NHS

GIRFT
GETTING IT RIGHT FIRST TIME

Adult Cranial Neurosurgery

Follow-up report

Nick Phillips *GIRFT Clinical Lead for Adult Cranial Neurosurgery*

Paediatric Cranial and Spinal Neurosurgery

GIRFT Programme National Specialty Report

Professor Paul May *GIRFT Clinical Lead for Paediatric Cranial and Spinal Neurosurgery*

September 2023

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Foreword from Professor Tim Briggs

Published in June 2018, the GIRFT national report for cranial neurosurgery was one of the first specialty reports shared by the programme, offering a series of recommendations to address the variation observed by Nick Phillips and the GIRFT team in their extensive review of England's neurosurgical units.

More than five years on, I am delighted to present this follow-up report, noting the significant progress that has been made in the intervening years despite the challenges of the Covid-19 pandemic, and highlighting areas of the patient pathway where continued effort and improvement is still required.

Revisiting the 24 neurosurgical units in England with refreshed data has enabled Nick to build an up-to-date picture of the service and to identify models of excellence and innovation, many of which are outlined in this report. His recommended next steps reflect on the areas where there is still work to be done, supporting NHS colleagues to continue their journey of improvement across the specialty.

Alongside this welcome follow-up report for adult cranial neurosurgery, I am also pleased to present our national report for paediatric cranial and spinal neurosurgery.

These two specialties are intrinsically entwined, with many similarities in the findings and recommendations generated by the national review process. In particular, they rely on the sharing of knowledge and expertise, so it is encouraging to see Paul May's recommendation for closer collaboration and mutual support between the adult and paediatric services on training and service provision, and the general strengthening of formal collaborative relationships, particularly around neuro-oncology and neuro vascular surgery.

His recommendations for greater alignment of paediatric neurosurgery networks and operational delivery networks (ODNs), more effective use of advanced nurse practitioners (ANPs) and clinical nurse specialists (CNSs), and formal protocols to ensure joint working and greater collaboration between neonatal services and paediatric neurosurgery, can only serve to strengthen the service for those young patients who require the complex care and treatment that our paediatric neurosurgeons and their wider teams have to offer.

It speaks to the impact of the GIRFT programme that trust engagement at both Nick's second round of deep-dive visits and Paul's first was extremely strong, with participation from the whole surgical team, allied health professionals and senior leadership.

I am immensely proud to learn that since the early adult neurosurgery GIRFT visits – when clinicians were often seeing their data for the first time – they are now looking at their data regularly, developing a greater sense of ownership of it and thereby feeling empowered to become more involved in the development of their services.

This GIRFT-influenced culture shift lends more weight to recommendations in both reports that further focus is required on outcomes and quality management; improving the way we measure, collect and assess data. It is my hope that this can be achieved and that we can build reliable and robust databases to help drive service development for the next five years and beyond, shaping the very best services for the patients of the future.

Professor Tim Briggs *CBE*

GIRFT programme Chair and National Director for Clinical Improvement and Elective Recovery for NHS England

Professor Tim Briggs is a consultant orthopaedic surgeon at the Royal National Orthopaedic Hospital NHS Trust, where he is also Director of Strategy and External Affairs. He led the first review of orthopaedic surgery that became the pilot for the GIRFT programme, which he now chairs.

Foreword from Nick Phillips

Time has moved rapidly since we conducted the deep-dive visits for the first Getting It Right First Time (GIRFT) specialty report on adult cranial neurosurgery. Since the report was published we have experienced the COVID-19 pandemic, which I very much hope is behind us. Neurosurgery, by its nature dealing with acute and semi-acute problems, has enjoyed some protection from the effects of the pandemic, although all units have experienced resource, staffing and logistical problems as a result.

It has been a great pleasure to work with Paul May, who led the paediatric neurosurgery reviews on our visits. The broad and deep overlap that cements the adult and paediatric neurosurgical practices led us to join these two reports in the conviction that they augment one another.

We have identified new clinical metrics for this follow-up report but have also found the need to redouble our efforts to address some of the more persistent challenges to our specialty, as outlined in the original report. We structure our discussion, on both achievements and ongoing challenges, in terms of the original report's themes.

It is commonly said across many specialties that there are pockets of excellence scattered throughout the country. The real challenge is to spread this good practice widely. This is true of neurosurgery, where we have found examples of good and innovative practice across the specialty, including those born in pragmatic response to the pandemic. We are committed to highlighting and promoting such examples of good practice, as is the GIRFT ethos.

This report contains many quality indices that describe our specialty, but to concentrate focus I would highlight two overarching areas:

- patient flow;
- improving outcomes, specifically through establishing agreed outcome measures that are regularly reviewed.

Firstly, patient flow – essentially the movement of patients in and out of the unit – remains a huge efficiency issue and daily affects our ability to get patients into the operating theatre. While this is a source of frustration for us, it can be truly awful for patients.

There are many external influences on patient flow, not least delayed discharge and repatriation. These often indicate a lack of resources locally and are not within the gift of neurosurgery alone to resolve. However, we have not been able to demonstrate a consistent approach within neurosurgery to making admissions more efficient and streamlining the patient pathway. For example, few units have one-stop investigation pathways and enhanced recovery programmes. There remain significant excess length of stay issues in nearly all units. We must culturally embed shorter lengths of stay in all areas of neurosurgery, such that it becomes the norm, with the obvious safety provisos. There are areas of excellence in units regarding bed use and we highlight these in the report.

Secondly, while we all want to improve the experience of our patients and the quality of care they receive, large areas of neurosurgery have few agreed and measured outcomes. Rapid agreement of clinical outcome measures, and implementation of audits to collect this data, is an urgent priority. It is difficult to assess and carry out quality improvement if we cannot measure the impact.

In addition, we have a number of areas of low-volume practice – surgery for chordoma and pineal tumours, for instance. Although it can be difficult to collect reliable data on low-volume practices, we nonetheless need to examine how these are best delivered so that patients presenting to any unit can be assured of a high standard of care.

Nick Phillips

GIRFT Clinical Lead for Adult Cranial Neurosurgery

Nick is a Consultant Neurosurgeon at Leeds Teaching Hospitals NHS Trust. He has worked in Leeds since 1997 and was Clinical Director for seven years. His clinical interests are in endoscopic skull base surgery and radiosurgery. A council member of the Royal College of Surgeons and the Society of British Neurosurgeons, Nick is also the lead for the National Neurosurgical Audit Programme and a member of the Invited Review Mechanism of the Royal College of Surgeons.

Foreword from Professor Paul May

It has been a privilege to lead this Getting It Right First Time (GIRFT) review into paediatric cranial neurosurgery, and I have been impressed by the dedication and commitment of the teams that I have met on the GIRFT deep-dive visits. The process has been slowed by the COVID-19 pandemic, which delayed and restricted visits to some units, but this has not diminished my respect and gratitude to all my colleagues for their openness and honesty during the visits. Paediatric neurosurgery has been the subject of many national reviews and recommendations in the past 20 years. Indeed, I was involved in 'Safe Paediatric Neurosurgery' in 2001.[1]

In the past, these reviews have resulted in an undercurrent of uncertainty, competition, anxiety and dislocation from adult cranial neurosurgery amongst colleagues and units. It is my hope that focusing on regional and national collaboration and engaged provision of care for all paediatric and adult neurosurgical practice will prevent this and help us maintain and improve the high standards of care we all expect for our patients.

This report on paediatric cranial neurosurgery needs to be considered in a wider context. Paediatric neurosurgery is a relatively small specialty, and the work that it does is impacted to a large extent by its relationship with adult neurosurgery. As a result, this report should be read in conjunction with the first GIRFT national report on adult cranial neurosurgery.[2] Many of the recommendations set out in that report (see **Appendix 1** p80) apply to paediatric neurosurgery as well, and these are highlighted later in this report. That is why we have chosen to publish the paediatric report in conjunction with Nick Phillips's follow-up adult report.

This report should also be considered in light of the NHS Long Term Plan,[3] with its focus on the 0–25-year-old age group; the Paediatric Critical Care and Surgery in Children Review published in 2019 by NHS England;[4] and the GIRFT national reports on neonatology, paediatric critical care and paediatric surgery.[5] These documents support the need for operational delivery networks (ODNs) to deliver change across complex systems of care in order to improve care quality and outcomes, and I endorse this approach. I would strongly encourage all paediatric neurosurgery units to ensure that links and relationships with adult neurosurgery are of a similar status to those within their ODN.

Professor Paul May

GIRFT Clinical Lead for Paediatric Cranial and Spinal Neurosurgery

Paul is Director of Clinical Academic Development at University of Liverpool. He was appointed as Merseyside's Children Neurosurgeon in 1991 and was responsible for the establishing the paediatric neurosurgical service at Alder Hey Hospital, one of the country's busiest services. He is a former president of the Society of British Neurological Surgeons (SBNS).

Due to other commitments, Paul stepped down from his GIRFT role in September 2023.

[1] *Chumas, P., Hardy, D., Hockley, A., et al., 2001. Safe paediatric neurosurgery, British Journal of Neurosurgery 07/2002; 16(3):208–10., DOI:10.1080/02688690220148806*

[2] *Phillips, N., 2018. Cranial neurosurgery: GIRFT programme national specialty report, https://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/07/CranialNeurosurgeryJune18-L.pdf*

[3] *www.longtermplan.nhs.uk/*

[4] *www.england.nhs.uk/publication/paediatric-critical-care-and-surgery-in-children-review-summary-report/*

[5] *See Adams, E., Harvey, K. and Sweeting, M., 2021. Neonatology: GIRFT programme national specialty report; Morris, K. and Fortune P-M., 2022. Paediatric critical care: GIRFT programme national specialty report; Hunter, J., 2022. Paediatric trauma and orthopaedic surgery: GIRFT programme national specialty report; Kenny, S.E., 2021. Paediatric general surgery and urology: GIRFT programme national specialty report. All published GIRFT reports are available at https://gettingitrightfirsttime.co.uk/girft-reports*

Statements of support

Society of British Neurological Surgeons

The GIRFT leads Mr Nick Phillips and Prof Paul May along with the GIRFT team have done an impressive job of collating relevant information across the neurosurgical units and identifying areas for improvement that would help the entire patient pathway from referral to discharge. A significant proportion of the recommendations for the adult GIRFT pathway are relevant to the paediatric neurosurgical community, as has been highlighted by Professor May.

I would welcome the recommendations regarding closer co-operation between the paediatric neurosurgical group and adult colleagues to offer the best available expertise in a particular condition i.e. vascular/oncology/functional where possible. Improving the access of 16 to18-year-olds to the paediatric pathways especially for paediatric specific pathologies would help to improve the management/experience in this group. The desire to establish outcome measures for benchmarking different paediatric neurosurgical conditions, especially tumours, would be something the BPNG would support and be willing to work with GIRFT on.

On behalf of the BPNG I would like to commend the authors and look forward to working with the GIRFT leads to implement recommendations aimed at improving the care we deliver.

Atul Tyagi
Chair of British Paediatric Neurosurgical Group

Chief Nursing Officer, NHS England

Paediatric neurosurgical teams provide some of the most complex care and treatment that the NHS has to offer and it is a pleasure to support the Getting It Right First Time (GIRFT) team in this newly published report into paediatric cranial and spinal neurosurgery.

Professor Paul May and his team have provided a thorough and detailed analysis through site visits and data review that has shown the current high performing nature of this specialist service. The report also highlights the opportunities to further enhance care for patients and their families.

This GIRFT review has identified a number of areas for further improvement work that link to wider NHS England policy, including the NHS Long Term Plan and the NHS England Critical Care and Children in Surgery Review. There are other reports from the GIRFT programme to also impact on this specialty, specifically neonatology, paediatric critical care and paediatric surgery.

Paediatric surgery requires co-ordination across complex system of care to deliver the outstanding outcomes that are achieved. A key part of this are the teams of doctors, nurses, allied health professionals and scientists working together to support these aims and outcomes. The report highlights this excellent teamwork and notes the significant contribution of the multi-professional team and the desire of the GIRFT recommendations to further enhance this capability.

As Chief Nursing Officer I am delighted to support the publication of this review and its ambitions to raise further the outcomes of paediatric neurosurgery.

Ruth May
Chief Nursing Officer, NHS England

A note on the structure of this combined publication

The adult and paediatric neurosurgical specialties have evolved together and are interwoven. For this reason, and because of the similarities in their key recommendations and the importance of sharing knowledge and expertise between them, the authors felt that a combined publication was the best approach for these complementary reports.

The first section comprises a follow-up to Nick Phillips's Adult Cranial Neurosurgery GIRFT National Specialty Report, published in 2018.[6] The second section is the first Paediatric Cranial and Spinal Neurosurgery GIRFT National Specialty Report led by Professor Paul May.

Unless otherwise stated, the preliminary pages and end matter are relevant to both reports.

[6] *Phillips, N., 2018. Cranial neurosurgery: GIRFT programme national specialty report, https://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/07/CranialNeurosurgeryJune18-L.pdf*

Executive summary[7]

In revisiting the neurosurgical units in England after the publication of our first GIRFT national specialty report, we found that two overarching themes emerged – the same themes that had dominated our first report:

- Patient flow – how we can continue to optimise each step in the patient pathway. This has become increasingly urgent in the aftermath of COVID-19 and in the face of ongoing challenges to the NHS.
- Outcomes and quality management – specifically how to further improve the way we measure, collect and assess data (particularly outcome data) so it can be used reliably to tailor the service to patient need and to ensure continual quality improvement.

We organised our findings and next steps under the headings below:

Avoiding unnecessary admissions

Unwarranted admissions from the emergency department (ED) and from the periphery for investigations, radiology or rehab, continue to reduce the number of beds available for urgent elective admissions and create inefficiencies in the patient pathway. It is important that work continues with commissioners to put in place levers and incentives to manage patient flow and repatriation.

Improving referrals

The use of electronic referral management (ERM) tools has been widely adopted, but the tools urgently need improvement so they can interface with hospital data systems and be used to manage referrals (e.g. by facilitating virtual assessment).

Accelerating referral to treatment time

Faster treatment is life-changing for many neurosurgery patients. All units should focus on developing and adapting optimal pathways that minimise delay for these patients.

Prioritising the urgent elective pathway for primary malignant brain tumour

Closely related to the previous topic, an urgent elective route for these patients – as opposed to non-elective admission – provides a better patient experience and reduces the strain on units caused by emergency admissions. Each unit should be supported to formally develop and prioritise this pathway.

Reducing length of stay

Enhanced recovery after surgery (ERAS) pathways, day of surgery admissions and to a lesser extent day case surgery are increasingly important in addressing the waiting times that are an issue post-COVID. All units should focus on reducing length of stay in order to optimise patient pathways.

Reducing delays to elective surgery

Dedicated acute theatres allow services to minimise the disruption and cancellations to elective work that can be caused by non-elective admissions. Those units that still lack this resource should consider assigning one, in line with the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) recommendations.

Improving patient flow between critical care and neurosurgery

Use of critical care beds for neurosurgery patients is increasing and there are complex issues and delays around discharge from critical care to the acute ward. In order to resolve this and reduce subsequent blockages/cancellations, we need further research into the use of critical care as well as greater provision of enhanced care within neurosurgery.

[7] *The paediatric cranial and spinal neurosurgery GIRFT programme national specialty report that shares this document has a separate executive summary on page 57*

Reducing time to procedure for subarachnoid haemorrhage

Time to procedure for these high-risk, time-sensitive patients is not dropping fast enough or consistently enough across providers. All units should follow the pathway recently developed by the British Neurovascular Group (BNVG), addressing delays and pinch points. Improvements in data are to be addressed by national audit.

Improving outpatient efficiency

Non-consultant-led and virtual appointments for routine surveillance and uncomplicated post-operative review are a valuable alternative to in-person consultant appointments. To further increase efficiency, trusts should investigate patient-initiated follow-up protocols in uncomplicated cases.

Focusing on discharge

Delayed discharge causes bottlenecks and bed shortages, affecting all elective patient pathways. Model discharge planning should be promoted, as should ERAS protocols. A review of neuro-rehab could further support timely discharge.

Focusing on volume

As a specialty with many low-volume procedures, neurosurgery needs improved data on outcomes and numbers of procedures by surgeon in order to ensure services are safe and of good quality as well as appropriate to population needs. Work on developing outcome measures is under way.

Enabling continual quality improvement

Reliable data is vital to ongoing improvement. Work is proposed to improve data collection and coding, from promoting closer collaboration between surgeons and coders within trusts to developing quality consensus core outcome datasets for national audit.

Introduction

For the second rounds of GIRFT visits, we developed a more robust questionnaire for each unit to complete and created new metrics relating specifically to subarachnoid haemorrhage and time to be seen after surgery. We also refined our metrics in relation to shunt surgery, procurement and litigation.

This follow-up report provides a concise overview of what has happened in the cranial neurosurgery specialty since we published our first GIRFT report in 2018[8] after visiting all 24 units in England. We consider the recommendations from the original report and note the clinical practice and policy developments, including the progress reported to us by trusts in implementing GIRFT recommendations, since publication.

For each recommendation, we summarise the findings of the original report and assess progress since publication. We then go on to examine the enduring challenges faced by the specialty, focusing on areas where – for a variety of reasons – there remains work to do in order to deliver the outcomes we identified in 2018. In each case we explore the nature of the opportunity before setting out next steps.

Wherever possible we include updated data to support our findings. We also include case studies to highlight and promote good practice and positive innovation wherever we find them. Changes to the context of neurosurgery services, for example the impact of winter pressures and COVID-19, are also noted wherever relevant.

The information for this follow-up report has come from a range of sources:

- our observations from the deep-dive revisits to trusts;
- observations of GIRFT workstream delivery managers and analysts;
- case studies and reports on implementation in trusts from the GIRFT regional teams.

Where graphs have been used to demonstrate performance over time, the colour of the graph has been altered from 2019/20 quarter 4 onwards to highlight any impact that COVID-19 might have had on the metric in question. It will be important for all units to assess the impact of COVID-19 on their performance, and to generate and implement recovery plans to deal with the backlog of patients that will inevitably have built up. It is equally important to identify the good and innovative practice that has necessarily developed in response to the pandemic and ensure that it is incorporated into business as usual.

Scope

The scope of this follow-up to the first GIRFT cranial neurosurgery national report is focused on the direct impact of the adult cranial neurosurgery workstream within neurosurgery, and not the full extent of its impact on the NHS. In addition, a separate paediatric cranial and spinal neurosurgery workstream has been created within the GIRFT programme and its findings published within this report.

Supporting trusts to implement GIRFT recommendations

GIRFT has in place a comprehensive programme to help implement the recommendations highlighted in the national report on cranial neurosurgery, including support to individual providers to implement these recommendations locally.

Following their GIRFT deep dives and revisits, trusts have developed their own specific implementation plans. These are based on the national report's recommendations, their trust data pack, and their conversations with the clinical lead.

Strong attendance and awareness of data on deep-dive revisits

Following the publication of the GIRFT national report on cranial neurosurgery, we have revisited all trusts. For these revisits (some of which were conducted virtually due to COVID-19), the GIRFT dataset was updated, some metrics were retired and some new metrics added, so that clinicians were provided with the most up-to-date data possible to reflect any early changes they had delivered since the first visit. These revisits provided an opportunity for clinicians and managers to reflect on how they had used their original visit, the national report and their work with the GIRFT regional teams. Our findings from these revisits have also informed this evaluation report.

Engagement at the deep-dive revisits has been very strong, with attendance from surgeons, the surgical team, allied health professionals and the trust senior leadership, including medical directors, chief executives and chief operating officers.

[8] *GIRFT. Adult Critical Care: GIRFT Programme National Specialty Report. 2021*

In the first GIRFT visits, clinicians and managers were frequently surprised at their own data and were seeing it for the first time. All valued seeing the data presented. Now trusts are looking at their data regularly ahead of and between their deep-dive visits. There is a far greater sense of ownership of data from clinicians, managers and other NHS staff, with far less scepticism of what the data can show. The result is that clinicians on the whole feel newly empowered to become involved in the local planning and development of their services, the benefits of which we are already beginning to see, and which are particularly relevant for a service with many low-volume procedures and, until recently, a relatively underdeveloped approach to networking, in order to manage capacity and build experience.

This increased use of the NHS's own data and tools has had an impact beyond GIRFT deep-dive visits and marks a cultural shift in the NHS that should be beneficial to other quality improvement initiatives as well as 'business as usual' work in trusts to improve patient outcomes. The key GIRFT neurosurgery metrics are now included in the Model Hospital System[9] – an online benchmarking tool that allows trusts to compare their performance with their peers.

[9] *https://model.nhs.uk*

Our findings

Overview

The first GIRFT report on adult cranial neurosurgery was based on deep-dive visits and in-depth questionnaires from all 24 providers of cranial neurosurgery in England, as well as detailed analysis of data from a range of NHS sources. As a general assessment of a service that has been, historically, somewhat under-audited and lacking in agreed outcome measures, the results were positive, indicating that the quality of service is generally very good. The opportunities we identified related for the most part to increasing the efficiency of current services so that the specialty can increase the number of procedures it conducts within existing resources while working continuously to improve outcomes.

Cranial neurosurgery is characterised by a wide variety of conditions, many of which occur in the population at low volumes. Compared to most surgical specialties, waiting lists have not historically been an issue for cranial neurosurgery – conditions tend to require urgent treatment, and surgical procedures have been scheduled accordingly. COVID-19 has changed this, however, and there are also tensions, as with most surgical specialties, between elective and emergency surgery – the latter by its nature being unpredictable and unavoidable, and therefore affecting overall capacity in ways that can cause delays and cancellations for elective patients, many of whom are extremely ill with terminal conditions.

Neurosurgical services and geographical provision have evolved to supply their local populations with high-quality care in a relatively autonomous way. The acute nature of much of cranial neurosurgery has dictated prompt local care with units skilled and capable in managing the majority of conditions. It is only recently that the crisis in social care has impacted on surgical capacity. This, and a clear policy for providing high-quality experience for low-volume conditions, has brought consideration of networks to share experience and workload.

With North and South London gateway hubs also now set up to link six London neurosurgery units, work is beginning, in part born out of pandemic-stimulated co-operation, to create a unified and cohesive approach to service provision for neurosurgery in London for both elective and non-elective patients. Most importantly, the hubs can be designated as specialist providers, ensuring minimum levels of expertise for rarer procedures and conditions. Structured co-operation of this nature, supported with reliable data, will prove invaluable in managing services and improving outcomes in the post-COVID recovery period and beyond.

Many opportunities for improvement remain, despite some impressive achievements since the publication of the first report. In compiling this follow-up report we have used some new data sources, developed new metrics and proposed further actions to tackle the specialty's more enduring challenges.

Where a positive change could be attributable to COVID-19, we have not claimed it as a GIRFT success, but we do discuss how best to capture/communicate and promote innovative practices wherever we find them.

Where opportunities for improvement were indicated, there was one dominant theme: patient flow, or ensuring the most efficient use is made of beds. As the first report noted: *'Every provider struggles to conduct as many cranial neurosurgery procedures as it needs to – meaning delays and cancellations are frustratingly common, especially for elective surgery.'* There was and remains scope to address contributing factors at every stage of the patient journey, from referral and admission procedures to repatriation/discharge following surgery. This breadth of opportunity was reflected in the report's recommendations.

A secondary theme throughout the first report was the need to develop further outcome measures and generally improve data collection and audit related to the specialty. Quite simply, in order to bring about and maintain improved quality and parity of service and outcomes, we need first to be able to measure them.

Despite much good work since 2018, there remain significant opportunities for improvement around both these themes. We have structured the main body of this report around these two keys themes, which allows us to discuss one by one the progress made on each recommendation. For every recommendation we conclude our analysis with a list of proposed next steps in order to build on current progress and continue the journey of improvement across the specialty. We have also added one extra section at the beginning for which no specific recommendations were made, but which impacts patient flow nonetheless: avoiding unnecessary admissions.

Patient flow

Avoiding unnecessary admissions

Although not specifically set out as a recommendation in the first report, this is an area that feeds into patient flow and is therefore important in the context of further opportunities for improvement. The first report noted:

"… one way in which providers can instantly reduce the pressure on their bed capacity is by avoiding unnecessary admissions. Both the data and the visits have helped indicate several opportunities to do this, through more effective use of outpatient services and through rethinking some of the standard pathways so that patients are only admitted when necessary."

The report identified inefficiencies in admission pathways, particularly relating to admissions directly from the emergency department (ED) when not clinically indicated. Where such patients are admitted unnecessarily, we would expect to see a high proportion of them being discharged without a procedure, although not every patient who does not have a procedure has been admitted unnecessarily (valid reasons for admission could include observation after a head injury, for example).

The original report looked at the number of patients admitted for elective treatment who were then discharged without a procedure taking place. There were 3,100 instances of this between April 2014 and March 2015, with wide variation between trusts, resulting in a poor experience for patients whilst costing the service around £2.9 million in additional bed days.

Progress and challenges since the first report

We continue to note significant variation in these admissions, indicating the need for ongoing analysis to establish the optimal proportion of admissions from ED, reduce variation and minimise the negative impact on the next day's elective admissions, who may, as a consequence of ED admissions, be denied a bed and have their procedure cancelled.

Discussions during the second round of GIRFT deep-dive visits highlighted that, although departments do not have fully ring-fenced beds for neurosurgery, the more control they are able to exert over their bed base, the greater their ability to implement recommendations relating to efficient use of beds and improving patient flow through the unit.

However, at deep dives neurosurgical centres told us that it is more difficult for them to reduce length of stay, to provide surgery on the day of admission and minimise delayed discharges, when they can exert little control over admissions to their beds, some of which come directly from the ED. It is therefore important that trusts admit patients to neurosurgery wards only if they are going to need neurosurgical care, and ideally only when they are going to have a surgical procedure. There should be no admissions from the ED without a prior patient-focused discussion and agreement with all clinical teams.

Another problem cited by trusts is the lack of out-of-hours MRI scanning at referring hospitals, which causes unnecessary referrals to neurosurgical centres for triage that should be done locally and leads to unwarranted admissions to neurosurgical beds. For example, many units report significant numbers of patients admitted for the investigation of potential cauda equina syndrome (pressure on the spinal cord leading to paralysis). This is generally a failure of local triage and could be resolved by access to MRI scanning either locally or promptly at the base neurological hospital. Transfer across regions is costly, unnecessary and results in a poor patient experience, as well as affecting the availability of beds for patients having elective neurosurgery admissions, as outlined above.

A new Cauda Equina pathway has been released by the GIRFT team. The Spinal Services GIRFT National Report recommended that patients with suspected cauda equina syndrome should have MRI scans carried out at their local district general hospital, and this is supported by the neurosurgery and emergency medicine GIRFT leads.[10]

CASE STUDY

Mobile radiographers

A key issue affecting local/out-of-hours MRI availability is the lack of trained MR radiographers.

The Barking, Havering and Redbridge University Hospitals NHS Trust has tackled this issue by implementing a 'radiographer on a bike' initiative, whereby retired or late-career senior radiographers who wish to work flexible or unusual hours travel to district general hospitals to operate their MRI scanners out of hours.

[10] *Hutton, M., 2019. Spinal services: GIRFT programme national specialty report, available at https://gettingitrightfirsttime.co.uk/girft-reports/*

As a result of unnecessary admissions, including admissions direct from EDs, and due to referral and triage challenges, including with respect to MRI capacity, the number of patients being admitted but having no procedure – either electively, where they are being cancelled due to bed pressures (see **Figure 1**), or non-electively, where they are admitted for investigation (see **Figure 2**) – has not improved since 2018. Where these admissions are particularly high it may be an indication that a trust under pressure has used neurosurgical ward beds for other patients in order to help manage demand on emergency departments.

During deep-dive revisits some units have described having a direct admissions policy from the ED, bypassing neurosurgical triage, contributing to poor patient experience, increased clinical risk and inefficiency. This happens occasionally when the ED is overwhelmed, therefore it is important that constant clinical dialogue is encouraged, and there is consistent collaboration with regards to admissions. We have also learned of safety issues, where patients have been admitted in this way to the wrong specialty.

Figure 1: Percentage of neurosurgery elective spells where procedure not carried out for medical or patient reasons, or for other or unspecified reasons, 2015–2021, HES

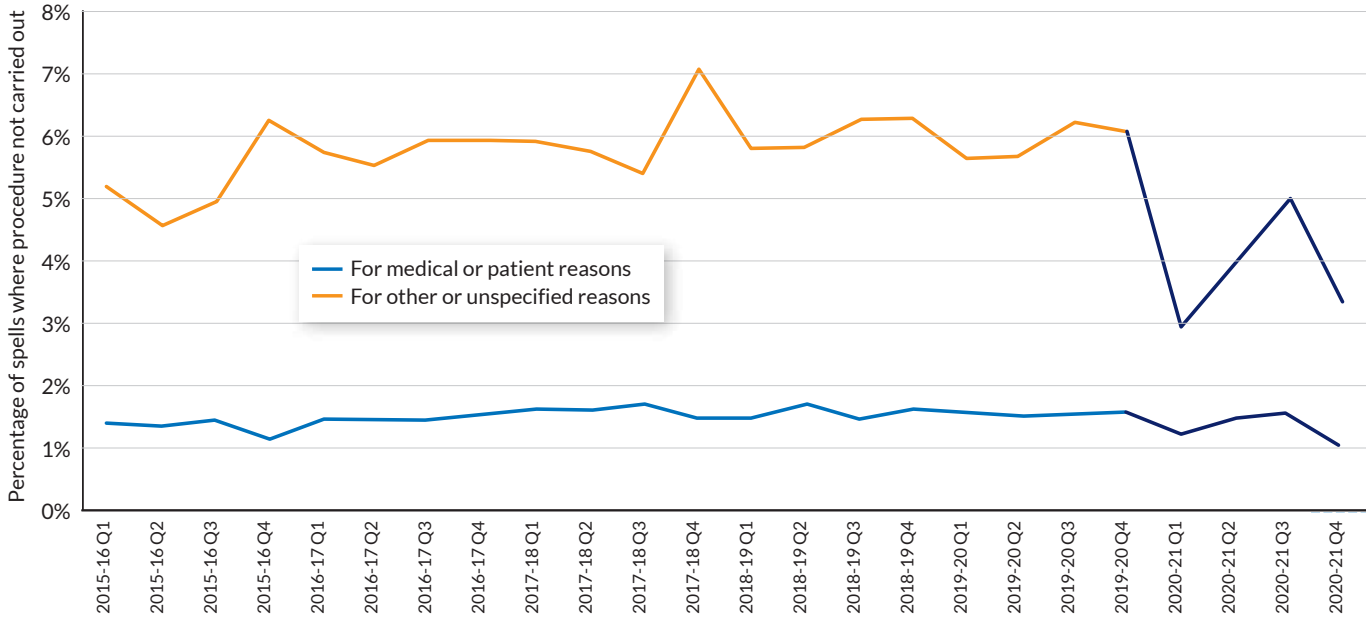


Figure 2: Percentage of neurosurgery non-elective spells where no procedure is carried out, 2015–2021, HES

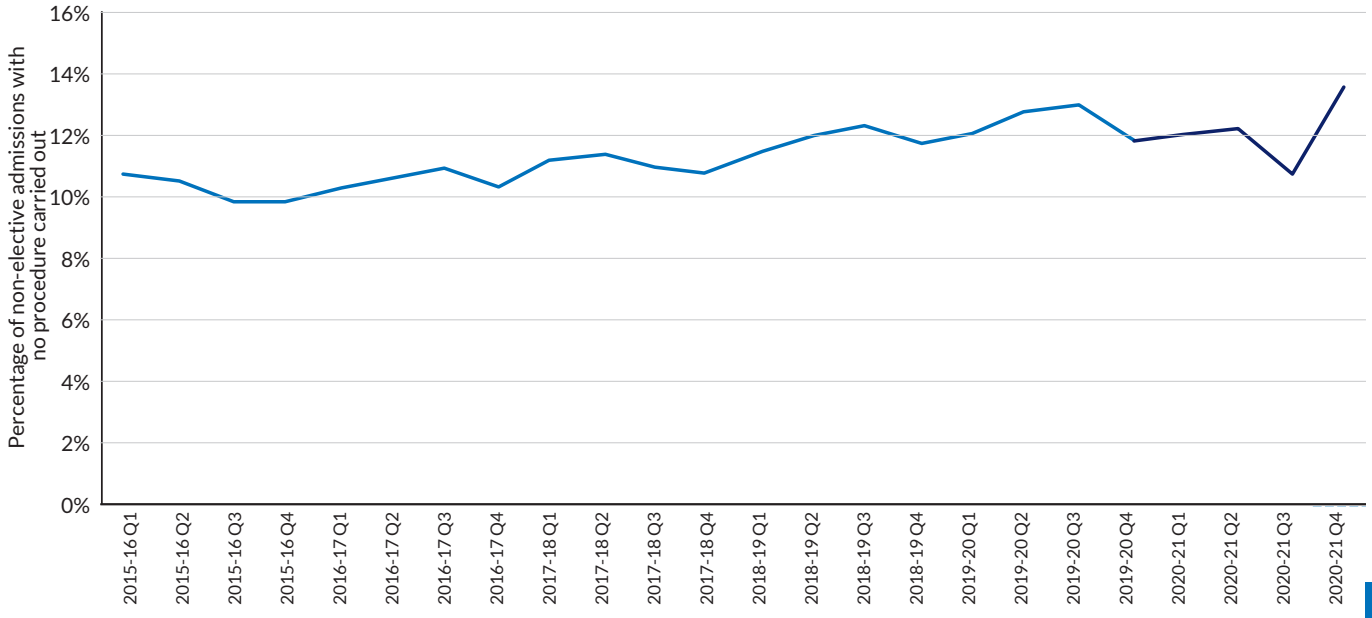


Figure 3 shows that the number of emergency admissions to neurosurgery units via ED has been increasing over time, and that approximately 40% of these admissions result in no surgical procedure. There is significant variation across units (see **Figure 4**) – for some units, 70% of their admissions via ED do not have a procedure, indicating admissions numbers above what is clinically appropriate, and/or a lack of clear admission criteria.

Figure 3: Emergency admissions to neurosurgery via ED – percentage with no procedure carried out, 2015–2021, HES

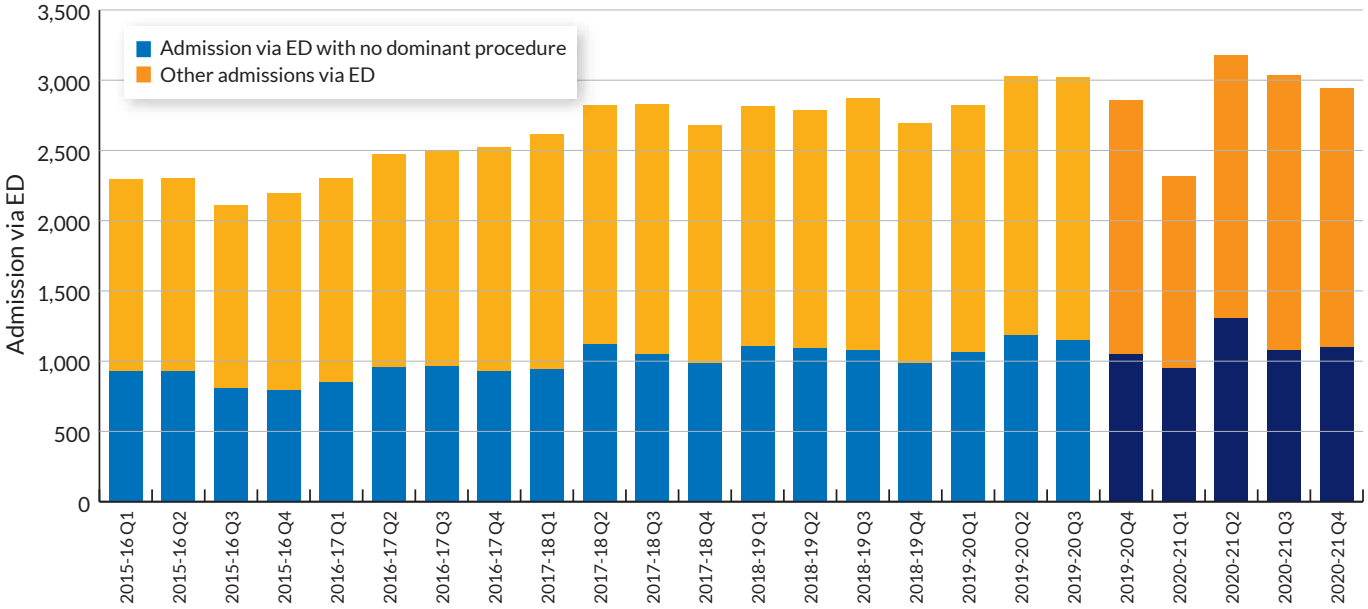
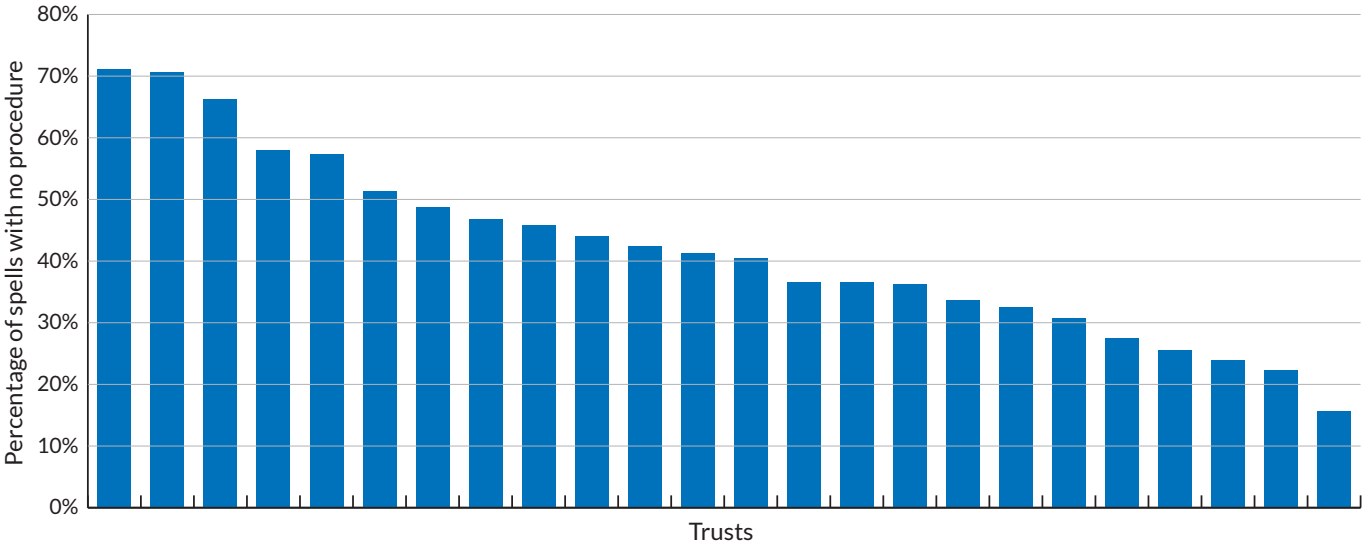


Figure 4: Emergency admissions to neurosurgery via ED – percentage with no procedure carried out, by trust, 2019, HES



CASE STUDY

Atraumatic back pain pathway[11]

Salford Royal NHS Foundation Trust introduced an atraumatic back pain pathway pilot in 2014 to assess whether consultant physiotherapists could effectively triage non-surgical complex back pain in ED. The pilot was successful, and the service has since adopted the pathway.

Patients are now seen by consultant physiotherapists, who are experts in the field, often on the day of their initial attendance. Patients presenting overnight are admitted under care of emergency medicine and referred the following morning to the spinal physiotherapy team.

Close links are maintained with spinal surgeons to enable direct referrals if required. Liaison with community musculoskeletal services allows for integrated outpatient management to prevent repeated ED attendances and enable early discharge with primary care follow-up.

As a result:

- Admissions for this patient group fell from 821.5 to 556.3 per year.
- Length of stay was reduced from 4.44 days to 1.04 days compared with the previous three years.
- The number of atraumatic back pain patients returning to the ED within 30 days decreased.
- Staff (including consultants from ED, acute medicine and spinal surgery, and senior nurses in ED and emergency admissions) agreed the pathway benefits patients and patient satisfaction increased.[12]

Next steps

Neurosurgery units should be involved in all decisions to admit patients to their beds, whatever the admission route. Units have not been resourced to provide rehabilitation, so there is a need to use beds as efficiently as possible for adequate patient flow. In addition, rehabilitation should be kept separate from extensive work-up or radiology. Patients should have had as many scans and investigations completed at their local hospital as possible prior to admission.[13]

- We will continue to work with Specialised Commissioning colleagues in supporting our recommendations, particularly regarding patient flow and repatriation processes, with appropriate levers and incentives identified.

[11] *For further information on this case study please contact michelle.angus@srft.nhs.uk*

[12] *Angus, M. L., Martin, B., Dickens, V., Mohammad S. and Siddique, I., 2019. Development of a physiotherapy-led atraumatic backai pathway: a novel initiative to improve the management of complex back pain in the emergency village. BMJ Innov doi: 10.1136/bmjinnov-2019-000366*

[13] *See, for example, Fountain, D.M., Davies, S.L.C., Woodfield, J. et al., 2019. Evaluation of nationwide referral pathways, investigation and treatment of suspected cauda equina syndrome in the United Kingdom, British Journal of Neurology, 33(6): 624–634. https://doi.org/10.1080/02688697.2019.1648757*

Improving referrals using electronic referral management (ERM)

The original report's recommendation was as follows:

> **Recommendation 1:** Make electronic referral management tools and related processes available in all cranial neurosurgery providers and referring trusts.

The report noted that effective referral management was a key factor in patient flow. It identified, for example, that thousands of patients were being admitted to neurosurgery units but only having a scan – something that should be done in an outpatient setting, if not at the referring hospital, avoiding the unwarranted use of a bed in the unit.

The report suggested that:

"The most appropriate solution here is effective electronic referral and information sharing using compatible systems so that consultants have the necessary information, including the scans, at their fingertips. … modern IT offers tangible opportunities to improve communication between providers and so improve overall effectiveness of cranial neurosurgery delivery."

Progress and challenges since the first report

On the face of it, this recommendation has been met. The revisits to trusts identified that all units now have an online referral tool. We also found that approximately two-thirds of units have implemented the Refer a Patient system, which allows doctors to refer patients to specialist doctors for advice and guidance using an app.[14]

There is, however, a lot more that could be done to increase the efficacy of the referral management tools so they achieve their full potential. A good level of integration with trust EPR systems is possible, allowing referrals to include scans and summary care records. This level of innovation removes many of the inefficiencies that referrers may experience when trying to contact a specialist doctor.

These systems can, and in many cases already do:

- reduce unnecessary admissions by, for example, allowing potential referrers to share patient notes and scans online;
- increase patient flow and allow for better use of available beds;
- allow for the provision of advice and guidance at tertiary level;
- facilitate the creation of a 'virtual ward' at referring hospitals for patients awaiting referral and admission;
- act as an effective governance and/or legal tool, showing clear advice appropriately recorded.

CASE STUDY

In-house EPR

The last ten years has seen the development of online referral tools and the electronic transfer of scans and clinical data between trusts in Yorkshire. **Leeds Teaching Hospitals NHS Trust** has developed an in-house electronic patient record (EPR) which has been extended to the regional hospitals. This has allowed them to identify which patients need to physically attend hospital and which can be seen virtually.

Prior to the electronic systems being in place, many patients were admitted to Leeds General Infirmary to be assessed. It is now possible to read the clinical notes and review MRI scans online, allowing the surgeons in Leeds to prioritise which patients should be admitted.

This saves transfer time, allows swifter decision-making, reduces duplication and enhances documentation and integration with the online referral system, as well as improving the patient experience.

[14] *www.referapatient.org/Home/Index*

Unfortunately, the quality of the referral management tools in use is variable as is integration with hospital IT systems and the EPR. For a referral management tool to be really useful, it must be able to interface with the hospital data system and the EPR. In addition, few of these systems appear to have a continuing programme of improvement and development and, as a result, often become relatively static after installation.

Referral tools can also include functionality that helps in repatriating patients to their referring hospitals, which is a problem for many units and can have a profound effect on patient flow. This is done simply by allowing trusts to easily identify the clinician referrer. (For more detail on discharge and repatriation see 'Focusing on discharge', page 43.) For many units, this process is currently disjointed and requires access to multiple, separate IT systems, which compounds an already taxing problem.

At present, there are no payment flows associated with the work that well-integrated referral management tools can facilitate. However, as the systems for using these tools are further developed, this is an option that should be explored.

Next steps

An effective ERM tool should integrate seamlessly with the EPR, the hospitals' patient administration system (PAS) and picture archive and communication system (PACS) to promote patient safety, improve documentation and increase efficiency. It will also support audit, governance and research. In addition, it should be possible to use the tool to refer a patient back to the original referrer for repatriation purposes.

The additional work (e.g., the provision of advice and guidance) that the neurosurgery teams are able to undertake using such a tool and the positive effect its use could have on patient flow (for example, by reducing the number of unnecessary specialised admissions and improving repatriation rates), deserves recognition and reimbursement from service commissioners.

- The Society of British Neurological Surgeons (SBNS) should begin work on defining standards that can be developed by IT teams and would allow an effective interface between referral tools and the hospital data systems.
- ERMs that enable patents to be assessed virtually, like the one in the Leeds case study above, should be developed and formalised in each neurosurgery unit. This allows admission scheduling and support for referrers.
- Providers should work with NHS England Specialist Commissioning and integrated care systems to explore how best referral and payment systems could be developed and made fuller use of, particularly with regard to managing repatriation issues, for example through the inclusion of associated payment flows and incentives.

Accelerating referral to treatment time

The original report's recommendation was worded as follows:

> **Recommendation 2:** Accelerate the referral to treatment time for all patients identified as in need of cranial neurosurgery.

Conditions that require neurosurgery are often very serious, debilitating and degenerative. To use malignant glioma as an example, poor prognosis is common and delays can be catastrophic. Historically, waiting lists have not been a problem, but post-COVID this situation has changed, and a backlog of patients means more people presenting with advanced conditions. Timely treatment can optimise the quality of survival and is yet another reason why good patient flow is a key goal for the specialty.

Since 2015, there has been a steady reduction in the percentage of patients treated within the national standard of 18 weeks, from 88% to 74% in December 2019 across all conditions.

Progress and challenges since the first report

Unsurprisingly, since the start of the COVID-19 pandemic in March 2020, waiting times for neurosurgery have continued to deteriorate and has been accompanied by a dramatic increase in the number of patients waiting over 52 weeks, from 91 to 3,816.

A significant volume of neurosurgical activity involves the treatment of primary malignant brain tumours (most commonly gliomas). These are severe conditions with a poor prognosis. Patients have limited life expectancy after diagnosis – an average of a year. To maintain quality of life during that year, which is naturally precious, requires prompt surgery and adjuvant radiotherapy. The faster patients get to the end of their treatment, the better their outcome. (The extreme urgency in treating these patients is also reflected in Recommendation 6, discussed in the next section, which advocates an urgent elective pathway over an emergency admission, specifically for the treatment of primary malignant brain tumour).

Next steps

There is good evidence regarding the optimum speed of these pathways in terms of patient outcomes.[15] In addition, an efficient elective pathway, where the resource for surgery is planned and pre-defined, has a positive impact on patient flow compared to a non-elective admission. Units must continue to develop formal urgent elective pathways that are of high quality and efficient in getting patients through treatment promptly.

- This work should ideally be championed by the British Neuro-oncology Society (BNOS) in collaboration with the SBNS. To further define quality of care in intrinsic brain tumours, this next step relates closely to the work on developing outcome measures as detailed in 'Enabling continual quality improvement', page 52.

[15] *For example, Sun, R. Sharma, S., Benghiat, H. et al., 2022. Reconfiguration from emergency to urgent elective neurosurgery for gioblastoma patients improves length of stay, surgical adjunct use, and extent of resective surgery. Neuro-Oncology Practice, 9(5): pp.420–428. https://doi.org/10.1093/nop/npac034 and Guilfoyle, M. R., Weerakkody, R. A., Oswal, A, et al., 2011. Implementation of neuro-oncology service reconfiguration in accordance with NICE guidance provides enhanced clinical care for patients with glioblastoma multiforme, British Journal of Cancer, 104:1810–1815, www.nature.com/articles/bjc2011153*

Prioritise urgent elective pathway for primary malignant brain tumour

The original report's recommendation was as follows:

> **Recommendation 6:** Reduce the proportion of primary malignant brain cancer patients admitted via the emergency/non-elective stream.

The first report identified good practice in relation to the treatment of patients with primary malignant brain tumour, which accounts for one of the specialty's highest-volume procedures. A number of trusts had set up an urgent elective pathway where the patient is seen by a consultant within a couple of days of referral and then scheduled for surgery three or four days later. This improved the experience for the patient and used the provider's beds more effectively. It is also notable that increasing the proportion of elective admissions reduces pressure on theatres (a topic we cover in greater detail in 'Reducing delays to elective surgery - see page 29). The first report strongly recommended that prompt elective pathways for primary malignant brain tumour should be widely adopted.

As is well evidenced, primary malignant brain tumour admissions to an urgent elective pathway rather than non-elective offer a significantly better experience for patients and their families.[16]

Malignant tumours of the brain progress and spread quickly. The sooner patients are treated after diagnosis the better their performance status and outcome from treatment, as they can better cope with the radiotherapy treatment that is subsequently required. Prompt treatment provides a much better patient experience and means patients can access important psychological support early at this difficult time.[17]

Our first report showed that units with a defined early elective pathway for primary malignant brain tumour tended to be well organised. The pathway was in effect a marker for high-quality care.

As explained in the previous section, these patients typically have a year or less to live and require radiotherapy promptly to maintain a good functional brain status for as long as possible. Where patients are not admitted to this pathway, the delays between referral, admission, procedure and subsequent radiotherapy can leave them vulnerable to hospital-acquired infections and thrombosis as well as rapid deterioration in brain function, significantly reducing their quality of life.

Progress and challenges since the first report

Increasing adherence to the optimal pathway for primary malignant tumour surgery means that fewer patients should be admitted as an emergency for their surgery. The data now shows a significant improvement in this measure: as elective admissions have increased, so the percentage of patients being admitted as an emergency dropped from 31% to 16%, prior to COVID-19.

Exemplar: Primary malignant brain tumour pathway

A well-managed urgent elective pathway works as outlined below. If the cancer is diagnosed on a Friday, the patient is booked into an outpatient clinic on the following Monday afternoon. There will be an identified team that enables all investigations to take place to ensure surgery is carried out promptly. This will include a discussion with a clinical nurse specialist and oncologist and then surgery within five days. All contact with the patient is conducted through outpatients, until surgery.

In contrast, where a unit does not have an urgent elective pathway, the patient will be admitted as an emergency on the day that they are diagnosed and will wait on the ward for seven to ten days before surgery. This is a highly inefficient pathway that requires the patient to spend far longer in hospital than is necessary.

[16] *See, for example, Sun, R. Sharma, S., Benghiat, H. et al., 2022. Reconfiguration from emergency to urgent elective neurosurgery for gioblastoma patients improves length of stay, surgical adjunct use, and extent of resective surgery. Neuro-Oncology Practice, 9(5): pp.420–428. https://doi.org/10.1093/nop/npac034 and Guilfoyle, M. R., Weerakkody, R. A., Oswal, A., et al. Implementation of neuro-oncology service reconfiguration in accordance with NICE guidance provides enhanced clinical care for patients with glioblastoma multiforme, British Journal of Cancer, 104:1810–1815, www.nature.com/articles/bjc2011153*

[17] *Waqar, M., Trifiletti, D. M., Mcbain, C., et al., 2022. Early therapeutic interventions for newly diagnosed glioblastomas: rationale and review of the literature, Current Oncology Reports, 24: 311–324, https://doig.org/10.1007/s11912-021-01157-0*

Figure 5 shows the steady increase in the proportion of primary malignant brain tumour cases that are being treated as elective admissions until the impact of COVID-19 is seen in 2020/21 Q1. The impact of COVID on all elective pathways, however urgent, has been significant, as resources have had to be directed elsewhere. Inevitably this means that those patients not admitted electively are, as a result, admitted as emergency cases later on.

Figure 5: Elective versus non-elective split for primary malignant brain tumour admissions, 2015–2021, HES

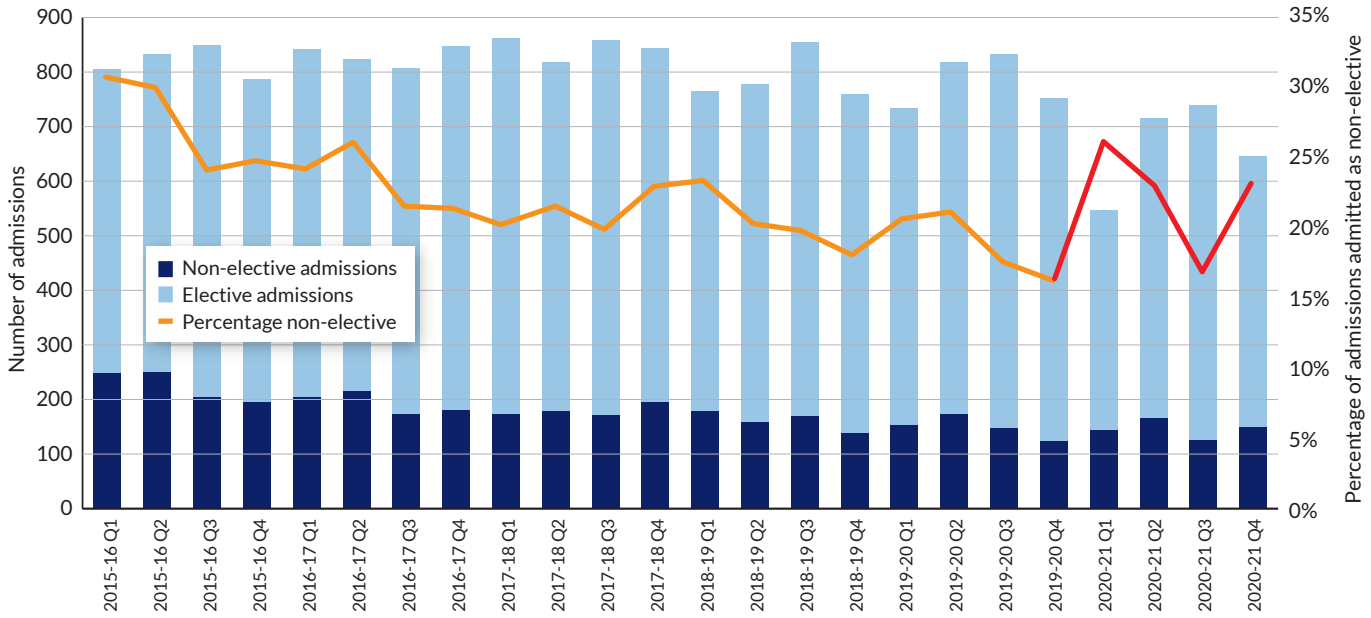
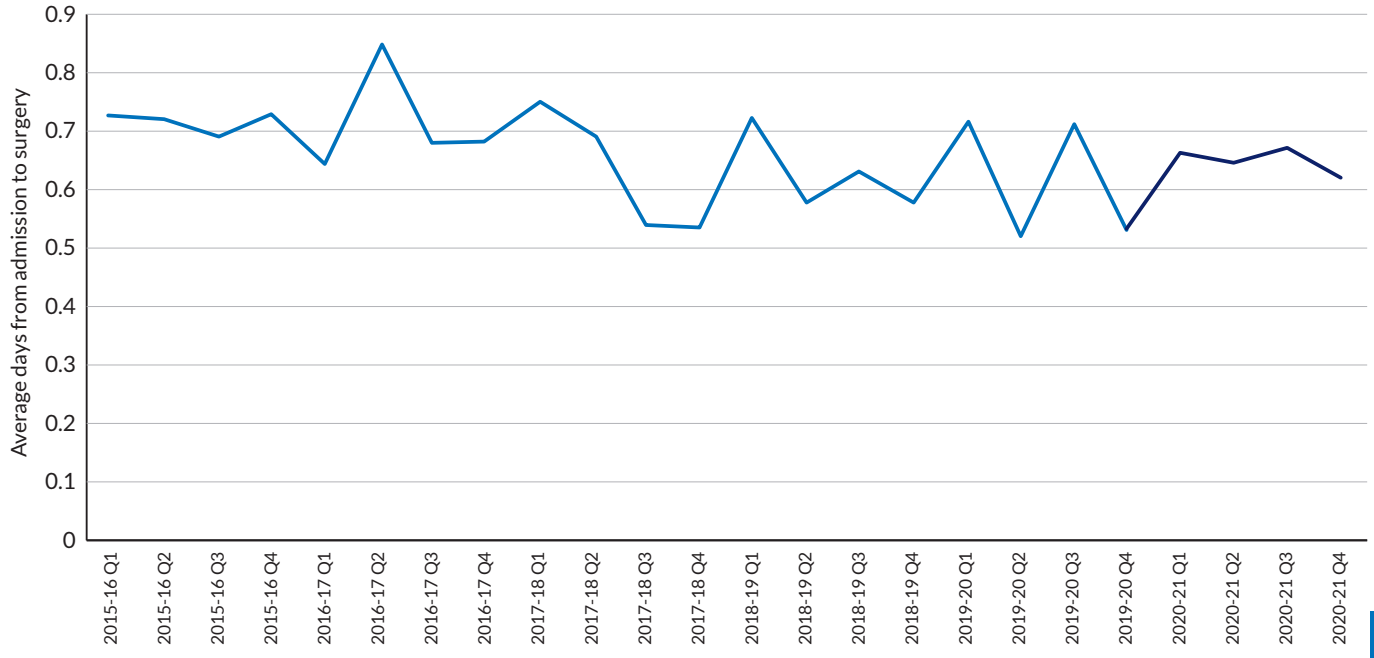


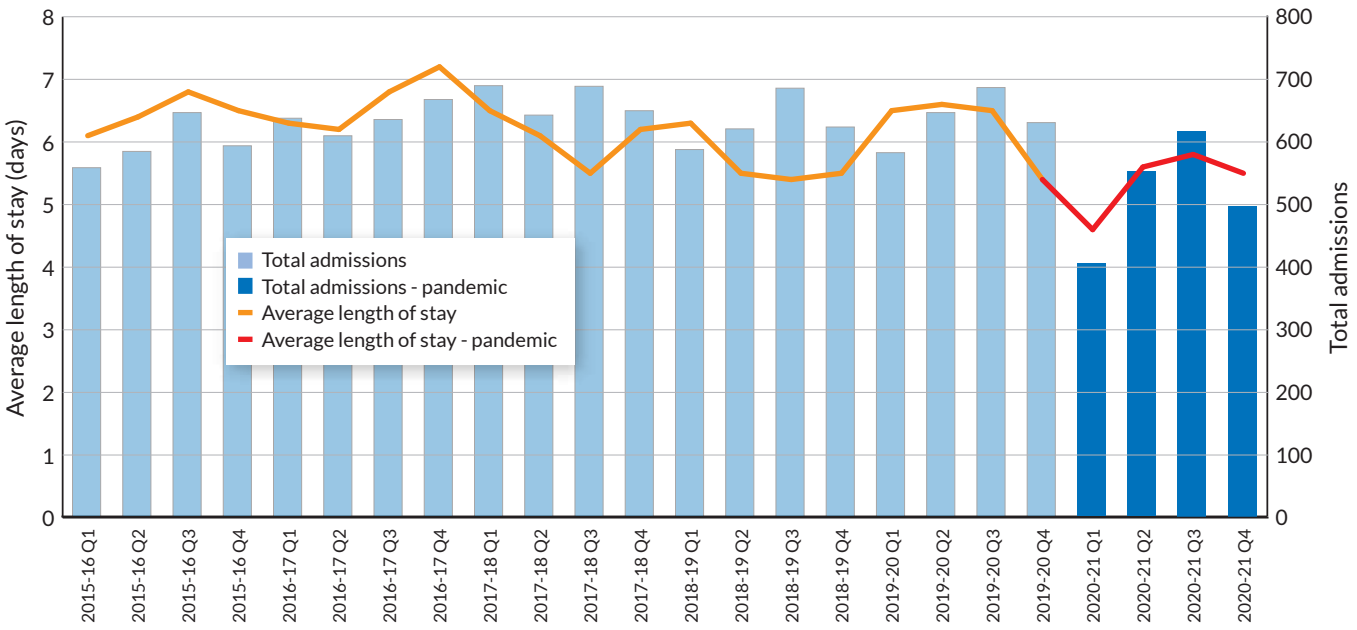
Figure 6 shows that there has been an improvement in the average number of days between admission and surgery for elective patients with primary malignant brain tumours. This shows that the pathway is working. However, most units are not organised to have an urgent-elective pathway, as they don't have the clinic and the operating list on the same day, and pre-admission that is carried out quickly. We would hope to see a further reduction – there remains great scope for improvement, with the support of local leadership.

Figure 6: Average days from admission to surgery for elective spells for cranial procedure for primary malignant tumour, 2015–2021, HES



As the proportion of primary malignant brain tumour patients treated electively increases over time (see **Figure 5**), **Figure 7** shows the start of a corresponding – albeit small – reduction in average length of stay. The period of COVID-19 shows reduced presentations of primary malignant brain tumour, in common with all diagnoses, and also a marked reduction in length of stay. For the future, however, we would expect the effects of the pandemic to be seen in an increased presentation of patients with more advanced disease, some of whom may be admitted acutely.

Figure 7: Average length of stay for elective primary malignant brain tumour surgery patients, 2015–2021, HES



Next steps

Regarding establishing the urgent elective pathway for primary malignant brain tumour patients, we acknowledge the significant improvements already made and urge that efforts are redoubled, particularly in view of the benefits in terms of both patient experience and reduced pressure on units through fewer emergency admissions.

- All units should focus on increasing the number of primary malignant brain tumour patients to whom the urgent elective pathway is offered and define and establish a formal elective pathway if they haven't already done so. This needs to be surgeon-led and supported by local managers to define activity levels, identify surgeons, job plan changes, and
- Units should agree who will be primary malignant brain tumour surgeons and who will lead the neuro-oncology service to facilitate the development of a clear formal urgent elective brain cancer pathway.

Reducing length of stay (through increased day case surgery and day of surgery admission)

The original report's recommendations were as follows:

> **Recommendation 4:** Increase day of surgery admission rates.
>
> **Recommendation 5:** Increase the proportion of procedures undertaken in the day case setting and increase the rate of 'short-stay admissions'.

The report identified that 10,000 preoperative bed days were reported against elective cranial neurosurgery patients, with vast variation across trusts. Among the reasons, it noted:

"it appears that those who admit the day before typically do so for historic reasons – it's what they've always done – or process reasons, such as ensuring any necessary preoperative checks are done. … many such checks could be conducted via outpatient services rather than requiring the patient to be admitted."

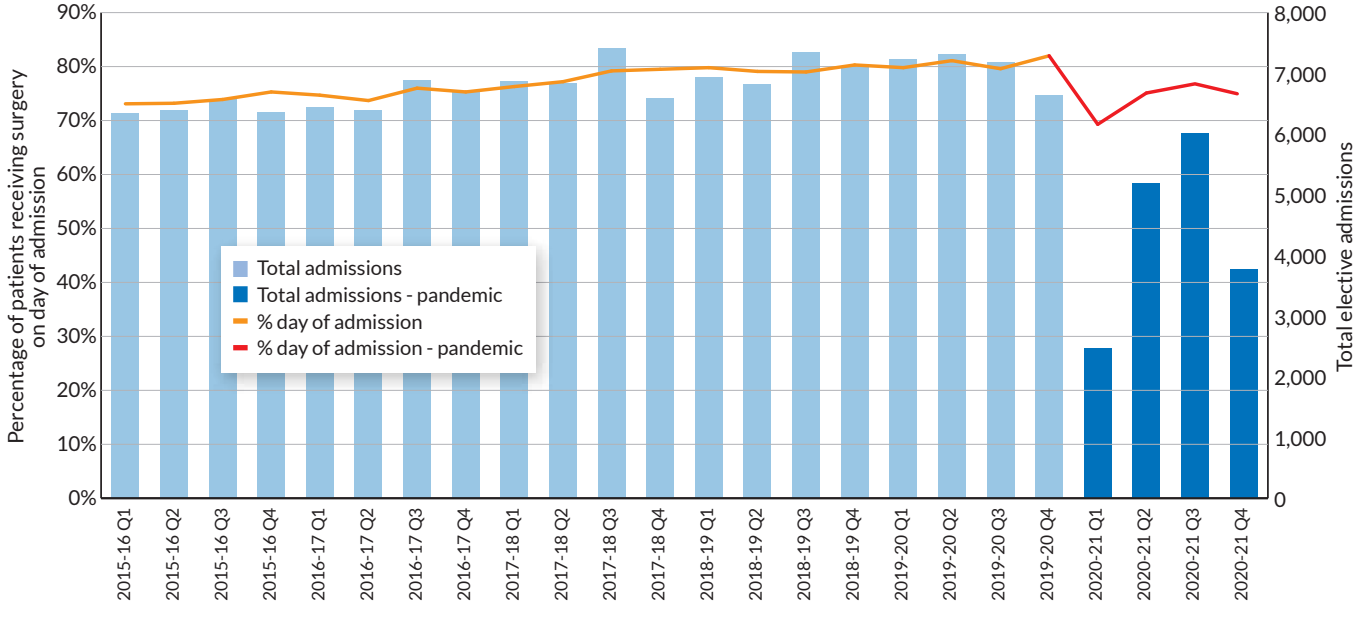
The report also identified wide variation in rates of day surgery for minimally invasive procedures, such as percutaneous treatments for trigeminal neuralgia, which do not require prolonged recovery. If providers could improve their day case rates and increase day of surgery admissions, it would both bring benefits to patients and improve the efficiency of the unit.

Progress and challenges since the first report

These recommendations represent clear opportunities to reduce length of stay and therefore make more efficient use of beds. However, day case opportunities are limited within neurosurgery because of the complexity of many of the procedures. For this reason, we have also considered an enhanced recovery after surgery (ERAS) approach, which aims to reduce length of time from procedure to discharge. (For more detail on ERAS and on discharge generally, see 'Focusing on discharge', see page 43).
Recommendation 4: The proportion of patients who receive surgery on the day of their admission increased from 73% in 2015 to 80% (December 2019) (see **Figure 8**), a saving of almost 500 bed days a year (£0.2m). However, there is further to go, with 1,500 patients a year still being admitted the day before their surgery. There continues to be wide variation nationally, with some trusts citing a lack of appropriate resources for on-day admission as the reason for their admitting patients the day before surgery.

Resources must include an admissions unit, where patients can be admitted and prepared for surgery. Without this facility neurosurgery wards are likely to be overwhelmed with admissions and prep work. Other barriers may include long travel distances for patients and lack of free beds on Mondays. It should be acknowledged too that some very elderly patients will require admission the day before surgery.

Figure 8: Percentage of patients receiving surgery on day of admission, 2015–2021, HES



CASE STUDY

Implementing day of admission surgery

The Walton Centre NHS Foundation Trust has increased the percentage of patients who receive their surgery on the day of admission from 18% in 2015 to 74% in 2021. They have achieved this through the implementation of a major transformational change programme that incorporated:

- **Ward reconfiguration**

This required capacity modelling based on the main bed base and activity, which allowed the unit to identify a specific ward as the same-day admissions (SDA) area.

- **Staffing**

There was a process of staff consultation for the nursing teams on the SDA area to enable them to be in work for 7am, ready to greet the patients for 7.15am.

- **Preoperative assessment redesign**

The preoperative assessment service was redesigned to fit the needs of the service and minimise on-the-day cancellations – this was nurse and anaesthetist led. An in-house preoperative e-form and dashboard were created and dedicated administrative support was recruited for the service. These systems gave a greater visibility of patients preparing for admission and allowed for prompt earlier preoperative assessment, as well as showing which, if any, results/tests remained outstanding.

- **Consent**

Prior to the SDA project, internal audits showed that the majority of consents were done on admission (the day before surgery). Additional clinic capacity was created (either by slot time or a separate consent clinic, running alongside pre-op) for the consultants to gain patient consent well in advance of the admission. This required review of all consultant job plans and existing clinic templates.

- **Clinical criteria**

A process was established to identify those patients clinically appropriate for SDA. This was a consultant-led change. There remain some exceptions –patients who do not meet the clinical criteria – who are still admitted the day before.

- **Digital change**

The SDA project ran alongside the development and launch of Ep2 (electronic patient record version 2) and so it was possible to develop an electronic listing document for the consultants to use in clinic, which captured key information required for successful preoperative care, theatre scheduling, kit requirements and coding. This system was intraoperable with the theatre management system.

- **Phased approach**

The project was delivered as part of a phased approach with full clinical engagement, beginning with the more straightforward of procedures, i.e. simple lumbar discs etc., leading up to the more complex cranial procedures.

- **Bed management**

The way in which bed management functioned dramatically changed to meet the needs of this service improvement. In full consultation with the team, it was possible to alter shift patterns, develop an enhanced method of communication between bed management and wards, and tighten up daily escalation processes to improve patient flow.

- **Information**

Patient information was redesigned, as were the website, TCI letters and preoperative assessment invite letters.

- **Whole-team engagement**

Crucially, representatives from the entire team were engaged – consultants, pharmacists, administrative staff, porters, theatre staff, nurses and other ward staff, etc.

Recommendation 5: Overall, it is accepted that day case surgery is good for patients and represents an efficient use of resources.[18] It is important, therefore, that the specialty identifies suitable conditions, procedures and patients for day case surgery.[19] Although relatively few conditions in neurosurgery are suitable for day case treatment, certain cranial procedures such as percutaneous trigeminal thermocoagulation (a treatment primarily for neuralgia) and some spinal surgery can often be done safely and successfully on a day case basis. For another example of a procedure that has been successfully implemented on a day case basis, see the case study from University Hospital Southampton below.

This approach does, however, require significant investment in day case units' scanning capacity, the production of high-quality patient information material, consent clinics and effective pre-assessment and anaesthetic review.

CASE STUDY

Day case biopsy and craniotomy

University Hospital Southampton NHS Foundation Trust has implemented day case image-guided biopsy and craniotomy for selected patients undergoing surgery for brain tumours. As noted by Grundy et al.,[20] this was the first UK series of day-case surgery for intra-axial tumours, consisting of 30 image-guided biopsies and 11 craniotomies, taking place over 1 year from October 2006.

Of 30 biopsy patients, 27 were discharged 6 hours postoperatively. Out of 11 craniotomy patients 9 were discharged 6 hours postoperatively. One biopsy case was admitted due to increased headache postoperatively, but with a normal CT and one craniotomy case had transient worsening of lower limb paresis requiring overnight admission.

The three other overnight admissions were for patient preference. One biopsy patient was readmitted 30 hours postoperatively with a seizure and discharged the following day. No patients suffered an adverse outcome.

The study observed 94% of patients had a same-day discharge, with no adverse events from 325 cases.

The day case service is not only more economic, efficient and cost-effective, but also leads to improved patient outcome and satisfaction.

Figure 9 shows the specialty has achieved a slight increase in zero length of stay (i.e. day case) rates for trigeminal thermocoagulation procedures. The majority of patients requiring trigeminal thermocoagulation can be treated as day cases. Despite the increasing trend over the last five years towards this, there are still some providers who are not delivering thermocoagulation routinely, if at all, as a day case (see **Figure 10**, which illustrates the variation between trusts). Assuming all trusts shown have a significant volume of patients admitted for this procedure, this figure highlights that day case/perioperative pathways are not being adopted. This an area where trusts need to be challenged (e.g. at GIRFT visits or during contract performance discussions with commissioners) and encouraged to use data that is available to them to understand variation against standards, for example where they have lower than expected day case rates.

Where trusts cite lack of access to day case admission facilities (such as a dedicated admissions ward) as the reason they cannot implement day case protocols for simple neurosurgical procedures, local clinicians and managers should negotiate access to these facilities.

[18] *See, for example, Snowden, C. and Swart, M., 2021. Anaesthesia and perioperative medicine: GIRFT programme national specialty report, pp. 34–54. Available at https://gettingitrightfirsttime.co.uk/girft-reports/ and Appleby, J., King's Fund, 2015. Day case surgery: a good news story for the NHS, BMJ, 351:h4060, https://doi.org/10.1136/bmj.h4060*

[19] *The British Association of Day Surgery (BADS) website has many useful resources, including a day surgery delivery pack published in collaboration with GIRFT; available from https://bads.co.uk/resources/day-surgery-useful-links/*

[20] *Grundy, P.L., Weidmann, C. and Bernstein, M., 2008. Day-case neurosurgery for brain tumours: the early United Kingdom experience, British Journal of Neurosurgery, 22:3, 360–367, https://pubmed.ncbi.nlm.nih.gov/18568724/*

Figure 9: Proportion of trigeminal thermocoagulation procedures with zero length of stay, 2015–2021, HES

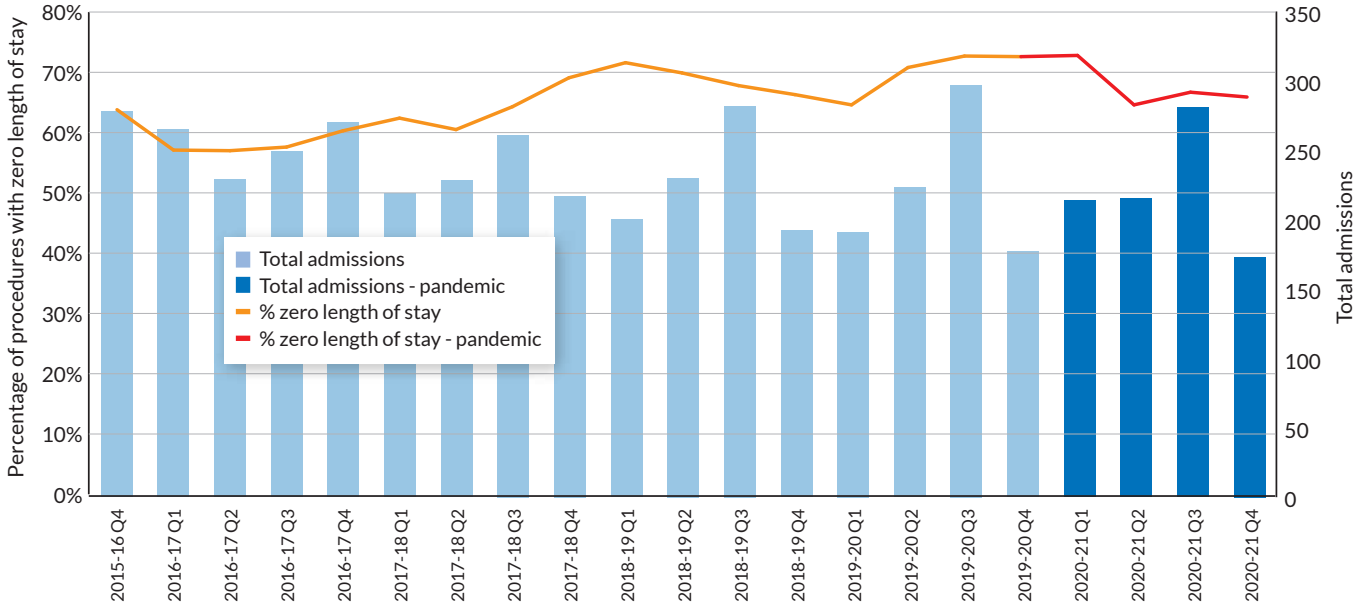
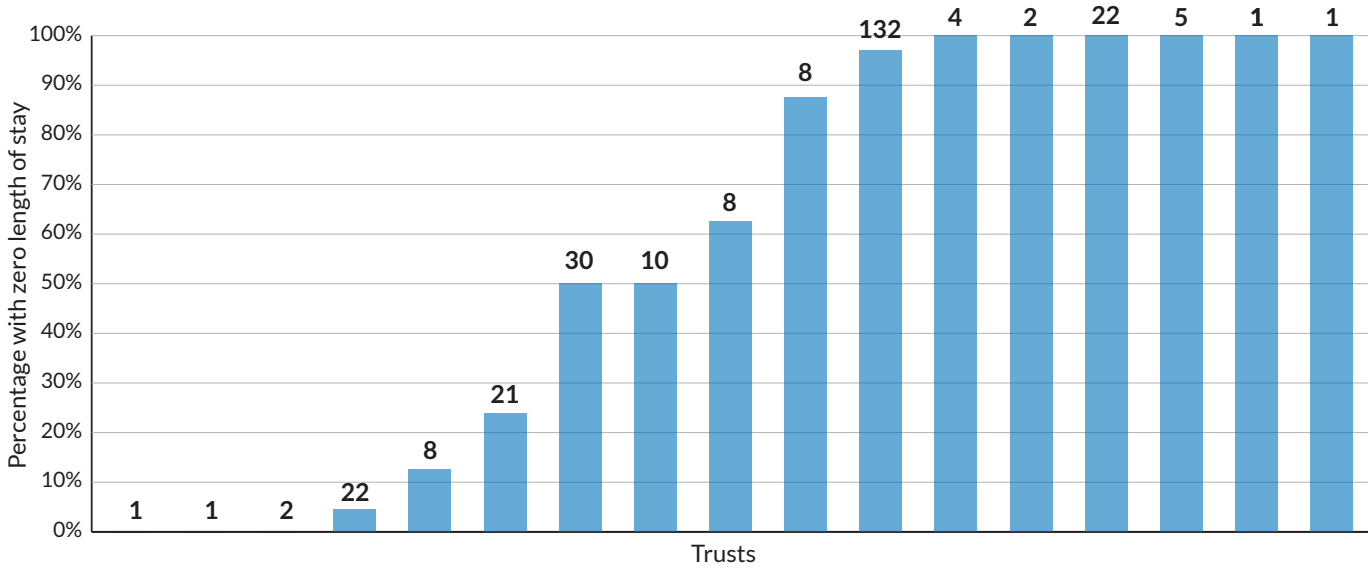


Figure 10: Proportion of trigeminal thermocoagulation procedures with zero length of stay, by trust, 2019, HES



However, for most neurosurgical procedures, the complexity of surgery and the clinical requirement for relatively long-lasting anaesthesia, means that reducing length of stay is more relevant than adopting the day case model. For this reason, while we would encourage certain simpler procedures to be undertaken as day cases by default, overall we prefer to emphasise the value of surgery on the day of admission and the enhanced recovery or ERAS model, both of which are widely applicable to neurosurgery, as a way of reducing length of stay.

Only seven of 22 trusts who completed the GIRFT questionnaire had developed ERAS or early supported discharge programmes. These are widely accepted and well-evidenced approaches to reducing length of stay, and as such they should be adopted as a matter of course. They are suitable for a range of conditions, and we would strongly urge units to develop these pathways especially for spinal but also pituitary, primary malignant brain tumour and other elective types of surgery. A modern, innovative neurosurgery unit should have enhanced recovery as an integral element of the patient pathway.

CASE STUDY

ERAS for elective pituitary surgery

Leeds Teaching Hospitals NHS Trust has implemented an enhanced recovery and accelerated discharge policy for elective pituitary surgery, which has reduced the average length of stay from 4.5 days to just 1.7 days.[21] This involved 71% of patients being discharged on the day following surgery. Patient feedback was positive, with a mean patient satisfaction score of 9.7/10.

The enhanced recovery protocol includes a number of measures:

- **Preoperative**

Holistic needs assessment carried out by the pituitary nurse specialist;
Patient information leaflet provided;
Benefits of short length of stay are discussed with the patient.

- **Perioperative**

Sedating premedication, catheters and use of lumbar drains are all avoided;
Dissolvable nasal packs are used after reconstruction.

- **Postoperative**

Patients are mobilised early;
Consultant-led endocrinology review on the day following surgery along with fluid balance charts and day 1 assessment of urea and electrolytes;
Early weaning regime of hydrocortisone;
Early discharge home with multiple contact points in case of concern;
Nurse specialist calls all patients 1–2 weeks after surgery.

The only additional cost to delivering this improvement in length of stay was the patient education leaflets.

Next steps

Trusts should actively promote ERAS pathways with appropriate backup and channels of communication. A one-night stay should be the default pathway for as much cranial surgery as possible, with patients being discharged the morning after surgery, provided their scans are normal. Managing patient expectations is a crucial element in reducing time in hospital and this should be prioritised.

- Units should address the challenge of reducing length of stay from both ends of the hospital admission – i.e. by implementing ERAS policies and performing the surgery on the day of admission.
- Trusts should invest in good patient information that prepares patients for a short length of stay, as well as ensuring adequate support for early discharge.

[21] *Hughes, M., Culpin, E., Darley, R. et al., 2020. Enhanced recovery and accelerated discharge after endoscopic transsphenoidal pituitary surgery: safety, patient feedback, and cost implications, Acta Neurochir (Wien) 2020 Jun; 162(6):1281-1286; https://pubmed.ncbi.nlm.nih.gov/32144485/*

Reducing delays to elective surgery with provision of a designated acute theatre

The original report recommendation was as follows:

> **Recommendation 7:** Implement the NCEPOD recommendation relating to access to acute theatres, through designating one or more of their existing elective neurosurgical theatres as an acute theatre with a robust plan for specialty-specific staffing.

The report looked at how long patients waited for their treatment. Only 70% of admitted patients and 83% of non-admitted patients were treated within the national standard of 18 weeks.

The original deep-dive visits highlighted theatre usage as key to this problem. As stated in the first report:

"One of the main causes of delays in both elective and non-elective streams, and cancellations in the elective stream, is the arrival of emergency patients. These patients need to be operated on fast; procedures may well take longer to perform, meaning that one emergency procedure could take the allotted slot of three or four electives."

Cranial neurosurgery has a high non-elective workload, at approximately 40% of activity. These cases are urgent conditions that necessarily displace elective work. If there is insufficient resource to deal with the urgent cases, they necessarily impinge on elective activity.

The preferred solution is to have dedicated non-elective services – specifically a dedicated acute theatre that, when not required, can be used flexibly for short elective cases. Such provision is the marker of a well-planned and organised service with effective elective pathways to minimise delays and cancellations.

Progress and challenges since the first report

The response to this recommendation has been impressive. As a result of the recommendation and our many conversations on this topic during deep-dive and subsequent visits, the number of trusts operating this model has more than doubled. Sixteen units now have a dedicated acute theatre for neurosurgery, up from the seven when we conducted the first round of visits.

We looked at the number of patients being admitted but then not having their surgical procedure (see **Figure 11**). The increase in dedicated acute theatres for neurosurgery has not yet resulted in an improvement in the national trend for this metric, possibly because improvements at trust level have not been large enough to affect the national trend. There may also be confounding factors affecting the trend that HES does not currently capture (for example, a non-medical cancellation could relate to transport failure, lack of a bed available, no anaesthetists, no surgeon and so on).

Figure 11: Percentage of elective neurosurgery spells where procedure not carried out for medical or patient reasons, or for other or unspecified reasons, 2015–2021, HES

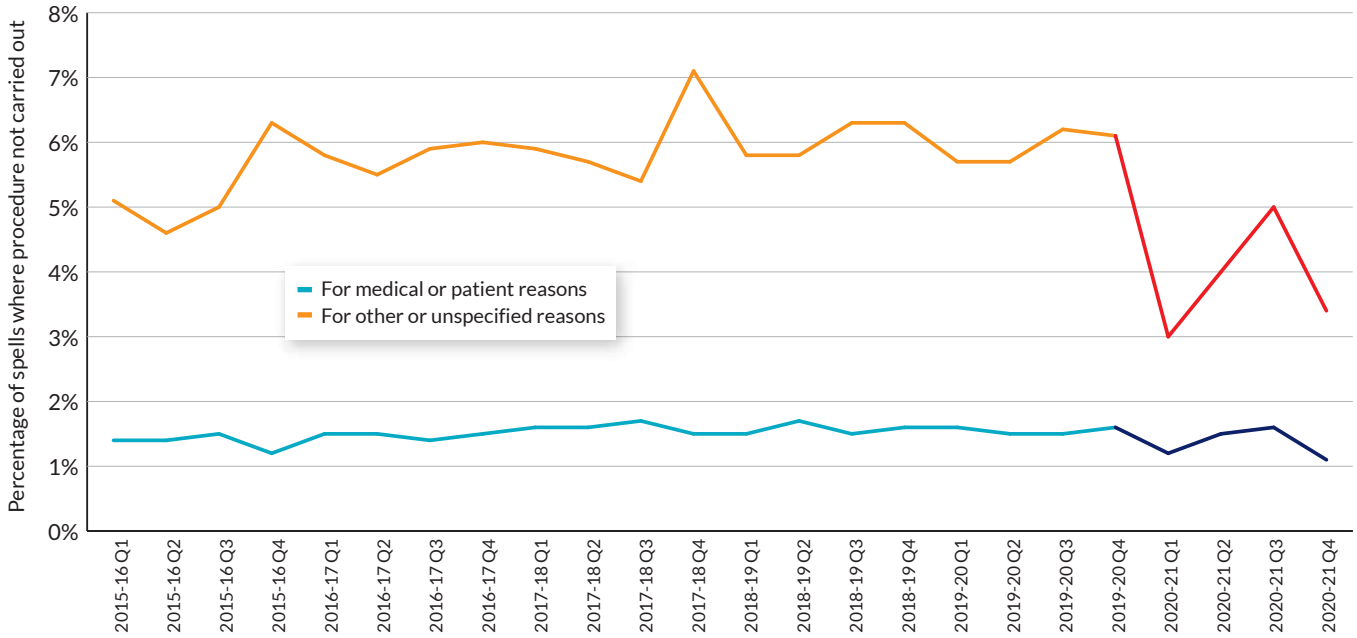


Figure 12a shows the variation by trust, highlighting the correlation between the lack of a dedicated acute theatre and a high proportion of procedures that did not take place for non-medical reasons. Seven of the eight units without a dedicated theatre are in the worst-performing 50% of trusts. As can be seen in the scatter chart version **Figure 12b**, larger/higher-activity units are more likely to have a dedicated acute theatre, whereas smaller units do not enjoy the benefits of scale and may be required to share an acute theatre with other specialties.

Figure 12a: Percentage of elective admissions where planned procedure did not take place for non-medical reasons, by trust, 2019, HES & GIRFT questionnaire

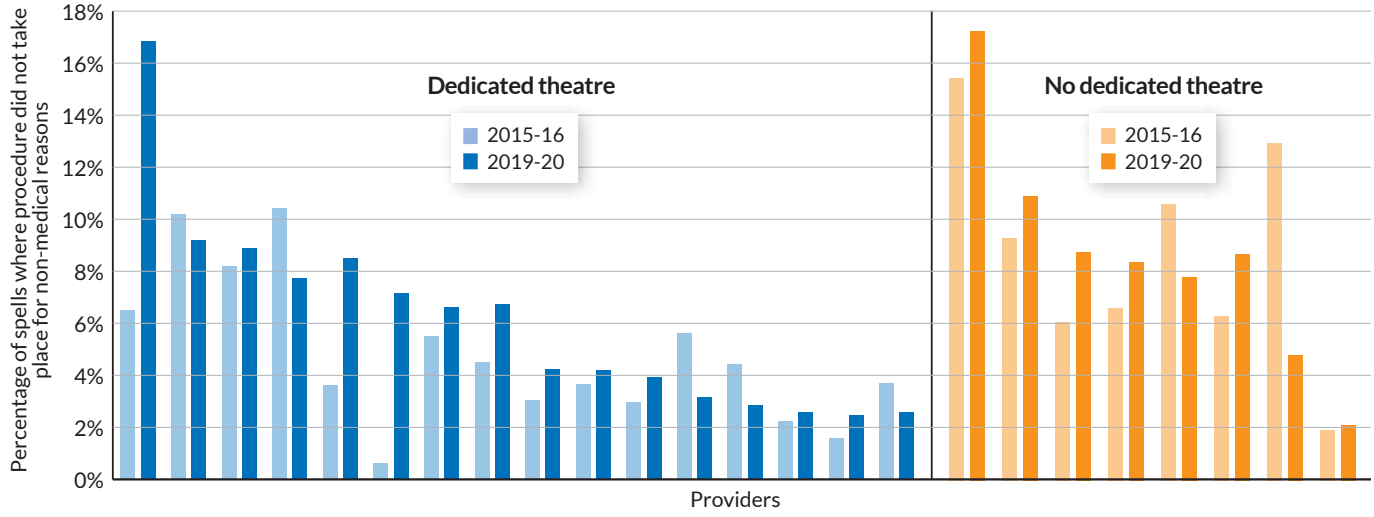
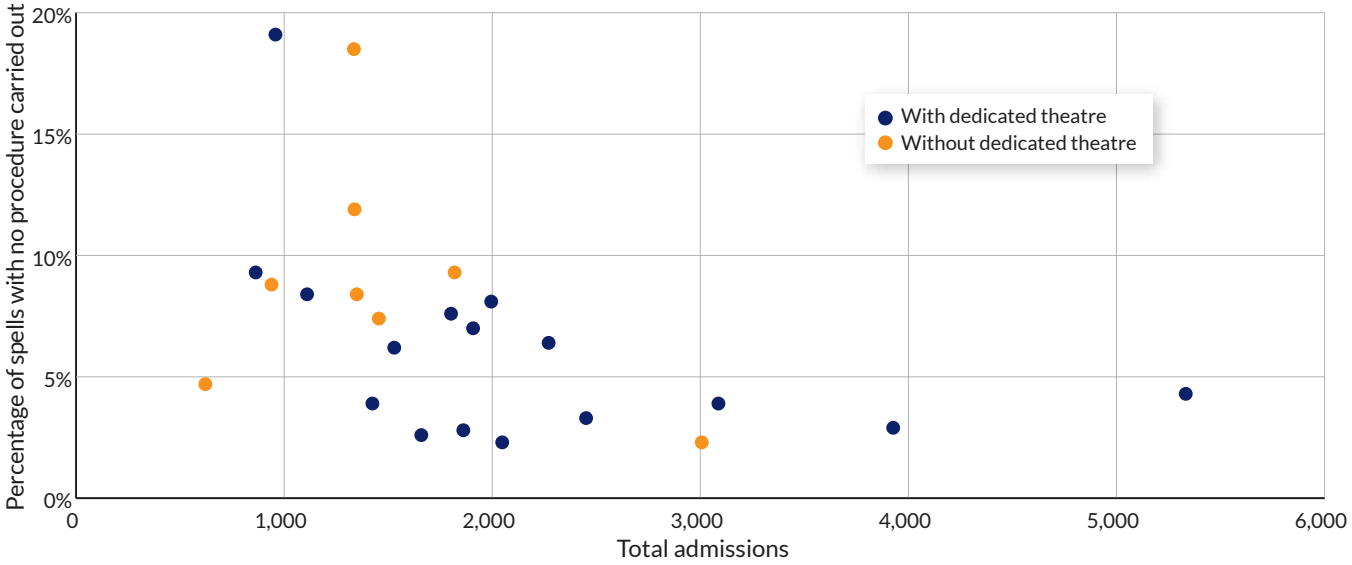


Figure 12b: Scatter chart illustration of percentage of elective admissions where planned procedure did not take place for non-medical reasons, 2019, HES & GIRFT questionnaire



Next steps

We are currently conducting further analysis into the effects on cancelled and delayed elective procedures when a dedicated acute neurosurgical theatre is established, with a view to further promoting this approach. In the meantime, we would reiterate the original recommendation and urge that:

- Those units without a dedicated acute theatre should give serious consideration to assigning one as such, in line with NCEPOD recommendations.

Improving patient flow between critical care and neurosurgery wards

The original report's recommendation was as follows:

> **Recommendation 8:** Improve patient flow between critical care and wards.

As we noted during our original deep dives, it is often difficult to step down patients from critical care to a ward bed. This is frequently a result of blockages in the system inhibiting patient flow, primarily delays in discharging patients from the acute neurosurgery ward, whether by repatriating them to their referring DGH or discharging them directly to their homes.

Providers reported that patients often spend longer on the critical care unit than is clinically necessary due to the lack of an available bed on the neurosurgery ward. This in turn may lead to elective procedures being cancelled where there is no critical care bed available. As noted in the GIRFT national specialty report for adult critical care, sub-optimal discharge from critical care 'is indicative of trust-wide blockages … and a trust-wide approach is required in order to improve the situation'.[22] For more on this topic (from the perspective of delayed discharge from neurosurgery wards) see 'Focusing on discharge' see page 43.

There is a finite need for an elective critical care bed following an elective neurosurgical procedure for patients undergoing long operations (four hours or more), for those with complex conditions, those at high risk of complications due to co-morbidities and, in certain cases, those who have tested positive for sleep apnoea, for example.

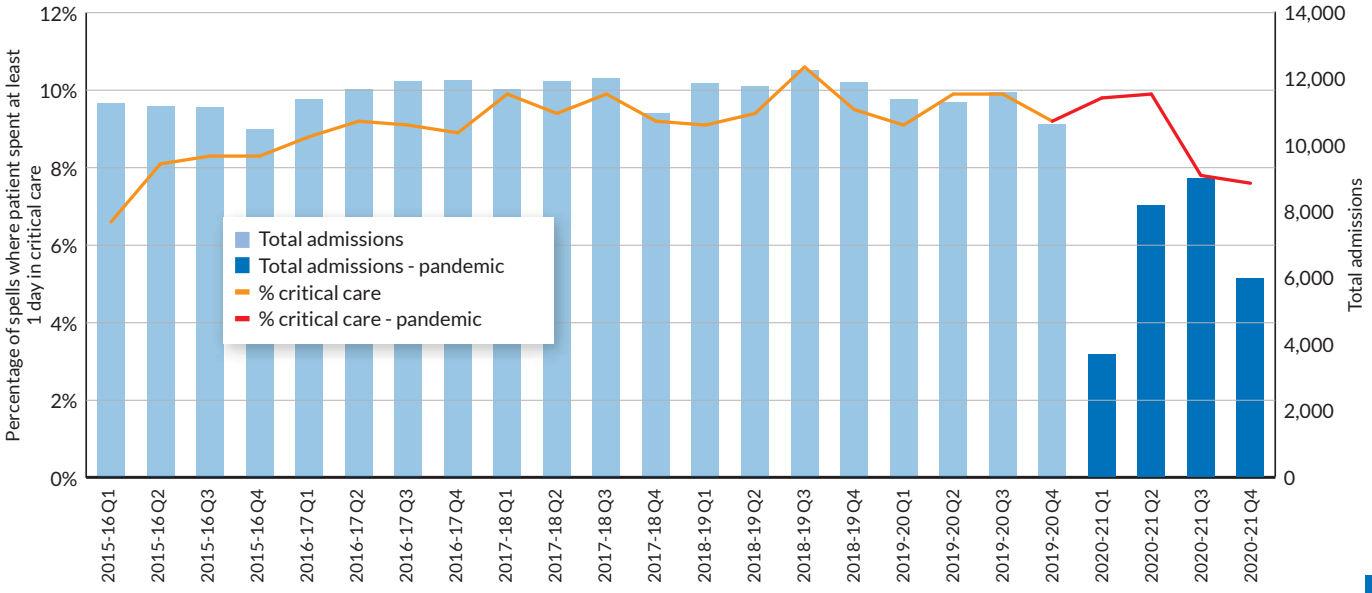
We saw different models (and significant variation) across the country in relation to the use of critical care, most based around a combination of the availability of critical care beds within the hospital in question and the culture that has developed on this basis, including the level of nursing care and staff numbers available within the neurosurgery unit. While some variation is understandable, the pathway would be improved overall if criteria were more uniformly applied.

Progress and challenges since the first report

Figures 13 and 14 show that there has been an increase in the use of critical care since the first round of visits (as part of a longstanding trend), both for the percentage of neurosurgical patients being admitted to critical care and for the percentage of total bed days spent there. Not only is overuse of critical care expensive to trusts, but the greater the proportion of neurosurgery patients admitted to critical care, the greater the risk of this leading to delays in the pathway.

It is possible that a reduction in the proportion of patients admitted to critical care, facilitated by a clearer set of criteria for admission and increased neurosurgical enhanced care provision, could go some way towards alleviating the problem, although the root cause in many cases remains delayed discharge from the acute neurosurgery ward.

Figure 13: Percentage of neurosurgery patients who spent at least one day in critical care, 2015–2021, HES



[22] *Batchelor, A., 2021. Adult critical care: GIRFT programme national specialty report, p. 8, https://gettingitrightfirsttime.co.uk/wp-content/uploads/2021/09/Adult-Critical-Care-Sep21m.pdf*

Figure 14: Percentage of total bed days for neurosurgery patients that are critical care bed days, 2015–2021, HES

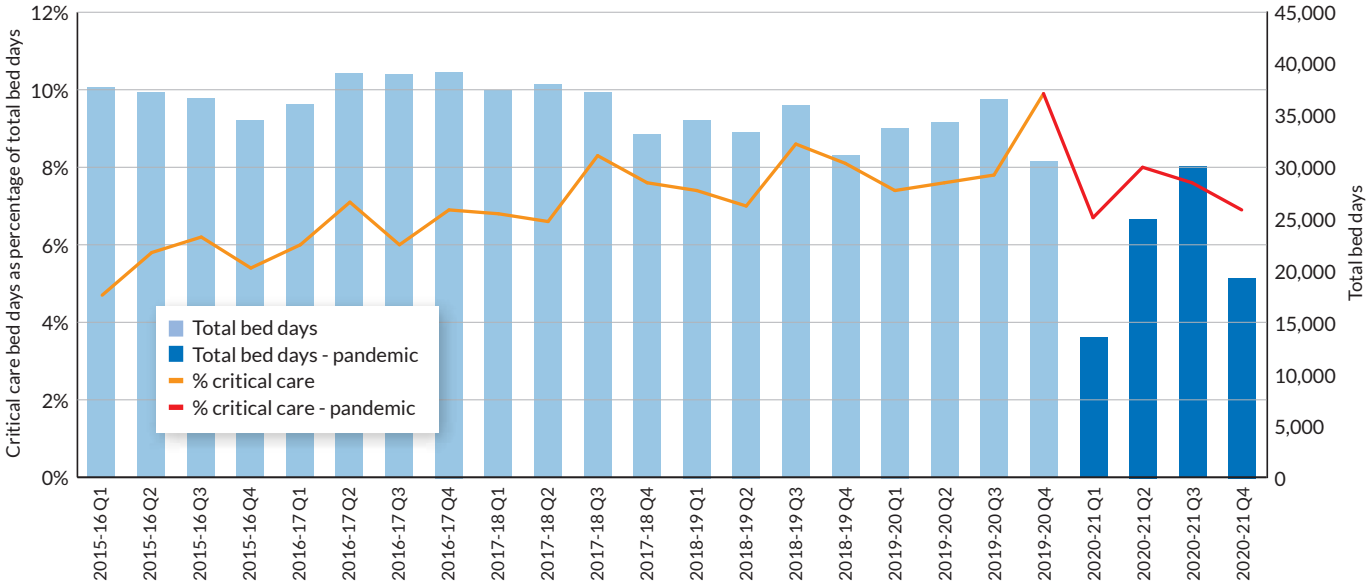


Figure 15 demonstrates the variation in the usage of critical care for cranial trauma, with some trusts only admitting 10%–20% of their patients to critical care, while for others this figure is over 60%. There is a similarly wide variation in the average number of days spent in critical care, from just two days to 19 days. To remove this unwarranted variation would require the setting of some agreed criteria as to which patients should be admitted to critical care as opposed to a ward bed or an enhanced care bed.

Figure 15: Patients undergoing cranial procedure for cranial trauma spending 1+ nights in critical care, 2019, HES

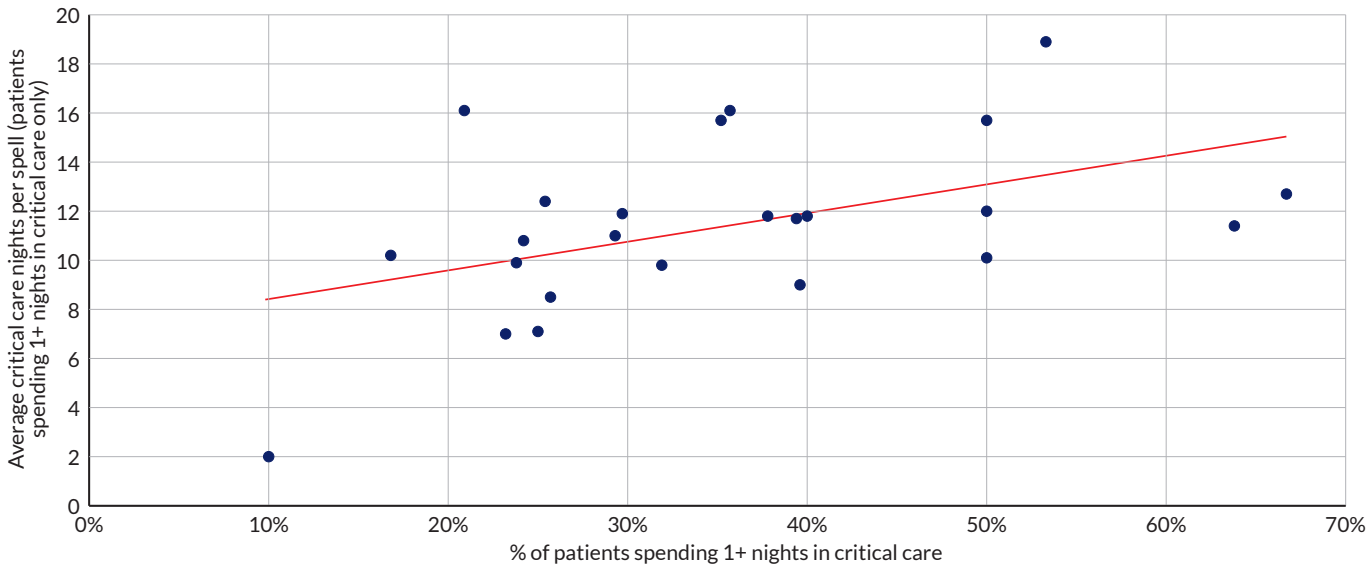
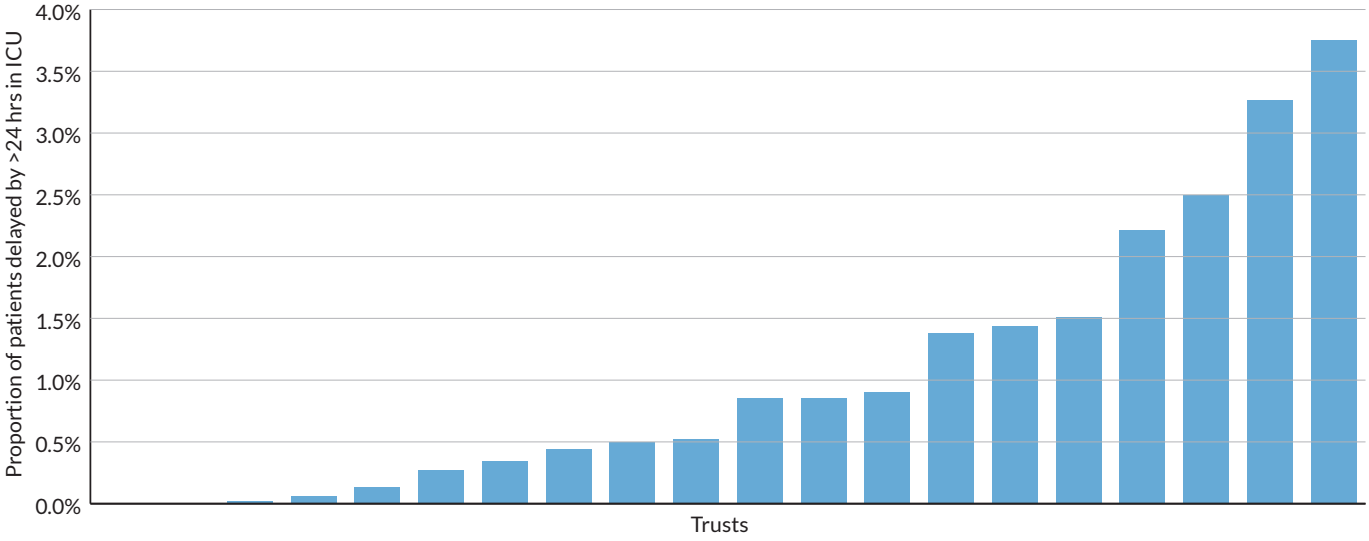


Figure 16 shows that there remains significant variation at trust level, meaning that some trusts have greater scope to find efficiencies in the pathway than others.

Figure 16: Proportion of neurosurgery patients in critical care beds that remained in critical care for more than 24 hours after the decision to discharge from intensive care unit, by trust, ICNARC, 2019



Since neurosurgery has high intensive care demands, it is not surprising that we have seen many of the problems described in the adult, GIRFT national report for adult critical care,[23], such as variation in access, elective patient cancellations, variable maturation of enhanced ward care (e.g. high observation beds, HOBS) and patient flow issues. As noted in that report, enhanced care provision can have a significant positive impact in terms of the availability of critical care beds. However, this has been adopted to varying degrees and in various models in hospitals in England, and where issues persist with patient flow it causes problems with discharging patients from critical care This backup means difficulty being able to admit patients who need intensive care.

Next steps

In tandem with the steps suggested under 'Focusing on discharge' (see page 43), it is important to ensure that critical care is not being overused and that, wherever possible, enhanced care can be provided by the neurosurgery unit to allow for some degree of flex in the patient pathway.

In order to reduce the number of patients admitted to critical care, trusts should:

- consider the use/development/expansion of enhanced care areas for neurosurgical patients;
- draw up of a list of key criteria to decide which patients warrant postoperative critical care.

[23] *GIRFT. Adult Critical Care: GIRFT Programme National Specialty Report. 2021*

Reducing time to procedure for subarachnoid haemorrhage

The original report's recommendation was as follows:

> **Recommendation 9:** Improve time to procedure to the 48-hour standard for emergency subarachnoid haemorrhage, as per NCEPOD recommendations.

An NCEPOD report looked at the number of patients with a subarachnoid haemorrhage who were treated within two days of admission.

A subarachnoid haemorrhage is a spontaneous bleed in the brain from an aneurysm, which brings about loss of consciousness. Of patients who experience this, around one-third will die during the haemorrhage itself, one-third will die within weeks (often as the result of a rebleed) and a further third will survive the incident, although many of them will be left with long-term neurological disability.

The aneurysm is a weakness on an arterial wall which can bleed again. A rebleed carries a high risk of mortality and often occurs in the first few days after the initial bleed, hence the target of securing the aneurysm from further bleeding within 48 hours.

In compiling data for the first report, we noted wide variation in the time to treatment amongst providers, with one-third of trusts taking at least two days in more than 10% of cases. There could be many reasons for this, but the day of the week that a patient was admitted played a role, with only 58% of patients admitted on a Saturday being treated within two days.

Clipping vs coiling

There are two treatments for subarachnoid haemorrhage:

- clipping the artery, which is an open surgical procedure carried out by a surgeon;
- coiling the artery, which is an endovascular procedure carried out by an interventional radiologist.

There is nothing to suggest that one method has significantly better outcomes overall. It is important to secure the aneurysm as soon as possible. Nationally around 80% of cases are treated by coiling and 20% by clipping, but this varies by trust.

The report also identified variation in the treatment of subarachnoid haemorrhage by comparing the proportion of patients undergoing clipping as opposed to coiling. Across the country, 80% of cases were treated using the coiling procedure, but this ranged from 99% to 48%. This variation was not always related to what was clinically appropriate for the patient but was often due to the experience of consultants or the availability of interventional radiologists. We recommend more comprehensive audit to examine the reasons for this variation.

Progress and challenges since the first report

The limitations of the data as regards the timestamping of haemorrhage and the patient attending hospital has yet to be resolved, meaning that the first element of the pathway (from bleed to first contact with medical services), which could range from two hours to 48 hours, is not yet captured.

However, there has been an improvement in capturing the time it takes the patient to move between trusts, resulting in a new metric, which measures the time from first attendance at ED or admission to hospital to treatment taking place. The target time for the treatment is within 48 hours of first attendance/admission. The limitations of the time field with the HES dataset means that we have had to use days rather than hours for our metric, in order to capture all modes of presentation (whether the patient was admitted directly to the neurosurgical centre, referred from a DGH or admitted via the ED).

Figure 17 shows that the position has remained static since 2015, with 82%–89% of patients being operated on within three days of their first attendance/admission. The majority of patients are admitted to hospital through the ED. Uncertainty about the diagnosis can often lead to a prolonged stay in ED due to further investigations being carried out. This can result in tension between the ED and the neurosurgery unit, often driven by conflicting incentives, particularly with regard to the four-hour wait A&E target.

Figure 17: Percentage of treatment for subarachnoid haemorrhage that took place within three days, for all subarachnoid haemorrhage admissions (from any source), 2015–2020, HES

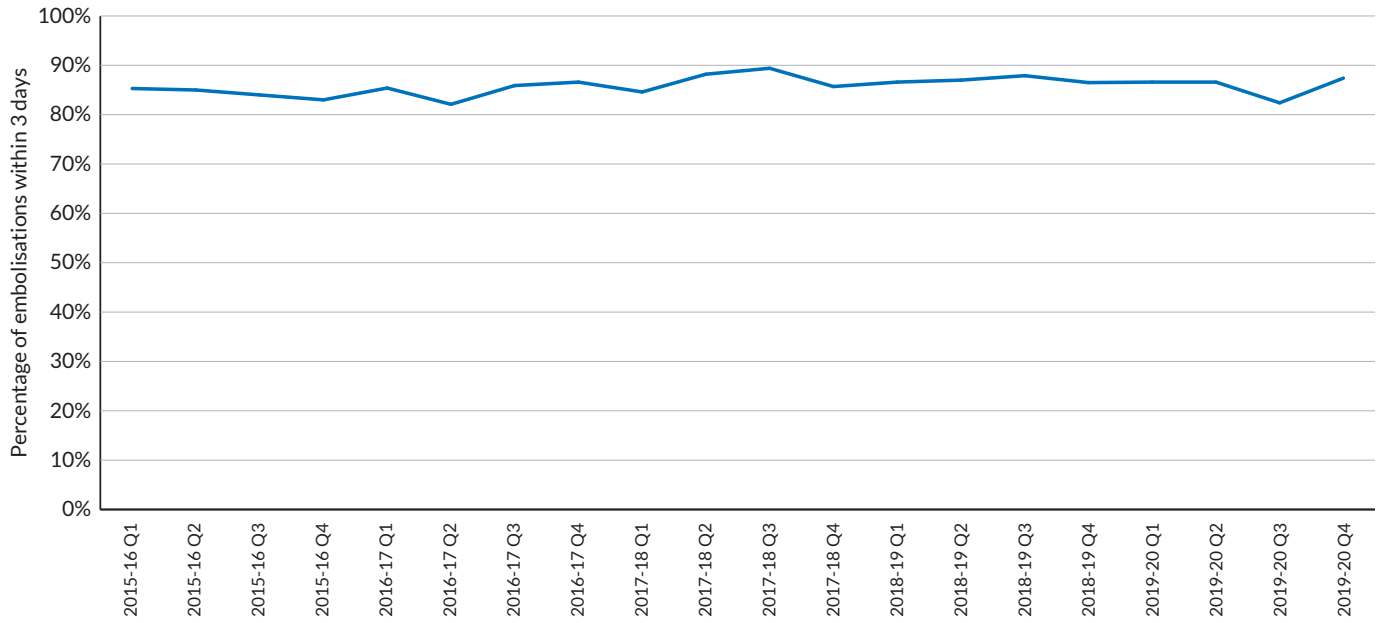
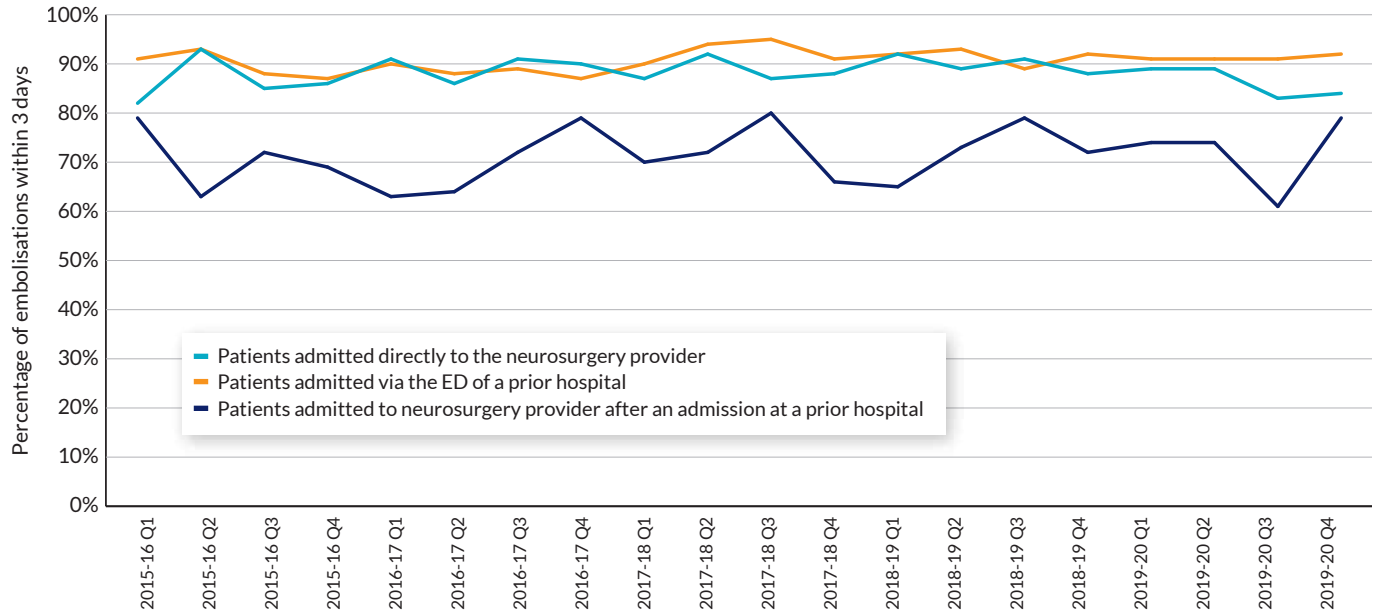


Figure 18 provides a breakdown of performance between the different pathways into the neurosurgery unit. (For more detail on the issue of admissions direct from the ED, see 'Avoiding unnecessary admissions' on p14.)

Figure 18: Percentage of treatment for subarachnoid haemorrhage that took place within three days – by referral pathway, 2015–2020, HES



There remains wide variation between trusts in relation to carrying out the treatment within three days, ranging from 63% to 100% (see **Figure 19**).

Patients with classical subarachnoid haemorrhage typically present to hospital. The diagnosis is usually made promptly and referral to a neurosurgical centre with agreed pathways is clear.

Delays can occur at any stage but are usually related to regional transfer and the availability of treatment at the base neurosurgical hospital. Around 80% of patients are treated by coiling and there is currently a shortage of trained radiologists to perform the procedure, a situation that is further complicated by the development of a new service for stroke thrombectomy.

The widespread geographical location of neurosurgical units means that geography rarely influences time to treatment.

Trusts achieving less than 85% treatment within three days should examine their processes and referral patterns for external factors that could be causing delay. Poor diagnosis in the periphery, for example, can have serious consequences. If this is suspected, units should review the clinical guidance and pathway information they provide for local referrers, ensuring that diagnostic criteria are clear and the need for prompt action on diagnosis of a subarachnoid haemorrhage is fully understood.

Trusts should also consider reviewing the provision of treatment in line with recommendations from the Society of British Neurological Surgeons (SBNS) and the subspecialty interest group the British Neurovascular Group (BNVG) regarding seven-day provision of interventional services. Where they do not and are treating fewer than 80% of subarachnoid haemorrhages within three days, they should feed this into national audit.

Figure 19: Percentage of treatment for subarachnoid haemorrhage that took place within three days (from any source) by trust, 2019, HES

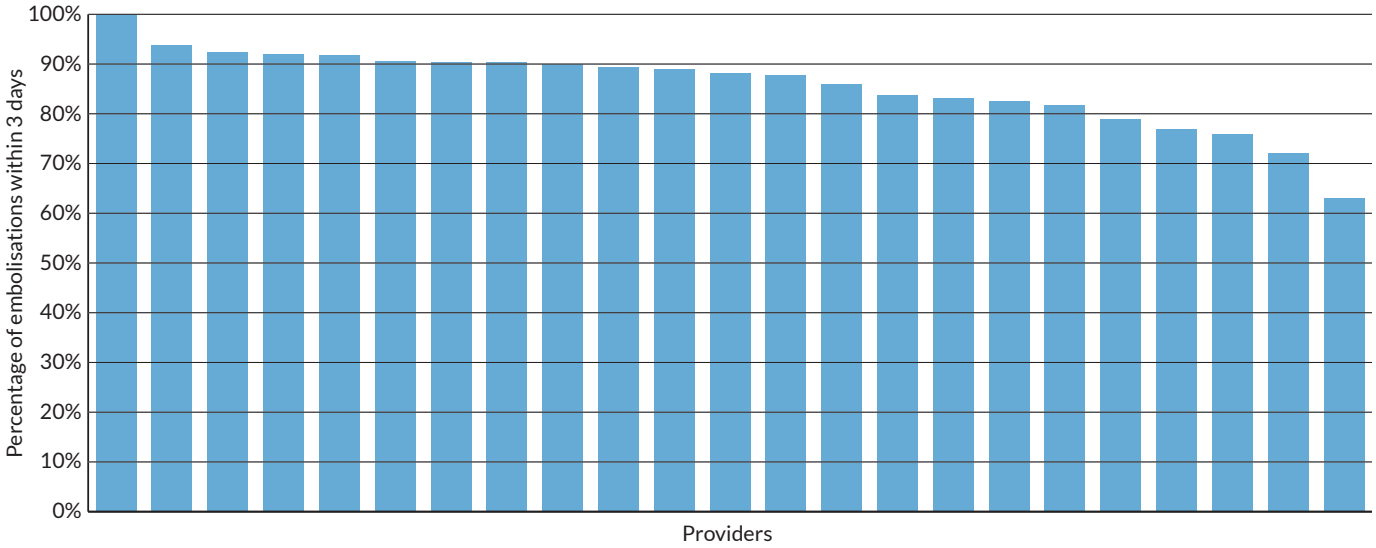


Figure 20 shows that, although improvements are being made and the gap is closing, patients are still more likely to undergo treatment within the two-day target if they are admitted on a weekday, as opposed to the weekend.

Figure 20: Percentage of subarachnoid haemorrhage patients undergoing treatment within two days of admission, by those admitted on a weekday compared to a weekend, 2015–2021, HES

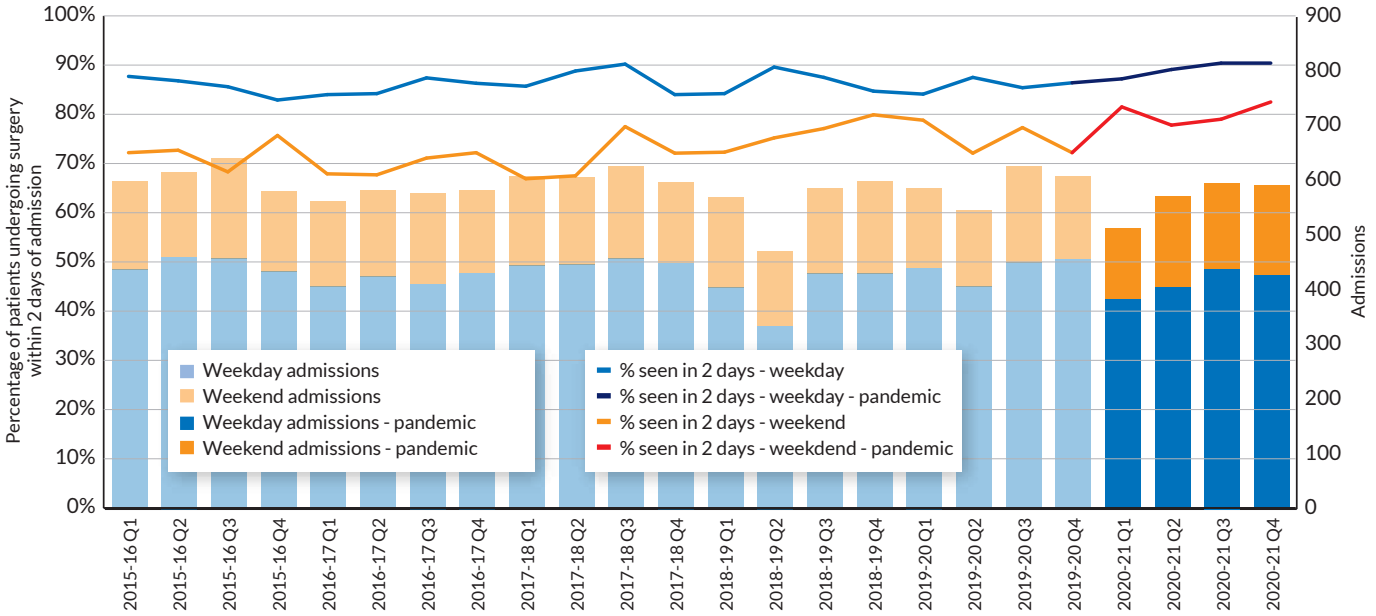
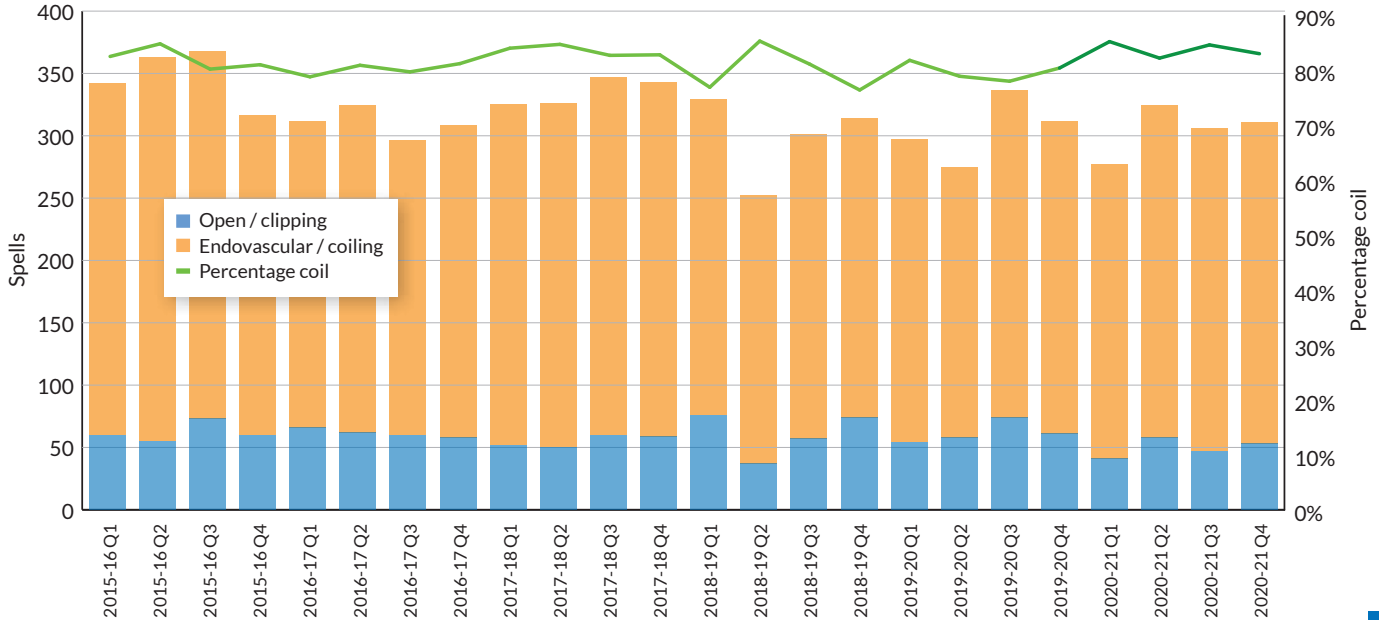


Figure 21 shows that there has been no significant change in the percentage of subarachnoid haemorrhage patients who receive endovascular coiling as opposed to clipping for the treatment of their aneurysm. The coiling to clipping ratio will vary between units dependent on the relative expertise of both interventional neuroradiology and surgical expertise in clipping. The BNVG should define acceptable outcome measures and apply them, in order to quality assure the differential rates we have seen.

Figure 21: Admissions for clipping vs endovascular coiling treatment of aneurysms in patients with subarachnoid haemorrhage, 2015–2021, HES



Next steps

The impact for patients of an improved pathway with reduced time to treatment for subarachnoid haemorrhage cannot be overstated. It is vitally important that trusts and units take active ownership of this pathway, accurately audit it and understand and act on their own performance in relation to other trusts and units.

- A model pathway for subarachnoid haemorrhage has been developed in partnership with the BNVG and will be referenced in the NHSE Neuroscience Programme. It is important that units follow this model, looking specifically for delays and pinch points in their own pathways in order to improve the speed to treatment for these patients. This should include providing education and training for referring hospitals, ensuring hospital transport services are appropriately set up and that all steps have been taken to ensure intensive care capacity makes the pathway workable. Interventional neuroradiology must become more clinically aligned with neurosurgery, contributing to the MDT and clinical audit.
- The time to treatment for subarachnoid haemorrhage will be added to the Model Hospital System with a standard of three days, allowing trusts to benchmark themselves against other providers. In line with this, the GIRFT team is liaising with the BNVG to work on improving the data through the development of a high-quality national clinical audit process to allow the specialty to access data more easily, look closely at variation and understand the reasons behind it.

Improving outpatient efficiency through non-consultant and virtual appointments

The original report's recommendation was as follows:

> **Recommendation 3:** Improve outpatient efficiency through greater use of non-consultant-led and remote outpatient appointments.

In the post-pandemic period, the pressure on first consultant appointments has increased significantly. It is important that patients can access their first important consultant appointment promptly, as this is where onward plans are often made. To do this, we need to use all members of the team optimally and make effective use of their skills.

The original report highlighted variation in the use of non-consultant outpatient clinics, with some trusts offering only consultant outpatient appointments. This presented an opportunity to use consultant time more productively and to accelerate the overall patient pathway by increasing the number of appointments conducted by other health professionals.

A large proportion of follow-up outpatient appointments are for radiological surveillance of benign tumours, the majority of which do not need to be managed by a consultant.

Since our first report many units have developed nurse-led radiological surveillance programmes – an idea we described during our initial round of deep-dive visits. It was clear during our second round of deep dives that neurosurgical teams recognise that the traditional outpatient model is outdated. Using triage to separate patients into those who do and those who do not require consultant time, the latter group can benefit from a nurse-led clinic with prompt and effective surveillance for tumours. Not only do nurse-led clinics save consultant time, creating greater resource for seeing new and urgent patients promptly, they are also most cost-efficient and generally lead to reduced waiting times and therefore improved patient experience.

CASE STUDY

Nurse-led meningioma virtual clinic

Leeds Teaching Hospitals NHS Trust introduced a nurse-led meningioma virtual clinic in 2018. Since inception, 455 results letters have been sent, saving 455 outpatient attendances. This involves interpreting MRI reports, seeking advice when changes are reported, writing to the patient and requesting the next MRI scan in line with the meningioma surveillance pathway.

As well as saving outpatient attendances, this system means that patients no longer go onto a waiting list for clinic or have their next scan delayed, reducing time to treatment and meaning that patients are not constantly chasing secretaries for their next appointment.

Between June 2020 and May 2021, 227 result letters were sent (average of 19 per month).

At the time of writing, there were 284 patients on the virtual waiting list for the next 12 months (average of 24 per month).

The number of patients continues to grow, with 2020/21 data affected to an extent by the pandemic, when routine scans were postponed.

On recent deep-dive visits we learned of other examples where a clinical nurse specialist rather than a consultant saw the patient, such as for epilepsy surgery follow-up and in implantable pulse generator stimulator clinics. Such developments have the double benefit of freeing up scarce consultant time as well as enabling patients to be seen more quickly. **Figure 22** shows the dramatic increase in the use of non-consultant-led clinics for follow up appointments, particularly during the pandemic.

Figure 22: Percentage of follow-up outpatient appointments that are non-consultant led, 2015–2021, HES

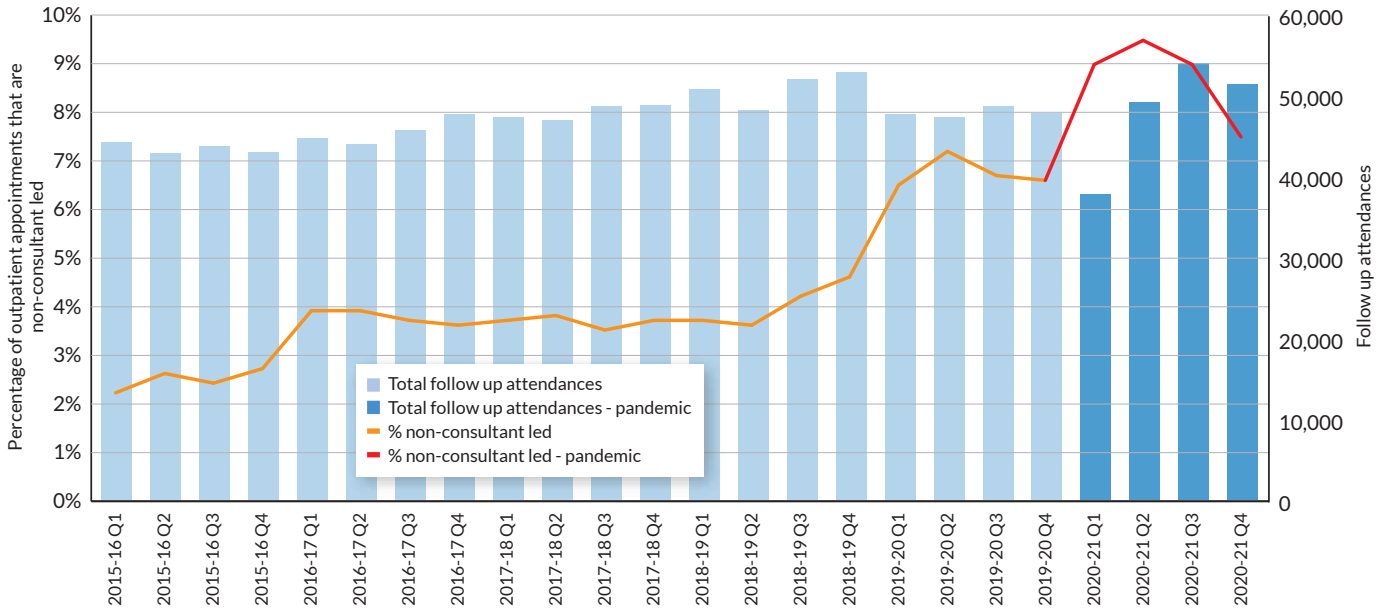
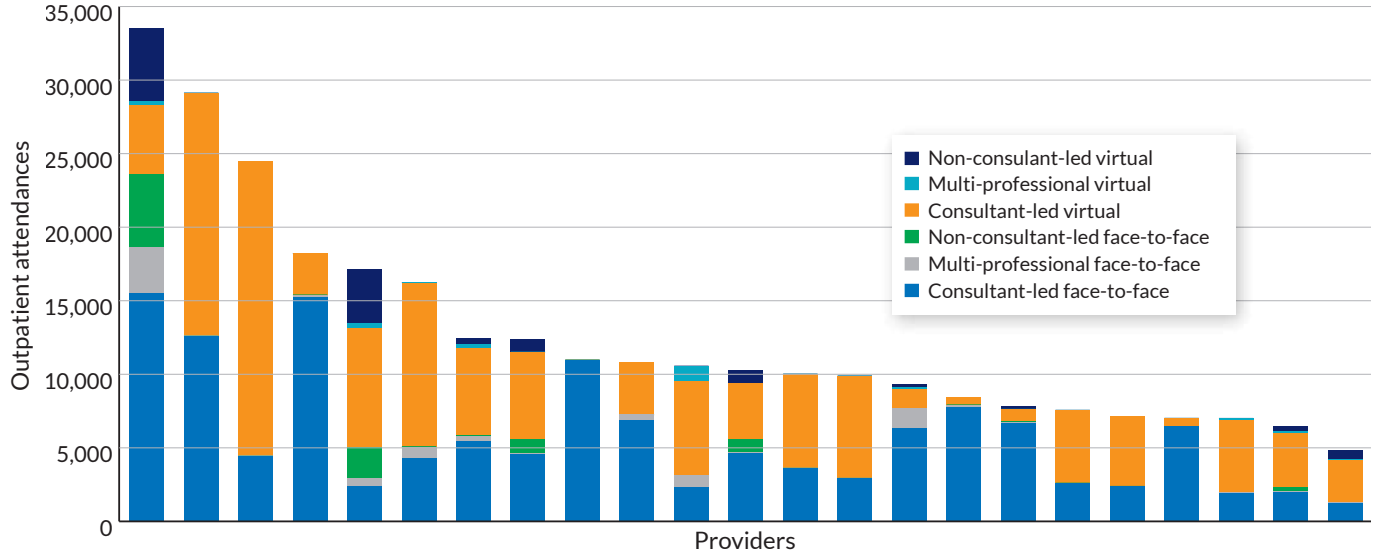


Figure 23 illustrates the continuing variation between trusts in provision of outpatient appointments, both in terms of proportion of virtual to face-to-face appointments and consultant to non-consultant-led appointments.

Figure 23: Distribution of all outpatient appointments by appointment type and professional lead, by trust, 2020/21, HES



See also the case study for Leeds Teaching Hospitals NHS Trust on p18, who have an EPR-linked system that allows patients to be assessed virtually.

Next steps

- In order to continually improve outpatient efficiency, trusts should exploit the benefits of virtual outpatient appointments whilst ensuring that patient safety, experience and outcomes are not impacted adversely.
- During the period of post-COVID recovery, where there are large numbers of patients waiting for first consultations with a consultant, the value of virtual outpatient appointments cannot be overstated and these should be the preferred option wherever clinically appropriate.
- Units should assess and implement patient-initiated follow-up (PIFU) protocols for routine, radiological, surveillance and post-operative review in uncomplicated cases. This is often better for patients, saving travel to unnecessary appointments, and also help to maximise capacity and efficiency. More details on implementing PIFU can be found here NHSE PIFU Guide.

Focusing on discharge

The original report's recommendation was as follows:

> **Recommendation 12:** Address delayed inter-hospital transfers and discharge by increasing the rate of discharge to home for non-elective cranial neurosurgery procedures, ensuring a timely transfer to rehabilitation centres for major procedures and timely repatriation to referring hospitals.

The GIRFT deep-dive visits identified delayed discharges as the main factor responsible for the inefficient use of bed capacity in the specialty.

Caveat: *We fully appreciate that in the current climate all specialties are facing difficulties in discharging patients in a timely manner. Significant challenges in social/community care provision and infrastructural issues, combined with post-COVID pressures against the context of an ageing population, mean that many aspects of discharge are effectively beyond the control of individual units. We make the following points and suggest next steps with this knowledge in mind. The fact remains that we must as a specialty do everything we can to keep patients flowing through our care at every step and ensure that they are in the best place (be that a neurosurgery unit, district general hospital (DGH), rehab facility or their own home) at every stage. Efficient discharge planning will always be key to achieving this.*

As noted in the first report:

"Currently, there is no consistent approach to address the issue nor any well-established programme focused on bringing allied health professionals and clinicians together within an individual unit to work to resolve it within neurosurgery. Part of the problem is a lack of robust data: the data used by GIRFT was delayed transfer of care (DTOC) data, recorded and reported at trust level, rather than by specialty."

The aim is to efficiently discharge patients to the appropriate environment at the point at which they are ready to leave the acute neurosurgery ward. Depending on the patient's needs, that environment could be:

- the referring district general hospital (DGH);
- a dedicated neuro-rehab centre; or
- the patient's own home.

Delayed discharge is particular problem for a relatively small group of long-stay patients who have been admitted acutely and require rehabilitation. They typically have moderate-to-severe head injury, cerebrovascular injury or rehabilitation needs after tumour surgery. These patients either require specialist neuro-rehabilitation or have relatively simple rehabilitation needs that are time-dependent and best achieved locally, in line with possible changes in their social situation.

Many referring hospitals have insufficient neurological recovery rehabilitation capacity, meaning that there is in effect no rehab bed available for patients to be repatriated to. This creates a cohort of patients on the acute neurosurgical ward requiring rehabilitation and resources from physiotherapy and occupational therapy, effectively taking these professionals away from their neurosurgical roles.

Another major factor leading to delayed discharges is the limited availability of neurophysiotherapy or occupational therapy services in the community and/or a need for essential changes to the home environment.

The final factor identified in the original report was relatively low numbers of weekend discharges, presumably related to weekend staffing.

Progress and challenges since the first report

Repatriation to DGHs remains a problem in many cases and some relationships with local hospitals have suffered as beds have become more scarce. The lack of progress in this area, with no change since our initial deep-dive visits, means this should continue to be a focus for trusts and commissioners.

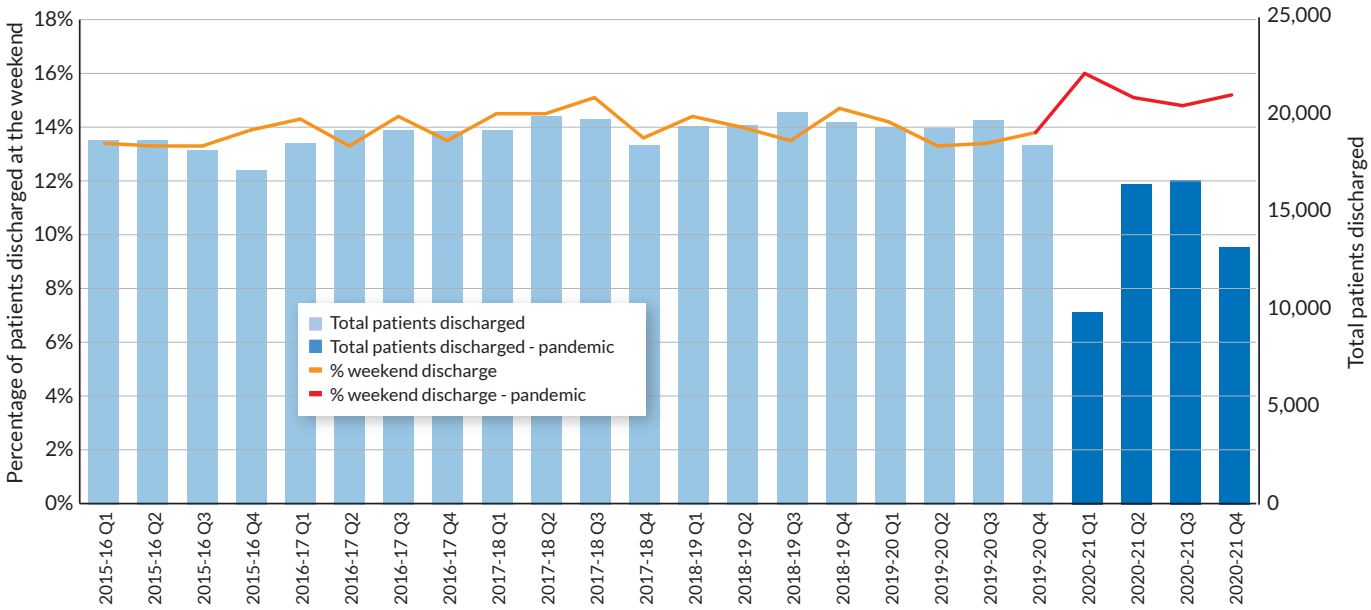
It is hoped that the proposed ICB structure will be beneficial in this regard. However, the COVID-19 pandemic has delayed the development of ICBs and they will require a period of maturation to enable them to support whole pathway problems such as exist in regional services.

Electronic referral management (ERM) tools can help with the process of discharging patients back to the original referrers. (For more detail on ERM systems see 'Improving referrals' see p18.)

All neurosurgery departments effectively deliver seven-day ward rounds and discharge at the weekend, but this is often as a consequence of bed pressures rather than proactive routine planning, and weekend discharge tends to happen at a lower rate than on weekdays. Support services such as pharmacy and transport increasingly need to be facilitating discharge.

Figure 24 shows a slight increase in the percentage of patients discharged at the weekend, but this remains about half of the 28% that could be expected were discharges equally distributed over seven days. While there has been some improvement, further work is needed.

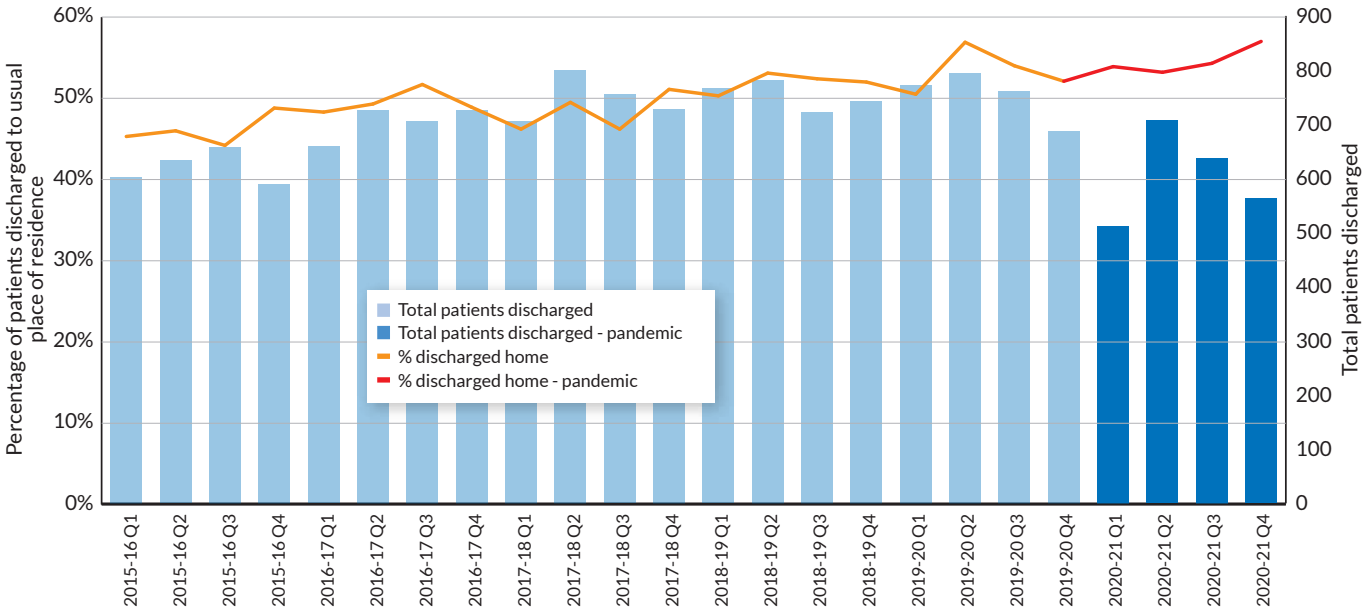
Figure 24: Percentage of patients discharged at weekend, 2015–2021, HES



Our second round of deep dives highlighted the continued poor co-ordination between the various professions that are required to deliver an efficient discharge – ward staff, physiotherapists, occupational therapists and social care teams. The majority of units have not yet developed enhanced recovery after surgery (ERAS) pathways and protocols with a culture of pre-discharge planning to which all professions are committed. Where this culture has been fostered, the improvement can be remarkable (see, for example, the University Hospital Southampton case study on page 46).

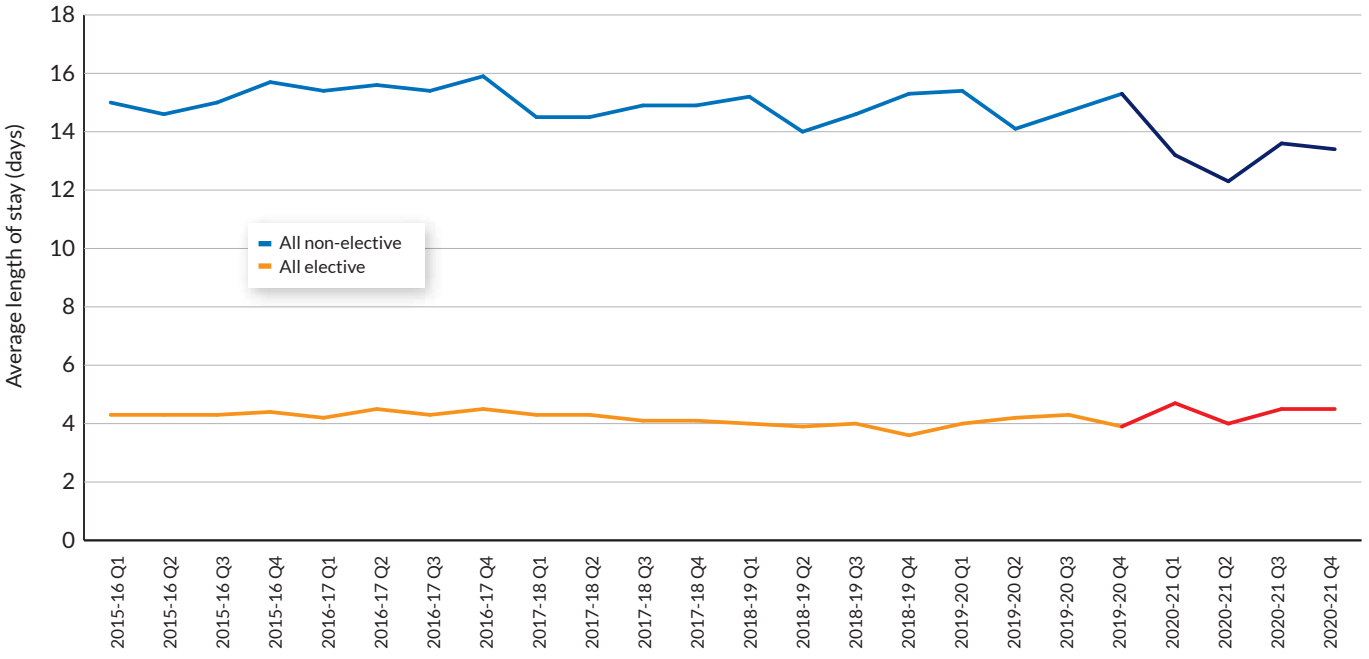
However, as **Figure 25** demonstrates, we have seen an increase of c.10% in numbers of non-elective patients being discharged to their normal place of residence.

Figure 25: Percentage of non-elective cranial procedure spells discharged to their usual place of residence, HES



The most significant and impactful change that the GIRFT programme overall has targeted is the speed with which patients move through the surgical pathway. This has been measured using hospital length of stay metrics, which have shown little improvement since the first deep-dive visits (see **Figure 26**). This highlights again the urgent need for units to develop and implement ERAS protocols and, by reducing and better managing length of stay, to retain control of access to neurosurgery beds. Alongside ERAS, anything that improves patient flow, such as admission on day of surgery (and day case protocols where applicable) is helpful, as detailed throughout this report.

Figure 26: Average length of stay in hospital, 2015–2021 HES



CASE STUDY

Supported early discharge

The neurosurgery unit at **University Hospital Southampton NHS Foundation Trust** has worked carefully to support early discharge by:

- ensuring patients are scanned before discharge and within 24 hours of surgery;
- setting patient expectations that they will be discharged on the day of surgery or the following day;
- providing a 24/7 specialist nurse helpline for discharged patients;
- ensuring patients are re-admitted on a fast-track basis if required.

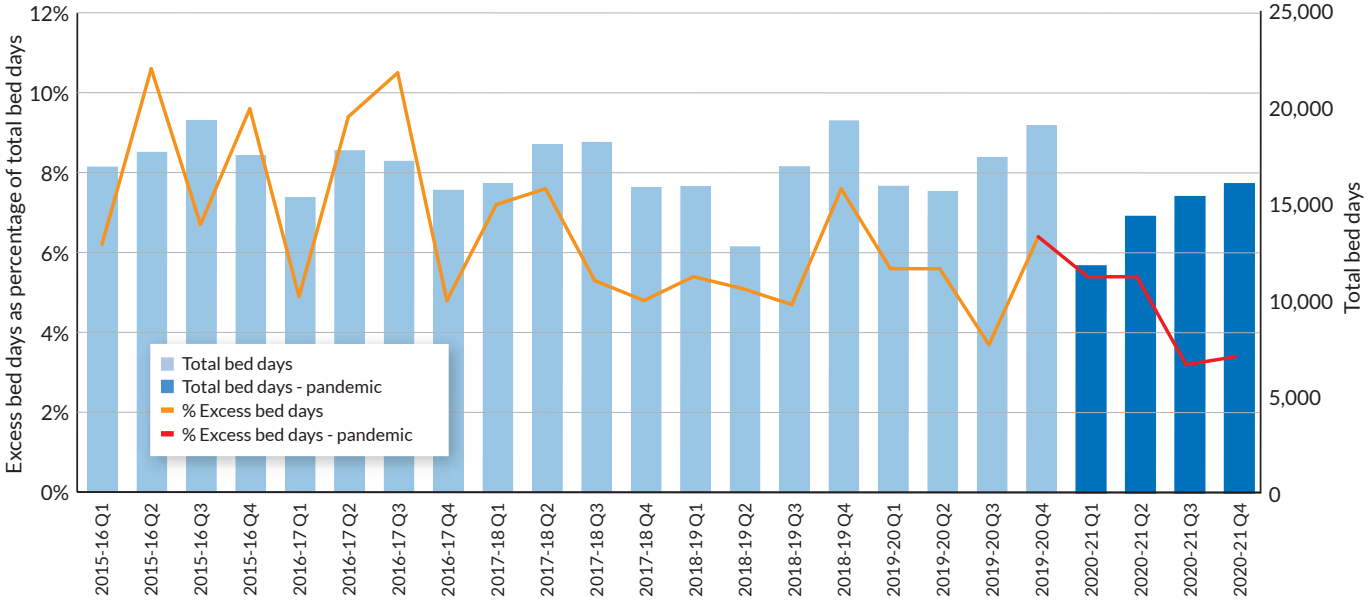
Initially, this approach was set up for primary malignant brain tumour surgery only. Once it became clear that early discharge was a manageable goal, it has become the standard for all cranial surgery where clinically advised.

The unit now has both on-day and next-day discharge embedded into their admissions for all cranial neurosurgery where possible (with discharge immediately after surgery for patients having a craniotomy or biopsy only). It has now become embedded in their culture that patients stay no longer than clinically necessary.

The resulting reduction in length of stay at the trust is reflected in recent Model Health System data. Implementing this approach has also reduced the number of cancellations before surgery. The approach hasn't increased costs because it utilises the same resources at a different time by bringing the discharge process forward.

In order to measure how well trusts are managing their subarachnoid haemorrhage pathway, we measured the percentage of bed days that were classed as 'excess bed days' – i.e., bed days that exceeded the norm for this condition.[24] (For more detail on this pathway see 'Reducing time to procedure for subarachnoid haemorrhage' see page 35.) In this case the data shows the specialty has achieved a significant reduction since the initial visits (see **Figure 27**).

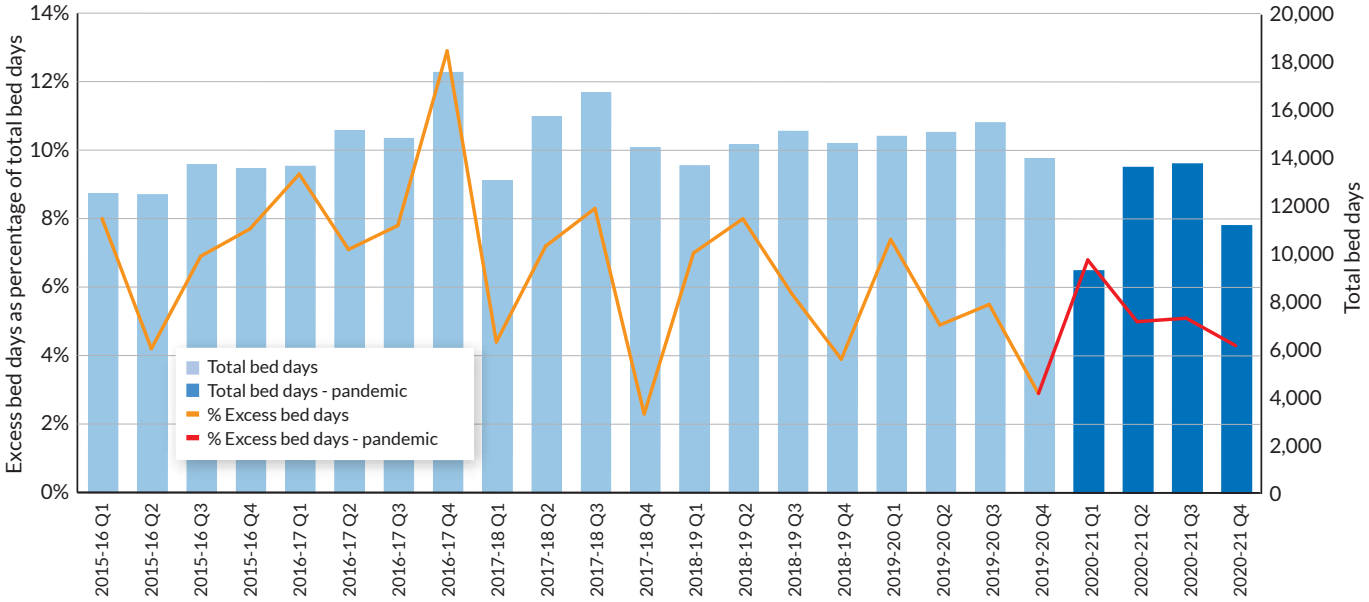
Figure 27: Subarachnoid haemorrhage - percentage of excess bed days of total bed days (non-elective admissions over one day only)



[24] *Excess bed days are counted when a patient's length of stay exceeds the trim point specific to that patient's particular Healthcare Resource Group (HRG). The 'trim point' is defined as the upper quartile length of stay for the HRG plus 1.5 times the inter-quartile range of length of stay.*

The same metric has been used for trauma admissions and shows a similarly positive trend downwards in the number of excess bed days (see **Figure 28**).

Figure 28: Trauma admissions – percentage of excess bed days of total bed days (non-elective admissions over one day only)



Next steps

- The GIRFT lead will work with ICBs to highlight model pathways of discharge planning, given their importance to the effectiveness of the whole patient pathway.
- Trusts should develop and implement ERAS protocols to facilitate early recovery after surgical procedures. (For more detail on ERAS see 'Reducing length of stay' see page 24.)
- A review of neuro-rehabilitation would be helpful to identify how dedicated neuro-rehab providers can support improvements in patient flow and discharge.

Outcomes and quality management

Focusing on volume

The original report's recommendations were worded as follows:

> **Recommendation 10:** Assess the evidence base on low-volume operating across surgical specialties and consider policy development from resulting insight.
>
> **Recommendation 11:** Provide treatment for extremely rare conditions, such as rare tumours (for example, chordoma) within a small number of high-volume centres.

Cranial neurosurgery covers a vast range of procedures, some of which are required only rarely. As noted in the first report:

"With so many different procedures, and the fact that most consultants choose to specialise, there is huge variation in surgeons' experience in conducting procedures. It is entirely feasible that a patient may present with a condition requiring a surgical procedure the consultant has conducted only very rarely and potentially not for some years."

The need for minimum levels of experience also pertains to the extremely rare conditions and the development of supra-regional centres for certain conditions, which would enable patients to be seen by surgeons with sufficient expertise and experience.

An additional difficulty with low-volume surgery is that data can be distorted at low numbers, making it very difficult to see who is doing well in terms of outcomes. Not only this, but for many rare conditions and procedures there are currently no outcome measures in place.

Progress and challenges since the first report

We are pleased to note that NHS England Specialised Commissioning, with the help of GIRFT clinical lead Nick Phillips, help has recently completed an analysis of the following low-volume procedures:

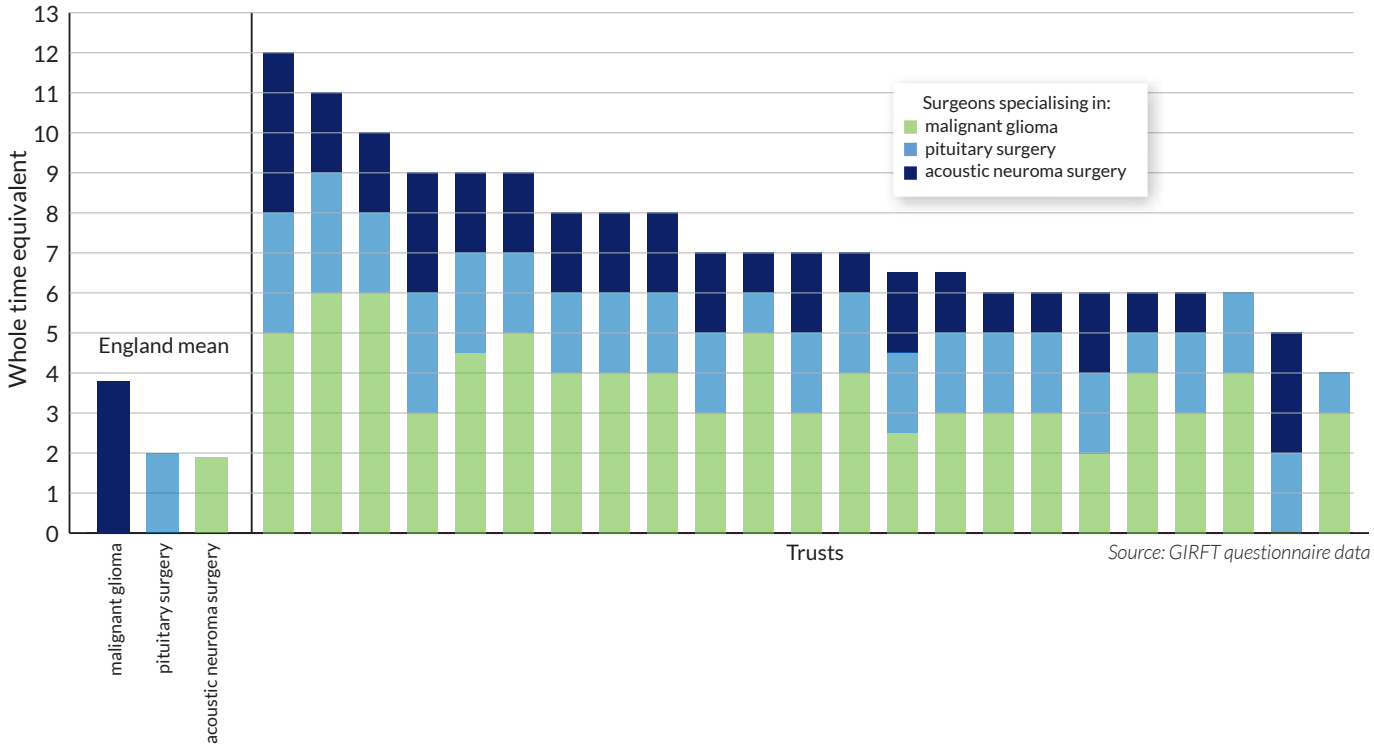
- removal of arteriovenous malformations of the nervous system;
- pineal tumours;
- resection of lateral skull base tumours;
- resection of anterior skull base tumours;
- surgical removal of brainstem tumours;
- deep brain stimulation;
- insula glioma/complex low-grade glioma;
- epilepsy surgery.

The results of this analysis will inform the organisation of service provision to ensure low-volume procedures are carried out by the most experienced surgeons. However, it was also apparent from our revisits that progress has been made: units are now better organised in relation to these procedures and, following our presentations in the initial deep dives, there is greater awareness of the need to concentrate expertise in order to deliver the highest-quality patient care.

Another positive indicator of progress in this area is that the SBNS is working with NHS England to develop a low-volume surgery policy that takes account of outcomes, transferable skills, networking, joint operating and mentoring. This work was delayed by the pandemic but has now started up again.

Figure 29 identifies the numbers of surgeons in each trust specialising in pituitary surgery and acoustic neuroma surgery. These are broadly in the proportions we would expect to see: for example, surgery for primary malignant brain tumour is performed at around double the rate of pituitary surgery, which is appropriately reflected in the number of surgeons per subspecialty. In our deep-dive revisits the units reported a responsible, patient-centred approach on the whole to subspecialisation. However, there remains some variation.

Figure 29: Surgeon specialisms, 2019



Since the original visits, we have developed a new metric based on cerebrospinal fluid (CSF) leaks to assess the outcomes of low-volume operators of pituitary surgery (see **Figure 30**). CSF leaks are the most frequent complication experienced after pituitary surgery. They put the patient at risk of meningitis and increase length of stay – the lower their incidence the better patient outcomes are likely to be. This new metric may have considerable validity in pituitary surgery but is unlikely currently to be coded entirely consistently. The GIRFT lead will work with the coding teams and the classifications service to establish coding rules around CSF leaks and how they are interpreted in different units. (This is listed as a next step in the section 'Enabling continual quality improvement' see page 52.) After validation, the metric should have more robust utility.

As can be seen in the figures below, there is significant variation both over time (**Figure 30)** and across trusts (**Figure 31**). The wide variation by trust, while alarming, may in part be attributable to a lack of clarity around how and when to code for CSF leaks. At present there is confusion about whether to code a CSF leak that occurs at any stage or only those reported on day two following surgery. We are currently seeking greater clarity around this issue with a view to establishing a uniform approach.

Figure 30: Percentage of spells for pituitary surgery with diagnosis of cerebrospinal fluid leak, 2015–2021, HES

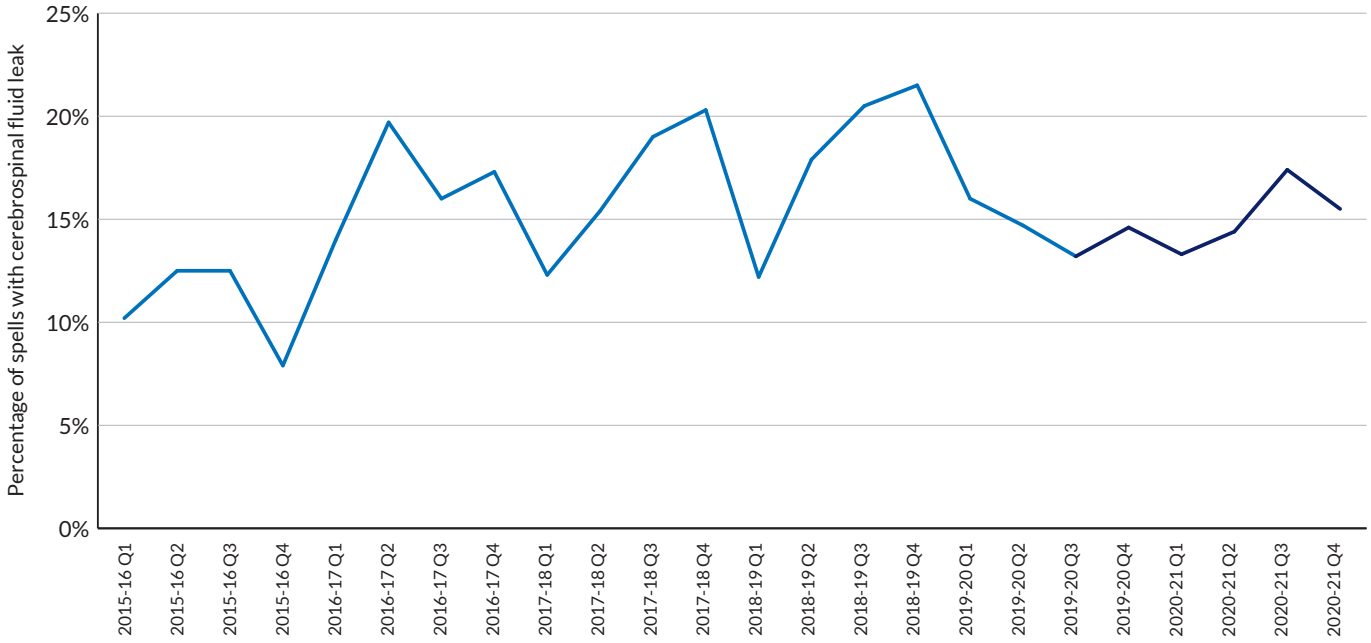


Figure 31: Percentage of spells for pituitary surgery with diagnosis of cerebrospinal fluid leak, 2019/20, by trust, HES

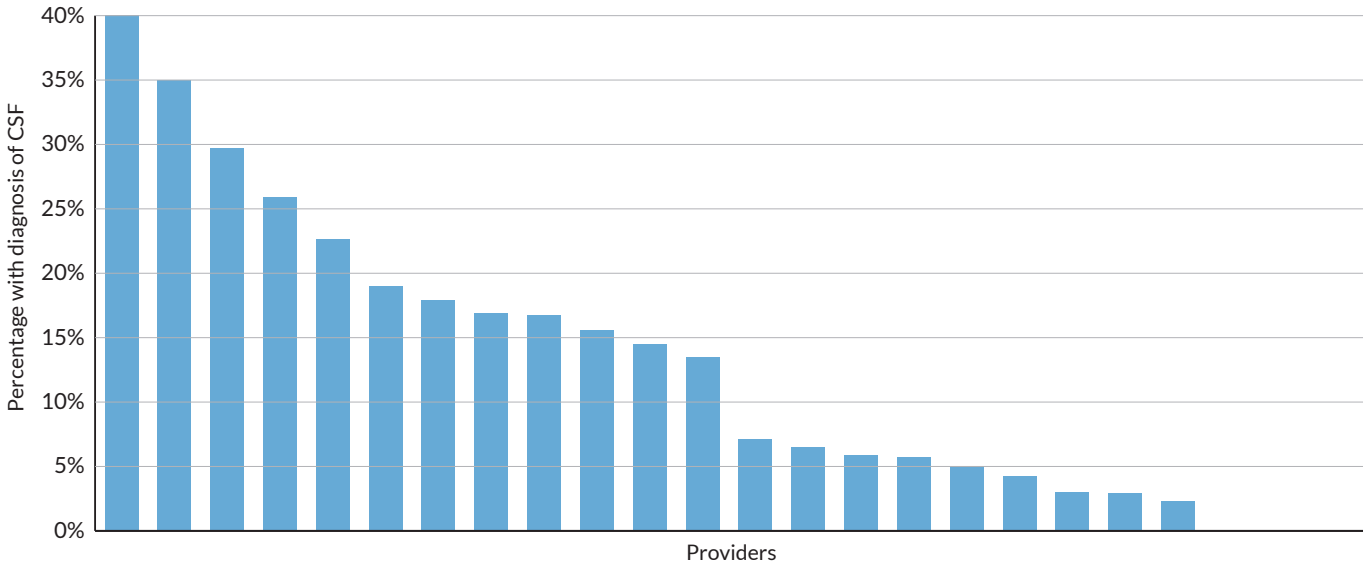
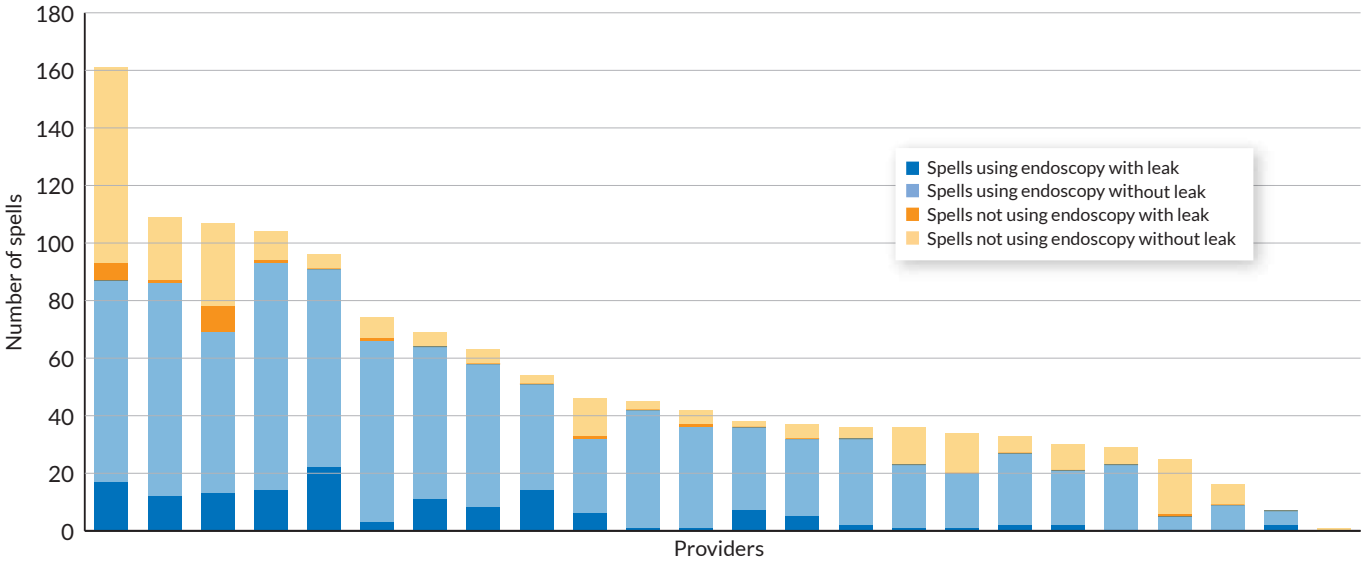


Figure 32 shows the relative leak rates for endoscopic and non-endoscopic pituitary surgery.

Figure 32: Number of spells for pituitary surgery with and without CSF leak, by type of surgery, 2019/20, HES



Next steps

GIRFT continues to work with NHS England Specialised Commissioning on data analysis and further work to ensure neurosurgical service provision and structure that reflects the needs of the population and offers the best patient outcomes. All units will need to agree on their subspecialty interests in support of this approach in order to concentrate surgical expertise appropriately.

- The first step is for GIRFT and the relevant subspecialty groups to develop outcome measures to monitor the quality of all low-volume procedures. Many of these will need to be collected through national audit. As is also recommended in the Paediatric Cranial and Spinal Neurosurgery National Report (see 'Clinical outcome data' on page 66 in that report), core outcome sets are being developed in a number of areas in neurosurgery, principally skull-based tumours, neuro-oncology, meningioma and craniopharyngioma, which will feed into future audit and GIRFT reports. These will provide a sound basis for more granular metrics in neurosurgery which will augment HES data and inform the evidence-based decision-making around appropriate volumes of surgery for the maintenance of competence and skills, and improved patient outcomes.
- The data analysis work undertaken by NHS England Specialised Commissioning should subsequently be used to inform the organisation of service provision. The output of this work will provide a clear rationale to support concentration of low volume procedures, which will help to reduce any resistance to change, where services might need to be withdrawn from a unit.

Enabling continual quality improvement

The original report's recommendation was worded as follows:

> **Recommendation 13:** Improve data collection in cranial neurosurgery, with particular reference to increasing accuracy of coding and improving audit data quality to enable its use for quality improvement.

In developing the information pack that accompanied the GIRFT deep-dive visits, we identified a number of shortcomings in the quality and comprehensiveness of the data currently collected. This was particularly the case in relation to the identification of delayed discharges (including those from critical care), theatre usage and the involvement of neurosurgery specialists in other parts of the hospital.

Other gaps identified in the dataset were the recording of stereotactic radiosurgery and the measurement of clinical outcomes. The only outcome measures available to the GIRFT team were readmission rates, mortality, readmissions for repeat procedures, and length of stay.

With no currently agreed national standard for collecting or publishing neurosurgery outcome data, it is difficult to identify unwarranted clinical variation in the quality of services provided across units. In addition, problems with data sharing meant that outcome data collected in three national neurosurgical audits could not be accessed by the GIRFT team. As a result, there was a significant gap in the datapack used to support the GIRFT deep-dive visits.

Progress and challenges since the first report

Work has been ongoing with the GIRFT coding team to clarify what information the coders use from the operation notes to improve the accuracy of clinical coding. In addition, work has been carried out between GIRFT and the terminology and classifications team of the former NHS Digital (now part of NHS England) to improve pituitary surgery coding, which has led to demonstrable improvements, with most trusts now using the correct codes (for more detail on pituitary surgery, and particularly on outcome measures such as CSF leaks, see 'Focusing on volume' on page 48).

It has also been apparent from the revisit deep dives that coders are increasingly attending monthly morbidity and mortality meetings – another positive step.

Next steps

The proposed action from the original national report still needs to be more widely implemented. Namely:

- Surgeons should meet trust information teams and coders once a month to review activity attributed to them.
- Trust management should ensure time is set aside for surgeon and coder engagement, using job planning if needed.
- The GIRFT neurosurgery clinical lead is working with NHS England (which now includes NHS Digital) on 'OPCS5' to improve coding across the board (including CSF leak and coding rules).

We also propose a new action to address the variability of coding by trusts:

- Units should work with their clinical coding team to ensure CSF leak in pituitary surgery is accurately recorded based on clear and uniform criteria. It should then be included in Model Hospital System as a metric. (Note that CSF leak is one of a range of outcome measures that NHS England is currently working urgently to refine.)

In addition, further work needs to take place between GIRFT and the SNBS to develop outcome measures:

- The SBNS should develop outcome measures in subspeciality areas, such as neuro-oncology, skull-base surgery and cerebrovascular surgery, working with the relevant professional bodies such as the British Neuro-oncology Society. Once available, these measures will facilitate wider quality improvement across the specialty (see also 'Clinical outcome data' on page 66 in the Paediatric report section of this document). If outcomes were more widely available, this would facilitate wider quality improvement
- The neurosurgical national audit programme must now move towards high-quality consensus core outcome sets (COS) for the majority of its cranial activity. Apart from audit, these will provide a vital basis for future clinical trials in surgery.

Reducing the impact of litigation

The original report's recommendation was worded as follows:

> **Recommendation 15:** Reduce litigation costs by applying the GIRFT Programme's five-point plan.

The cost of litigation claims against neurosurgery was £289m between 2012/13 and 2016/17. The average claim per admission was £927, and the actual figures ranged from £0 to £5,610.

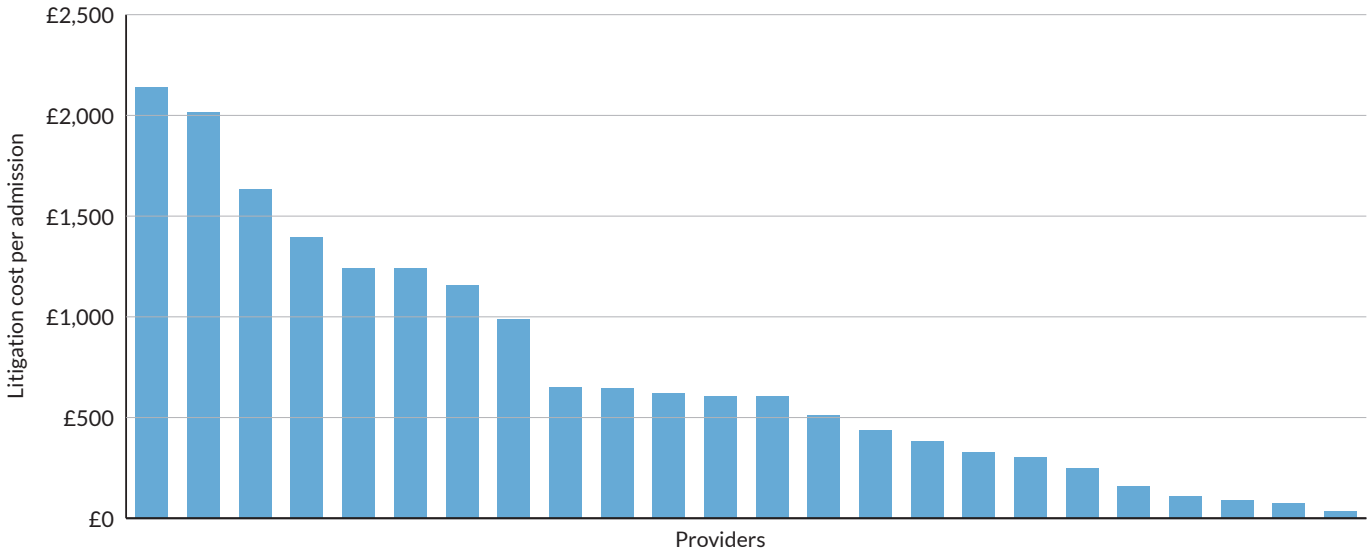
It was clear during the initial GIRFT visits that many clinicians had not had the opportunity to discuss and learn from their unit litigation cases. Providers had little knowledge of the claims against them. This included some with high litigation costs per admission as well as those at the low end. As a consequence, very few lessons have been learnt from the claims to inform future practice.

Progress and challenges since the first report

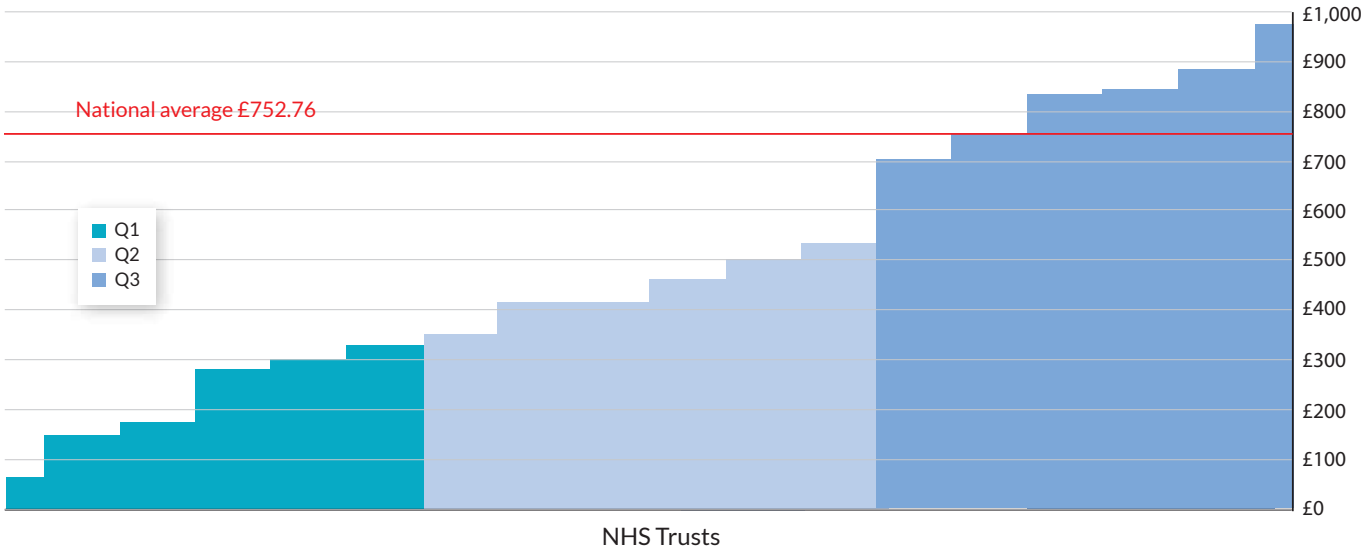
We saw some evidence in the revisits to trusts that surgeons are now being sent their litigation data, but more progress is needed regarding the way the information is used by units. For example, in the deep-dive revisits we learned that litigation data is not widely incorporated in morbidity and mortality meetings. There is little evidence that units are discussing individual litigation claims and we are concerned that few neurosurgical teams report receiving any feedback on litigation and the variation between trusts remains too wide.

The estimated cost of litigation claims between 2016/17 and 2020/21 is £396mm (2012/13 to 2016/17, £289m), with the national average estimated cost of litigation per admission falling from £927 to £753. However, there remains significant variation in litigation costs (see **Figure 33**).

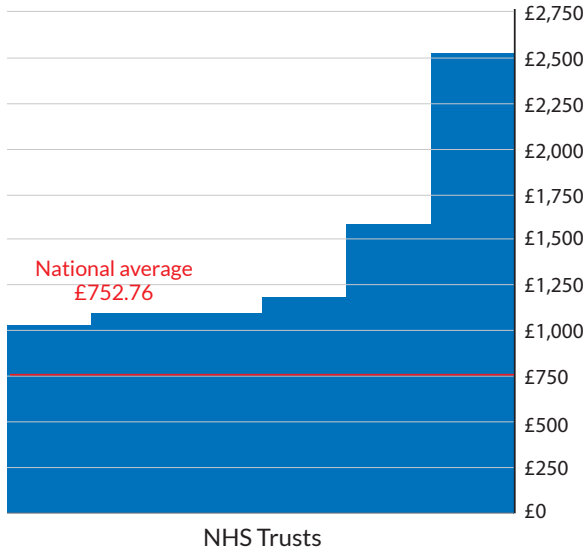
Figure 33: Litigation claims – estimated cost per admission, NHS Resolution, 2016/17-2020/21–2019/20



Showing quartile 1 to 3



Showing quartile 4 only



Next steps

The original recommendation still needs to be fully implemented, with clinicians having better access to the litigation details, taking greater ownership of litigation data and understanding how changes in clinical practice can lead to a reduction in litigation cost.

Notional operational opportunities

As shown throughout this report, there are many areas where the recommendations derived from the GIRFT data packs, deep-dive visits and national report have had a demonstrable impact on the way in which cranial neurosurgery is delivered. Positive change can be seen that has benefits for patients and also supports services nationally to create capacity to meet increasing demand. As has always been the intent of the GIRFT programme, improvements in clinical practice are naturally followed by efficiencies.

The key area that needs continued attention to improve the operational efficiency of neurosurgery departments is patient flow, specifically a reduction in the length of stay for neurosurgery patients. This common problem has come up at all deep-dive visits and is one of the central themes running through this report.

To optimise their average length of stay, units need to focus on:

- admitting patients on the day of surgery;
- establishing a dedicated acute operating theatre to avoid disruption of the operating list;
- agreeing an emergency admission policy with the emergency department that requires all teams to be involved in the decision-making;
- developing policies for enhanced recovery (ERAS) in each specialty condition;
- establishing a culture of timely discharge, with preoperative discharge planning involving all professions;
- agreeing admission and discharge/repatriation protocols with referring hospitals, including where patients receive their MRI scan;
- establishing a prompt elective pathway for primary malignant brain tumour patients;
- redesigning patient information leaflets to manage patient expectation;
- agreeing admission policies for use of critical care.

By delivering on this list of actions, units should expect to see their lengths of stay fall, as demonstrated for example with the use of enhanced recovery in pituitary surgery[25], freeing up bed capacity, enabling more patients to be seen and treatedthereby reducing the waiting list backlog that has built up during the pandemic.

[25] *Phillips, N, Hughes, A, Culpin, E, et al., Enhanced recovery and accelerated discharge after endoscopic transsphenoidal pituitary surgery: safety, patient, feedback, and cost implications, March 2020, https://pubmed.ncbi.nlm.nih.gov/32144485/*

Paediatric Cranial and Spinal Neurosurgery

GIRFT Programme National Specialty Report

Professor Paul May

About this report

This report sets out nine recommendations put forward to improve the way paediatric neurosurgery – surgery to the brain and central nervous system, including related spinal conditions – is delivered in the NHS in England, with the pivotal aim of supporting the specialty to deliver consistent high-quality, evidence-based care to all patients for this high-complexity and generally low-volume specialty.

The deep-dive visits have been a collaborative process between the adult cranial and paediatric neurosurgical GIRFT programmes. There is significant overlap with recommendations in the GIRFT national report on adult cranial neurosurgery, particularly around:

- focusing on surgeons' experience;
- improving data collection in paediatric cranial neurosurgery and developing nationally agreed core outcomes measures; and
- reducing the impact of litigation.

We chose to publish our report alongside the adult neurosurgery follow-up report in acknowledgement of the strong link between the specialties. Paediatric neurosurgery is a highly specialised field with a unique history. However, we recognise and value the interdependencies of training, co-location of provision for the majority of services, delivery of service at registrar and consultant level, and the requirement of close collaboration with our related subspeciality colleagues (e.g. interventional neuroradiology), that link the paediatric and adult services. For this reason, it is vital that a strongly engaged, practical and supportive relationship between the specialties continues and is allowed to flourish. This relationship comes under the overall guidance of the Society of British Neurological Surgeons (SBNS) and the British Paediatric Neurosurgical Group (BPNG).

Close working relationships between specialist paediatric neurosurgical providers on a regional basis are also of prime importance for improving service delivery and patient experience and are to be fostered and supported at every opportunity.

Executive summary

The recommendations in this report are designed to encourage all those committed to the challenging practice of paediatric neurosurgery (including neurosurgeons, specialist nurses, provider trusts and their management teams), to develop and improve on the already excellent work undertaken.

We discuss the findings of our deep-dive visits under the headings below.

Paediatric neurosurgery networks and operational delivery networks (ODNs)

ODNs are vital for sharing resources, expertise and best practice. For a low-volume specialty such as paediatric neurosurgery, the close alignment of paediatric networks is also highly desirable. In order to help units develop the network models that work best for them, we recommend these be encouraged, supported and enabled both locally and nationally.

Collaboration with adult neurosurgery units

We strongly support close collaboration and mutual support between the adult and paediatric services for training and service provision. Sharing of expertise is vital and we recommend formal collaborative relationships are established and maintained, particularly around neuro-oncology and neuro vascular surgery.

Clinical outcome data

The need to develop appropriately robust nationally applied and standardised outcome measures, particularly around cranial tumour surgery, as an integral part of continual quality improvement is a key recommendation of this report. It is not possible to make significant reconfiguration plans for complex surgical provision without the agreed outcome data on which to base these decisions. There has been and continues to be challenging discussion around the provision of cranial tumour surgery in the paediatric population, with significantly lower numbers of cases than managed in adult neuro-oncology services. In some areas, the progressive separation of adult and paediatric tumour practice has highlighted these experience-based challenges where re-engagement and closer collaboration from research to overlapping surgical skill sets could improve care.

Advanced nursing practice

The judicious use of advanced nurse practitioners (ANPs) and clinical nurse specialists (CNSs) is an effective means of helping patients avoid critical care as well as improving patient experience overall and streamlining outpatient care.

The service for 16–18-year-olds

There is a need to address the current inequity of access to paediatric neurosurgery services for 16–18-year-olds who may or may not, depending on location and historic admission policies, be able to access the 0–16-year-old pathway.

Engagement with neonatal services

There is unwarranted variation in the degree of collaboration between neonatal services and paediatric neurosurgery. Formal protocols are needed to ensure joint working, in particular around the detection and management of potential spinal cord abnormalities and hydrocephalus in neonates.

Lessons from the adult cranial neurosurgery GIRFT report

As closely aligned specialties, there are many similarities in our findings and those of the adult service. The one we have not covered separately but would like to endorse is the recommendation from adult cranial neurosurgery that electronic referral management (ERM) tools are used to their fullest potential to improve the effectiveness of referral pathways and repatriation processes.

List of recommendations

Recommendation	Actions
1. Ensure that all paediatric neurosurgery networks are co-operating effectively for the benefit of patients and are cross-linked and engaged with all relevant paediatric ODNs and networks.	**a** Systems should finalise the delivery models for all networks and operationalise within the funding available. **b** Systems should work with the GIRFT regional implementation teams to develop networks appropriate to local configuration.
2. All paediatric units should encourage, maintain and develop close links with their local adult neurosurgical units, if not already in place, particularly around neurovascular and neuro-oncological services.	**a** Paediatric and linked adult providers, with support from the SBNS and BPNG, should establish, resource and support formal relationships allowing collaborative pathways, particularly around neuro-oncology and vascular surgery.
3. Develop and publish outcome measures to assess the quality of paediatric neurosurgery units and inform future decisions on appropriate volumes of surgery in relation to best outcomes for patients. This particularly applies to cranial tumour surgery and requires a national collaborative research programme between the BPNG and the SBNS as a priority.	**a** The BPNG and SBNS should establish a national collaborative research programme to develop outcome measures for paediatric neurosurgery and, most urgently, to develop a robust, evidence-based reporting system for outcomes in paediatric cranial tumour surgery. **b** The BPNG and SBNS should develop clinical audit to enable measurement of outcome measures.
4. Actively promote appointment of ANPs and CNSs, particularly in hydrocephalus care, neuro-oncology and general paediatric neurosurgery care.	**a** Providers should invest in programmes to promote and develop advanced nursing practice in paediatric neurosurgery/neuroscience linked to opportunities to develop clinical academic positions and progression to senior specialist nursing and AHP status.
5. Provide access to the highest-quality paediatric neurosurgery pathways for 0–16-year-olds to those in the 16–18 age group, irrespective of historic referral and admission policies.	**a** Providers should review their access policies for 16 – 18 year-olds to ensure that they are providing equity of access for this patient cohort.
6. Align pathways for mild to moderate head injury in 16–18-year-olds to those in the established paediatric pathway.	**a** Providers should ensure that equity of access exists for 16–18 year-olds, particularly around neuro-psychological and neuro-cognitive assessment and support.
7. Establish network-wide protocols for initial management and referral pathways to raise awareness of signs consistent with potential spinal cord abnormalities in the newborn period and engage with all neonatal units on agreed protocols and pathways for the management of neonatal hydrocephalus.	**a** Paediatric neurosurgical services and networks and neonatal ODNs should work in collaboration between the two networks with regard to neurosurgical pathways.
8. Improve electronic referral management (ERM) systems to increase compatibility with hospital patient administration systems and to improve functionality. **Note:** This recommendation is based on proposed next step (p19) from the adult neurosurgery GIRFT follow-up report	**a** NHS England and systems should explore how best to make fuller use of ERM systems, especially with regard to repatriation and virtual assessment. **b** The SBNS should define performance standards/requirements that would allow IT teams to start developing an effective interface between ERM and hospital data systems.
9. Reduce litigation costs by application of the GIRFT Programme's five-point plan.	**a** Clinicians and trust management to assess their benchmarked position compared to the national average when reviewing the estimated litigation cost per activity. Trusts would have received this information in the GIRFT litigation data pack. **b** Clinicians and trust management to discuss with the legal department or claims handler the claims submitted to NHS Resolution included in the dataset to confirm correct coding to that department. Inform NHS Resolution of any claims which are not coded correctly to the appropriate specialty via CNST.Helpline@resolution.nhs.uk

Recommendations continued

Recommendation	Actions
9. Reduce litigation costs by application of the GIRFT Programme's five-point plan.	**c** Once claims have been verified clinicians and trust management to further review claims in detail including expert witness statements, panel firm reports and counsel advice as well as medical records to determine where patient care or documentation could be improved. If the legal department or claims handler needs additional assistance with this, each trusts panel firm should be able to provide support
	d Claims should be triangulated with learning themes from complaints, inquests and patient safety incidents (PSI) and where a claim has not already been investigateded asPSI we would recommend that this is reviewed to ensure no opportunity for learning is missed. The findings from this learning should be shared with all front-line clinical staff in a structured format at departmental/directorate meetings (including Multidisciplinary Team meetings, Morbidity and Mortality meetings and regional service meetings where appropriate).
	e Where trusts are outside the top quartile of trusts for litigation costs per activity GIRFT we will be asking national clinical leads and regional teams to follow up and support trusts in the steps taken to learn from claims. They will also be able to share with trusts examples of good practice where it would be of benefit.

About paediatric cranial and spinal neurosurgery

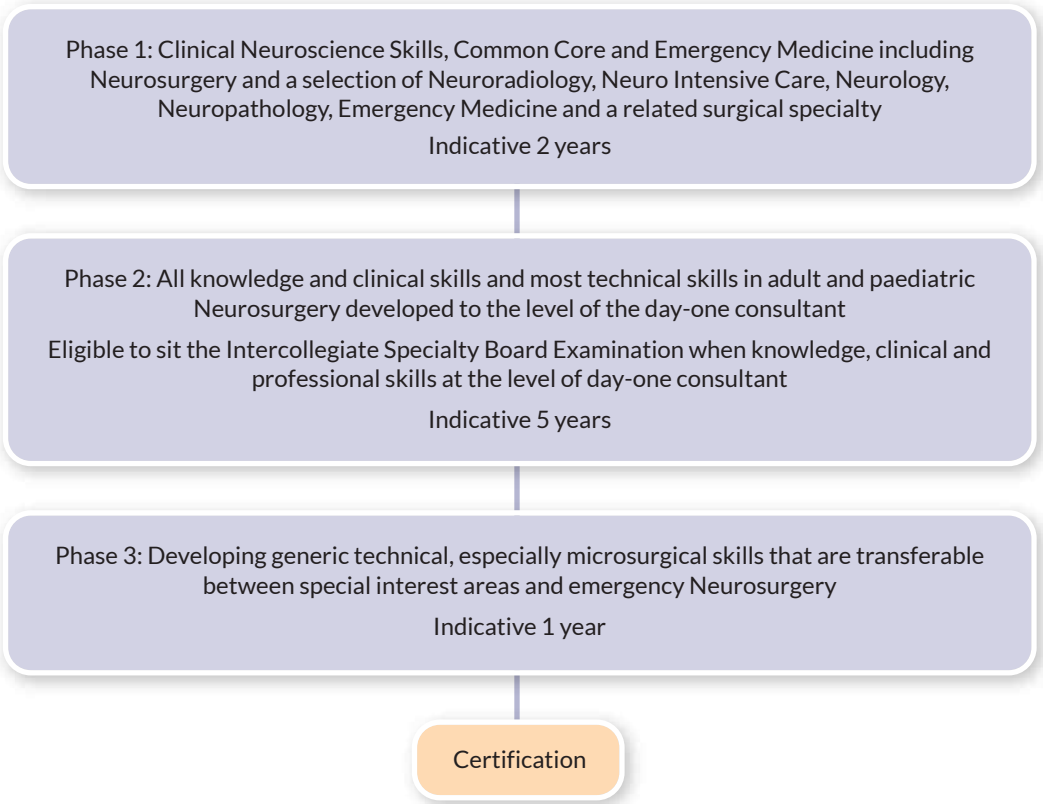
Paediatric neurosurgery covers a range of complex and generally rare surgical procedures carried out on the brain and spine of neonates, infants and children. It includes surgery for congenital conditions (e.g. craniofacial syndromic) and acquired conditions (e.g. post-haemorrhagic hydrocephalus in prematurely born children). The age range for children as defined legally and by the GMC is birth to 18th birthday. There is significant variation in national admission policy, however, and analysis of Hospital Episode Statistics (HES) data has identified some services where 16–18-year-olds are managed entirely in the adult unit. This activity is also described in the adult cranial neurosurgery GIRFT national report.[26]

There is a mixed economy of provision, with some standalone paediatric units and others that are integrated with the adult service – see Appendix 2 on page 81 for details. Across England, 18 NHS hospitals provide paediatric neurosurgical care in various ways, admitting around 27,000 patients a year. About 40% of these are emergency admissions and 10% overall are in the 16–18 age group. Unlike adult cranial neurosurgery, around 50% of all-age paediatric neurosurgical activity directly involves the management of hydrocephalus and ventriculo peritoneal (VP) shunt malfunction.

Over the last 30 years there has been a significant change in the development, recognition and provision of paediatric neurosurgery as a distinct subspeciality of neurosurgery in the UK. The British Paediatric Neurosurgical Group (BPNG) was formed in 1988 with 13 founder members from across the UK and Ireland. The questionnaire in the current GIRFT programme has identified 70 consultant neurosurgeons in England as having a dedicated or significant contractual commitment to paediatric neurosurgical practice. The BPNG was the first subspeciality group to be recognised formally by the Society of British Neurological Surgeons (SBNS) and the elected secretary has a permanent position on the SBNS council.

Over the last 20 years paediatric neurosurgical training has become an integral part of the curriculum for progression to a certificate of completion of training in neurosurgery aligned to the new outcome-based curriculum introduced from August 2021. The new curriculum has three planned stages, as outlined in **Figure 1** below.

Figure 1: Training pathway in neurosurgery



Source: Intercollegiate surgical curriculum programme, 2021, Neurosurgery curriculum[27]

[26] *Phillips, N., 2018. Adult cranial neurosurgery: GIRFT national specialty report, https://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/07/CranialNeurosurgeryJune18-L.pdf*

[27] *www.iscp.ac.uk/media/1104/neurosurgery-curriculum-aug-2021-approved-oct-20.pdf*

This new curriculum has more clearly defined core topics on:

- emergency paediatric neurosurgery;
- paediatric head and spine injury;
- paediatric hydrocephalus;
- paediatric tumours; and
- paediatric intracranial vascular disorders.

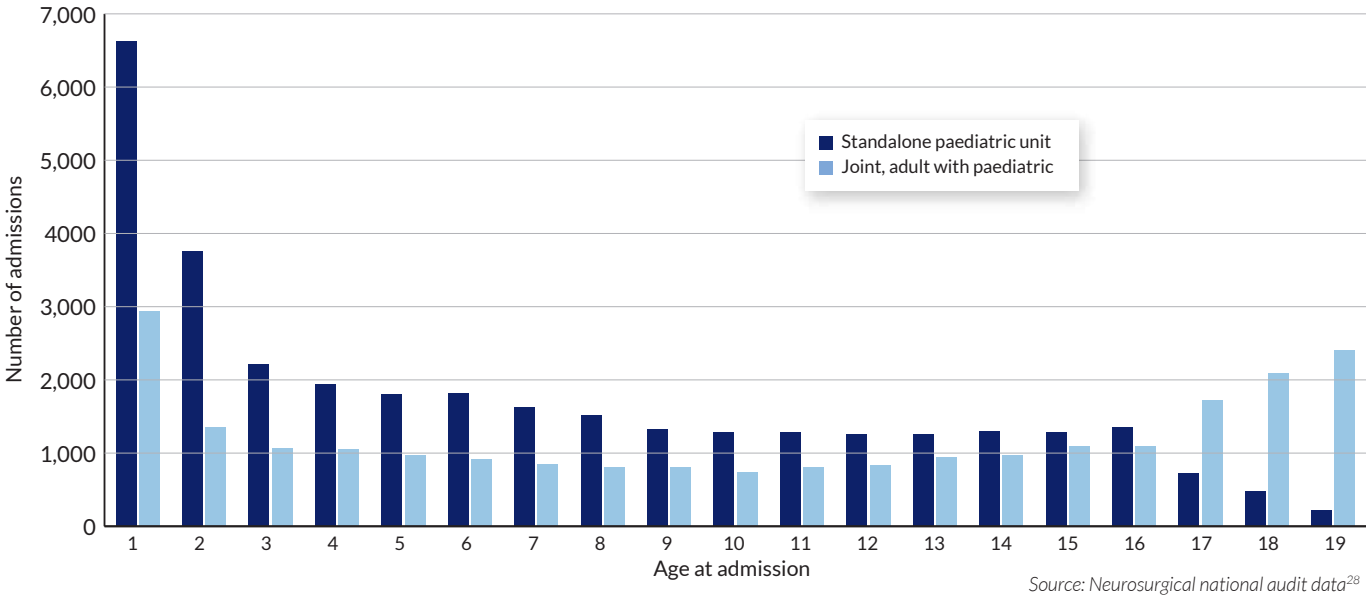
By the end of training, trainees should have had a broad exposure to emergency and scheduled components of many areas of the curriculum, including paediatric neurosurgery. Trainees must be able to demonstrate knowledge and understanding of the management of critical conditions, including emergency paediatric neurosurgery. The trainee logbook must demonstrate an aggregate of no fewer than 1,200 operations, of which at least 70 must be paediatric. Index paediatric cases require the trainee to perform one supratentorial and one infratentorial tumour resection under direct supervision. No minimum times are stipulated for training in the paediatric components of the neurosurgical curriculum. The majority of trainees require a minimum period of 12 months training in paediatric neurosurgery during Phase 2 and/or Phase 3 of the training programme.

Trainees who undertake Special Interest training in paediatrics in Phase 3 will be expected to develop competence in all aspects of the non-operative neurosurgical management of children presenting with disorders of the nervous system. They will have detailed knowledge of the statutory framework governing the care of children, paediatric neuro-intensive care, the principles of paediatric neuro-rehabilitation and of the management of non-accidental injury. They will be competent to undertake all aspects of the emergency neurosurgical operative care of children and to undertake a range of elective procedures.

The GIRFT cranial neurosurgery data for adult and paediatric services incorporates 30 units across England, of which 18 provide paediatric neurosurgery in some form (of these, 15 provide significant, established paediatric neurosurgical care), as defined by the age range 0–18 years. Twelve centres are co-located with adult counterparts (a small number of these provide neurosurgical care for the 16–18 age group as a consequence of local admission policies) and six units function as standalone paediatric neurosurgery centres in children's hospitals. In both types of unit, activity is high at neonatal age and then falls gradually (with age), with the exception of that in combined units, where it starts to rise in the teenage years.

Figure 2 shows the distribution of activity across the age range.

Figure 2: Distribution of activity by age, 2013–2019



Source: Neurosurgical national audit data[28]

[28] *www.nnap.org.uk*

The paediatric neurosurgery GIRFT data is relevant to patients 0–18 years of age and incorporates 27,100 spells from the period 2016–2019 (10,900 non-elective and 16,200 elective). Of these, 2,500 (9%) are in the 16–18-year-old age group. In the three-year period for which data was analysed there were 1,986 cranial tumour procedures.

Four models of paediatric neurosurgical unit have been identified:

1. standalone units that are based within a children's hospital;
2. paediatric units co-located with adult provision offering shared experiences with adult colleagues;
3. units co-located with adult colleagues but functioning as a separate entity;
4. paediatric neurosurgical centres (small number) within a major trauma centre (MTC) (also a paediatric MTC) but without a core paediatric neurosurgical practice.

There are five NHS England nationally commissioned specialist paediatric neurosurgical services:

- craniofacial services (four providers);
- children's epilepsy surgical services (CESS) (four regional centres with six units providing services);
- selective dorsal rhizotomy for spasticity (four providers);
- foetal surgery for spinal dysraphism (one provider);
- Vein of Galen intervention (two providers).

These nationally prescribed services are mandated to provide public audit and outcome data, but there is inconsistency and variation in the outcome measures used.

Paediatric neurosurgery networks and operational delivery networks (ODNs)

ODNs are determined by clinical need as agreed between providers and commissioners, and their outcomes and outputs are included in the relevant commissioning service specifications.[29]

Responsibility for assuring governance arrangements for ODNs sits with NHS England Specialised Commissioning and responsibility for 'hosting' the ODN is agreed with a local provider organisation.

The first ODNs in England were developed from established managed networks with national coverage:

- adult critical care;
- neonatal critical care;
- major trauma;
- burns care.

This has now been extended into hepatitis C, cardiovascular and stroke care, and the recommendations of the GIRFT national reports in paediatric critical care, neonatology and paediatric surgery strongly support integration across the ODNs, improvement in pathway collaboration and access to specialist care for sick children.[30]

Paediatric neurosciences ODNs were to be established across England from 2015. They have had limited success and development as a result of inconsistent funding mechanisms. In some regions, e.g. the North West, the ODN remains in place, in this case with funding support from the Royal Manchester and Alder Hey Children's Hospitals. NHS England's Paediatric Neuroscience Clinical Reference Group (CRG), part of the Women's and Children's National Programme of Care (NpoC) Board, strongly supports the re-establishment of sustainable, functioning paediatric neuroscience ODNs.

We asked units in our 2019 GIRFT questionnaire whether they were part of an established paediatric neuroscience ODN. Of the 14 who answered this question, 12 stated that they were, but that organisation, engagement and support with other paediatric networks and ODN was variable and inconsistent, and lacked consistent funding and support.

CASE STUDY

Cross-boundary working and resource sharing

Alder Hey and Royal Manchester Children's Hospitals have developed the North West Paediatric Neuro-epilepsy Service, which has joint appointments, consultants working between both trusts and the delivery of joint clinics. There are also established joint craniofacial clinics and joint MDTs for oncology and vascular services.

This is an exemplary model of co-operation – as relevant for adult services as for paediatrics – particularly in that it encompasses not only sharing resources and expertise across trusts but also provides joined up services to link subspecialties.

[29] *NHS Commissioning Board, 2012. Developing operational delivery networks: the way forward, www.england.nhs.uk/wp-content/uploads/2012/12/develop-odns.pdf*

[30] *See Adams, E., Harvey, K. and Sweeting, M., 2021. Neonatology: GIRFT programme national specialty report; Morris, K. and Fortune P-M., 2022. Paediatric critical care: GIRFT programme national specialty report; Hunter, J., 2022. Paediatric trauma and orthopaedic surgery: GIRFT programme national specialty report; Kenny, S.E., 2021. Paediatric general surgery and urology: GIRFT programme national specialty report. All published GIRFT reports are available at https://gettingitrightfirsttime.co.uk/girft-reports*

Figure 3: Map of the ten paediatric critical care ODNs across England

Source: NHS England, 2019, Paediatric critical care and surgery in children review[31]

[31] *www.england.nhs.uk/publication/paediatric-critical-care-and-surgery-in-children-review-summary-report/*

Both the NHS Long Term Plan[32] and the Paediatric Critical Care and Surgery in Children Review[33] highlight the importance of ODNs, which facilitate the sharing of resources, expertise and best practice. On a similar theme, the GIRFT national specialty report for paediatric critical care[34] also recommended that specialist paediatric pathways be more closely aligned, with a children's strategic forum (CSF) in each region with representation from each paediatric ODN. This is an essential component for paediatric neurosurgery as it tackles the challenges presented by low-volume procedures and the need for children to be in the right place and on the right specialist pathway of care.

We would recommend enhancing and supporting the re-establishment and funding of paediatric neuroscience ODNs mapped out to the existing ODN pathways and linked to the CSFs and the related paediatric ODNs.

The GIRFT deep-dive visits highlighted differing approaches to the adoption of a network model:

- Some units are working closely together to share resources and expertise, as outlined in the case study on p63. A similar model is run by Great Ormond Street and Cambridge University Hospitals.
- Another model is to create partnerships according to geography. The North Tees paediatric unit has strong links with the adult centres in Newcastle for the north of their catchment area and in Leeds for the southern portion of their catchment area.
- Some networks are still in the development phase, such as the aspiring network being created by Oxford and Southampton.

Our recommendation regarding the operation of paediatric neurosurgery networks is premised on them being encouraged, supported and enabled, locally and nationally, by the regional GIRFT implementation teams, NHS England and the ICSs.

Recommendation

Recommendation	Actions
1. Ensure that all paediatric neurosurgery networks are co-operating effectively for the benefit of patients and are cross-linked and engaged with all relevant paediatric ODNs and networks.	**a** Systems should finalise the delivery models for all networks and operationalise within the funding available.
	b Systems should work with the GIRFT regional implementation teams to develop networks appropriate to local configuration.

Collaboration with adult neurosurgery units

It is apparent from the discussions held on the GIRFT deep-dive visits that collaboration with adult neurosurgery units is as important as a high-functioning ODN in enabling a unit to deliver high-quality, efficient and co-ordinated care. We identified four structures in paediatric neurosurgery:

1. standalone units in a paediatric hospital;
2. units co-located with adult neurosurgery, sharing the same resource;
3. units co-located with adult neurosurgery but where sharing of resource, collaboration and co-ordination of care is less well established;
4. paediatric neurosurgical centres (a small number) within a major trauma centre (MTC) (also a paediatric MTC) but without a core paediatric neurosurgical practice.

[32] *www.longtermplan.nhs.uk*

[33] *www.england.nhs.uk/publication/paediatric-critical-care-and-surgery-in-children-review-summary-report/*

[34] *Morris, K. and Fortune, P-M., 2022. Paediatric critical care: GIRFT programme national specialty report, available at www.gettingitrightfirsttime.co.uk/girft-reports/*

CASE STUDY

Engagement with adult services

The Newcastle upon Tyne Hospitals NHS Foundation Trust is a good example of a paediatric unit that is well integrated with the adult service with which it is co-located. The paediatric neurosurgeons have adult responsibilities and there is joint MDT working, particularly around oncology and vascular surgery.

Alder Hey Children's NHS Foundation Trust runs a monthly neurovascular MDT meeting/clinic with full engagement of the adult interventional neuroradiologists from the Walton centre. This enables the service to overcome the problems associated with rarer conditions of very-low-volume procedures, as they are able to draw on the experience of the adult service.

It is recognised that neurosurgical techniques involve many transferrable skills that apply to both adult and paediatric practice. The volume of work in terms of numbers of procedures involving cranial tumour surgery is significantly greater in adult than in paediatric neurosurgical practice. Closer collaboration between adult and paediatric neurosurgical oncology services allows for beneficial sharing of experience in both directions and is strongly recommended. This principle also clearly applies to the subspeciality of vascular neurosurgery and the intimately linked specialty of interventional neuroradiology, where sharing adult and paediatric experience through formal arrangements, such as combined MDT meetings, can improve experience and outcomes for our patients. This relationship works both ways: hydrocephalus management is a high-volume practice in paediatric neurosurgery and colleagues in the adult service can benefit from paediatric's greater experience in techniques such as complex neuro-endoscopy.

Of the 15 respondents to our survey, three units did not discuss oncology patients pre-surgically at MDT meetings for tumour surgery. Clearly this is unacceptable except in emergency situations. Collaboration between the adult and paediatric services serves as a marker for the good communication and practice so vital in a low-volume surgical specialty and prevents the isolation that can lead to such poor practice.

Our recommendation regarding collaboration with adult neurosurgery units promotes a reciprocal and valued relationship across training and service provision.

Recommendation

Recommendation	Actions
2. All paediatric units should encourage, maintain and develop close links with their local adult neurosurgical units, if not already in place, particularly around neurovascular and neuro-oncological services.	**a** Paediatric and linked adult providers, with support from the SBNS and BPNG, should establish, resource and support formal relationships allowing collaborative pathways, particularly around neuro-oncology and vascular surgery.

Clinical outcome data

There is currently no agreed national standard for collecting or publishing outcome data in relation to paediatric neurosurgery, making it difficult to identify unwarranted clinical variation in the quality of services provided across the paediatric neurosurgery units. Similarly, there are no clinical audits that can be used to benchmark units. This meant there was a significant gap in the datapack used to support the GIRFT deep-dive visits.

In order for units, patients and their families to understand the quality of the service that is being provided, and to allow for quality improvement, it is imperative that clinical outcome measures are developed, recorded and published. This will require careful thought and consideration to ensure that the right measures are used and that, when published, they are discussed appropriately and responsibly.

CASE STUDY

Published clinical outcome data

The paediatric neurosurgical service at **Great Ormond Street Hospital** has an excellent public/patient-facing web page with extensive listed neurosurgical outcome data, including risk-adjusted mortality rates, adverse events and shunt infection and revision rates.
(See www.gosh.nhs.uk/conditions-and-treatments/clinical-outcomes/neurosurgery-clinical-outcomes/)

Great Ormond Street Hospital currently collects and analyses its own outcomes data (and has done so since 2010), and we appreciate that not all trusts are currently able to do this. However, with the new/improved clinical outcome measures and audit processes we are recommending, this data will be collected by trusts so that all services should in theory be able to share their outcome data in this way.

Examples of areas where outcome measures would be particularly useful include oncology, with patient-reported outcomes, long-term outcomes and the impact on the family.

For neuro-oncology in paediatric and adult practice this poses a significant challenge. There is no standardised nationally agreed mechanism for reporting morbidity associated with paediatric brain tumour surgery. This needs to be established in order to support informed recommendations on service change and pathway design for these children.

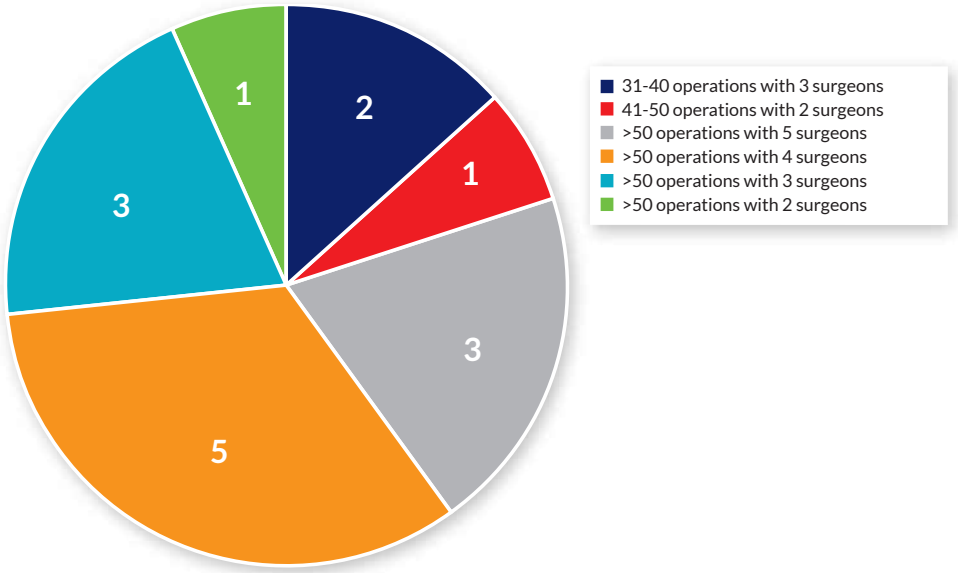
A key recommendation of this report is the development of a robust, validated and evidenced-based reporting system for outcomes in paediatric brain tumour surgery. We recommend that a national working group with a clinical panel consisting of the oncology leads from paediatric neurosurgical providers in England is set up urgently to agree a set of core outcome measures.

In line with views set out in the adult cranial neurosurgery follow-up report published in combination with this report, we recommend that the BPNG develop outcome measures in subspeciality areas such as neuro-oncology, skull base surgery and cerebrovascular surgery. The current lack of agreed measures means too large a proportion of neurosurgery is not open to quality improvement.

The neurosurgical national audit programme must now move towards high-quality consensus core outcome sets for the majority of its cranial activity. As well as forming the basis for audit, these will also provide a vital basis for future clinical trials in surgery.

Figure 4 shows the number of tumour operations carried out in each unit, and by how many surgeons. It is not possible to comment on the appropriateness of these activity volumes without good-quality outcome data, although it is apparent that there is significant variation.

Figure 4: Number of tumour operations carried out in most recent three-year period, 2019



Source: GIRFT questionnaire data
Note: 15 units responded; number of units within each category is indicated on the pie chart

Aligned with recommendations 10 and 13 in the adult cranial neurosurgery GIRFT national report (shown below), this is highly relevant to quality improvement in paediatric neurosurgical practice. This particularly applies to paediatric cranial tumour surgery.

GIRFT Adult Cranial Neurosurgery national report related recommendations

Recommendation 10: Focusing on surgeons' experience
Assess the evidence base on low-volume operating across surgical specialties, and consider policy development from resulting insight.

Recommendation 13: Focusing on surgeons' experience
Improve data collection in cranial neurosurgery, with particular reference to increasing accuracy of coding and improving audit data quality to enable its use for quality improvement.

In the three-year period for which data was analysed, there were 1,986 cranial tumour procedures. However, complications in paediatric neuro-oncology surgery are seldom consistently reported.[35] Existing morbidity scales, i.e. the Clavien–Dindo, Landriel, and Drake scales, have significant limitations and an improved tool to quantify morbidity from paediatric neuro-oncology surgery is needed.

There is an urgent need to agree a set of outcome measures with the BPNG so that the quality of services can be monitored and to ensure decisions on service provision are based on objective data.

Core outcome sets are being developed in a number of areas in neurosurgery, principally skull-based tumours, neuro-oncology and craniopharyngioma, which will feed into future audit and GIRFT reports. These will provide a sound basis for more granular metrics in neurosurgery, which will augment HES data and inform the evidence-based decision-making around appropriate volumes of surgery for the maintenance of competence and skills and improved patient outcomes.

[35] *Foster, M.T. et al, 2021. Reporting morbidity associated with pediatric brain tumor surgery: are the available scoring systems sufficient? Journal of Neurosurgery Pediatrics. https://pubmed.ncbi.nlm.nih.gov/33636703/*

Recommendation

Recommendation	Actions
3. Develop and publish outcome measures to assess the quality of paediatric neurosurgery units and inform future decisions on appropriate volumes of surgery in relation to best outcomes for patients. This particularly applies to cranial tumour surgery and requires a national collaborative research programme between the BPNG and the SBNS as a priority.	**a** The BPNG and SBNS should establish a national collaborative research programme to develop outcome measures for paediatric neurosurgery and, most urgently, develop a robust, evidence-based reporting system for outcomes in paediatric cranial tumour surgery.
	b The BPNG and SBNS should develop clinical audit to enable measurement of outcome measures.

Advanced nursing practice

Increased demands on healthcare as a result of the changing health needs of the population, and the evolution of services in response, have provided opportunities for the nursing profession to develop and expand their roles. Advanced nursing practice has been developing in the NHS for many decades and has contributed to improved care outcomes for patients. Roles such as advanced nurse practitioners (ANPs) and clinical nurse specialists (CNSs) provide significant continuity of care as well as offering important clinical career pathways for nurses. Many allied health professionals (AHP) also study advanced-level practice in order to progress their careers.

The two main advanced nursing roles in neurosurgery are CNS and ANP. In many long-term conditions CNSs tend to focus on proactive case management (a 'keyworker' function) and ANPs on acute management in hospital or clinics. Both run nurse-led services in long-term conditions, including nurse-led follow-up.

These nurses work within the four pillars of advanced practice:

- advanced clinical practice;
- leadership;
- facilitation of education and learning;
- evidence of research and development.

They are educated at master's level and have been assessed as competent in clinical practice, based on expert clinical skills and knowledge within their area of work.

Both roles are autonomous – CNSs and ANPs make decisions based on their assessment, diagnosis and treatment of patients, demonstrating clinical judgement and critical thinking. The roles have shown to improve patient care and outcomes in many areas and are considered to be cost effective. CNSs and ANPs apply a bio-psychosocial approach, which is particularly valuable in symptom control, proactive case management (including admission avoidance), health promotion, and psychological care. Their skills are appropriate for patient care at every stage of the pathway from assessment to discharge.

The deep-dive visits clearly showed us that those units with well-developed and engaged advanced paediatric nursing programmes provided improved pathways of care and patient experience. Overall, the increased use of ANPs, CNSs and critical care outreach services has had a significant impact on several elements of the patient pathway. The GIRFT datapacks and deep-dive visits have led us to conclude that they:

- significantly reduce the use of critical care beds;
- significantly increase outpatient activity;
- significantly improve patient care both as inpatients and outpatients, particularly for shunt-related patients;
- significantly improve accessibility for families with concerns.

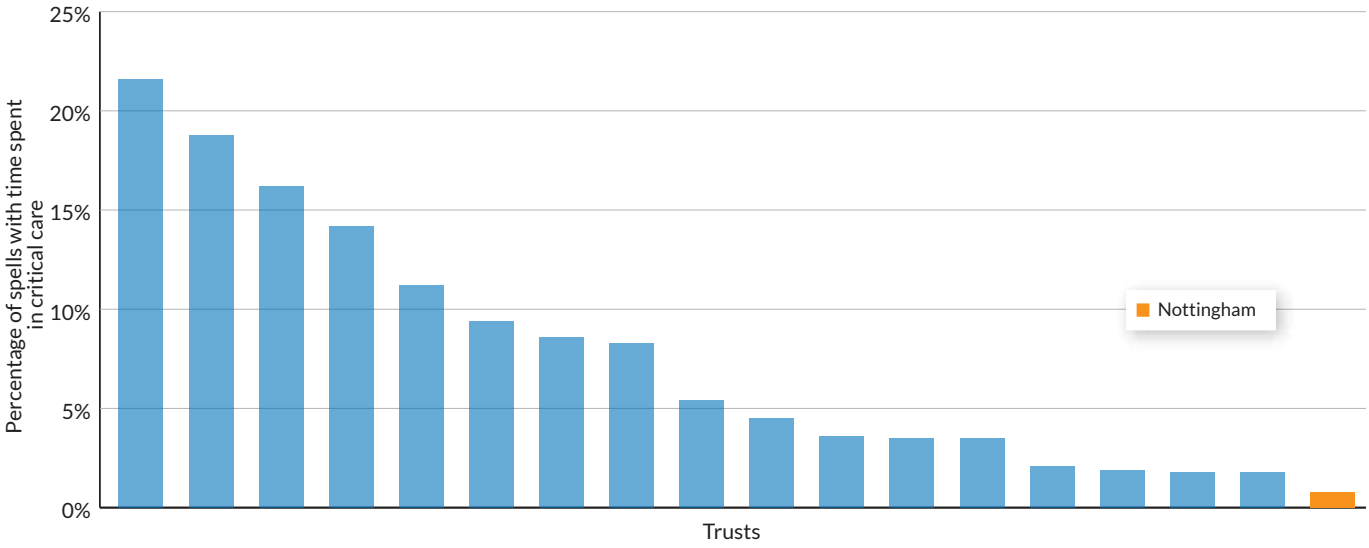
Use of Level 3 beds by patients post-craniotomy varies from 7% to 85%. The paediatric critical care GIRFT national report[36] highlights the innovation at Great Ormond Street, where employing specialist nurses on the neurosciences ward led to a reduction in the need for post-operative ventilation for open craniotomy patients.

Several units described their ANP-led pathway for hydrocephalus, where parents can ring directly through to the ANP, visit the ward or attend a daily outpatient programme, whereby the ANP can speak to or see the patient, arrange a scan or discuss concerns with the consultant.

[36] *Morris, K. and Fortune,P-M., 2022. Paediatric critical care: GIRFT programme national specialty report, available at www.gettingitrightfirsttime.co.uk/girft-reports/*

The deployment of ANP on the ward at the paediatric neurosurgical service in Nottingham Hospital has meant that patients can be cared for on the ward, without the need for admission to a critical care bed, which is not only better for the patient, but more cost effective (see **Figure 5**).

Figure 5: Percentage of paediatric neurosurgery spells where patient was admitted to critical care, 2016–2019, HES



Overall, we strongly recommend a renewed/increased focus on the appointment of AHP and particularly ANPs to neurosurgical wards in view of their proven value in reducing reliance on critical care and improving patient care and patient experience.

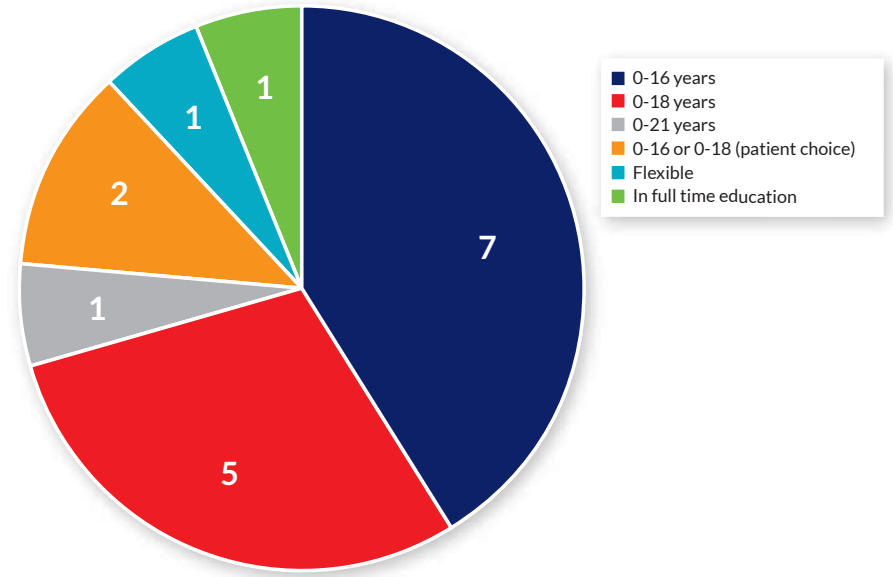
Recommendation

Recommendation	Actions
4. Actively promote appointment of ANPs and CNSs, particularly in hydrocephalus care, neuro-oncology and general paediatric neurosurgery care.	**a** Providers should invest in programmes to promote and develop advanced nursing practice in paediatric neurosurgery/neuroscience linked to opportunities to develop clinical academic positions and progression to senior specialist nursing and AHP status.

The service for 16–18-year-olds

The legal definition of childhood, and that used by the General Medical Council, is 0 to 18th birthday. However, although in some regions admission policies go up to 18 years, others only go up to 16 (see **Figure 6**). Around 10% of all paediatric neurosurgery patients fall into the 16–18-year-old age range, meaning there is significant inequity of access to paediatric neurosurgery. For example, those young adults who suffer a head injury – depending on where they live – may or may not be cared for by the local paediatric service. From GIRFT deep-dive visits it was clear that some 16–18-year-olds with mild-to-moderate head injury who are being treated in an adult setting may miss out on key elements of the paediatric pathway, including the neuropsychological and educational support programme and outpatient follow-up.

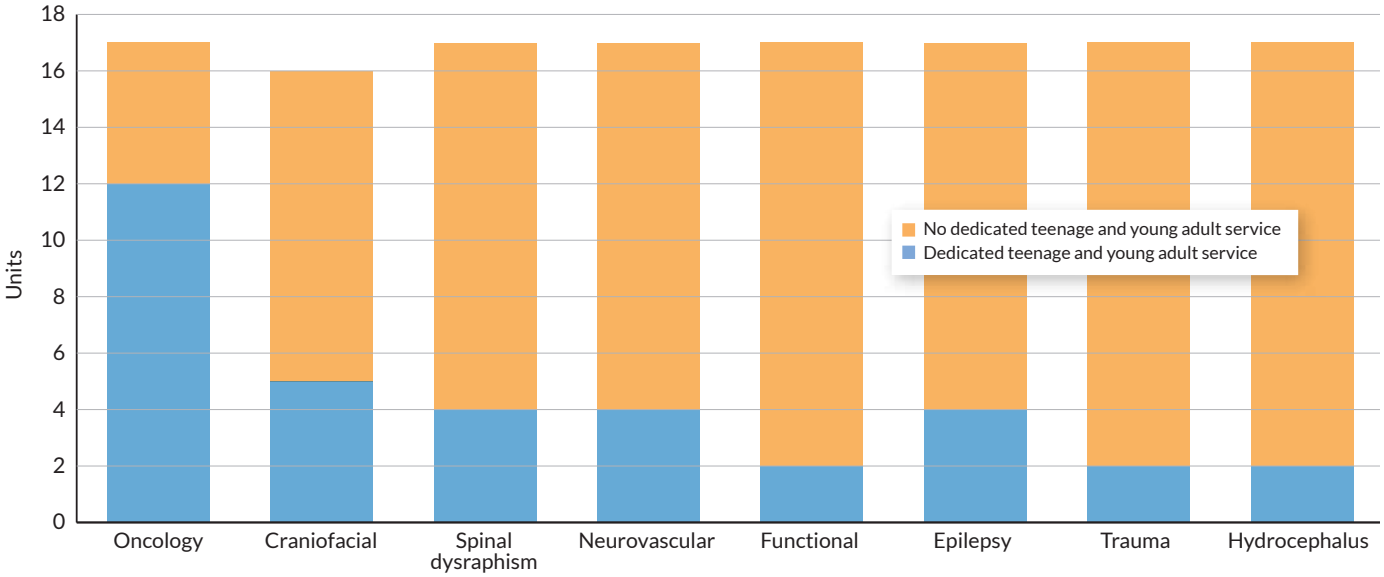
Figure 6: Age range used in admission policies for paediatric neurosurgery units, 2019



Source: GIRFT questionnaire data
Note: 17 units responded; number of units within each category is indicated on the pie chart

Figure 7 shows for which conditions units have set up dedicated teenage and young adult clinics.

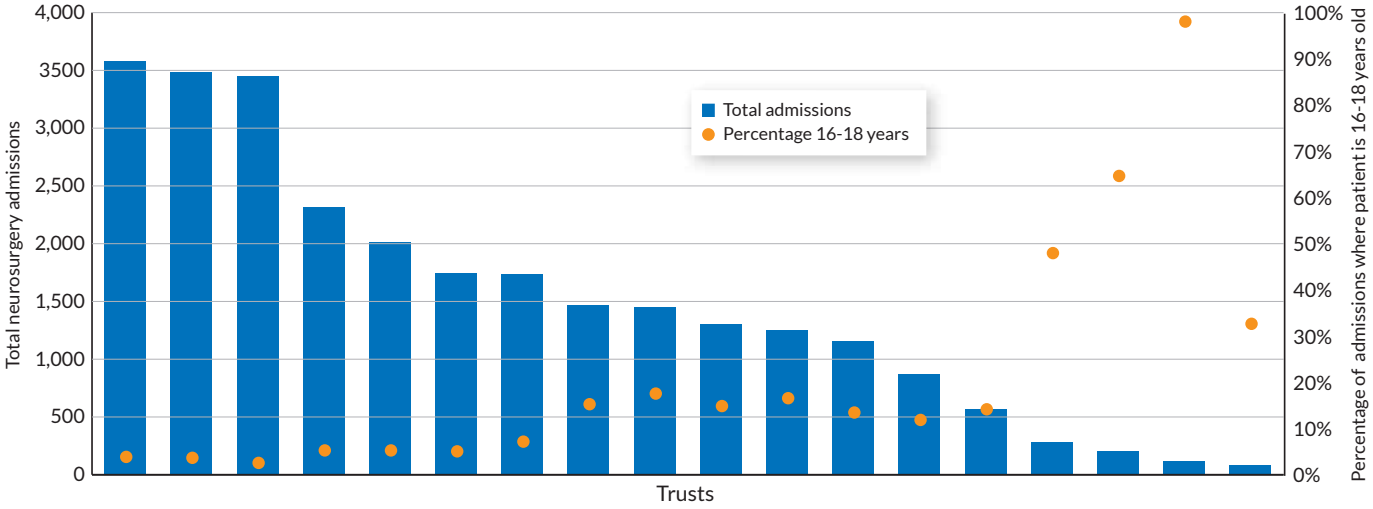
Figure 7: Units with dedicated teenage and young adult service, with specialist arrangements for MDT and clinic, 2019



Source: GIRFT questionnaire data

Figure 8 shows the variation by unit of the proportion of activity relating to this age group, with the largest units having the lowest proportion of 16–18-year-olds.

Figure 8: Percentage of paediatric neurosurgery admissions where patient was aged 16–18 years, by trust, 2016–2019, HES



There should, in all paediatric neurosurgery provider units, be an awareness of the challenges around the care of 16–18-year-olds and an understanding that historical admission and referral policies excluding this group from paediatric services could result in inequity of access to appropriate treatment pathways. Clinical decision-making should not be influenced by historic admission and referral policies.

Recommendations

Recommendations	Actions
5. Provide access to the highest-quality paediatric neurosurgery pathways for 0–16-year-olds to those in the 16–18 age group, irrespective of historic referral and admission policies.	**a** Providers should review their access policies for 16 – 18 year-olds to ensure that they are providing equity of access for this patient cohort.
6. Align pathways for mild to moderate head injury in 16–18-year-olds to those in the established paediatric pathway.	**a** Providers should ensure that equity of access exists for 16–18-year-olds, particularly around neuro-psychological and neuro-cognitive assessment and support.

Engagement with neonatal services

There are 156 neonatal units in England; 43 neonatal intensive care units (NICU), 75 local neonatal units (LNU) and 38 special care units (SCU).

- **NICU** provide intensive care for the smallest and sickest babies across the whole region, in addition to offering high-dependency, special care and transitional care for their local population;
- **LNU** provide short-term intensive care and high-dependency, special care and transitional care services for their local population;
- **SCU** provide short-term intensive care and high-dependency care, and special care and transitional care for their local population.

There are 15 NICUs co-located with paediatric neurosurgery units, but a significant number of neonates will be cared for in LNUs and SCUs. It is expected that, for pre-term babies at risk of post-haemorrhagic hydrocephalus, there will be direct contact between the paediatric neurosurgery unit and the neonatal unit, with clearly agreed management pathways along with shared follow-up, engagement and review.

Of the 15 paediatric neurosurgery units that completed the GIRFT questionnaire, 14 confirmed that they had an agreed protocol for the management of post-haemorrhagic hydrocephalus with the neonatologists. It is important that this way of working is adopted consistently and that the same approach is applied to potential spinal cord abnormalities.

We have worked closely with the GIRFT neonatology clinical leads, who have recommended closer collaboration as outlined above, in relation to raising awareness of signs consistent with potential spinal cord abnormalities in the newborn period.[37] Again, as with post-haemorrhagic hydrocephalus, education, clear management pathways and shared follow-up at a regional network level are recommended.

Recommendation

Recommendation	Actions
7. Establish network-wide protocols for initial management and referral pathways to raise awareness of signs consistent with potential spinal cord abnormalities in the newborn period and engage with all neonatal units on agreed protocols and pathways for the management of neonatal hydrocephalus.	**a** Paediatric neurosurgical services and networks, and neonatal ODNs should work in collaboration between the two networks with regard to neurosurgical pathways.

Lessons from the adult cranial neurosurgery GIRFT report

As is to be expected with two specialities that are so closely linked, there are many recommendations from the adult neurosurgery national report[38] that are highly relevant to paediatric neurosurgery. We have covered above those aligned recommendations of 'Enabling continual quality improvement' and 'Focusing on surgeons' experience' (both covered in our section on 'Clinical outcome data' on page 66) and 'Improving the effectiveness of referral pathways and outpatients' (covered in our section on 'Advanced nursing practice' on page 69 by supporting advanced nursing appointments).

The effectiveness of referral pathways is also improved by the adoption of electronic referral systems, which we cover below.

The litigation section is separate, as per the usual GIRFT report style, but it should be noted that here too the adult and paediatric approaches are closely aligned.

Improving the effectiveness of the referral pathways with (ERM) tools

The current process for accepting referrals from district general hospitals (DGH), and for the repatriation of patients back again, is cumbersome and time-consuming in many units.

[37] *Adams, E., Harvey, K. and Sweeting, M., 2021. Neonatology: GIRFT National Specialty Report, available at www.gettingitrightfirsttime.co.uk/girft-reports/*

[38] *Phillips, N., 2018. Cranial neurosurgery: GIRFT national specialty report, https://gettingitrightfirsttime.co.uk/wp-content/uploads/2018/07/CranialNeurosurgeryJune18-L.pdf*

As has been discussed in the adult cranial neurosurgery GIRFT national report and in the follow-up report (see 'Improving referrals', page 18) published in tandem with this one, there is more work to be done to ensure that ERM tools are seamlessly integrated with the electronic patient record and patient administrative system. Not only will this save clinical and administrative time in managing the admission and discharge processes, but will ultimately result in a more efficient patient pathway and reduced lengths of stay. We fully support the recommendation and next steps proposed by the adult cranial neurosurgery team and have framed this as a recommendation below.

Recommendation

Recommendation	Actions
8. Improve electronic referral management (ERM) systems to increase compatibility with hospital patient administration systems and to improve functionality. **Note:** This recommendation is based on proposed next steps (see page 18) from the adult neurosurgery GIRFT follow-up report.	**a** NHS England and systems should explore how best to make fuller use of ERM systems, especially with regard to repatriation and virtual assessment.
	b The SBNS should define performance standards/requirements that would allow IT teams to start developing an effective interface between ERM and hospital data systems.

Reducing the impact of litigation

Each of the GIRFT programme teams have been asked to examine the impact and causes of litigation in their field with a view to reducing the frequency of litigation and more importantly reducing the incidents that lead to it. It is important for clinical staff to have the opportunity to learn from claims in conjunction with learning from complaints, patient safety incidents (PSIs) and inquests, all of which should lead to improved patient care and reduced costs both in terms of litigation itself and the management of the resulting complications of potential incidents.

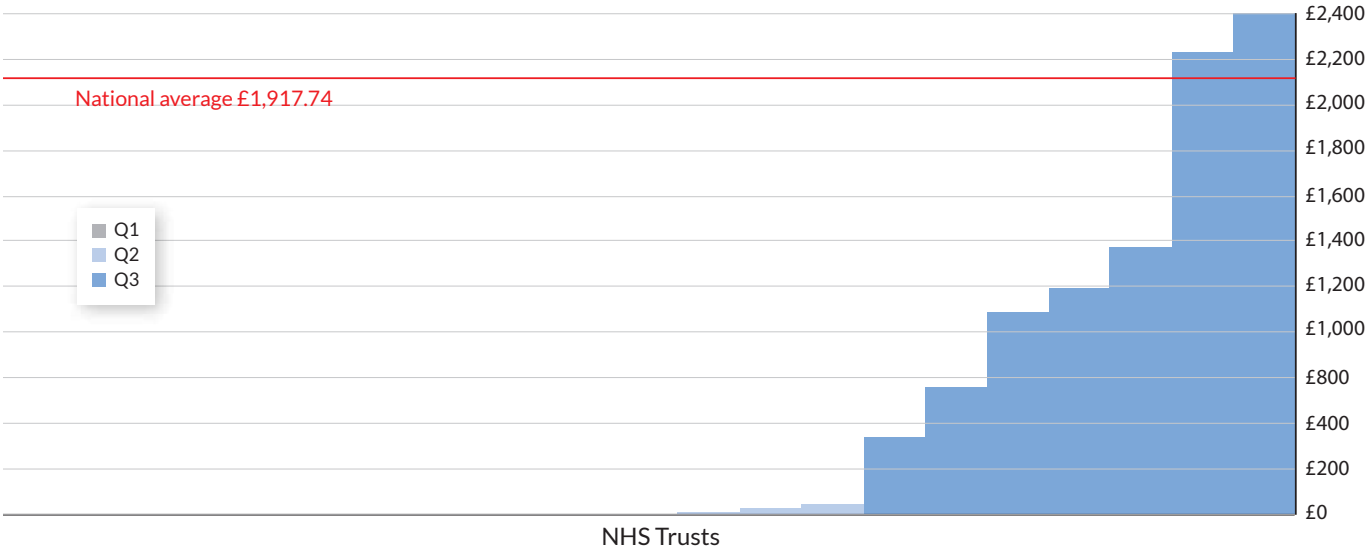
A key recommendation is for clinicians and trust management to discuss with the legal department or claims handler, the claims submitted to NHS Resolution in the dataset, to confirm correct coding to paediatric cranial neurosurgery. NHS Resolution should also be informed of any claims which are not coded correctly to the appropriate specialty. Following this, meaningful review of the claims can occur within the department and organisation in order to identify areas for learning, improvement and action for patient safety.

Data obtained from NHS Resolution of 35 clinical negligence claims attributed to paediatric neurosurgery are detailed in **Table 1**. Between 2016/17 and 2020/21, the total number of claims has remained consistent with a peak in the final year. There was a significant increase in total claim costs throughout the time period reflecting the distribution of a small number of claims which were high value. We found the national average estimated cost of litigation per paediatric cranial neurosurgery admission was £1,918.

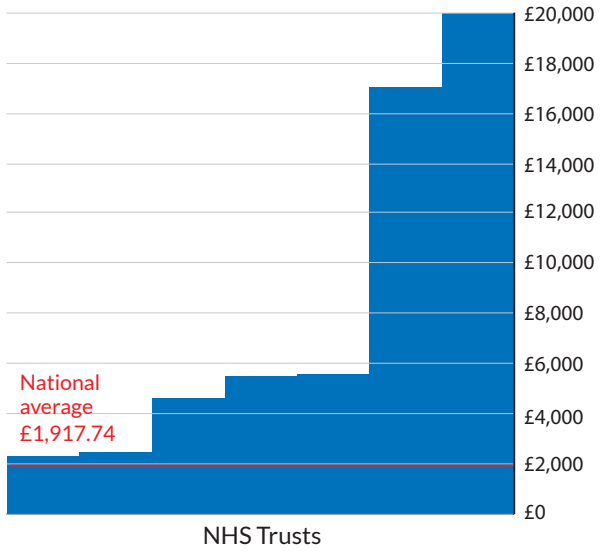
Table 1: Litigation claims attributed to paediatric neurosurgery

Notification year	Count of claims	% change in claims	Total claim costs (£)	% change in costs
2016/17	7		£34.7 mil	
2017/18	5	-29%	£14.8 mil	-57%
2018/19	7	40%	£7.4 mil	-50%
2019/20	7	0%	£11.1 mil	50%
2020/21	12	71%	£37.4 mil	237%
Total	**38**		**£105.4 mil**	

Showing quartile 1 to 3



Showing quartile 4 only



Using the NHS Resolution data, common causes for litigation in these claims were identified. More than one cause can be assigned to each claim, depending on the nature of the claim described. The most frequent cause attributed was failure/delay in diagnosis and/or treatment, with eight and seven claims respectively. Injuries were recorded for each claim, with brain injury identified in nine claims (24%) These claims together represent over half of total claim costs, £43.3 million. Other injuries in this clinical realm represent high-value claims with injuries/outcomes such as cerebral palsy, partial paralysis and tetra/quadriplegias.

In all, 17 claims have total claim costs greater than £1 million each, with two claims costs' greater than £10 million each. Review of available incident details identified eight of these claims related to decision-making. Such claims include delay in diagnosis, investigation, or treatment, such as for infection, hydrocephalus and skull fracture.

The published literature in paediatric neurosurgery litigation is minimal and there is no systematic analysis published. A review of paediatric claims in Germany identified seven claims over a 10-year period, of which five claims were related to paediatric cranial surgery. [39] Three claims related to shunt operations and two related to cranioplasty procedures. Review of the cases identified one medical error (inappropriate treatment intra-operatively), whereas the remaining claims were related to adverse events such as post-op CSF infection, difficult venous access in a premature baby, a deep vein thrombosis after shunt revision and severe intracranial haemorrhage intra-operatively leading to cardiopulmonary resuscitation.

Recommendation

Recommendation	Actions
9. Reduce litigation costs by application of the GIRFT Programme's five-point plan.	**a** Clinicians and trust management to assess their benchmarked position compared to the national average when reviewing the estimated litigation cost per activity. Trusts would have received this information in the GIRFT litigation data pack.
	b Clinicians and trust management to discuss with the legal department or claims handler the claims submitted to NHS Resolution included in the dataset to confirm correct coding to that department. Inform NHS Resolution of any claims which are not coded correctly to the appropriate specialty via CNST.Helpline@resolution.nhs.uk
	c Once claims have been verified clinicians and trust management to further review claims in detail including expert witness statements, panel firm reports and counsel advice as well as medical records to determine where patient care or documentation could be improved. If the legal department or claims handler needs additional assistance with this, each trusts panel firm should be able to provide support
	d Claims should be triangulated with learning themes from complaints, inquests and patient safety incidents (PSI) and where a claim has not already been investigateded asPSI we would recommend that this is reviewed to ensure no opportunity for learning is missed. The findings from this learning should be shared with all front-line clinical staff in a structured format at departmental/directorate meetings (including Multidisciplinary Team meetings, Morbidity and Mortality meetings and regional service meetings where appropriate).
	e Where trusts are outside the top quartile of trusts for litigation costs per activity GIRFT we will be asking national clinical leads and regional teams to follow up and support trusts in the steps taken to learn from claims. They will also be able to share with trusts examples of good practice where it would be of benefit.

[39] *Beez, T., Steiger, .HJ., Weber, B. et al., 2019. Pediatric neurosurgery malpractice claims in Germany. Childs Nerv Syst 35, 337–342 https://doi.org/10.1007/s00381-018-3963-y*

About the GIRFT Programme

Getting It Right First Time (GIRFT) is a national programme designed to improve treatment and care by reviewing health services. It undertakes clinically-led reviews of specialties, combining wide-ranging data analysis with the input and professional knowledge of senior clinicians to examine how things are currently being done and how they could be improved.

Working to the principle that a patient should expect to receive equally timely and effective investigations, treatment and outcomes wherever care is delivered, irrespective of who delivers that care, GIRFT aims to identify approaches from across the NHS that improve outcomes and patient experience, without the need for radical change or additional investment. While the gains for each patient or procedure may appear marginal, they can, when multiplied across an entire trust – and even more so across the NHS as a whole – deliver substantial cumulative benefits.

The programme was first conceived and developed by Professor Tim Briggs to review elective orthopaedic surgery to address a range of observed and undesirable variations in orthopaedics. In the 12 months after the pilot programme, it delivered an estimated £30m-£50m savings in orthopaedic care – predominantly through changes that reduced average length of stay and improved procurement.

The same model has been applied in more than 40 different areas of clinical practice. It consists of four key strands:

- a broad data gathering and analysis exercise, performed by health data analysts, which generates a detailed picture of current national practice, outcomes and other related factors;
- a series of discussions between clinical specialists and individual hospital trusts, which are based on the data – providing an unprecedented opportunity to examine individual trust behaviour and performance in the relevant area of practice, in the context of the national picture. This then enables the trust to understand where it is performing well and what it could do better – drawing on the input of senior clinicians;
- a national report, that draws on both the data analysis and the discussions with the hospital trusts to identify opportunities for improvement across the relevant services;
- an implementation phase where the GIRFT team supports providers to deliver the improvements recommended.

Implementation

GIRFT has developed an implementation programme designed to help trusts and their local partners to address the issues raised in trust data packs and the national specialty reports to improve quality. The GIRFT team provides support at a local level through the NHS England regional teams, advising on how to reflect the national recommendations into local practice and supporting efforts to deliver any trust specific recommendations emerging from the GIRFT visits. GIRFT also helps to disseminate best practice across the country, matching up trusts who might benefit from collaborating in selected areas of clinical practice. Through all its efforts, local or national, the GIRFT programme strives to embody the 'shoulder to shoulder' ethos that has become GIRFT's hallmark, supporting clinicians nationwide to deliver continuous quality improvement for the benefit of their patients.

Glossary

British Paediatric Neurosurgical Group (BPNG)
The British Paediatric Neurological Group is the part of the Society of British Neurosurgeons dedicated to neurosurgery in children.

Cerebral aneurysm
A bulge in a blood vessel inside the brain. If this bulge causes the blood vessel to burst, this is known as a ruptured aneurysm, which is an extremely serious condition.

Cerebrovascular
Cerebrovascular diseases are conditions caused by problems that affect the blood supply to the brain. The main one considered in this report is subarachnoid haemorrhage.

Chordoma
A type of malignant tumour that occurs in the bones of the skull base and spine. Chordoma is rare; it is diagnosed in less than one in a million people worldwide each year.

Clipping
An alternative name for open surgery to repair a cerebral aneurysm. It involves closing the aneurysm with a tiny metal clip (see also 'coiling').

Coiling
An alternative name for endovascular surgery to repair a cerebral aneurysm. It involves inserting a thin tube into an artery in the leg or groin, then using X-rays to help guide the tube into the brain, where tiny platinum coils are then inserted through the tube into the aneurysm, sealing it off (see also 'clipping').

Cranial neurosurgery
Cranial neurosurgery refers to surgical procedures carried out on the brain or on nerves located in the skull.

Craniectomy
A neurosurgical procedure that involves the permanent removal of a portion of the skull in order to relieve pressure on the underlying brain. This procedure is typically done in cases where a patient has experienced a very severe brain injury that involves significant amounts of bleeding around the brain or excessive swelling of the brain.

Craniotomy
A neurosurgical procedure that involves the removal of a small piece of the skull bone (a bone flap) to gain access to the brain. The bone is replaced after treatment.

Day of surgery admission
Admitting a patient on the day for which their surgery is scheduled, rather than in advance. This is not the same as day surgery, where patients are admitted for surgery and discharged within the same day.

Glioma
A glioma is a type of tumour that starts in the glial cells of the brain or the spine. Gliomas comprise about 30 per cent of all brain tumours and central nervous system tumours, and 80 per cent of all primary malignant brain tumours.

Interventional radiology
A range of techniques that use radiological images to diagnose and treat diseases in a minimally invasive way.

Intracranial
Within the skull.

Length of stay
This is a term to describe the duration of a single episode of hospitalisation.

National Confidential Enquiry into Patient Outcome and Death (NCEPOD)
Government-funded body that reviews the care of patients of all specialties.
www.ncepod.org.uk

National Neurosurgical Audit Programme (NNAP)
Established by the Society of British Neurological Surgeons (SBNS) to gather comprehensive data the full spectrum of elective and emergency neurosurgical activity.
www.nnap.org.uk

Neurosurgery
Neurosurgery, or neurological surgery, refers to surgery on any portion of the nervous system, including the brain, spinal cord, peripheral nerves, and extra-cranial cerebrovascular system.

Percutaneous
Any medical procedure where access to inner organs or other tissue is done via needle-puncture of the skin, rather than by using an 'open' approach where inner organs or tissue are exposed.

Shunt
A small implant – typically a valve and catheter – which drains excess fluid from the brain to prevent swelling.

Society of British Neurological Surgeons (SBNS)
The Society of British Neurological Surgeons is a medical association for British neurosurgeons and supports the study and advancement of neurosurgery.
www.sbns.org.uk

Acknowledgements

From Paul May

The GIRFT process is a highly collaborative one that requires the support and engagement of my colleagues in neurosurgery, their provider trusts and management teams, allied health professionals and all hospital staff. During this challenging time – the most challenging in the 70-year history of the NHS – I appreciate the support and commitment of all in the NHS and in the GIRFT programme who have helped and guided me through these last two years. In particular, I would like to thank Nick Phillips for his help and guidance, Gina Godfrey and Tim Briggs from GIRFT, the SBNS and the BPNG, and the Walton Centre NHS trust for their ongoing collaboration and support.

From Nick Phillips

Neurosurgery was one of the first few specialties to be influenced by Professor Tim Briggs into joining the GIRFT programme and we have benefited from long experience of working with excellent colleagues within GIRFT under Tim's leadership.

We particularly would like to thank Diane Stafford for helping write this report, James Murphy and Matt Colmer for guidance, Gina Godfrey and Nicky Joyce for organising our very helpful teams in the visits to all trusts, and Tim Gustafson for being such an able and enjoyable colleague on visits to trusts.

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Since 2017 the SBNS has been very supportive of the GIRFT work plan, as have our individual trusts in giving us time to engage in such enjoyable work.

This is the first GIRFT report for paediatric neurosurgery and we are grateful for guidance from Eleri Adams, the GIRFT clinical lead for neonatology.

We would like to thank the British Paediatric Neurosurgery Group (BPNG) for embracing our approach so positively, and all the neurosurgical units for their warm and engaging discussion during the visits.

GIRFT report team

With thanks also to:
Matt Colmer – Prinicipal Finance and Analytics Manager;
Diane Stafford – Report Editor;
Maddy Connolly – Deputy Director Clinical and Financial Information;
James Murphy – Head of GIRFT Academy;
Matthew Barker – Senior Policy Lead;
Andrew Daniel – Senior Policy Manager;
Melanie Proudfoot – Head of Communications;
Michelle Carter – Communications and Media Relations Manager;
John Machin – GIRFT Litigation Lead.

Appendix 1

Recommendations of the GIRFT National Specialty Report on Adult Cranial Neurosurgery

Improving the effectiveness of referral pathways and outpatient services

1. Make electronic referral management tools and related processes available in all cranial neurosurgery providers and referring trusts.
2. Accelerate the referral to treatment time for ALL patients identified as in need of cranial neurosurgery, whether identified via a screening programme or any other route.
3. Improve outpatient efficiency through greater use on non-consultant and non-face-to-face outpatient appointments.

Admitting patients on the day of surgery

4. Increase day of surgery admission rates.

The use of day surgery

5. Increase the proportion of procedures undertaken in the day-case setting and increase the rate of short-stay admissions.

Increasing the proportion of patients admitted electively

6. Reduce the proportion of primary malignant brain cancer patients that are admitted via the emergency/non-elective stream.

Enabling procedures to take place on schedule

7. Implement the NCEPOD recommendations relating to access to acute theatres, through designating one or more of their existing elective neurosurgical theatres as an acute theatre with a robust plan for specialty-specific staffing.
8. Improve patient flow between critical care and wards.

Optimising resources to provide time-critical procedures promptly

9. Improve the time to procedure to the 48-hour standard for emergency subarachnoid haemorrhage, as per NCEPOD recommendations.

Focusing on surgeons' experience

10. Assess the evidence base on low-volume operating across surgical specialties and consider policy development from resulting insight.
11. Provide treatment for extremely rare conditions, such as rare tumours (for example, chordoma) within regional centres.

Focusing on discharge

12. Address delayed transfers of care and discharge by increasing the rate of discharge to home for non-elective cranial neurosurgery procedures, ensuring a timely transfer to rehabilitation centres for major procedures and timely repatriation to referring hospitals.

Enabling continual quality improvement

13. Improve data collection in cranial neurosurgery with particular reference to increasing accuracy of coding and improving audit data quality to enable its use for quality improvement.

Increasing consistency and reducing costs in procurement

14. GIRFT, trusts and the NHS procurement community should work together to enable improved procurement through cost and pricing transparency, aggregation and consolidation, and the spreading of best practice.

Reducing the impact of litigation

15. Reduce litigation costs by applying the GIRFT programme's five-point plan.

Appendix 2

Providers of paediatric cranial and spinal neurosurgery

Provider name	Visit type
Alder Hey Children's NHS Foundation Trust	Paediatric only
Birmingham Women's and Children's NHS Foundation Trust	Paediatric only
Great Ormond Street Hospital for Children NHS Foundation Trust	Paediatric only
Manchester University NHS Foundation Trust	Paediatric only
Sheffield Children's NHS Foundation Trust	Paediatric only
University Hospitals Bristol NHS Foundation Trust	Paediatric only
Cambridge University Hospitals NHS Foundation Trust	Paediatric and Adult
King's College Hospital NHS Foundation Trust	Paediatric and Adult
Leeds Teaching Hospitals NHS Trust	Paediatric and Adult
North Bristol NHS Trust*	Paediatric and Adult
Nottingham University Hospitals NHS Trust	Paediatric and Adult
Oxford University Hospitals NHS Foundation Trust	Paediatric and Adult
Sheffield Teaching Hospitals NHS Foundation Trust*	Paediatric and Adult
South Tees Hospitals NHS Foundation Trust	Paediatric and Adult
St George's University Hospitals NHS Foundation Trust	Paediatric and Adult
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	Paediatric and Adult
University Hospital Southampton NHS Foundation Trust	Paediatric and Adult
University Hospitals of North Midlands NHS Trust*	Paediatric and Adult

** low levels of activity, predominately 16–18 age group*

For more information about GIRFT,
visit our website: www.GettingItRightFirstTime.co.uk
or email us on info@GettingItRightFirstTime.co.uk

You can also follow us on Twitter @NHSGIRFT and
LinkedIn: www.linkedin.com/company/getting-it-right-first-time-girft

The full report and executive summary are also available to download as
PDFs from: www.GettingItRightFirstTime.co.uk