses receive many calls from patients who have not started prescribed medication, have stopped taking it or are considering doing so. They can support patients by talking through the importance of medication, addressing their concerns about taking it, and giving advice about contacting their treating team before making any changes – a proactive approach to help reduce non-persistence at 120 days and beyond.

KPI 7 will combine the data on bone treatment and 120-day follow-up data that are already being collected to profile whether the teams in different units know whether their patients are promptly started on effective treatment and whether appropriate 120-day follow-up and support is in place to help their patients continue to take it or to swap to an alternative form of medication if necessary.

Staff in those units (59%) that fail to collect any 120-day follow-up data should consider how this might be arranged. Follow-up data are crucial if clinical teams are to understand the outcome of the care they provide, the extent to which this restores patients' mobility and independence, and whether their patients successfully return to their original residence: this final question being key to KPI 6 and most patients' principal concern when they present with hip fracture.

Periprosthetic femoral fracture

New data for the 2021 annual report

***Definition*:** A fracture of the femur around any orthopaedic implant (nail, plate, screw or joint replacement).

Since January 2020 the NHFD has been collecting data on periprosthetic femoral fractures (PPFF) in people over the age of 60. These are not reported on the NHFD website, but this section of the report presents the first full year of this data.

Surgery to the hip or femur often includes the use of metal implants such as joint replacements, plates, or screws. While the strength of metal is useful in helping these implants last a long time, the relative difference between the hardness of bone and metal creates a zone of risk for fractures of the bone around the implant to occur. When a bone breaks around or near an orthopaedic implant, patients may need further and often more complex surgery. At present, there is little information on the scale of this injury on a national basis. By collecting data and presenting results, the NHFD can provide an estimate of how many of these injuries happen every year (incidence) and how they are managed. It is believed that many of the risk factors for PPFF are the same as those for hip fracture and as a result a similar approach to both injuries may benefit patients.

In total, 2,606 fractures around orthopaedic implants were reported this year. The vast majority of these (2,411) were related to either a previous hip or knee replacement. Most patients sustaining a PPFF around a hip or knee replacement were women (67%) and their mean age was 83 years (range 60–104 years).

Table 4: number and percentage of types of PPFF recorded in the NHFD in 2020.

Fracture location	Number
Around a hip replacement – A (trochanteric)	265 (11%)
Around a hip replacement – B (around the stem)	1,054 (44%)
Around a hip replacement – C (distal to stem/cement)	381 (16%)
Around a knee replacement – A (epicondyles)	77 (3%)
Around a knee replacement – B (involving implant/cement)	166 (7%)
Around a knee replacement – C (proximal to implant/cement)	335 (14%)
Between a THA and a TKR – D (inter-prosthetic)	133 (6%)

Fractures of the femur around hip replacements were the most common (71%) compared with knee replacements (24%) with the remainder occurring in the bone between hip and knee replacements. The majority (82%) underwent surgery.

The decision not to operate may be because the implant and bone are stable and will heal on their own, or it may be that further (complex) surgery is too high risk for that patient. The decision to treat these fractures conservatively may lead to increased care needs as a result of reduced mobility.

In total, 135 of the 171 hospitals that contributed to this annual report admitted at least one patient with a PPFF. The mean number of PPFFs treated by each hospital was 17, but ranged from 1 to 110. The high numbers seen in some units is likely to reflect the complex nature of these injuries requiring transfer to a specialist team.

Review by a geriatrician within 72 hours

The value of orthogeriatric review that has been proven for hip fracture means that such care is already being provided to people with PPFF. This target was achieved for 89% (*cf* 87% for people with hip fracture) which is very reassuring given the complex nature of these injuries and the patients who sustain them.

Operative management

The decision of which operation is required for each fracture is driven by a combination of patient factors and the pattern of the fracture itself, including whether the previous joint replacement is loose or well fixed. National level research regarding these fractures to date has come from the National Joint Registry (NJR). However, the NJR only collects information on those fractures treated with a re-do joint replacement and not those fixed with plates and screws or treated without an operation. Initial data from the NHFD this year suggest that re-do joint replacements only represent 26% of all PPFFs in our database and 32% of those people who went on to have an operation of some description.

Time to surgery

Unlike routine hip fracture surgery, operations for PPFF are often complex, requiring specialist surgeons, equipment, preoperative planning and patient work-up. This can result in delays to surgery greater than the next day target we aim for in hip fractures. Only 28% of patients who underwent surgery for PPFF went to theatre within 36 hours, compared with 69% of those with hip fracture. The reasons for this are understandable, but patients may be in considerable pain while waiting for surgery. Recent research has suggested that delays to surgery may be associated with increased mortality and worse outcomes (Farrow *et al* 2021). This remains an area that requires further research, using NHFD data to investigate whether these delays to surgery are associated with poorer outcomes and how we might reduce time to theatre.

Mobilisation by the day after surgery

As with hip fractures, getting patients out of bed by the day after surgery can be expected to be beneficial in patients undergoing surgery for PPFF. Two-thirds (67%) of people who had surgery for PPFF got out of bed by the following day. This is lower than the 81% we report for people with hip fracture and may reflect the fact that this is often more complex and often prolonged surgery. The effect of this delay on patients is a further focus for future research.

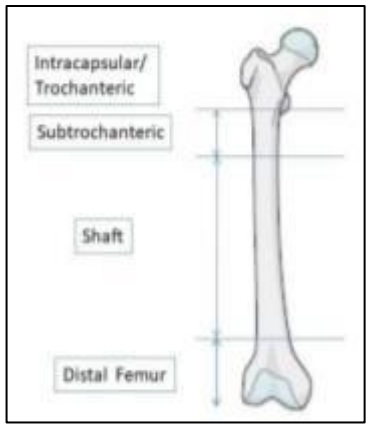
Missing information

There is little doubt that the NHFD provides the most comprehensive information to date about PPFF in England and Wales, but it is not perfect. These data represent the first year of collection and not all fractures will have been reported, so this total falls substantially short of expectations (Bottle *et al* 2020). Some NHFD units had not started recording PPFF as these were not yet eligible for BPT, and it is likely that one or more specialist hospitals that do not routinely look after people with hip fracture had not registered with the NHFD. As the database grows and reporting improves, we can expect to see more useful information to guide us in ways to improve patient care.

Non-hip femoral fractures

Femoral shaft and distal femur fractures

Definition: A fracture of the thigh bone (femur) below the hip and above the knee where no orthopaedic implants are present.



People with thigh bone (femur) fractures below the hip are likely to need very much the same quality of multidisciplinary care as those with hip fracture. The NHFD started collecting data for such injuries from January 2020.

During 2020 the NHFD collected data on 1,378 people with distal femur fractures (fractures within 5 cm of the knee joint). The mean age for this injury was 81 years and 87% of patients were women. Such fractures can be subdivided into one-third (33%) that extend into the knee joint itself and two-thirds (67%) that did not. Typically, fractures that involve the joint are considered more complex, due to the increased risk of future arthritis. Surgery was provided for 82% of people with distal femur fractures, with fixation used in similar proportions of those with fractures inside and outside the knee joint.

During 2020 the NHFD collected data on shaft fractures for 1,017 people with a mean age of 80 years, and 78% were women. Nearly all (96%) underwent surgery.

Review by a geriatrician within 72 hours

Only 171 of the 1,017 patients suffering femoral shaft fractures (17%) and only 261 of the 1,378 people with distal femur fractures (19%) had information recorded on time to review by a geriatrician. The marked contrast of this with 89% figures reported for PPFF perhaps suggests that most of these people were not reviewed.

Time to theatre

Of the 1,084 people with distal femoral fracture who had time to theatre reported, 47% received surgery within 36 hours of admission. For femoral shaft fractures the corresponding figure was 62%. This is not quite as good as the 69% figure for hip fracture and perhaps implies that hip fractures are being prioritised. It is markedly higher than the figure for PPFF (28%) and may reflect the fact that shaft and distal femoral fractures are less technically demanding and therefore do not need to wait for specialist surgeons or equipment.

Mobilisation by the day after surgery

Three-quarters (74%) of people with femoral shaft fractures and two-thirds (69%) of those with distal femur fractures with information on mobilisation by the day after surgery reported to the NHFD were recorded to have successfully got out of bed. The corresponding figure for people with hip fracture was 81%.

Summary

The number of people sustaining fractures of the distal femur and femoral shaft who were reported to the NHFD is similar to the number suffering PPFF. However, a far lower proportion of those with shaft and distal femoral fracture were reviewed by an orthogeriatrician prior to surgery. Most operations happen within 36 hours and most people get out of bed by the day after surgery, but these figures lag behind those currently being achieved for people with hip fracture.

National Hip Fracture Database report

Citation

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References

The references for this annual report and its predecessors are available in the NHFD reference file.

This report was prepared by the National Hip Fracture Database team:
Tim Bunning, Crown Informatics
Caroline Cormack, FFFAP programme coordinator
Rosie Dickinson, FFFAP programme manager
Jonathan Evans, NHFD fellow
Elizabeth Fagan, FFFAP project manager
Richard Holleyman, NHFD fellow
Dominic Inman, NHFD clinical lead, orthopaedic surgery
Antony Johansen, NHFD clinical lead, orthogeriatrics
Andrew Judge, professor and senior statistician, University of Bristol
Anjali Shah, statistician, University of Oxford

Data analysis was performed by:
Bristol NIHR Biomedical Research Centre, Musculoskeletal Research Unit, Translational Health Sciences, Bristol Medical School, University of Bristol **www.bristolbrc.nihr.ac.uk**
Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford **www.ndorms.ox.ac.uk**

NHFD data collection webtool and performance tables are provided by Crown Informatics **www.crowninformatics.com**

Falls and Fragility Fracture Audit Programme
The NHFD is run by the Care Quality Improvement Department (CQID) of the Royal College of Physicians (RCP). It is part of the Falls and Fragility Fracture Audit Programme (FFFAP), one of three workstreams alongside the Fracture Liaison Service Database (FLS-DB) and National Audit of Inpatient Falls (NAIF). The programme is commissioned by the Healthcare Quality Improvement Partnership (HQIP) and works within a governance structure that includes the Programme's Board, Advisory Group and Patient and Carer Panel.

Healthcare Quality Improvement Partnership
The National Hip Fracture Database is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement in patient outcomes, and to increase the impact of clinical audit, outcome review programmes and registries on healthcare quality in England and Wales.

HQIP commissions, manages and develops the National Clinical Audit and Patient Outcomes Programme (NCAPOP), around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh government and, with some individual projects, other devolved administrations and crown dependencies **www.hqip.org.uk/national-programmes**

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Get in touch

For further information please contact us – we want to hear from you.

www.nhfd.co.uk

nhfd@rcp.ac.uk

@RCP_FFFAP

Royal College of Physicians, 11 St Andrews Place, London NW1 4LE **www.rcplondon.ac.uk**
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