



GETTING IT RIGHT FIRST TIME

Cranial Neurosurgery

GIRFT Programme National Specialty Report

by **Nick Phillips**

GIRFT Clinical Lead for Cranial Neurosurgery

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Foreword from Professor Tim Briggs GIRFT Programme Chair

I am delighted to present and recommend this report by Mr Nick Phillips, GIRFT clinical lead for cranial neurosurgery; one of the leading clinicians who has spent many months visiting NHS hospital trusts to help improve the specialty they have devoted their career to, and ensure better care and outcomes for the patients who put their trust in our hands.

The Getting It Right First Time (GIRFT) programme covers 35 surgical and medical specialties, working directly with frontline clinicians to identify and reduce unwarranted variations in service delivery and clinical practice. When I began the first specialty review of orthopaedic surgery more than five years ago, it was clear when visiting hospitals and meeting surgeons, clinicians, managers and support teams how everyone shares a desire to improve practices, techniques and processes for the benefit of our patients. Staff across the NHS recognise and support the importance of having a better insight and understanding of how their specialty is performing and the kind of impact unwarranted variation is having on their services.

Each GIRFT review results in a report that includes a range of evidence-based recommendations that our clinical leads, all experts in their field, feel would truly make a difference to patient care and efficiency in that specialty. In tackling the variation in the way services are provided and delivered, we are able to identify recommendations that can help improve the quality of care and outcomes for patients, as well as helping the NHS deliver much-needed efficiency savings.

Throughout, we have found a real willingness to engage with our programme and this review into cranial neurosurgery has been no exception.

Nick Phillips' review has helped to build a more detailed picture of cranial neurosurgery procedures; the many advances in technology and techniques and the opportunities this presents for treating more patients and with better outcomes. His report has highlighted some of the barriers and frustrations which our hospital teams face in being able to treat cranial neurosurgery patients effectively and appropriately.

His 15 recommendations set out the case for making smarter use of existing resources with the aim of enabling the specialty to see and treat more patients sooner. The report focuses on the pathways of patients, changes that will help avoid bottlenecks, and identifies ways to free up hospital beds. What this offers is the potential to improve surgical capacity, reducing delays and cancellations for patients which are frustratingly too common particularly for elective surgery.

Through its examination of the specialty, this report highlights what works well and what isn't working, helping clinicians and managers to understand the collective benefits of small changes which together can improve the capacity of current services across the NHS for the benefit of patients.

GIRFT and the other Carter programmes are already demonstrating that, by transforming provider services and investing to save, there are huge gains to be made in stabilising trusts financially and improving care for patients. My hope is that GIRFT will provide the impetus for clinicians, managers and programmes such as ours, to work together, shoulder to shoulder, to create solutions and improvements that for too long have seemed impossible to deliver.



GIRFT Programme Chair and NHS Improvement's National Director for Clinical Quality and Efficiency

Professor Tim Briggs is Consultant Orthopaedic Surgeon at the Royal National Orthopaedic Hospital (RNOH), where he is also Director of Strategy and External Affairs. He led the first review of orthopaedic surgery which became the pilot for the GIRFT programme, of which he is now Chair.

Prof Briggs is also National Director for Clinical Quality and Efficiency at NHS Improvement.

Professor Tim Briggs CBE

Foreword from Nick Phillips

GIRFT Clinical Lead for Cranial neurosurgery

From serious head injuries to intracranial bleeding to brain tumours, cranial neurosurgery deals with extremely serious and often urgent conditions. Over recent decades, our capacity to treat these kinds of conditions has progressed enormously; advances in technology and techniques mean many more patients can be treated effectively. A simple demonstration: in the last 40 years in the UK, brain cancer survival rates have doubled¹.

Yet the Getting It Right First Time (GIRFT) programme has underlined how much more we could be doing. Almost without exception, the NHS cranial neurosurgery departments in England confirmed during GIRFT deep-dive visits that they believe they could see more patients and treat people sooner – a view that mirrors my own experience. Almost without exception, the departments cited the same barriers that mean they are not able to do so: patients staying under the care of cranial neurosurgery longer than is clinically necessary, meaning those departments' capacity to take in new patients is restricted.

This in turn means delays for those new patients and high cancellation rates in elective surgery. It means that in many places, referral to treatment targets are missed. On occasions, it has required departments to refer patients onto their peers in other trusts, simply because they cannot admit them soon enough. Importantly, these bottlenecks don't just affect the patients waiting for treatment; they mean patients who have had surgery aren't discharged in a timely way. Surgical teams are frustrated and money is wasted.

There is no single solution to this problem, but the value of the GIRFT programme is that it examines best practices from across the country. It has helped us pinpoint opportunities for improvement across the entire pathway; opportunities that involve making smarter use of existing resources to ensure more patients can be seen, sooner.

That starts with being smarter about when to admit patients: bringing them in on the day of surgery, rather than in advance. It looks at the use of day surgery for minimally invasive procedures and at rethinking the way theatres are used so that treating patients in an emergency does not inevitably disrupt all other schedules and patients. Crucially too, it considers discharge processes, recommending changes in commissioning to ensure that the hospitals who refer patients in are required to take them back when those patients are clinically ready. It also raises the need for better integration with social and community care to help patients recover – physiotherapy, occupational therapy and other support.

On their own, each of these changes might only make a small difference to the number of patients a cranial neurosurgery team can treat. Together, however, I believe they could lead to a substantial increase in capacity. Freeing up just one extra bed, per trust, per day, would allow thousands more patients to receive the care of cranial neurosurgeons each year without any increase in resource: the recommendations set out in this report provide opportunities for all trusts to achieve that.



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.

Nick Phillips

¹ Brain Cancer (C71), Age-Standardised One-Year Net Survival, England and Wales, 1971-2011, available via: www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/brain-other-cns-and-intracranial-tumours/survival#heading-Two

Statement of Support

The Society of British Neurological Surgeons

"The Society of British Neurological Surgeons (SBNS) welcomes the publication of this report on cranial neurosurgery and the work of the GIRFT programme.

We strongly endorse the 15 recommendations made in the report and will continue to work closely with GIRFT and the NHS to improve access, flow and quality for patients with neurosurgical conditions."

Paul May

President of the Society of British Neurological Surgeons



The Society of British Neurological Surgeons was founded in 1926 and is one of the world's oldest national neurosurgical societies. It currently has over 970 members.

The Society's purpose is the study and advancement of neurosurgery, achieved through scientific meetings, publications and fostering professional relationships amongst neurosurgeons and through engagement with the public and bodies involved in the provision of care.

About this report

This report sets out 15 recommendations to improve the way adult² cranial neurosurgery – surgery to the brain and the nervous system – is delivered in the NHS in England, with the pivotal aim of allowing the speciality to see and treat more patients, sooner. The recommendations stretch across the entire care pathway, from preadmission to discharge and rehabilitation, and aim to make far better use of existing surgical resources. Many of these can be implemented with minimal effort from providers, and have the potential to deliver an immediate impact on surgical capacity and throughput – meaning more procedures can be conducted overall, and patients who need urgent surgery can receive it faster.

The report also makes recommendations focused on long-term quality improvement, with an initial focus on improving the quality and depth of data gathered around cranial neurosurgery.

The report and recommendations are the output of work conducted under the NHS Improvement programme, Getting It Right First Time (GIRFT). The recommendations are made following visits to the 24 NHS trusts in England that conduct cranial neurosurgery. They have been reviewed and considered by relevant stakeholders before publication, securing strong support for both the overall direction and the specific detail of implementation. The aim is that they should serve as the catalyst for further discussion and action, at national, trust and individual surgeon level.

² The report makes no recommendations on paediatric cranial neurosurgery. Data relating to paediatric procedures has been removed from all HES admitted patient care data. However, in some areas it has not been possible to exclude paediatric data.

Executive summary

Cranial neurosurgery is a term covering a vast range of surgical procedures carried out on the brain or on nerves located in the skull. It includes potentially life-saving surgery to stop bleeding in the brain and remove tumours, as well as procedures to address debilitating pain caused by nerve damage. Cranial neurosurgeons also play a pivotal role in monitoring patients who have suffered a head injury, who will often not need a surgical procedure.

Just 24 NHS hospitals across England conduct cranial neurosurgery, together admitting around 75,000 neurosurgery patients a year. About 40% of these are emergency admissions, often of otherwise healthy patients. Once admitted, cranial neurosurgery patients typically stay longer in hospital than in many other surgical specialties due to the severity of the illness or injury and the longer recovery period from potentially highly invasive surgery.

The Getting It Right First Time (GIRFT) programme has examined in detail the way that cranial neurosurgery is provided in England, to identify differences in procedures and practice as well as common issues in the 24 trusts.

The common challenge

The visits to the 24 providers of cranial neurosurgery in England have identified some important variation in practice and decision-making. But perhaps more importantly, they have crystallised a problem that is experienced in all trusts: a recurring challenge in achieving the throughput they would like. Every provider struggles to conduct as many cranial neurosurgery procedures as it needs to – meaning delays and cancellations are frustratingly common, particularly for elective surgery.

While it is expected that many patients will stay in hospital for several days after a procedure, providers indicated that patients frequently stay in their care longer than is clinically necessary. A common reason was that there was no suitable option for discharge. A lack of available beds then prevents the provider from admitting the next intake of patients.

This in turn contributes to the fact that during the period studied, only a third of providers met the 18-week referral to treatment target. For patients, this is at best disruptive; at worst, it can mean their condition rapidly deteriorates before surgery. For clinical teams, it can be highly demoralising.

Opportunities in cranial neurosurgery

Opportunities to improve in cranial neurosurgery occur at every stage of the patient pathway, beginning with avoiding unnecessary admissions in the first place.

There are then opportunities to streamline the process from admission to surgery, so that patients are routinely admitted on the day of the procedure rather than in advance. Compatible and comprehensive electronic referral systems would aid this, giving providers the information they need to plan ahead. It is also possible, even in a specialty as complex as cranial neurosurgery, to undertake some procedures as day surgery, rather than requiring overnight admissions. Already, five providers perform over three quarters of trigeminal neuralgia procedures as day cases. This is a short and minimally invasive procedure with a fast recovery time. If it was delivered as a day case as standard, as this report recommends, this would instantly reduce pressure on beds.

To address the issue of frequent cancellations, as well as identifying ways to free up beds, this report recommends that providers designate one of their operating theatres as an acute theatre and exclude it from elective list planning. It can then be used to accommodate emergencies, such as surgery for serious head injury, for subarachnoid haemorrhage or for life-threatening presentations of brain tumours. Currently, the nine providers with the highest cancellation rates do not have a designated acute theatre. This means any emergency admission throws the elective lists into disarray – which in turn results in cancellations and delays.

Deep dives: learning from peers using data

The deep-dive visits repeatedly provided explanations for the challenges experienced and some of the variation identified. One critical finding from the visits was that a regular barrier to discharge is the lack of a bed in the referring secondary care provider for the patient to return to. In particular, cranial neurosurgery providers reported that when they sought to return patients to the hospital which initially referred them, these referring hospitals, or alternative district general hospitals, frequently responded that they had no capacity. While the cranial neurosurgery provider, as a specialised service, is contractually obliged to accept a referral, there is no comparable duty on the referring hospital to accept the patient back. The report recommends changes to local ways of working to address this.

The visits also provided an opportunity to discuss differences in procedural mode – for example, around the repair of ruptured cerebral aneurysms which can be conducted by open or endovascular surgery. The latter is less invasive and offers faster recovery times; however, it is not always the best option clinically. Deep-dive discussions raised the possibility that the modality decision may sometimes be made based on surgeons’ experience and/or the availability of interventional radiologists (who are required for the endovascular method.) The decision should always be made on the basis of what the best option for the patient is. This then leads to questions about how to help build surgical experience, particularly in rarer conditions and procedures, and about the options available to refer patients to another provider undertaking sufficient volumes of procedures to build experience and maintain expertise.

The report makes recommendations on both topics, and raises the possibility of designating some providers as specialist hubs for certain conditions or types of procedure and of setting minimum levels of experience for surgery on these rare conditions.

Achieving continual quality improvement

Alongside these core recommendations to enable cranial neurosurgery providers to treat more patients, the report also highlights the need to develop further outcome measures, and data collection related to the specialty, as an integral part of continual quality improvement. Alongside specific issues, for example the way data relating to stereotactic radiosurgery is collected and coded (discussed in more detail within the report), there are wider opportunities for improvement. For example, some units involve clinicians in coding and reporting. In other units, Mortality and Morbidity meetings are attended by members of the coding team. In both cases, there is a positive impact on the quality of overall reporting and specifically on clinical coding, which supports continual quality improvement.

Potential impact

This report seeks to identify how cranial neurosurgery providers, and national bodies and programmes, could work together to deliver a better service to patients, treating them more promptly and to higher standards. These changes, if implemented, could free up essential resources – beds, operating theatres, and surgeon time – so that the specialty can increase the number of procedures it conducts within the existing resources available. Across the country, the gross notional financial opportunity is estimated to be in the order of £8.9m. Each of the individual opportunities is not necessarily cash-releasing in itself, but together they enable a focus on improving the capacity of current services, through the redeployment and more effective use of precious resources.

Examples of best practice

Across the country, different providers are already seeking to optimise their resources and effectiveness in different ways. One such example comes from University Hospital Southampton, which has developed a surgical pathway for glioma – a type of malignant brain cancer – that is based around swift and scheduled elective admission, rather than treating these patients via the emergency stream (as might be expected.) The pathway is designed around the clear expectation that, whenever possible, patients will stay in hospital for one night only. This approach has helped Southampton achieve an average length of stay for elective glioma admissions of just two days; the national average is 6.4 days.

But crucially, this approach benefits patients. It avoids the long stays in hospital associated with admitting patients as emergencies as soon as they are referred, and means patients can prepare for surgery in the comfort of their own home. In short, in adopting this process, Southampton has demonstrated the viability of an urgent pathway for glioma, which involves admitting patients electively, shortly after the patient is referred, with surgery scheduled.

LIST OF RECOMMENDATIONS

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 of 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 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 speciality 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.

NEXT STEPS: IMPLEMENTATION

This report has underlined a need to transform services and practice at pace, to reduce variation and, in so doing, deliver a higher quality, more sustainable service. As such, NHS Improvement's objective is for GIRFT implementation in cranial neurosurgery to be complete, and a new business as usual phase reached by June 2019. The principal mechanism for doing this will be delivery of tailored implementation plans in each trust, which will translate this report to meet local needs.

Trusts should begin developing their implementation plan, based on:

- the specific recommendations reported to the trust following the GIRFT visit;
- the recommendations in this national report.

In developing and delivering their implementation plans trusts should prioritise:

- the recommendations most emphasised in the GIRFT visit report, based on both the data and the discussions during the visit; and
- actions against this report's recommendations, based on the timeline indicated.

To achieve results, it is vital that clinicians, management and all staff within trusts work together to progress these plans. Where this report recognises that national guidance, or any other national support, is needed prior to provider implementation, this is reflected in the timescales associated with our recommendations.

NHS Improvement and the GIRFT programme team recognise that developing implementation plans and delivering against them may be challenging. As such, GIRFT Regional Hubs across England will support trusts by providing advice and management support, including advice on developing and troubleshooting implementation plans, as well as access to clinical advice. The hubs will also lead a buddying process to help spread best practice between trusts, and manage dependencies with other transformation efforts including Sustainability and Transformation Partnerships and NHS RightCare. The core GIRFT data will be updated on an annual basis to enable trusts to monitor progress, and where necessary reprioritise their implementation efforts. As trusts will be aware, in addition to this implementation support, GIRFT provides a revisit programme to support trusts continually to improve patient care.

We will also ensure policy links and dependencies with national bodies, associated with this report, are managed effectively. For example, we would notify NICE of any recommended changes to practice that might affect its guidelines relevant to cranial neurosurgery. To provide assurance of consistency within the service specification, NHS England will consider how best to reference this report.

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

What is cranial neurosurgery?

Cranial neurosurgery refers to surgical procedures carried out on the brain or on nerves located in the skull. It is a subsection of neurosurgery that covers a wide range of conditions and procedures, from craniotomy – the opening of the skull to allow access to the brain – to radiology and, at some providers, radiosurgery procedures.

Some of these procedures are emergencies, such as to remove a blood clot on or in the brain: any delay can increase the risk of brain damage, or threaten the patient’s life. Other procedures, such as surgical removal of a malignant tumour, may need to be urgently conducted, within a few days of diagnosis; others, such as treatment for trigeminal neuralgia, can be planned as elective procedures.

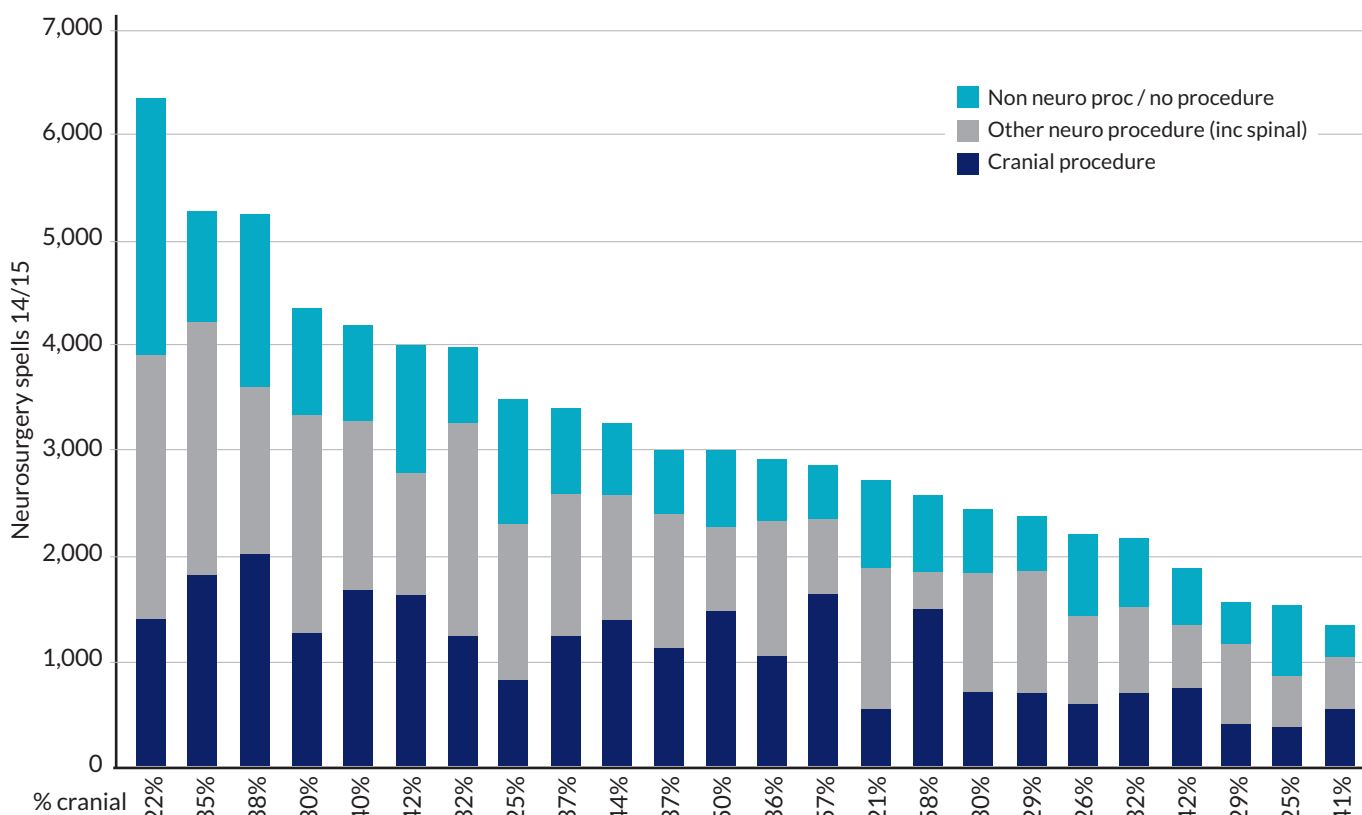
Admission numbers

There are 24 NHS trusts in England that provide neurosurgery. Together, they admit around 75,000 neurosurgery patients each year, with providers admitting between 1,300 and 6,300 patients per year for both cranial neurosurgery and other neurosurgery.

In 2014/15, just over a third of these (27,000) received a cranial neurosurgery procedure; a further third (29,500) were for non-cranial neurosurgery, including spinal. The remainder either had a non-neurosurgical procedure or no procedure: this includes patients admitted for investigations such as an MRI or CT scan, or for expert monitoring after head injury.

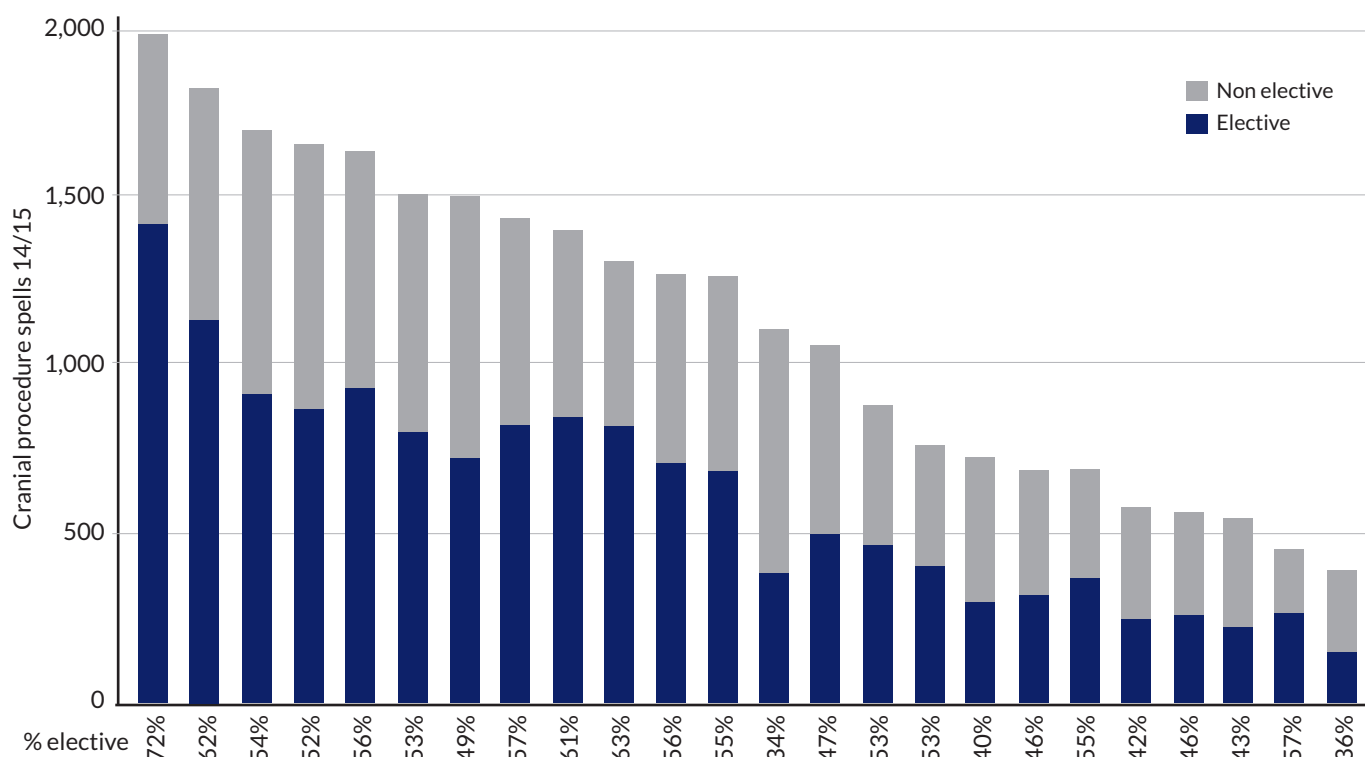
Nationally, 54% of cranial neurosurgery patients were elective admissions. However, this varied by provider, ranging from 36% to 72%.

Figure 1: Total neurosurgical spells by provider, split by type of procedure 01 Apr 2014 to 31 Mar 2015



Source: HES

Figure 2: Cranial neurosurgery procedure spells by provider, split elective / non-elective: 01 Apr 2014 to 31 Mar 2015



Source: HES

In addition, cranial neurosurgery teams may be required to support patients who have a range of injuries as well as head injury and are therefore admitted under other specialties.

Patient profile

Nationally, cranial trauma is the commonest reason for emergency admission within cranial neurosurgery. Head injuries can clearly affect people of all ages, but a large proportion are typically below the age of 15, which was not investigated by the GIRFT review. For some conditions, such as trigeminal neuralgia, patients are typically middle-aged or older – and the same applies to patients who receive surgery for cerebral aneurysms, where the average age is between 50 and 60.

In general, there is no pattern of common co-morbidities amongst cranial neurosurgery patients and many are otherwise in good health.

Length of stay

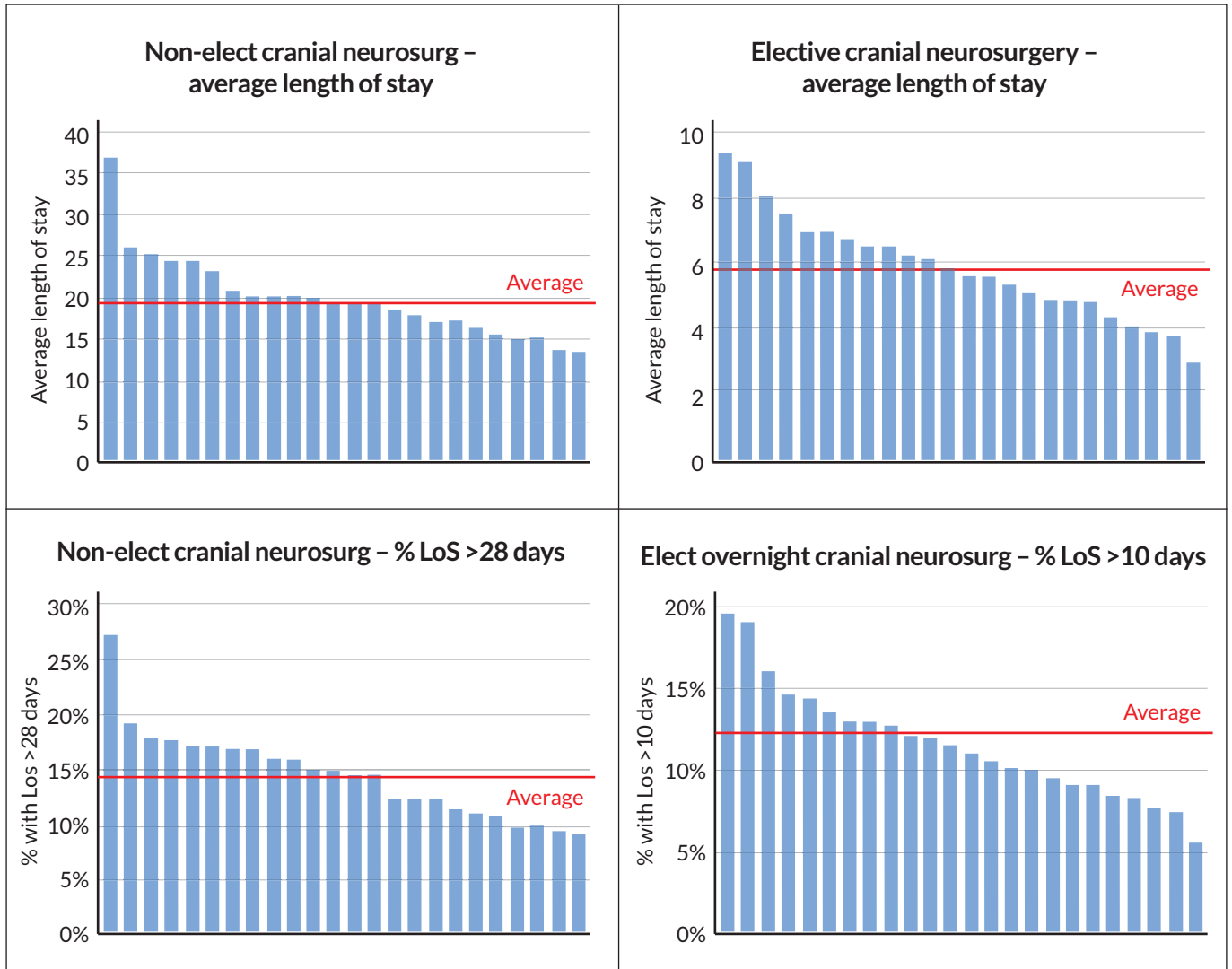
Due to the severity of their illness or injury, and the nature of some procedures, many cranial neurosurgery patients will need to remain in hospital for several days, or even weeks, after surgery. Initial recovery for a large proportion of patients will be in a critical care unit, particularly in the first four to six hours after surgery where the risk of complications is highest. This may be followed by extended monitoring on a ward, then rehabilitation involving specialist physiotherapy and occupational therapy (though this latter stage need not take place in a cranial neurosurgery unit.)

The average³ length of stay for patients who had a non-elective cranial neurosurgery procedure was 19.4 days, with an average of 14% of patients spending more than 28 days in the neurosurgery provider. One provider reported that 27% of its cranial neurosurgery patients stayed longer than 28 days.

For elective procedures, the average length of stay was 5.8 days and of those patients who are admitted for one night or more, 12% stayed more than 10 days with the provider.

³ Unless specifically stated, where the term "average" is used in this report, it refers to the mean.

Figure 3: Average length of stay for cranial neurosurgery procedures and proportion of long-stay spells by provider, split elective / non-elective 01 Apr 2014 to 31 Mar 2015



Source: HES

However, there are also some cranial neurosurgery procedures that are minimally invasive and can be carried out without anaesthetic. Examples of these are radiosurgery procedures, procedures for trigeminal neuralgia and surgery for some brain tumours, which can be delivered as day surgery.

Cranial neurosurgery in England

Cranial neurosurgery is delivered by just 24 NHS providers across England. Of these, 22 also have major trauma centres – underlining the close links between cranial neurosurgery and cranial trauma. Providers vary in size; while the majority have between eight and 12 consultant neurosurgeons, two have more than 20. The largest unit has 96 dedicated neurosurgical beds (these are for all neurosurgery, rather than purely cranial) and the smallest, in terms of bed numbers, has 22. The map at Figure 4 highlights the distribution of providers across England.

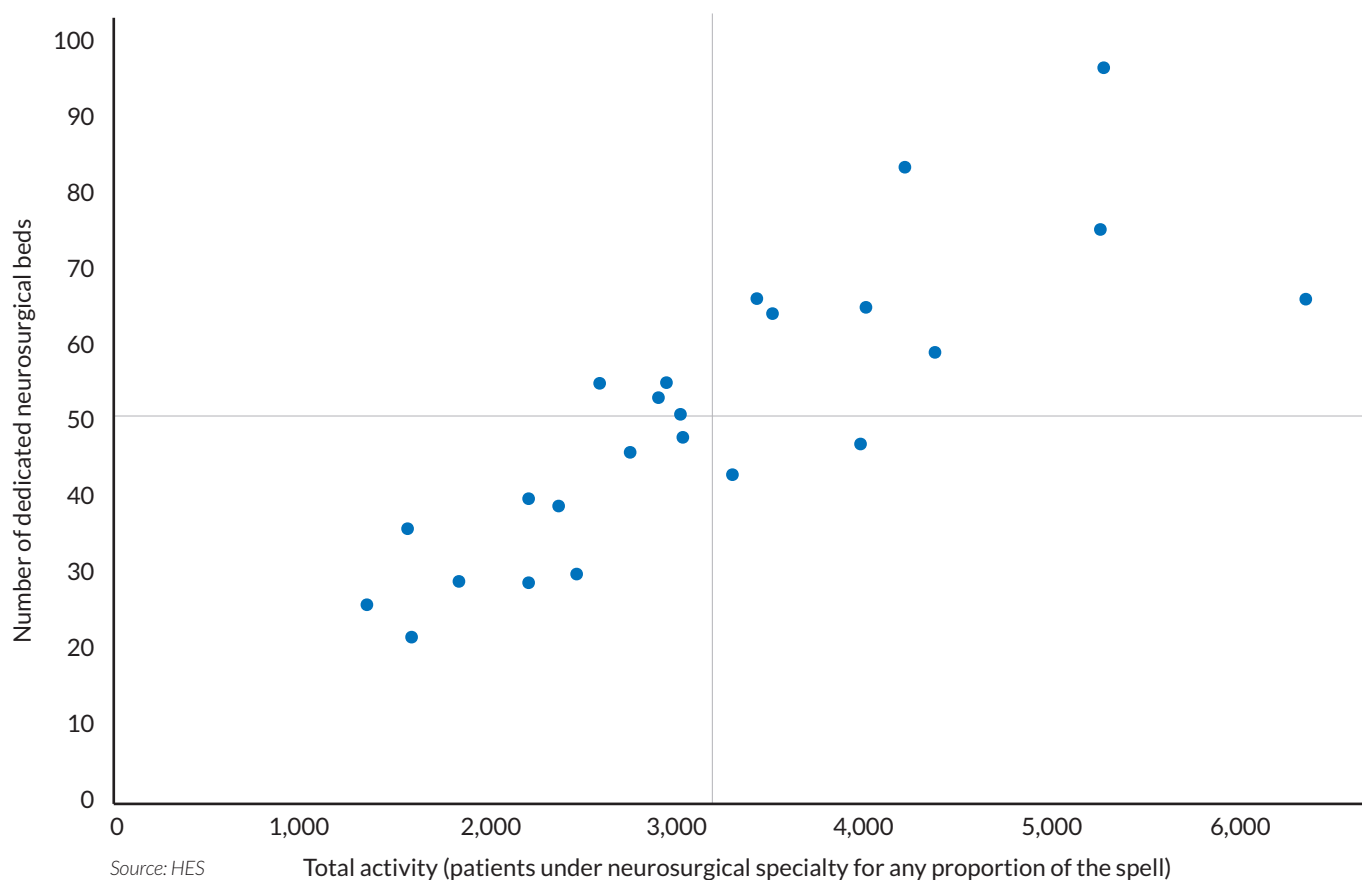
Figure 4: Hospital trusts delivering neurosurgical services in England



List of providers that offer neurosurgery

1. Barking, Havering and Redbridge University Hospitals NHS Trust
2. Barts Health NHS Trust (London)
3. Brighton and Sussex University Hospitals NHS Trust
4. Cambridge University Hospitals NHS Foundation Trust
5. Hull and East Yorkshire Hospitals NHS Trust
6. Imperial College Healthcare NHS Trust (London)
7. King's College Hospital NHS Foundation Trust (London)
8. Lancashire Teaching Hospitals NHS Foundation Trust
9. Leeds Teaching Hospitals NHS Trust
10. North Bristol NHS Trust
11. Nottingham University Hospitals NHS Trust
12. Oxford University Hospitals NHS Foundation Trust
13. Plymouth Hospitals NHS Trust
14. Salford Royal NHS Foundation Trust
15. Sheffield Teaching Hospitals NHS Foundation Trust
16. South Tees Hospitals NHS Foundation Trust
17. St George's University Hospitals NHS Foundation Trust (London)
18. The Newcastle Upon Tyne Hospitals NHS Foundation Trust
19. The Walton Centre NHS Foundation Trust (Liverpool)
20. University Hospitals Birmingham NHS Foundation Trust
21. University Hospitals of North Midlands NHS Trust
22. University Hospitals Coventry and Warwickshire NHS Trust
23. University Hospital Southampton NHS Foundation Trust
24. University College London Hospitals NHS Foundation Trust

Figure 5: Dedicated neurosurgical beds and total admission count, by trust 01 Apr 2014 to 31 Mar 2015



While this general picture indicates that units with higher numbers of beds can admit more patients, the data shown above doesn't differentiate between procedures. Closer inspection reveals that the biggest differences are in elective procedures, where the locations with more beds are able to carry out substantially more elective procedures. By contrast, the variation in numbers of non-elective procedures is far less pronounced, with all trusts carrying out between 200 and 800 non-elective procedures a year (see figure 2 above).

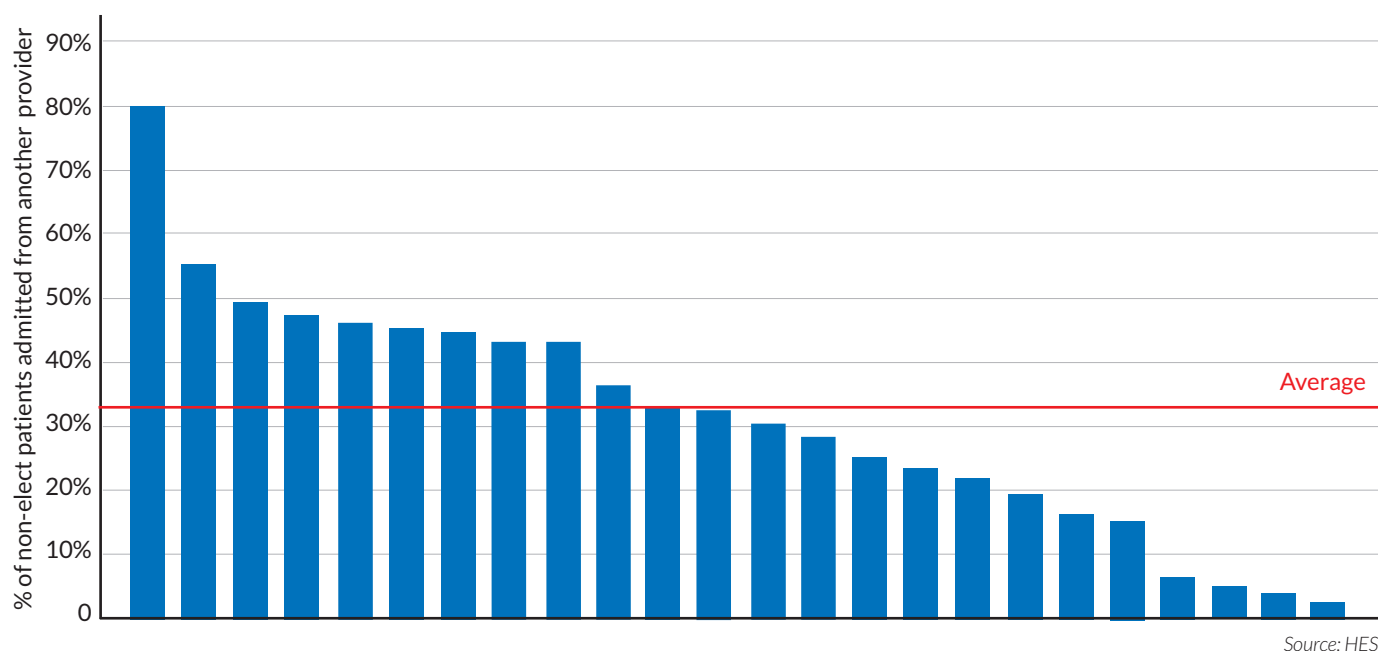
Referrals and discharge

The 24 neurosurgery providers serve as the focal point for referrals from a network of hospitals in the nearby area: 85% of all secondary care hospitals in England are within an hour's drive of the nearest neurosurgical centre.⁴

Nationally, 33% of patients who are admitted for a non-elective cranial neurosurgery procedure were referred from another NHS provider, often following local protocols for referral between trauma units and the major trauma centre. This includes patients who were seen in another provider's emergency department. However, the variation is substantial: at some providers, referrals account for fewer than 5% of non-elective admissions, while in one provider some 80% of non-elective admissions were referrals from other hospitals.

⁴ See National Confidential Enquiry into Patient Outcome and Death (2013) *Managing the Flow? - A review of the care received by patients who were diagnosed with an aneurysmal subarachnoid haemorrhage.* http://www.ncepod.org.uk/2013report2/downloads/ManagingTheFlow_SummaryReport.pdf

Figure 6: Percentage of non-elective cranial procedure spells admitted as a transfer from another provider (including patients referred by another provider's A&E), by trust 01 Apr 2014 to 31 Mar 2015



At the other end of the pathway, more than 90% of patients having elective cranial neurosurgery procedures are discharged to their usual place of residence. However, this is not the case for non-elective admissions, where only 61% of patients are discharged to their usual place of residence – and in some providers, less than half were. Where not discharged home, patients are typically transferred to another NHS hospital to continue their care. This requires the agreement of the receiving hospital and so affects the ability of cranial neurosurgery providers to control the overall length of stay in the neurosurgical unit.

Patient flow in cranial neurosurgery

This variation in procedure volumes – demand and supply – is one of the many aspects of variation in cranial neurosurgery that has been examined as part of the GIRFT process. As in the other clinical specialties under review, the GIRFT programme has also identified potentially significant variation in treatment choices, waiting times and costs.

However, for cranial neurosurgery as a whole, variation is only part of the story. What is arguably more telling are the similarities between trusts. The GIRFT programme has brought into sharp focus some critical issues that affect almost every unit to some degree.

- Large numbers of patients are staying in specialist cranial neurosurgery care for longer than they clinically need to. This is primarily due to a lack of appropriate options for timely discharge, but also because some units admit patients some days before they can offer surgery.
- Providers frequently have difficulties gaining access to sufficient critical care beds – causing major logistical problems when they admit emergency patients.
- Wait time targets are being missed. Two-thirds of trusts do not meet the national 18-week referral to treatment target for admitted patients for all neurosurgery (including non-cranial); eight trusts treat fewer than 60% of patients within 18 weeks of referral.
- While the picture is better for emergency treatment, around 1 in 10 patients nationally do not receive surgery for subarachnoid haemorrhage within the target of 48 hours from diagnosis. The longer the delay in treating such haemorrhages, the greater the risk becomes of severe brain damage or death.
- The cancellation rate is high, with six trusts reporting that procedures were cancelled post-admission in more than 10% of all elective admissions (including non-cranial).

These recurring issues are clearly connected: because providers cannot discharge patients from cranial neurosurgery wards in a timely way, they can't release patients from critical care onto the ward. That means the critical care beds aren't available for the next intake – leading to delays and cancellations.

In two extreme situations, this led to coroners issuing reports to prevent future deaths⁵ relating to incidents where patients were refused admission for emergency cranial neurosurgery because the provider was unable to access a critical care bed for the patient's recovery. These reports have made it clear that providers must not deny emergency surgery simply because a critical care bed is not available – something that cranial neurosurgery providers have accepted and are addressing.

Nonetheless, the underlying problem remains, with huge consequences for patients. For patients with a subarachnoid haemorrhage even a short delay in admission for surgery can be fatal, as can prolonged delays for procedures to remove a malignant tumour. Patients with trigeminal neuralgia must continue living in excruciating pain for longer, and deal with the disappointment and disruption associated with cancellation and delay. For those who remain in hospital longer, rehabilitation may be delayed while risks of secondary infection increase.

The impact on providers is also significant; productivity levels are affected and costs incurred, while repeated failures to complete surgical lists damage the morale of surgical teams.

To those inside the profession, none of this will come as a surprise. These are known issues, that repeatedly occur in most, if not all, cranial neurosurgery providers. That's why the majority of the recommendations in this report focus on addressing different parts of the problem – improving pathways into, through and out of care to provide a better patient experience and a more productive cranial neurosurgery service.

Variation in data about cranial neurosurgery

One area of significant variation that has been identified through the GIRFT process is the way that data about cranial neurosurgery activity is being recorded. There are differences in the ways that different providers record their activity – leading to several areas where the data brought together by the GIRFT team did not reflect what was known to be the case.

The most striking example of this was regarding stereotactic radiosurgery, a type of highly targeted high-dosage radiotherapy that is used to treat small tumours. According to the Hospital Episode Statistics (HES) returns from hospitals, only four trusts undertake this in any significant volumes (i.e. more than 10 times a year) – and one trust far outstrips every other, undertaking 827 procedures a year compared to the next highest, 195.

This simply isn't the case; the procedure is conducted regularly by a majority of the contracted providers. This is illustrated by the far higher number of procedures recorded by more providers in the national radiotherapy dataset (RTDS).⁶

When the GIRFT team examined this in more detail, it became apparent that many trusts recorded stereotactic radiosurgery in HES as an oncology procedure rather than cranial neurosurgery. While this is perhaps understandable, it means that providers may not be building up a true picture of their departmental workload – which may then affect service design, governance, potentially recruitment and other issues.

While it is not so easy to demonstrate, there are also concerns that the involvement of cranial neurosurgery staff in the care of patients admitted under other specialties is not being recorded consistently. For example, a patient with a brain tumour may be admitted to a specialist cancer unit; a patient with multiple injuries following a car crash may be in the trauma unit or have other surgery, while the head injuries are just monitored. The deep-dive visits indicated that different hospitals take different approaches to recording data about such patients, again making it harder to gain a true picture of cranial neurosurgery activity.

The process also identified that:

- there are very few accepted or widely-used outcome measures for cranial neurosurgery; and
- there are several areas where data is available for the whole of neurosurgery, rather than specifically focused on cranial neurosurgery.

A long-term goal of the GIRFT programme is to address these data gaps to enable continuous improvement.

⁵ These are known as 'Regulation 28 reports' as under Regulation 28 of The Coroners (Investigations) Regulations 2013, coroners have a duty to issue a report where they have identified an event or set of circumstances that, if it were to recur, could lead to further deaths.

⁶ Under the standard contract for stereotactic radiosurgery, all procedures must be recorded in RTDS. See D05/S/a Stereotactic Radiosurgery and Stereotactic Radiotherapy (Intracranial) (All Ages) www.england.nhs.uk/commissioning/wp-content/uploads/sites/12/2016/10/b03-master-spec-srs-srt.pdf

Recommendations

As set out above, the recurring theme identified throughout the GIRFT process was that due to a range of problems within the overall patient pathways cranial neurosurgery providers are not able to be as productive as they would like to be. A range of evidence from both the core data and the deep-dive visits demonstrated that pathways are not optimised, and are too easily blocked, with clear impacts on patient care.

While there is no single factor that can change this, the GIRFT team has identified that there are opportunities to improve throughput in cranial neurosurgery, while delivering a better patient experience, at almost every stage of the pathway. This could mean earlier access to vital treatment, less disruption due to delays or cancellations, shorter hospital stays overall and rehabilitation starting sooner after surgery.

Taking any of these opportunities would be beneficial. The cumulative benefit of taking all of them would be greater still.

The majority of recommendations in this report relate to this issue. They are not listed in order of priority, but in terms of the patient journey.

Avoiding unnecessary admissions

Pressure on capacity for cranial neurosurgery beds comes from a range of sources. The nature of many more invasive procedures means inpatient stays are often longer than in other surgical disciplines. The unpredictable pattern of cranial trauma admissions makes it hard to plan with precision.

But 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.

Improving the effectiveness of referral pathways and outpatient services

The majority of cranial neurosurgery activity cannot be delivered in an outpatient setting; the recovery times post-surgery and the need for monitoring make that impossible. However, it seems that this has led to a culture within the speciality where the use of outpatient services has been minimal.

In the year from April 2014 to March 2015, around 2,100 patients were admitted electively to neurosurgery units but did not have a surgical procedure. (This does not include patients who had their procedure cancelled). Of these:

- 1,100 had no procedure recorded;
- 1,000 had only a non-surgical 'procedure' recorded, with most of these being either a CT or MRI scan.⁷

This indicates a thousand patients were admitted, yet only had a scan: something that could often be undertaken in an outpatient setting. In fact, the GIRFT visits indicated that this approach of requiring patients to be admitted for a scan is now less common, yet the use of outpatient services is still limited. For example, 11 of the 24 trusts that provide cranial neurosurgery do not offer any non-consultant outpatient appointments. By contrast, five trusts conduct at least 10% of outpatient appointments without a consultant present, and one does all almost 40%. This variation suggests an opportunity – both to use consultant time more productively and accelerate the overall patient pathway, by increasing the number of appointments conducted with other members of the multidisciplinary team. Aside from scans, various pre-operative checks could be conducted without a consultant needing to be present, as could some post-operative monitoring and radiological review meetings.

In addition to performing more scans within an outpatient setting, outpatient services could be organised more effectively, for example through the use of 'one-stop shops'. Such services would enable relevant diagnostics, such as MRIs and endocrine tests, to be performed within a single appointment. It should also be possible to reduce the number of appointments used for consent and pre-admission clinic activities. This would avoid the need for patients to attend more appointments than necessary; creating both a more efficient service and enhanced patient experience. It would require, however, appropriate staffing by clinical nurse specialists or other allied health professionals.

Related to this, improving information sharing between referring district general hospitals and cranial neurosurgery units would help make pathways more efficient. This is particularly pertinent given the tertiary nature of the speciality, which means cranial neurosurgery units receive referrals from, and provide advice on managing patients to, district general

⁷ Reducing the amount of elective activity which resulted in no procedure provides a financial opportunity, described in the Potential Impact section of this report.

hospitals across a given region. It is wholly conceivable that a unit could, for example, receive 100 referrals a day, admit 2 patients a day, and provide advice on cases they do not admit.

During the GIRFT deep-dive visits, several providers described a common scenario in which patients are referred to them on the basis of a scan conducted at the referring hospital – only for the provider to have to conduct the scan again, because it doesn't have sufficient or timely access to the patient's imaging or other vital information.⁸ This means that the outpatient process can become far longer than necessary; effectively the patient ends up having two discussions with the consultant, with a break in the middle while they wait for a scan. That may be possible on the same day; in other cases, it may require repeat visits.

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 when they see or give an opinion on the patient. In some areas, this will already be in place and delivered by major trauma pathways, while in other cases many trusts already have the capability to transmit and share essential data through electronic referral management systems. Replication of this more widely may not remove all duplication, but it would do so to a large degree; this in turn would shorten the time between a patient being referred to the unit, and then being treated.

In addition, a repeated finding in deep dives was that more modern IT offers tangible opportunities to improve communication between providers and so improve overall effectiveness of cranial neurosurgery delivery. In some areas, use of technology is helping cranial neurosurgery units provide effective advice to district general hospitals, because they can respond faster and in more detail. This in turn can reduce the need for some cranial neurosurgery admissions – benefiting patients and providers. Improved information sharing might include, for example, use of instant messaging, supported by advanced cyber security, for transferring patient notes between units. Improved information sharing in ways like this may also improve clinical governance, offering opportunities to continually improve the quality of patient care.

Recommendation	Actions	Timeline
1. Make electronic referral management tools and related processes available in all cranial neurosurgery providers and referring trusts.	1A: Trusts to implement referral management tools and appropriate technologies for information sharing where not already in place.	6 months from publication date.

Recommendation	Actions	Timeline
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.* <i>*The future GIRFT workstream addressing outpatients may provide further advice on introducing one-stop facilities and other opportunities to optimise outpatient services.</i>	2A: Trusts to develop cranial neurosurgery outpatient facilities, considering the possible tariff-related impacts when doing so, and where possible based on nursing staff or AHP availability.	6 months from publication date.
	2B: NHSI Clinical Productivity workstream to consider workforce implications, and any appropriate response.	For immediate consideration.
	2C: GIRFT Hubs to collect case studies for inclusion in a Good Practice Manual, illustrating how new outpatients' facilities have been implemented.	For continual collection.

⁸ Though the full research has yet to be published, it is understood that the Evaluation of National Treatment and Investigation of Cauda Equina Syndrome (ENTICE) study being run primarily by the Neurology and Neurosurgery Student Interest Group (NANSIG) with the support of the British Neurosurgical Trainee Research Collaborative has found similar issues.

Further, there are opportunities to use technology so that outpatient appointments could take place via phone or video link. Follow-up appointments could be conducted in this way. Investigation results could also be communicated and discussed with the patient like this, often by nurses rather than consultants. Currently, in a large proportion of cases, scan results are communicated by consultants; annually, this could amount to as many as 20,000 consultant appointments, many of which could be undertaken by other members of the cranial neurosurgery team.

These are all ways to free up consultant resource and make the pathway flow more smoothly, as well as reducing unnecessary admissions. This also has benefits to the patient: aside from the fact that few patients wish to stay in hospital when they don't have to, it can also mean additional journeys to the cranial neurosurgery unit are avoided – an important consideration when some patients will have to travel some distance and may not be able to drive due to their condition.

The change needed here is primarily a cultural one, where providers move from a default approach of admitting patients to one where services are offered via outpatients wherever possible. It may then require some reallocation of human resource, but at the same time it should free bed capacity, and consultant capacity.

Recommendation	Actions	Timeline
<p>3. Improve outpatient efficiency through greater use of non-consultant and non face-to-face outpatient appointments.</p>	<p>3A: Trusts to increase use of telephone-based outpatient appointments, and explore better use of other technology to enable non face-to-face appointments.</p>	<p>6 months from publication date.</p>
	<p>3B: GIRFT Hubs to collect case studies for inclusion in a Good Practice Manual, particularly focusing on use of technology.</p>	<p>Manual to be produced within 6 months of report publication date.</p>

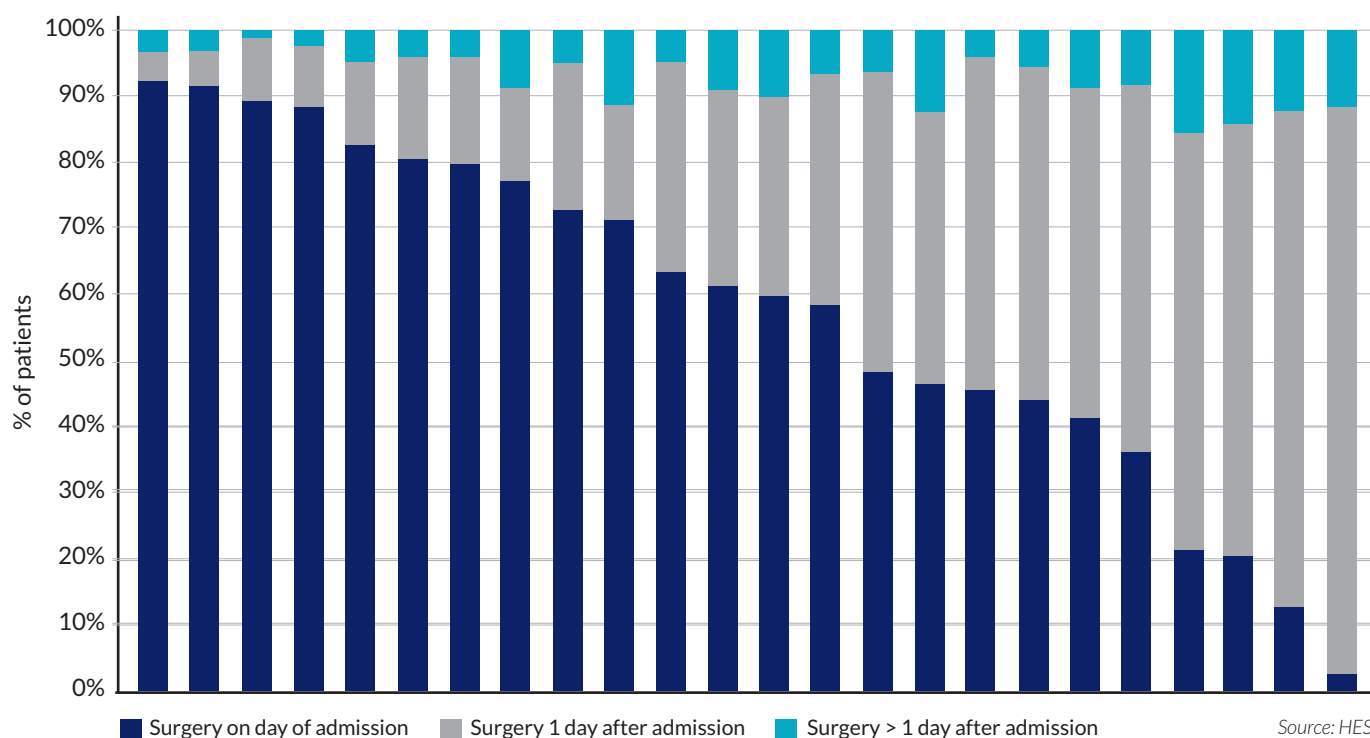
Admitting patients on the day

Another opportunity identified by the GIRFT process to reduce unnecessary bed use is to admit elective patients on the day their procedure is scheduled, rather than in advance.

GIRFT data indicates significant variation here. Nationally, 55% of patients admitted for elective cranial neurosurgery receive that surgery on the day they were admitted. However, two providers carry out over 90% of elective cranial neurosurgery procedures on the day the patient was admitted.

By contrast, others routinely admit patients at least one day before the elective surgery takes place. The most extreme example is a provider where under 5% of patients receive the procedure on the day of admission. In such cases, 95% of patients are in hospital at least one night before the procedure, using up valuable capacity and exposing them to the various risks of being in hospital, such as infection.

Figure 7: Proportion of elective cranial procedures by days from admission to surgery, by trust 01 Apr 2014 to 31 Mar 2015



Clearly, there will always be some cases where patients need to be admitted in advance. There are also undoubtedly sometimes logistical reasons for admitting patients the day before – for example, because they live far enough from the hospital that they would struggle to get there in the morning and no patient ‘hotel’ accommodation is available.

However, in total around 10,000 pre-operative bed days were reported against elective cranial neurosurgery patients – a cost of almost £4m a year.⁹ The vast variation identified, which has no discernible impact on surgical outcomes, supports the view that in many cases there is no clinical reason for admitting patients early. Instead, 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 pre-operative checks are done. As indicated in the previous section, many such checks could be conducted via outpatient services rather than requiring the patient to be admitted.

Again, tools such as electronic referral can also assist, giving the provider the essential information they need about the patient’s medical history rather than needing to complete paperwork the night before.

Some have argued that having patients in hospital in advance makes it more likely that the next day’s surgical lists can proceed on schedule. While that may on occasions be true, emergency admissions can still derail the process, as can the availability of critical care beds. Above all, it’s unnecessary for the patient.

Recommendation	Actions	Timeline
4. Increase day of surgery admission rates.	4A: Trusts to review day of surgery admission rates against benchmarks of 55.4%, 80.2% and 90%, and seek to achieve the highest feasible rate by addressing any unnecessary expectations of early admission, conducting pre-operative checks in outpatients and use of electronic referral.	6 months from publication date.
	4B: NHS Specialised Commissioning to consider use of contractual levers to incentivise day of surgery admission rates, seeking GIRFT input as needed.	For immediate consideration

⁹ This figure is based on 2015/16 reference costs for bed days and the average number of neurosurgery excess bed days. Increasing day of surgery admission provides a financial opportunity, described in the Potential Impact section of this report.

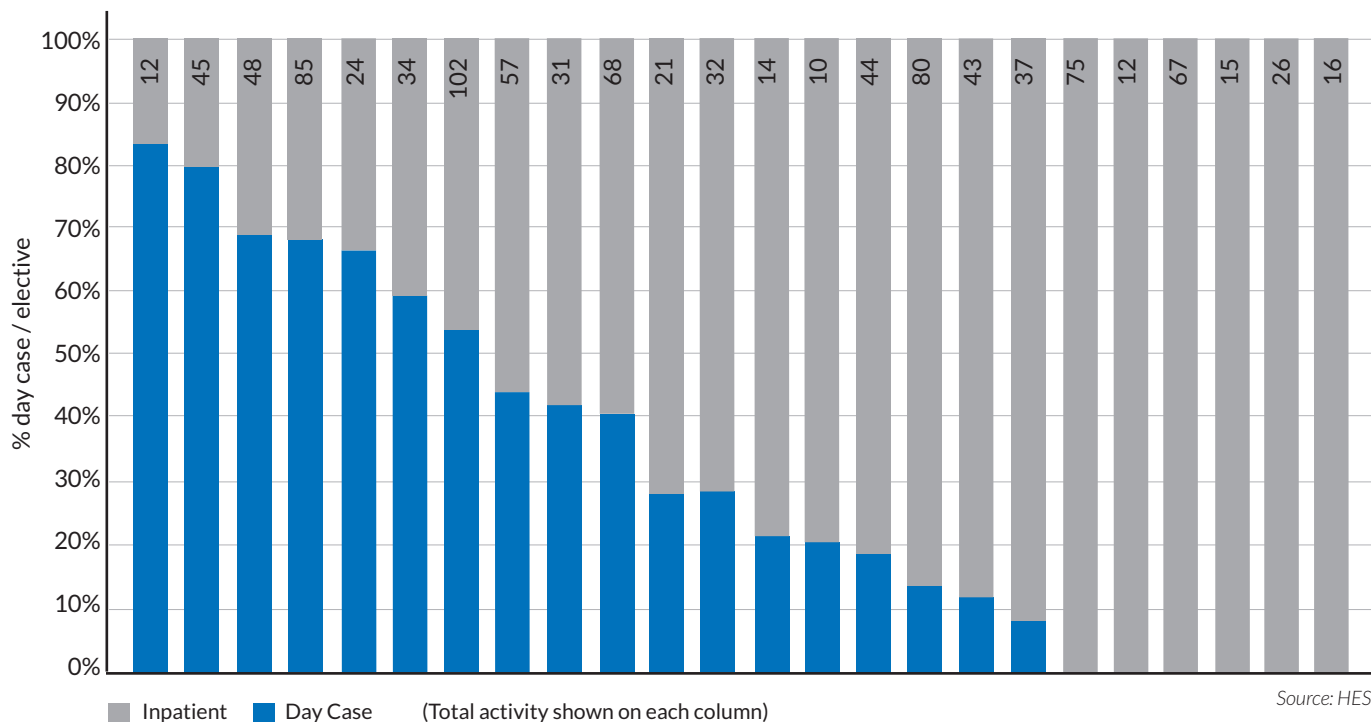
The use of day surgery

Once admitted, many cranial neurosurgery patients will need to stay in hospital for several days following their procedure. However, there are some minimally invasive procedures, such as for percutaneous treatments for trigeminal neuralgia, which don't require prolonged recovery.

Such procedures are very quick – typically lasting less than half an hour – and patients aren't anaesthetised. They generally experience little or no discomfort post-operation; indeed, many instantly feel much better, as the pain has been relieved.

There is therefore a strong case for carrying out this kind of procedure as day surgery, with no hospital stay whatsoever. Already, five trusts perform over 60% of such procedures as a day case. Yet six trusts who offer this procedure don't ever conduct it as a day case.

Figure 8: Proportion of 'trigeminal thermocoagulation' procedures that are performed as a day case, by trust 01 Apr 2014 to 31 Mar 2015



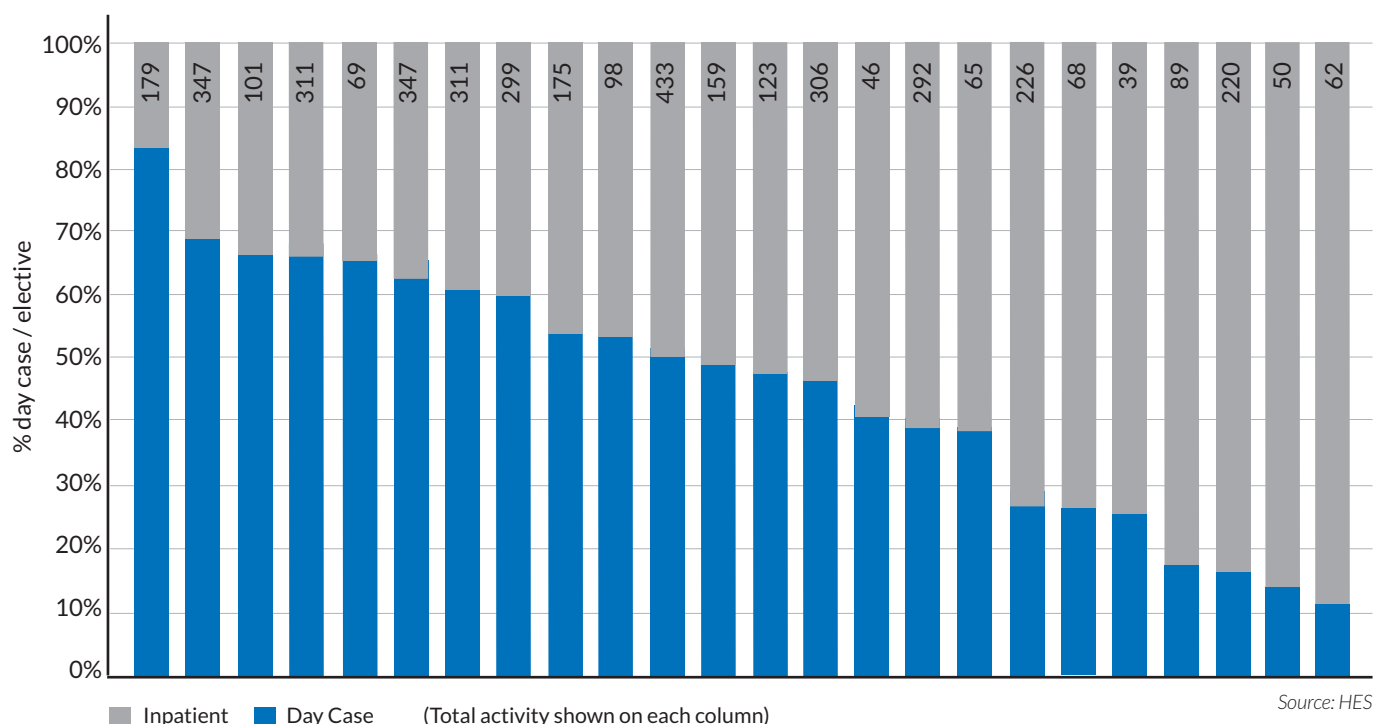
While outcome data around cranial neurosurgery remains limited, there appears to be no difference in the clinical outcomes whether this procedure is offered as day surgery or on an inpatient basis. Those providers that currently conduct the majority of procedures as day surgery have no concerns about it and would be confident to increase the use of day surgery, though recognise that in a minority of cases, there will remain a need for inpatient admission.

Conducting these procedures as day cases benefits patient and provider alike. It means patients can go home post-surgery, giving them more freedom and flexibility in their recovery from surgery. From the provider perspective, it means that beds are freed up and unnecessary costs avoided.

If the principle of using day surgery where possible, rather than short stays, was adopted for more cranial neurosurgery procedures, there are further potential savings. Currently, around 4,500 patients nationwide have a cranial procedure with post-operative length of stay of one day or less. However, there is considerable variation between providers in terms of how many require no overnight stay. In one provider, 84% of short-stay patients are discharged without an overnight stay. At the other end of the spectrum, one provider only discharges 11% of short-stay patients on the day of surgery.

Overall, if all providers achieved day case rates at the best quartile or above for both trigeminal thermocoagulation and other short-stay procedures, this could release significant bed capacity within neurosurgery units.

Figure 9: Proportion of short-stay (<2 days) elective cranial procedures that are performed as a day case, by trust 01 Apr 2014 to 31 Mar 2015



Recommendation	Actions	Timeline
5. Increase the proportion of procedures undertaken in the day case setting, and increase the rate of 'short-stay admissions'.	5A: Trusts to implement an enhanced recovery programme for cranial neurosurgery procedures, as far as practicable.*	Within 6 months of publication date.
	5B: GIRFT Hubs to collect case studies for inclusion in a Good Practice Manual, such as University Hospital Southampton's glioma pathway and the Leeds Teaching Hospitals pathway for pituitary surgery.	Manual to be produced within 6 months of report publication date.
	<i>*The future GIRFT workstream addressing outpatients may provide further advice on introducing one-stop facilities and other opportunities to optimise outpatient services</i>	

Urgent pathways for primary malignant brain cancer

The question of timely admissions should also be considered in the context of some procedures typically seen as non-electives. The most obvious example that emerged from the GIRFT process was around malignant brain tumours such as glioma.

A high-grade glioma is an extremely serious condition and, once diagnosed, surgery to remove the tumour invariably needs to be conducted urgently. Yet the GIRFT visits revealed two very different approaches to achieving this.

Several providers stated that they admit patients diagnosed with high-grade glioma on the point of referral. Once in the hospital, the patients are placed on the non-elective list for emergency surgery – theoretically providing the quickest route to removal.

However, emergency surgery then proves hard to schedule. Glioma patients are invariably pushed down that list when other patients are admitted with more urgent conditions. This in turn means the glioma patients may find themselves in hospital for some days before they are operated on. On average, glioma patients admitted on referral waited three days in hospital before surgery. However, 18% of patients didn't have surgery until six or more days after admission. Physically, their condition is unchanged; mentally, however, they are undergoing the enormous stress of coming to terms with the diagnosis, plus the ups and downs of expecting an operation and then waiting.

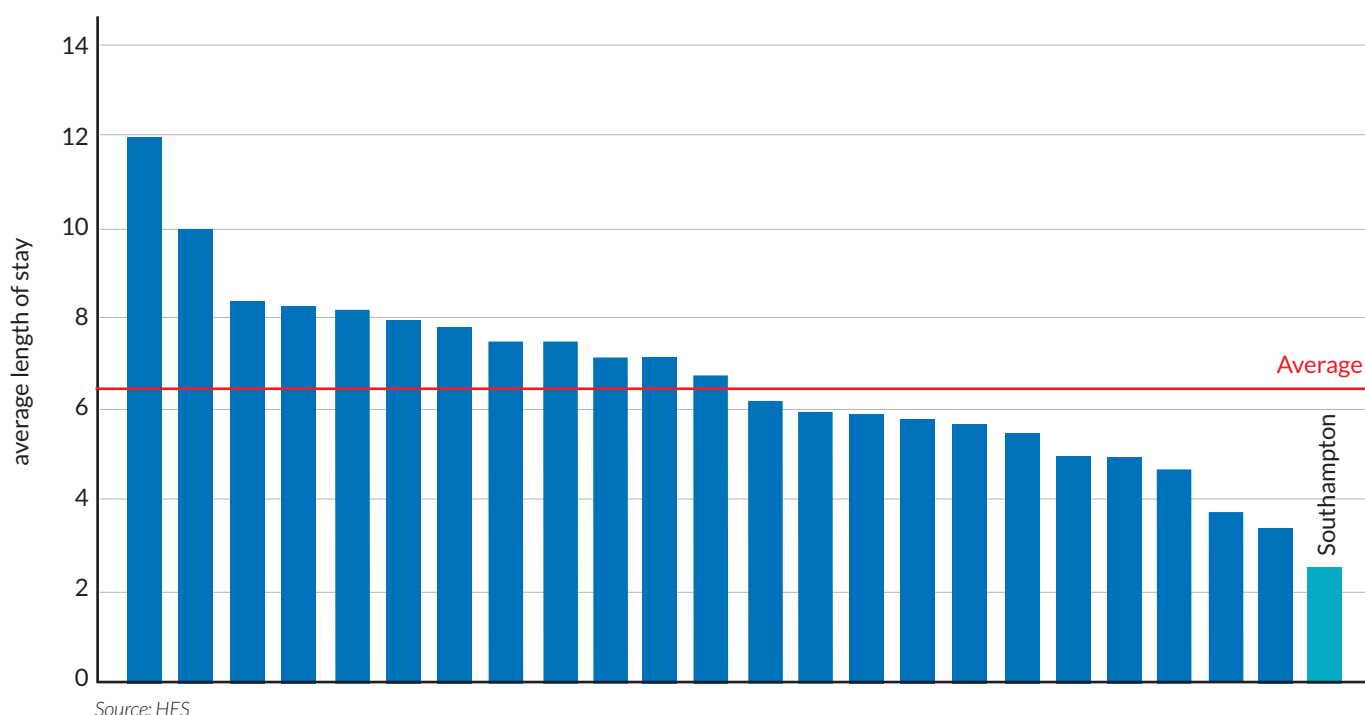
From the resource perspective, meanwhile, this means a cranial neurosurgery bed is being occupied by a patient who – though clearly ill – does not actually need to be there, and who will have to spend a further prolonged period in hospital after the operation.

The solution to this issue is the creation of an urgent elective pathway for glioma. This reflects the finding that, in most cases, patients are currently managed more effectively when admitted via the elective stream. A simple demonstration of this is the fact that the average length of stay for glioma patients admitted non-electively was 13.4 days; for those admitted electively, this drops to just 6.4 days.

During deep-dive visits, some providers described precisely such an urgent elective pathway. The patient is seen by a consultant within a couple of days of referral, then scheduled for surgery three to four days later. The patient benefits from a clear schedule, that the provider can adhere to and that typically results in them receiving surgery as quickly as they would if they had been on the non-elective list. Furthermore, they can prepare for that surgery at home. The experience of the individual glioma patient is better; the bed they aren't using, unnecessarily, can be used by other patients. The costs to the provider are lower too. Overall, such an approach represents a much more organised service, improving efficiency and considerably enhancing patient experience.

Taking this a stage further, University Hospital Southampton has developed a policy of managing glioma surgery for the majority of patients with just a single night in hospital. The policy is designed to enable patients to recover in the comfort of their own home, and also facilitates patient flow through the department. In all likelihood, this policy has made a significant contribution to Southampton's average length of stay for glioma of just over 2 days.

Figure 10: Average length of stay for elective glioma surgery patients, by trust 01 Apr 2014 to 31 Mar 2015 (highlighting University Hospital Southampton)



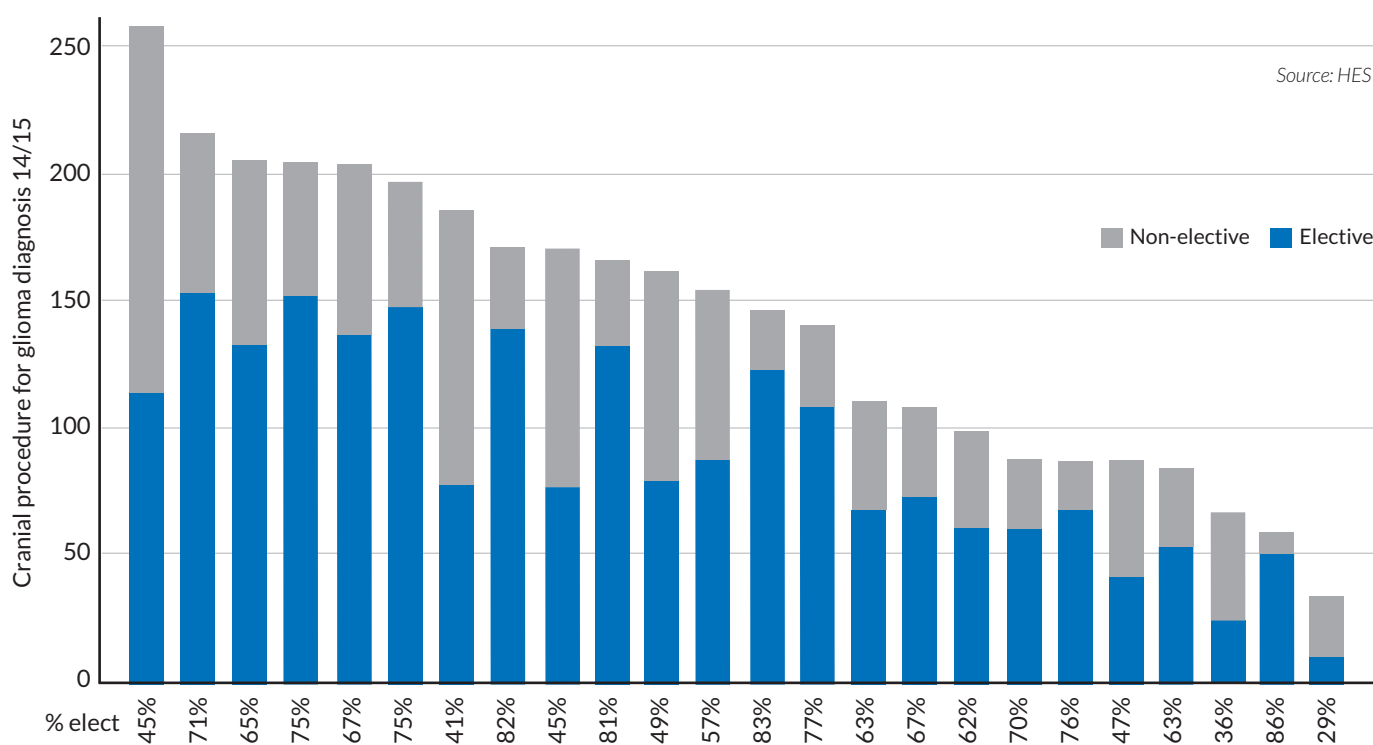
To enable this, the department modified a range of different parts of the treatment process, from pre-admission through to discharge. The pre-admission process is conducted via a specialist neuro-oncology clinic where patients are assessed and any further MRI scans or other preparatory work are conducted. Resources are well-organised to ensure the surgery goes ahead on the planned day, and post-operative MRI slots are booked – prior to admission – to take place early the day after surgery. Back in the ward, the team, including physiotherapists and consultants, then discuss post-operative care and reassess the patient, with the aim of discharge by lunchtime.

Crucially, from the pre-admission clinic onwards, patients are told that the intention will be to keep their stay in hospital as short as possible, and at discharge they are given clear written information including the contact details of key members of the cranial neurosurgery team.

Developed initially for glioma patients, the same approach is now used for patients with a range of tumours and is backed by a policy of day surgery for biopsies. Patients are happy and the impact on the department is positive.

While not all units will be ready to adopt such a policy – at least in the short term – the fundamental shift, of treating a larger number of brain tumours via elective admission, should be feasible everywhere. The data gathered by the GIRFT team indicates 64% of admissions for cranial neurosurgery procedures for patients with malignant brain tumours were elective, but that seven trusts admitted more patients non-electively than electively. If all providers were to achieve the national average percentage or above, this would result in 210 patients being admitted electively rather than non-electively; based on the average length of stay figures cited above, this change could potentially impact positively on bed capacity by saving around 1,470 bed days a year.¹⁰

Figure 11: Volume of total admissions (elective and non-elective) for primary brain malignancy, by trust 01 Apr 2014 to 31 Mar 2015



Recommendation	Actions	Timeline
6. Reduce the proportion of primary malignant brain cancer patients that are admitted via the emergency/non-elective stream.	6A: Unless contraindicated, trusts to provide an urgent care pathway for malignant brain cancer, consisting of elective admission, preferably on the day of surgery, within a week of referral.	Within 6 months of publication date.
	6B: GIRFT to produce guidance on how to replicate the University Hospital Southampton model, also referred to in recommendation 5.	Within 6 months of publication date.

¹⁰ 2015/16 reference costs, neurosurgery excess bed day average.

Enabling procedures to take place on schedule

Every trust, even those who were high performers across a range of GIRFT indicators, recognised that delays and cancellations were an issue in cranial neurosurgery.

To some extent, this is unavoidable in this surgical discipline: cranial neurosurgeons address some of the most urgent and life-threatening conditions in medicine, where there is no room for delay. Patients with such conditions are rightly prioritised, and to accommodate them the provider many need to reorganise resources – not only in terms of beds and theatre slots, but also surgeons and other members of the clinical team.

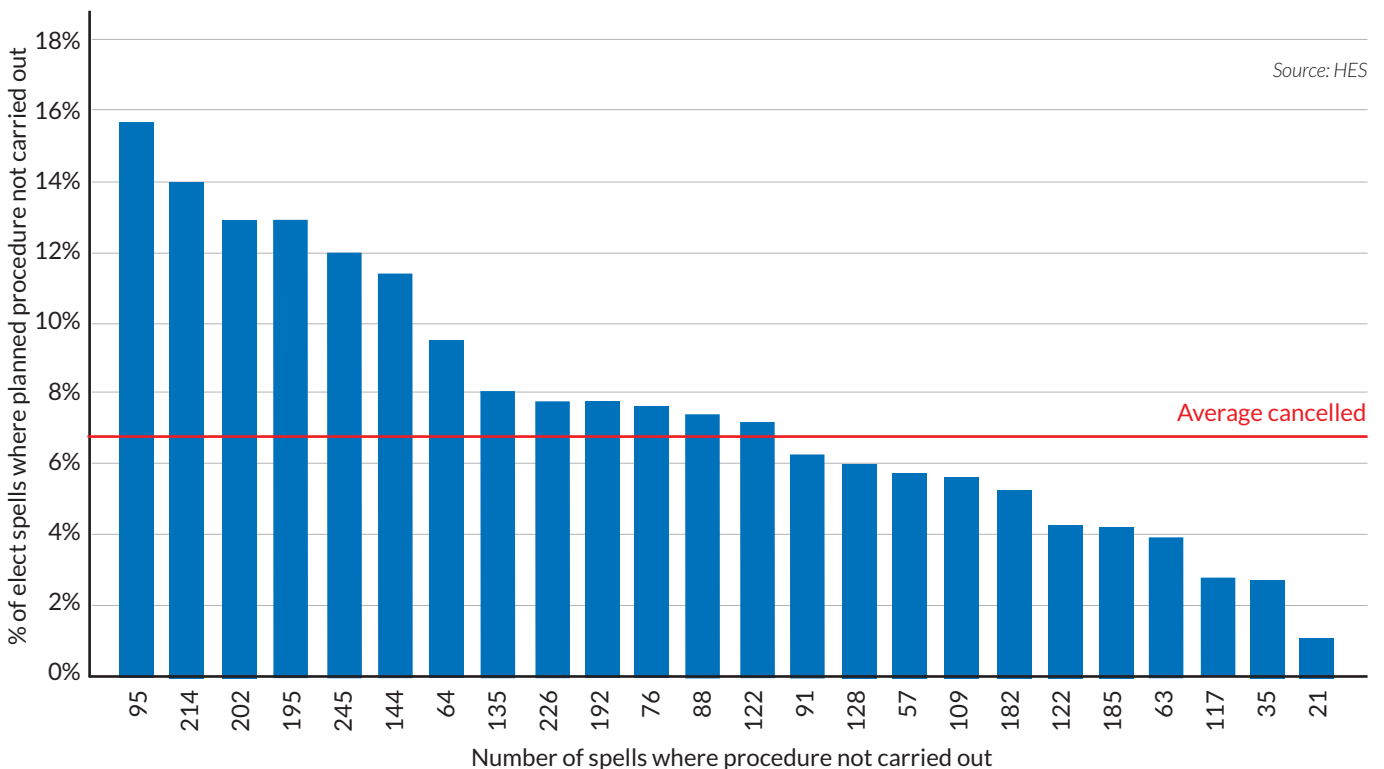
Understanding cancellations

While there will always be occasions where some patients are pushed down the list to accommodate emergencies, it is also clear that the frequency of cancellations varies enormously between trusts.

The available data does not show how many cranial neurosurgery procedures were cancelled prior to admission. However, it is possible to identify where patients were admitted electively for a neurosurgery procedure (cranial and non-cranial) but discharged without this planned procedure taking place. In the period under review, there were 3,100 such instances – equating to around 7% of the total elective activity and a total cost of around £2.9m. Costs aside, this amounted to a very poor patient experience.

Within this figure, however, there was wide variation. At six providers, this occurred in fewer than 5% of cases, but at the other end of the spectrum, six providers discharged patients without the planned procedure taking place in more than 10% of cases. The highest rate was nearly 16%. If all providers achieved the average rate or below, there would be 690 fewer cancellations each year. While the number may not seem striking, the impact of every cancellation on patients, and their families, is significant: aside from the logistical issues of having to make arrangements to re-attend, patients are left with the ongoing stress and anxiety of waiting for major and potentially high-risk surgery. Every cancellation avoided therefore has a substantial impact on patient experience.

Figure 12: Proportion of total neurosurgical elective admissions where the planned procedure did not take place, by trust 01 April 2014 – 31 March 2015



Cancellations and delays occur for various reasons, from the lack of an available operating theatre, to a lack of staff, to a lack of available beds for recovery. All of these issues apply to other surgical disciplines as well as cranial neurosurgery.

Referral to treatment targets

Whatever the reasons, delays and cancellations across the specialty are continuing to have a significant impact on overall performance. In the period from April 2017 to September 2017, only two trusts met the national target of ensuring that 92% of (all) neurosurgery admissions progressed from referral to treatment within 18 weeks; only five trusts met this target for non-admitted patients.

Nationally, 70% of admitted patients and 83% of non-admitted patients were treated within 18 weeks of referral. Some 4,050 admitted patients had waiting times in excess of 18 weeks, as did 6,000 non-admitted patients. Within the 4,050 patients not admitted in 18 weeks, nearly 150 of these waited longer than 52 weeks for treatment.

Given that providing treatment with 18 weeks of referral is a requirement within the NHS Constitution, this appears a systematic issue that needs to be addressed, with sufficient capacity being commissioned to improve the performance across the specialty.

Figure 13: Total neurosurgical 18-week referral to treatment performance, admitted patients, April 17 - September 17

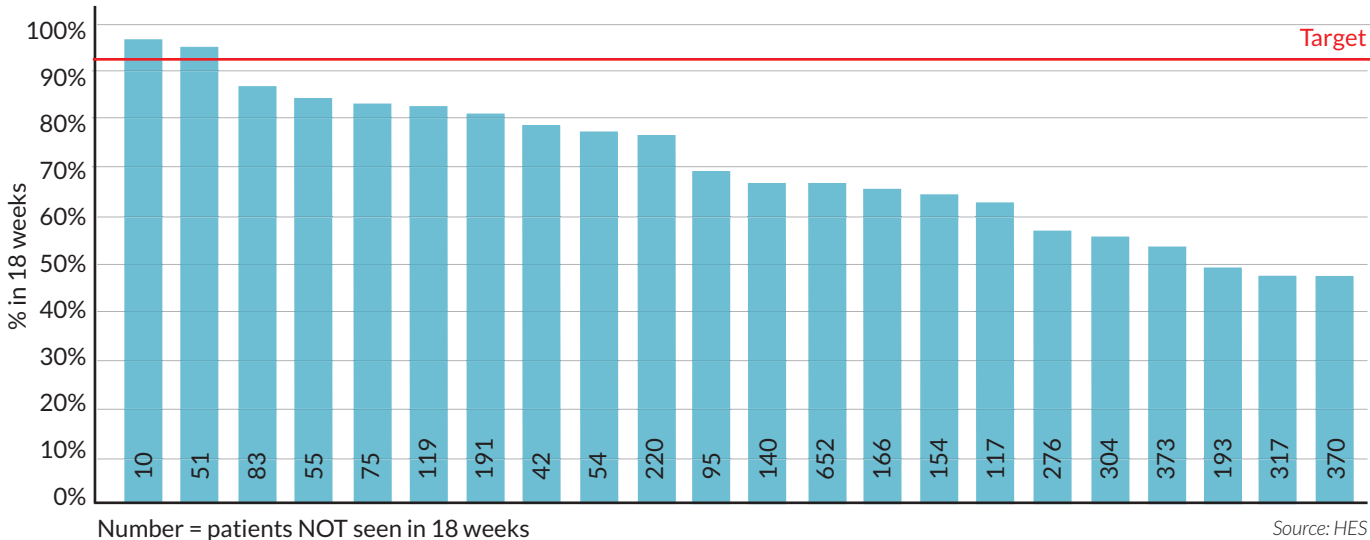
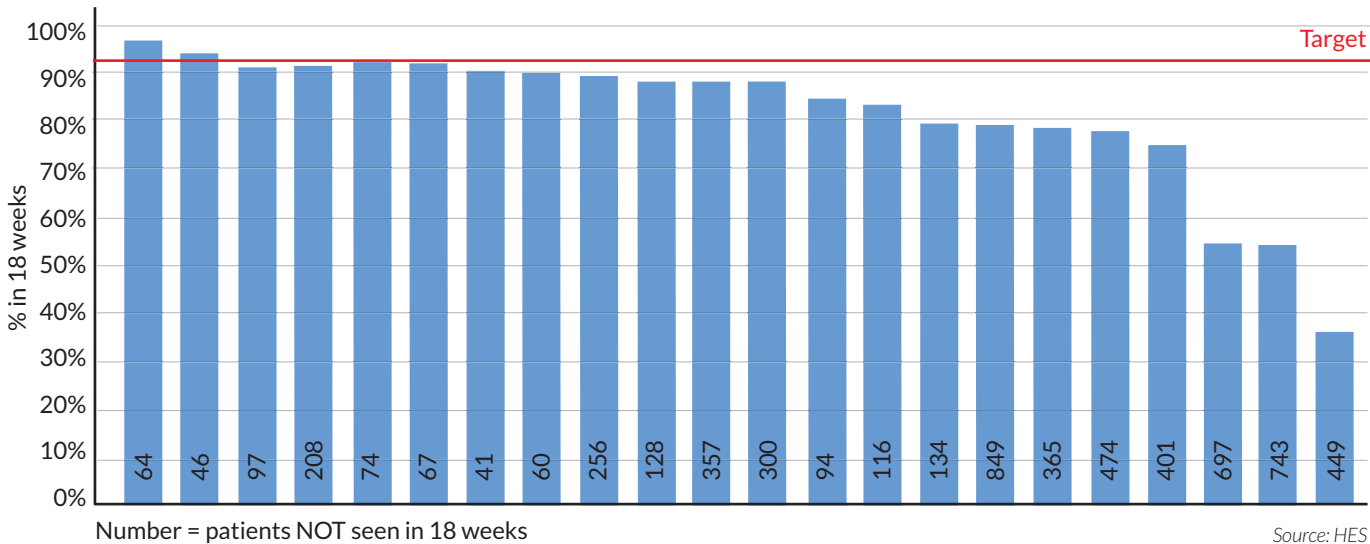


Figure 14: Total neurosurgical 18-week referral to treatment performance, non-admitted patients, April 17 - September 17



With providers of all sizes failing to reach the target, this cannot be purely an issue of resource. Processes, including decisions about when to use critical care, theatre allocation and how discharge is managed, must also be factors – and can be addressed more easily in the short term.

Rethinking theatre usage

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.

As this is a well-known challenge for cranial neurosurgery, NHS service specifications have previously sought to address it. The service specification for neurosurgery stipulates that *“All units require a minimum of two fully resourced dedicated operating theatres and immediate access to an emergency theatre. Those units serving a population of more than two million require a minimum of four theatres.”*¹¹

In practice, however, different providers have addressed the requirement for “immediate access to an emergency theatre” in different ways.

Some providers operate on a system where all theatres have full elective lists for the day but when an emergency occurs, they simply use the first available theatre. In general, even in an emergency, there is a period of preparation before a patient can be operated on. In many cases, this begins either when a consultant accepts a referral from a district general hospital, or when a provider is alerted to a patient being transported to them for emergency surgery. This short window allows the provider to complete a procedure and clear a theatre in advance of the emergency patient’s arrival.

However, there is immediate effect on the rest of the list. The patient that was scheduled to be in that theatre next will be delayed or cancelled. If they needed an urgent procedure, then perhaps they will be rescheduled that day, perhaps for a different theatre – meaning someone else’s operation is cancelled instead and lists for other theatres are also affected.

Theoretically, this approach allows a higher number of procedures to be completed as theatres can be ‘booked’ all day, every day. But it causes recurring practical problems for the staff, who constantly have to juggle the lists across theatres. One emergency procedure causes problems; two or three, and the whole process is disrupted. For patients, the results are upsetting and unsettling. Furthermore, the high levels of cancellations increase costs, particularly where patients have already been admitted for their elective procedure.

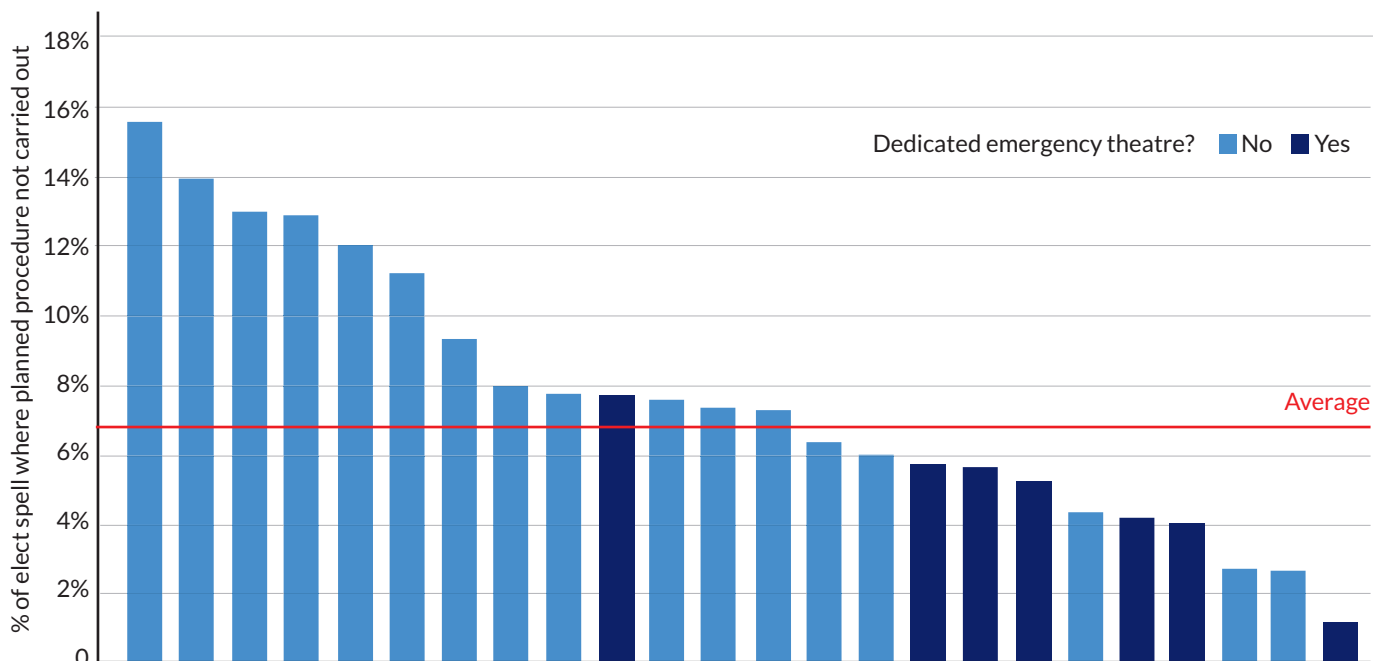
An alternative approach is for the provider to nominate one of its theatres as the designated acute theatre. Importantly, this does not mean it is only used for emergency procedures, but rather that it is kept separate from the longer-term elective planning where procedures are booked perhaps weeks in advance. By separating this theatre, providers make sure it can be used for genuine emergencies, plus acute requirements – for example, where a consultant has identified that a patient needs an operation within days, but where a few hours might not make a difference.

An acute theatre list can be compiled the preceding day, with gaps in the schedule to allow emergency procedures to be undertaken without disrupting the list too greatly. Where the acute list is very small, the theatre can also be used for short elective procedures (i.e. procedures that even if they go ahead, will not cause delays for the emergency patient) or even shared with other surgical disciplines.

This approach makes it easier for providers to accommodate emergency cases without causing administrative headaches and mass rescheduling. This results in higher quality care for acute neurosurgical patients, improved patient experience through reduced cancellations, and minimises disruption to elective activity. The evidence from the GIRFT programme shows that the nine providers with the highest cancellation rates did not have a designated emergency neurosurgery theatre. By contrast, those with a designated emergency neurosurgery theatre typically had fewer cancellations.

¹¹ See D03/S/a NHS Standard Contract For Neurosurgery (Adult); Schedule 2 – The Services – A. Service Specifications www.england.nhs.uk/wp-content/uploads/2013/06/d03-neurosurgery.pdf. Note that this is currently subject to revision.

Figure 15: Proportion of total neurosurgical elective admissions where the planned procedure did not take place, by trust 01 April 2014 – 31 March 2015: highlighting providers with dedicated emergency theatres



Source: HES and questionnaires

It therefore seems that designating one theatre for acute procedures only may be a practical and effective way to address a known problem. While such designation would obviously reduce the total capacity theoretically available for elective surgery, the experiences of those providers who have a designated acute theatre indicate that it does not, in practice, reduce the actual elective surgery throughput and has no negative impact on RTT performance. Further, because it appears to reduce the likelihood of planned procedures not going ahead on schedule, it enhances the experience overall for elective patients.

This is not an argument for additional theatres and the extra investment that entails; instead, it's a means of optimising the use of existing resources.

Recommendation	Actions	Timeline
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 speciality specific staffing.	7A: GIRFT to produce an operational model for inclusion in a Good Practice Manual, detailing how to implement a designated theatre and what changes to staffing and planning may be required.	Within 6 months of report publication date.
	7B: GIRFT Hubs to identify a suitable low-volume site to pilot the model and provide relevant support. GIRFT to refine the model as necessary based on pilot programme.	Within 6 months of completion of 7A.
	7C: All providers to roll out the refined model.	Within 6 months of completion of 7B.

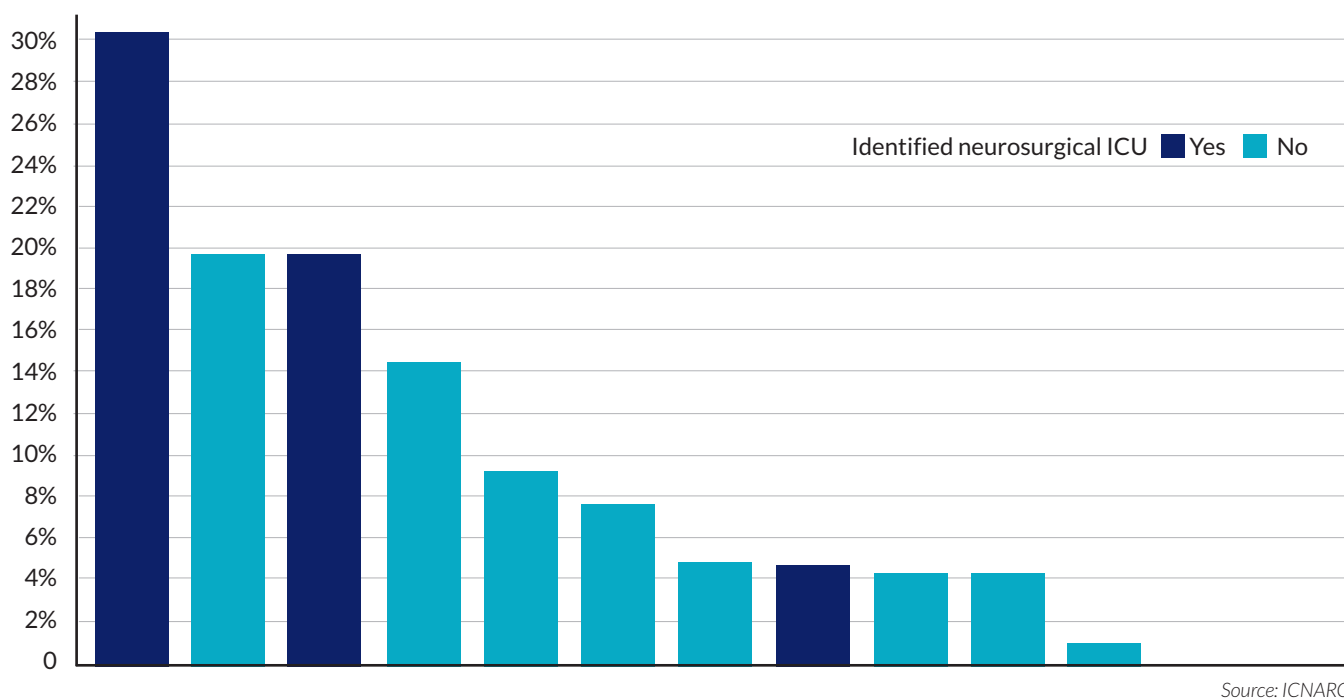
Optimising usage of critical care beds

Aside from theatre spaces, the availability of critical care beds is recognised as a constraint on cranial neurosurgery throughput, with some evidence that a lack of available beds is a direct cause of cancellations.

Many cranial neurosurgery procedures require patients to recover in intensive care, especially if they have been ventilated. Some patients may have to stay in critical care for longer periods, particularly if they have brain swelling. It is therefore vital, for emergency procedures and some electives, that providers are certain that a critical care bed will be available for the patient post-surgery.

Further analysis for the GIRFT programme has helped confirm the view emerging from deep-dive visits: that the issue is not about overall numbers, but about flow of patients. One of the main causes of this lack of availability appears to be slow discharge from critical care to the ward – caused by a lack of available ward beds.

Figure 16: Proportion of trust-wide elective cancellations (all specialties) due to a critical care bed unavailability, by trust 01 Jul 2016 to 30 Sep 2016



Only twelve of the 24 cranial neurosurgery providers returned data to the NHS England Specialised Services Quality Dashboard about cancellations due to critical care bed shortages and two of these recorded 0%. However, in five providers, over 10% of cancellations were attributed to a lack of critical care beds (across all specialties).

It is important to reiterate that these are elective cancellations; emergency admissions must not be refused due to a lack of critical care beds. Nonetheless, with three providers (i.e. a quarter of respondents) attributing 20% of elective cancellations to critical care bed shortages, it is clear that there is a major problem to address.

The GIRFT process examined the number of specialist critical care beds (i.e. available for neurosurgery patients only) at each provider. Four had more than 20 such beds; eight had none and instead rely wholly on the hospital's general intensive care unit (ICU). It is also important to note that some trusts include high-dependency unit (HDU) beds in their calculations while other don't; some trusts have both ICU and HDU, while others have one but not the other.

Perhaps surprisingly, the available data does not provide any strong correlation between higher critical care bed numbers and lower frequency of cancellations. In fact, the most obvious advantage with having more critical care beds, based on the data studied in the GIRFT process, is that it appears to lead to shorter overall stays.

For elective procedures, trusts with between one and nine dedicated critical care beds reported length of stays on average 16.6% shorter than those with no dedicated critical care beds. In trusts with more than ten dedicated critical care beds, the average length of stay was 25.5% shorter. Having more than ten dedicated critical care beds also correlated with shorter stays in the non-elective stream (though fewer than ten had no impact.) Clearly, this is an advantage for patient experience and appears to benefit overall efficiency.

Returning patients to the ward

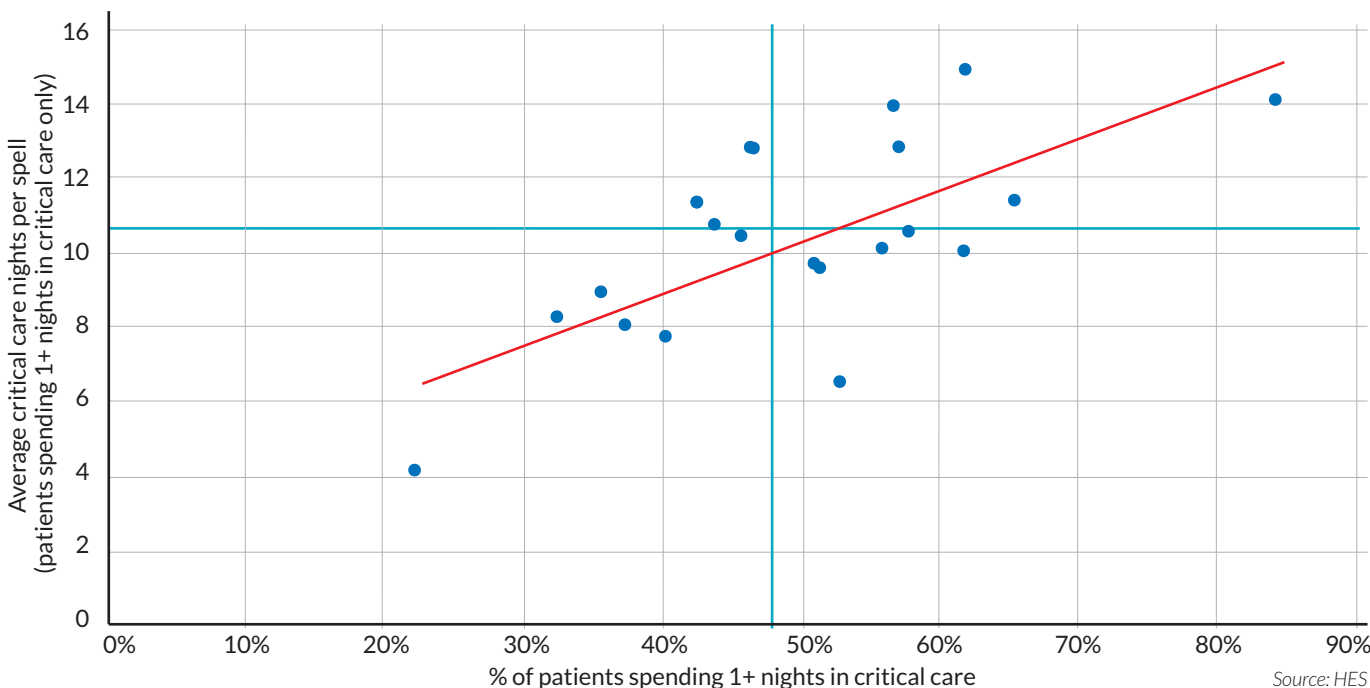
The potential benefits in terms of length of stay notwithstanding, the most important issue relating to critical care appears to be the availability of critical care beds, when required, to enable procedures to take place on time and avoid cancellations. During the GIRFT process, and in particular the deep-dive visits, it became clear that one of the factors that most affects availability of critical care beds is the availability of ward beds – so that patients can be moved out of critical care and back on to a normal ward.

In some trusts, just 6% of inpatient bed days are spent in critical care for patients who have a procedure for cranial trauma. In others, it's over 37%. While some of this will reflect the nature of procedures undertaken and access to rehabilitation facilities, it also indicates a difference in approach. For example, just under half (47%) of all patients who have a procedure for a cranial trauma spent at least one night in critical care; however, at one provider the figure was 84%, while at another it was 23%.

There was also a vast difference in the length of stay in critical care, with three providers on average keeping patients in critical care for an average of more than 14 nights (compared to a national average of 10.6 nights in critical care in these circumstances).

The cost impact of this is considerable: 2015/16 reference costs report an average cost of £1,328 per day for neurosurgery critical care. By contrast, an excess bed day in a neurosurgery ward costs £388 as reported by reference costs.¹²

Figure 17: Patients undergoing cranial procedure for cranial trauma spending 1+ nights in critical care, April 2014 to March 2015

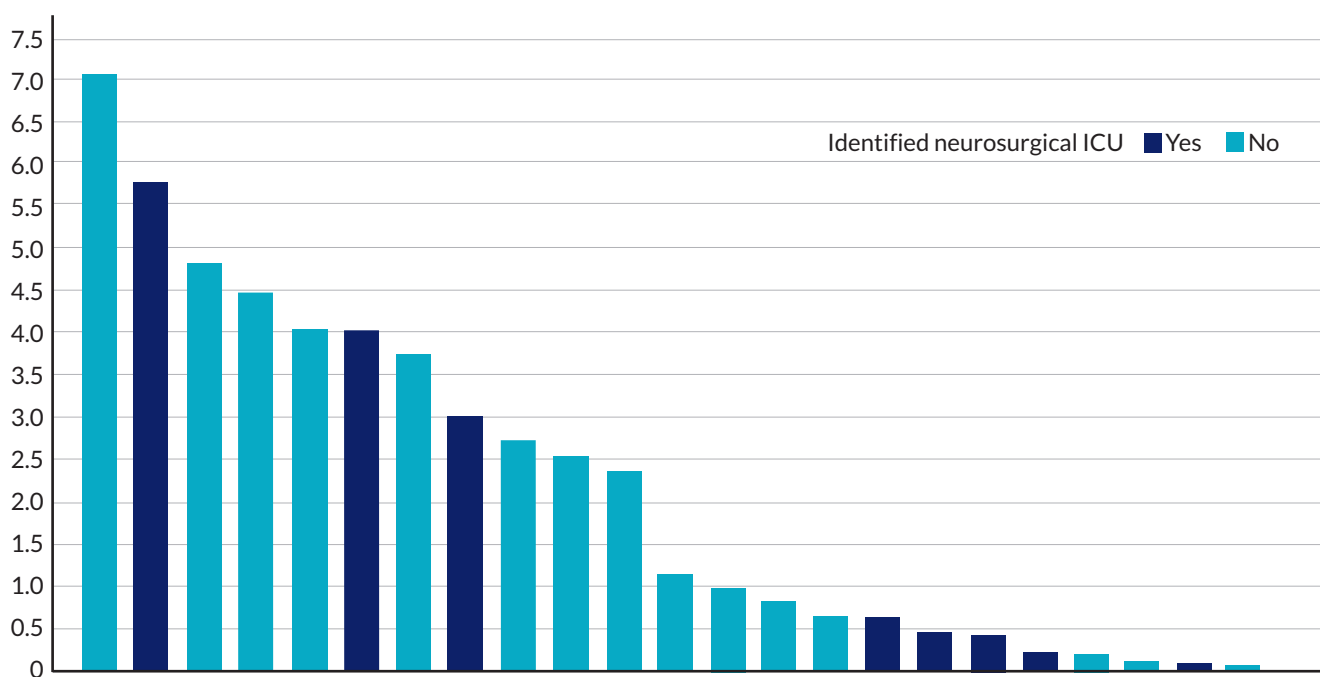


¹² Reducing average critical care bed usage per patient provides a financial opportunity, described in the Potential Impact section.

One partial explanation for the variation in critical care stay was given during GIRFT visits. Some providers indicated that they had invested in training ward staff to a higher level so that they could provide some of the additional monitoring that patients would receive in critical care. Clearly, this delivers valuable cost savings, but more importantly it frees up critical care beds for the next intake.

But this was not the only reason given for prolonged stay in critical care post-surgery. One of the most frustrating findings from the GIRFT process was that patients frequently remained in critical care longer than was clinically necessary simply because there was no ward bed available. Figure 18 below demonstrates the scale of this problem. Within trusts, up to 7% of critical care beds were occupied by neurosurgery patients for more than 24 hours after the decision to discharge from the intensive care units. Trusts also tended to be closer to this 7% figure than at the lower end of the scale, suggesting the problem was present within most trusts – a view supported by feedback in the deep-dive visits.

Figure 18: Proportion of critical care beds occupied by neurosurgery patients for more than 24 hours after the decision to discharge from Intensive Care Unit (ICU), by trust 01 Apr 2016 to 30 Jun 2016



Source: ICNARC

Aside from the cost implication to providers, these unnecessarily prolonged stays in critical care risk delaying surgery for other patients, whose operations can't proceed because there is no critical care bed available for them post-surgery. This cycle then contributes to failures to meet referral to treatment time targets overall.

The data indicates that providers with their own dedicated critical care beds are less likely to leave patients in critical care after a decision has been made to discharge them. But the issue is ultimately linked to the availability of ordinary ward beds, for patients to be moved into once they no longer need critical care. It may be the case that providers with their own critical care beds have a greater control of overall capacity. However, in this context of freeing up ward beds, the earlier recommendations on avoiding early admissions and unnecessary admissions are crucial; they reduce the pressure on ward beds, so can help allow patients out of critical care at the right time. In turn, that means the next set of procedures requiring recovery in critical care can take place.

The other key factor here is around enabling timely discharge from the wards – which is discussed in a later section.

Recommendation	Actions	Timeline
8. Improve patient flow between critical care and wards.* <i>*The future GIRFT workstream on intensive and critical care may provide further guidance on how to optimise the use of critical care.</i>	8A: GIRFT to develop a model pathway for critical care to improve bed usage and patient flow.	Within 6 months of report publication.
	8B: GIRFT Hubs to support providers to adopt this pathway and take other steps to improve patient flow.	Within 6 months of completion of 8B.

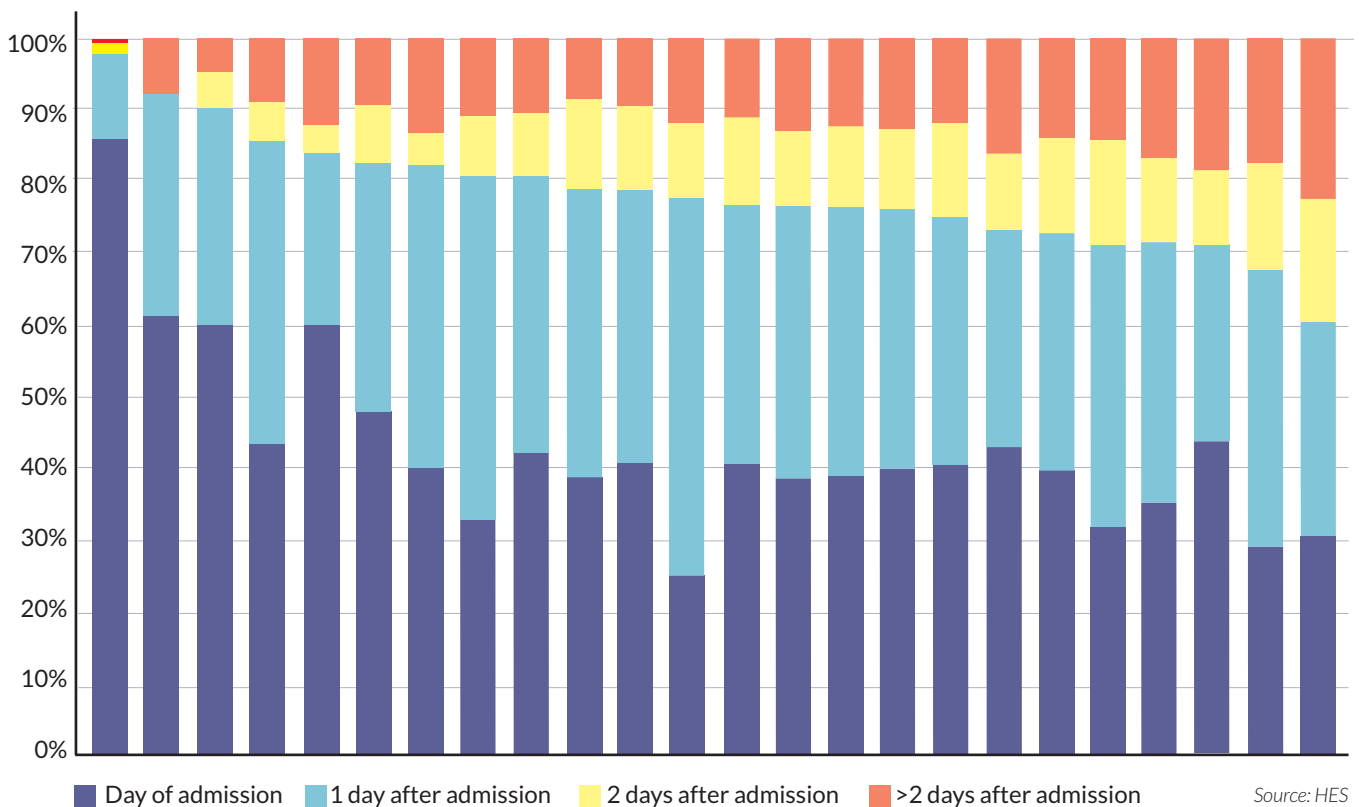
Optimising resources to provide time-critical procedures promptly

One of the most time-critical procedures undertaken by cranial neurosurgeons is the treatment of subarachnoid haemorrhages, where bleeding from a ruptured cerebral aneurysm can cause rapid and extensive brain damage. Surgery or interventional treatment is provided to prevent a second bleed or, in cases where an unruptured aneurysm has been detected, as a preventative measure.

The mortality rate from subarachnoid haemorrhage is about 30% within 24 hours. In 2013, the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) recommended that all bleeding cerebral aneurysms should be treated within 48 hours of diagnosis. Current data recording processes do not allow this to be measured precisely: providers record the day of admission rather than the timing of the bleed. As a proxy for the 48-hour target, the GIRFT team examined whether surgery was performed within two days of admission.

As can be seen, while the best performer undertook treatment on the day of admission in 85% of cases, it still didn't complete surgery on all patients within two days of admission. A third of providers took at least two days in more than 10% of cases.

Figure 19: Days from admission to surgery for all patients admitted with a subarachnoid haemorrhage, by trust 01 Apr 2014 to 31 Mar 2015



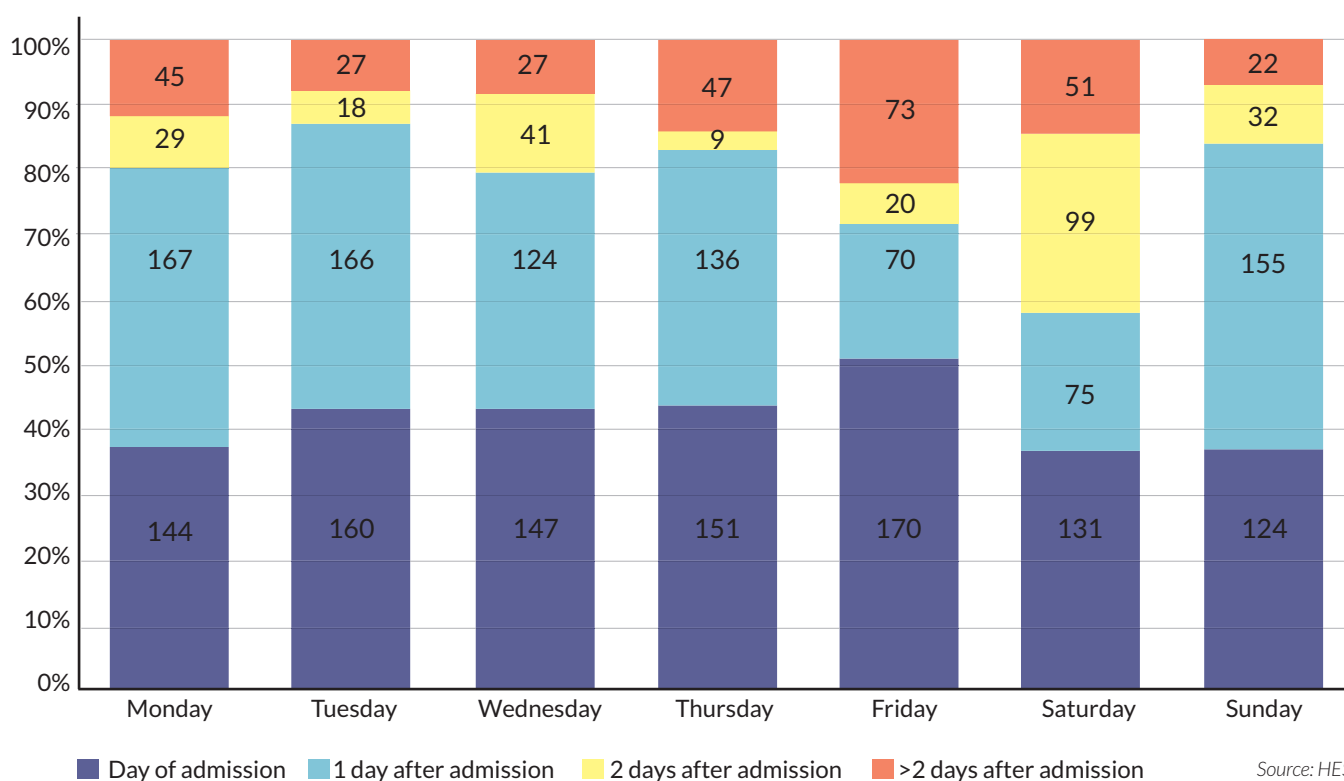
Source: HES

The GIRFT process has not yet specifically examined reasons for delay in subarachnoid haemorrhage treatment, but it seems reasonable to suggest that the issues considered in previous sections – lack of available theatres and lack of beds – could play a role. In other cases, the patient’s condition may be such that surgery is not possible.

One factor that appears to exercise a disproportionate influence on whether a patient receives subarachnoid haemorrhage surgery within two days is the day of the week that they were admitted.

The percentage of patients having surgery within two days of admission fell to 74% for those admitted on a Friday and 58% for those admitted on a Saturday – compared to an average of 83% across other days of the week.

Figure 20: Days from admission to surgery for all patients admitted with a subarachnoid haemorrhage, by day of week, 01 Apr 2014 to 31 Mar 2015



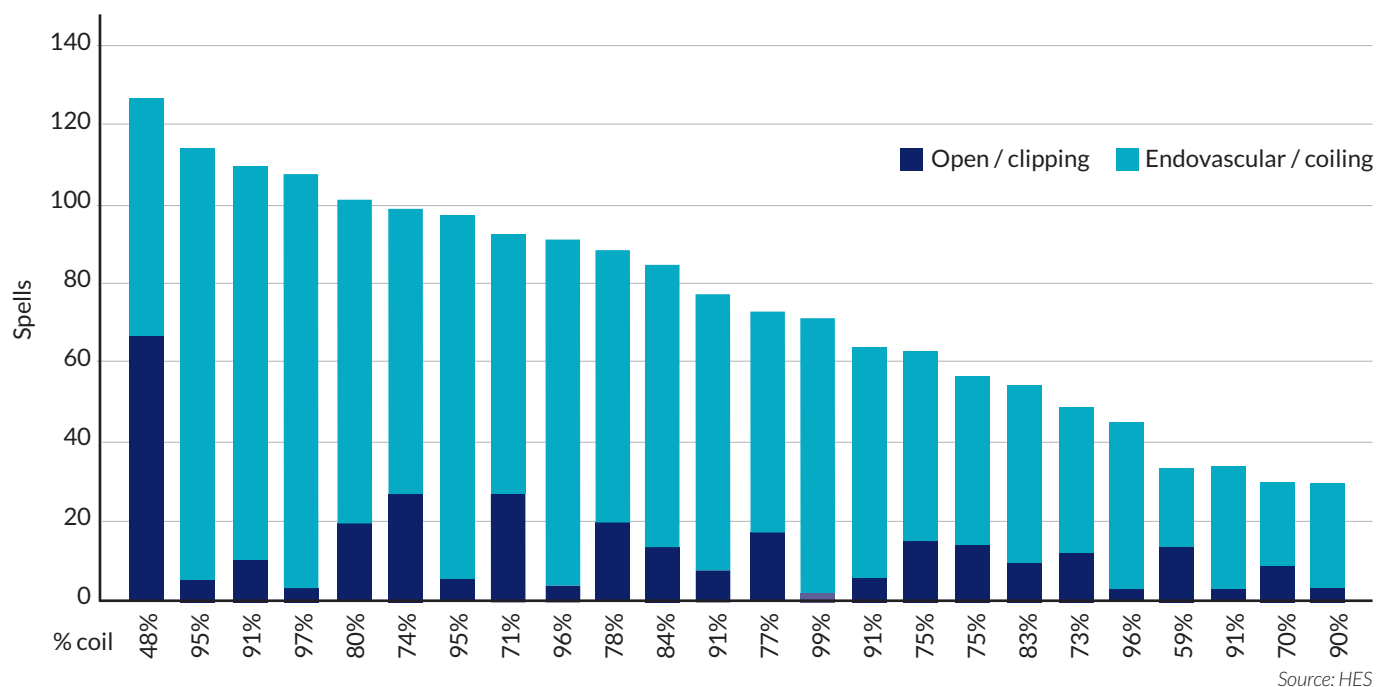
In general, the impact of this is most apparent in providers that struggle to conduct surgery within two days of admission on any day; their performance drops further. Those that typically do conduct surgery within two days (or even one day) of admission are more likely to retain that level over the weekend.

Choosing the best surgical method for the patient

There are two accepted methods for treating cerebral aneurysms: open surgery, also known as ‘clipping’, and endovascular surgery, known as ‘coiling’. Coiling is an interventional radiology procedure that is far less invasive than clipping – meaning recovery is often faster, as evidenced by the shorter average length of stay for coiling procedures: in 2014/15, this was 18.3 days, compared to 28.8 days for clipping procedures.

In the period studied, 82% of cerebral aneurysm surgery was by coiling, and 15 providers performed endovascular repair in more than 80% of cases. Half of the 24 providers performed fewer than ten open repairs in the year, with six of these trusts conducting fewer than five. By contrast, the five trusts that conducted the most open repairs carried out more than the other 19 put together.

Figure 21: Admissions for clipping and endovascular coiling treatment of aneurysms in patients admitted with subarachnoid haemorrhage, by trust 01 Apr 2014 to 31 Mar 2015



However, from a clinical perspective, the two are not wholly interchangeable. For example, even though recovery times for coiling are shorter, there are sometimes clinical reasons why the more invasive procedure, clipping, is the better option.

The considerable variation in the use of the two methods raises the concern that different providers are using different criteria to determine procedural modality. Two possible issues have been identified:

- that some providers are making the decision on the basis of surgical preference and experience;
- that the decision is being influenced by the availability (or lack of availability) of appropriately skilled staff.

The rise in use of endovascular treatment has meant that many consultants have comparatively little experience in open surgery to treat subarachnoid haemorrhage. If surgeons on call find themselves in this position, and the patient would be better served by an open procedure, they essentially have three options. They can undertake open surgery, which they may have only done rarely; they can seek to transfer the patient to another provider, with greater experience in clipping; or they can opt for endovascular repair, even though this may be clinically less desirable.

Endovascular treatment meanwhile can only be conducted when interventional radiologists are available. It is recognised that nationally there is a shortage of qualified interventional radiologists, and workforce strategies are seeking to address this. However, the demand for interventional radiologists is set to rise, to support stroke treatment, and this may impact on the availability of interventional radiologists for cranial neurosurgery.

Some cranial neurosurgery providers have struggled to provide an endovascular service because they don't have sufficient expertise available; instead, they have had to refer patients in need of endovascular repair to the nearest available provider. Any referral to another location risks a longer journey for the patient, at a time when every hour could be critical.

Some providers also indicated that they particularly struggle to have adequate interventional radiology cover at weekends – which may help explain the impact of Friday or Saturday admission on the numbers of patients receiving subarachnoid haemorrhage surgery within two days.

In vital, potentially life-saving surgery such as the treatment of cerebral aneurysms, the procedural decision must be made purely on a clinical basis: which method would offer the best chances of a positive outcome for the patient? Does a decision to refer a patient needing clipping to a more experienced surgeon at another provider result in the two-day being exceeded?

If, and only if, there is no clinical advantage of open over endovascular surgery, then the default should be the latter, which offers faster recovery times.

Recommendation	Actions	Timeline
9. Improve time to procedure to the 48-hour standard for emergency subarachnoid haemorrhage as per NCEPOD recommendations.* <i>*Treating emergency subarachnoid haemorrhage within 48 hours would align with standard 6 of the Seven Day Services Clinical Standards, which states that inpatients must have timely 24-hour access, seven days a week, to key consultant-directed interventions.¹³</i>	9A: GIRFT and the Society of British Neurological Surgeons (SBNS) to work together to improve the quality of data relating to time to procedure for emergency subarachnoid haemorrhage.	For immediate action.
	9B: Drawing on the data gathered, GIRFT and SBNS to work together to define appropriate pathways that will enable all such procedures to take place within 48 hours.	Within 6 months of publication of the report.

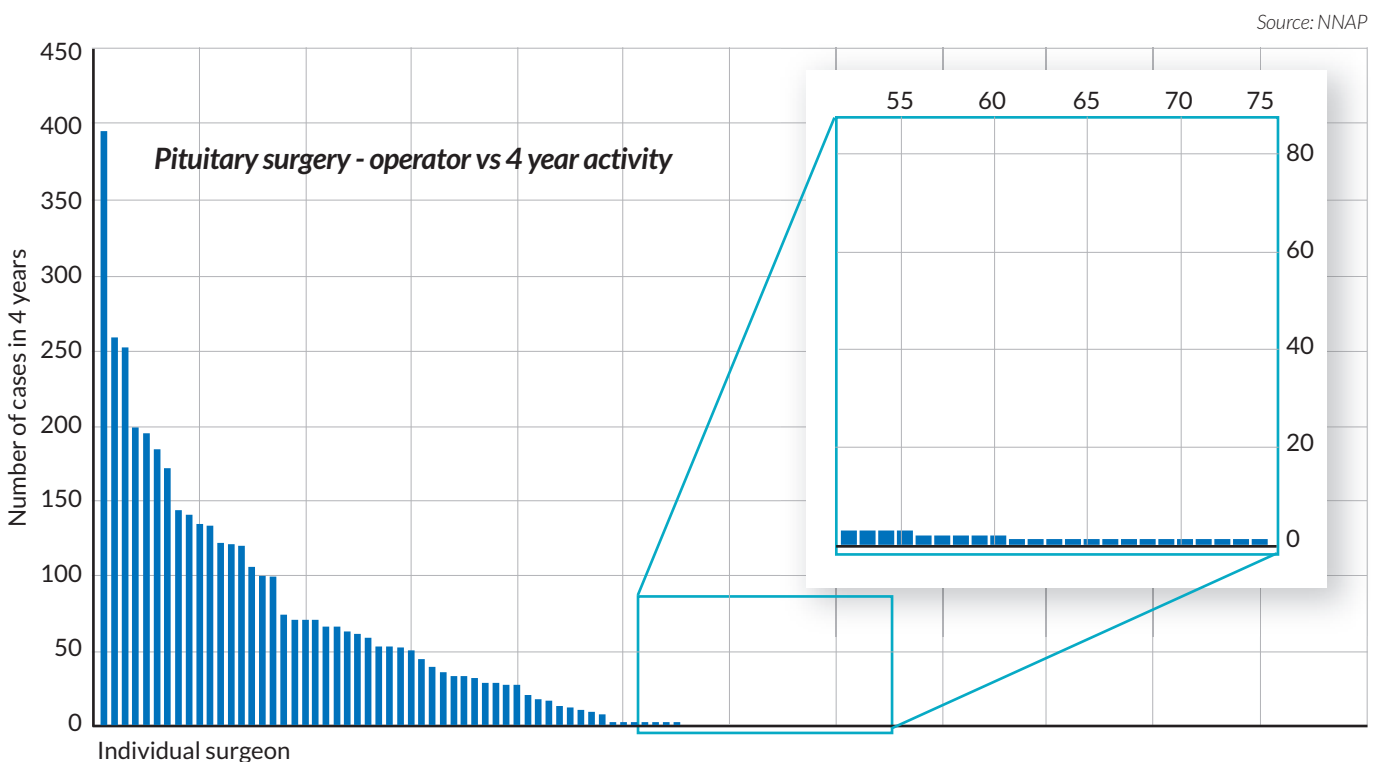
Focusing on surgeons' experience

Cranial neurosurgery covers a vast range of procedures, some of which are required only rarely. For example, there are many types of brain tumour – benign and malignant, some (relatively) common and some extremely rare; removal of tumours in different areas of the brain brings different risks.

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.

For example, between 2013 and 2017, 107 surgeons carried out 4,232 pituitary surgery procedures¹⁴ in England. As figure 22 below shows, over this period, 18 surgeons conducted more than 100 procedures; over half conducted fewer than ten and 45 surgeons were recorded as carrying out only one. While some of this may be a result of coding errors, of shared operations or emergency surgery where there was no other option, the data strongly indicates that a large number of surgeons conducted procedures in which they had very little recent experience.

Figure 22: Pituitary surgery activity count by surgeon 2013-2017 (NNAP data)



¹³ See NHS (2017) Seven Day Services Clinical Standards. www.england.nhs.uk/wp-content/uploads/2017/09/seven-day-service-clinical-standards-september-2017.pdf

¹⁴ This number of procedures is based on the 11 main codes used to record pituitary surgery in the NNAP.

Across all surgical disciplines, it is widely accepted that higher activity levels result in better patient outcomes. However, this has historically been hard to quantify; what is a suitable activity level, and how much better are the outcomes?

GIRFT has initiated work to examine this in detail and this will be published at a later date. While not prejudging the outcome of this research, the impact of recommendations such as minimum volume requirements must be considered. In the interim, pragmatic steps can be taken to increase the experience surgeons have of complex procedures. These include having two surgeons operating, with the second surgeon assisting the consultant leading the operation. This happens relatively regularly in some cranial neurosurgery on children; it would seem logical to extend this practice to different procedural areas, allowing surgeons to develop knowledge by assisting on a minimum number of procedures before they conduct them alone. As highlighted in the GIRFT report on General Surgery, having two surgeons involved can actually accelerate the procedure time – meaning the patient spends less time under anaesthetic.

Recommendation	Actions	Timeline
10. Assess the evidence base on low-volume operating across surgical specialties, and consider policy development from resulting insight.	10A. GIRFT to commission research and discuss outcomes with relevant stakeholders	To be commissioned within 3 months.

Considering a regional model for rare conditions and procedures

The argument for minimum levels of experience in some areas of cranial neurosurgery also applies to the small number of extremely rare conditions, such as rare tumours (e.g. chordoma). Because these are so rare, it is unlikely that many surgeons nationally will acquire a desirable level of current experience. In the case of these extremely rare conditions, patients and providers alike may be better served by moving to a regional model, where specific procedures are delivered at a smaller number of higher-volume centres. As well as having the core surgical expertise, these centres would also be able to invest in the necessary resources and wider clinical and care experience to deal with the rarest conditions.

For example, surgery on functioning pituitary tumours requires interventional radiology expertise and knowledge of endocrinology; this combination, along the surgical skill and experience, is likely to be found in fewer centres. To offer the best chance of a successful outcome, patients requiring such surgery should be referred to hospitals that offer that specialist combination. The referring surgeon could seek to assist in the procedure to help build his or her experience.

It is also possible that this may also provide the best means of offering clipping/open repair for subarachnoid haemorrhage, focusing resources on a handful of centres and small subset of surgeons who then acquire greater experience in this highly complex and high-risk procedure.

Such a move would require changes to referral processes between cranial neurosurgery providers. These need to be developed mutually, and resources reallocated appropriately, so that the supraregional centre remains able to conduct core procedures – such as more common tumour removal – in sufficient volumes, as well as taking on the specialist role. This is not an argument for a move to a more networked model overall, but a targeted shift to provide better outcomes to a small proportion of procedures.

Recommendation	Actions	Timeline
11. Provide treatment for extremely rare conditions, such as rare tumours (for example, chordoma) within a small number of high-volume centres.	11A. NHSE Specialised Commissioning to consider commissioning certain low volume procedures defined by the Specialty Society (SBNS) as a Highly Specialised Service through a more limited number of centres. <i>*This would feed into existing peer review by NHS England.</i>	To be agreed with NHSE Specialised Commissioning

Focusing on discharge

As indicated throughout this report, one of the key constraints on cranial neurosurgery throughput is a lack of available beds. Providers repeatedly indicated during GIRFT visits that a major reason for this is that they struggle to discharge patients on time. Some clinicians suggested that as many as 20% of patients may experience delay in being transferred out of the cranial neurosurgery unit. This is a complex problem, with delays caused by multiple factors, but in particular clinicians reported challenges with returning patients to the district general hospitals from where they were initially referred.

Currently, there is no consistent approach to address the issue nor any well-established programme focused on bringing allied health professionals and clinicians together 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.

GIRFT uses this data to provide trust-level context about the pressure a service might be facing, and in 2015/16 DTOC was reported to account for 4% of all bed days in England. However, DTOC does not include delayed repatriation to district general hospitals (or other transfers between acute hospitals); this therefore means that DTOC data does not address what clinicians have said is the key driver of delayed discharge in the specialty.

A helpful long-term response may be to collect data measuring delayed transfers between acute hospitals, provided it is practical and proportionate to do so. Collecting this data would help establish whether this is indeed a relevant source of delay; collecting more clinically relevant data would also better engage surgeons in improvement. To progress this, GIRFT could build on its experience establishing audits, such as the Surgical Site Infection audit, and establish an audit to collect this data.

This appears an important issue to address as the impact on patients is reportedly enormous: it directly results in delays for patients who are awaiting surgery. It also means that those patients waiting for discharge are spending more time than they need to in a neurosurgery ward, potentially further from home. Given many cranial neurosurgery patients may have already been in hospital for some weeks, this is an unnecessary additional frustration for the patient and potentially their family and/or carers.

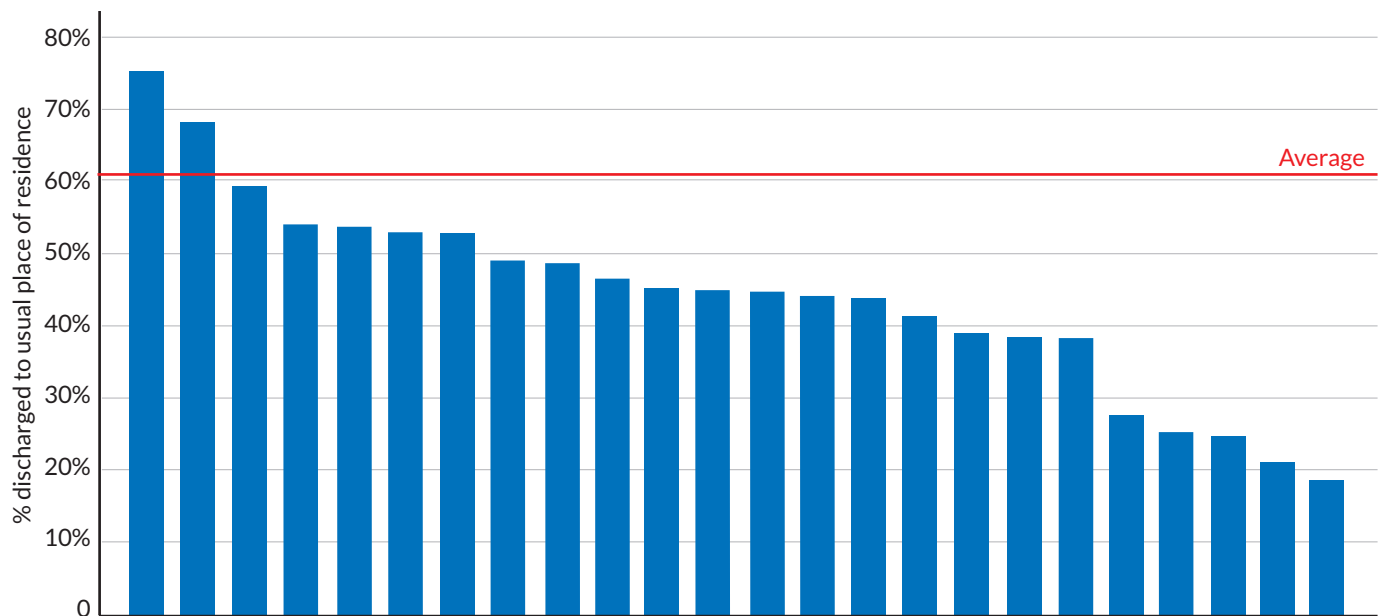
Options for discharge

The main options for discharge from a cranial neurosurgery ward are:

- discharge to a dedicated rehabilitation facility;
- discharge to a bed in an ordinary ward (whether in the same trust or the trust that referred the patient to the cranial neurosurgery provider); and
- discharge home.

Where a patient has been in for monitoring only following a cranial trauma, and has not had a cranial procedure, the latter is most likely. However, amongst patients who had a non-elective procedure, there was a wide variation in discharge destinations; on average, 61% of non-elective patients were discharged to their usual place of residence but in two providers, the figure is around three-quarters and in two barely half are discharged home.

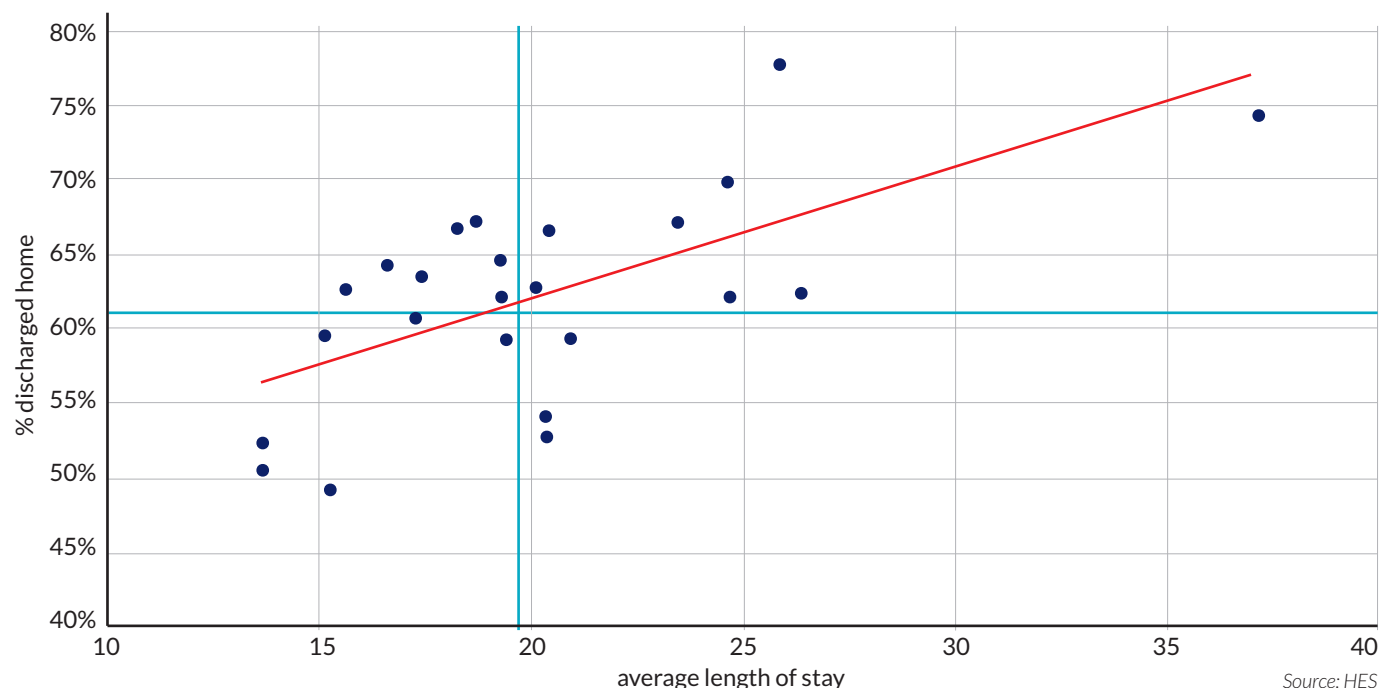
Figure 23: Percentage of non-elective cranial procedure spells discharged to their usual place of residence, by trust 01 Apr 2014 to 31 Mar 2015



Source: HES

One factor in how soon a patient can be discharged after a major procedure may be the availability of suitable physiotherapy or occupational therapy, or a need for essential changes being made to the home environment (such as assistance with stairs). Data examined by the GIRFT programme indicates that patients who stay longer in hospital after a non-elective procedure are more likely to be discharged home – potentially indicating that such therapy took some time to arrange. Shorter stays are more common amongst patients who are discharged from the cranial neurosurgery to other providers – potentially locations with specialist therapy available.

Figure 24: Non-elective cranial procedures average length of stay and proportion of patients discharged home 01 Apr 2014 to 31 Mar 2015



Source: HES

While evidence on this is limited, professional experience strongly indicates that the sooner patients commence rehabilitation following a major cranial procedure, the better. Cranial neurosurgery wards are not the right place for it; they don't have the facilities, the staff or the space. Timely transfer to a rehabilitation centre or to home, where the support is available, is crucial to long-term recovery.

Clearly the biggest constraint on such rehabilitation is resource; centre places are limited, and patients may need to stay in a centre for some time. In terms of home care, it is important to recognise that the kind of therapy required is specialised; many physiotherapists, for instance, may not have the expertise to work with patients recovering from brain injury. This therefore means that all the demand is focused on those therapists with relevant skills. Consolidation in where these services are provided has also resulted in patients being sent greater distances for rehabilitation at a new hospital, whereas historically the patient may have been simply returned to the referring district general hospital.

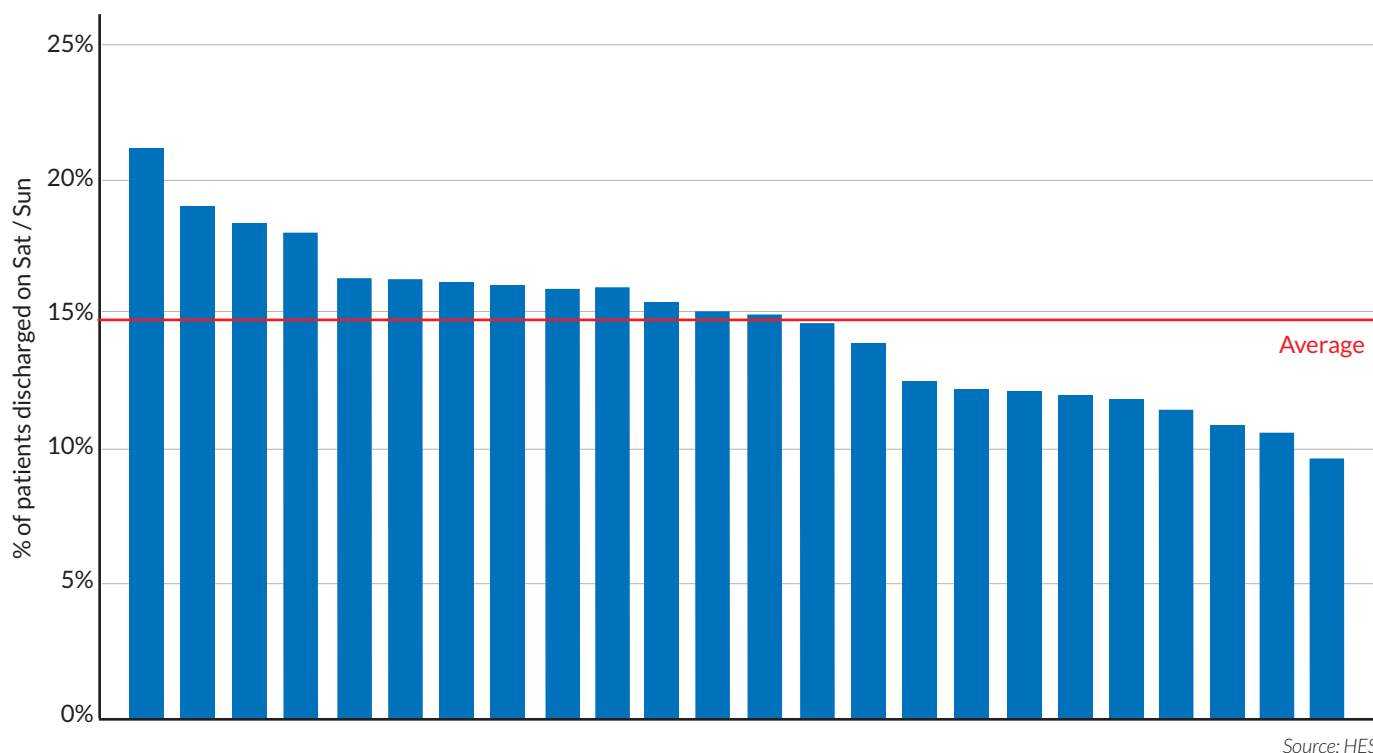
However, it is also possible that some of the delays in transfers are a result of inefficient or unsystematic joint working with other teams and professions. Not all providers have standard protocols for transfer to rehabilitation. Access to social care will also be a relevant factor, this is not an area the GIRFT programme would currently comment on.

The example of the glioma pathway at the University Hospital Southampton cited above shows the value of a focussed approach to discharge. Resources are co-ordinated so that different members of the team, including physiotherapists and the consultants, are available to discuss patient care and ensure the patient is ready for discharge. The added assurance of providing contact details for the team also means that patients are confident that being discharged doesn't mean the end of the process.

Weekend discharge

Another area of marked variation was around discharge over the weekend. If discharge was shared equally across all days, 28.6% of patients would be discharged over the weekend. However, only one provider discharged more than 20% of patients on a weekend; the average was under 15%.

Figure 25: Percentage of cranial surgery patients discharged on a weekend, by trust 01 Apr 2014 to 31 Mar 2015



Given the issues identified earlier of patients remaining in hospital longer than necessary, there would seem to be scope for improvement here – moving to a full seven-day model including ward rounds.¹⁵

Addressing a commissioning disconnect

These issues notwithstanding, the message emerging from the GIRFT visits was that too often the reason for delayed transfer out of neurosurgery units is that there is no hospital bed available for patients elsewhere. Most notably, providers reported significant difficulties when they seek to return patients to the hospitals that first referred them in.

Deep dives suggested this had been a growing problem over recent years. Neurosurgery units, run under specialised commissioning, are contractually obliged to accept such referrals. District general hospitals, managed by Clinical Commissioning Groups (CCGs), are often reluctant to accept patients back because their own bed capacity is stretched. As the pressure has increased on beds in district general hospitals, some have simply refused to accept patients back for local rehabilitation in a timely fashion, and occasionally refused to take on rehabilitation at all. The result is often that patients remain in the neurosurgery unit, with higher bed costs; more significantly, it means that these occupied beds cannot be used – as intended – for the next patient.

This is despite the neurosurgery service specification stating that mechanisms should be in place to achieve this.

To enable cranial neurosurgery units to increase their throughput and treat more patients sooner, this needs to be addressed. A lack of beds in referring hospitals should not be the cause of delays to vital surgery.

Once again, electronic referral processes can assist with this, as they ensure there is a comprehensive record of where the patient has come from and what care they will need on return. So too can new local partnerships to improve health and care, such as sustainability and transformation partnerships (STPs) and integrated care systems (ICSs), which can establish relevant protocols between providers.

Recommendation	Actions	Timeline
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.	12A: Trusts to implement seven-day ward rounds and increase engagement with physiotherapy, to enable faster discharge, including weekend discharge.	Within 6 months of publication
	12B: GIRFT Hubs to support providers to agree and implement local repatriation arrangements that reflect the capacity commissioned, working collaboratively across local systems as necessary. GIRFT national team to ensure collaboration with the Urgent and Emergency Care programme on stranded and super-stranded patients.	Within 12 months of publication.
	12C: GIRFT to collect and share examples of effective local protocols and working arrangements, such as Healthcare for London's Standards for Inter-Hospital Transfers.	Within 6 months of publication.
	12D: GIRFT to consider a snapshot audit of specialty level delayed transfers to help quantify the scale of the issue. This could include acute to acute transfers, discharge practices and rehabilitation bed supply, and any alternatives.	For consideration as part of revisits to cranial neurosurgery providers.
	12E: GIRFT to consider development of a rehabilitation and discharge support package, tailored to specialties as appropriate.	For immediate consideration.

¹⁵ Increasing weekend discharges provides a savings opportunity, described in the Potential Impact section

Enabling continual quality improvement

Improving data collection is essential to empower clinicians and the providers they work in to continuously improve the quality of the care they provide patients. Where clinically useful data is not collected, or not collected to sufficient volume or quality, this limits our understanding of the quality of care patients receive, and what can be done to improve it.

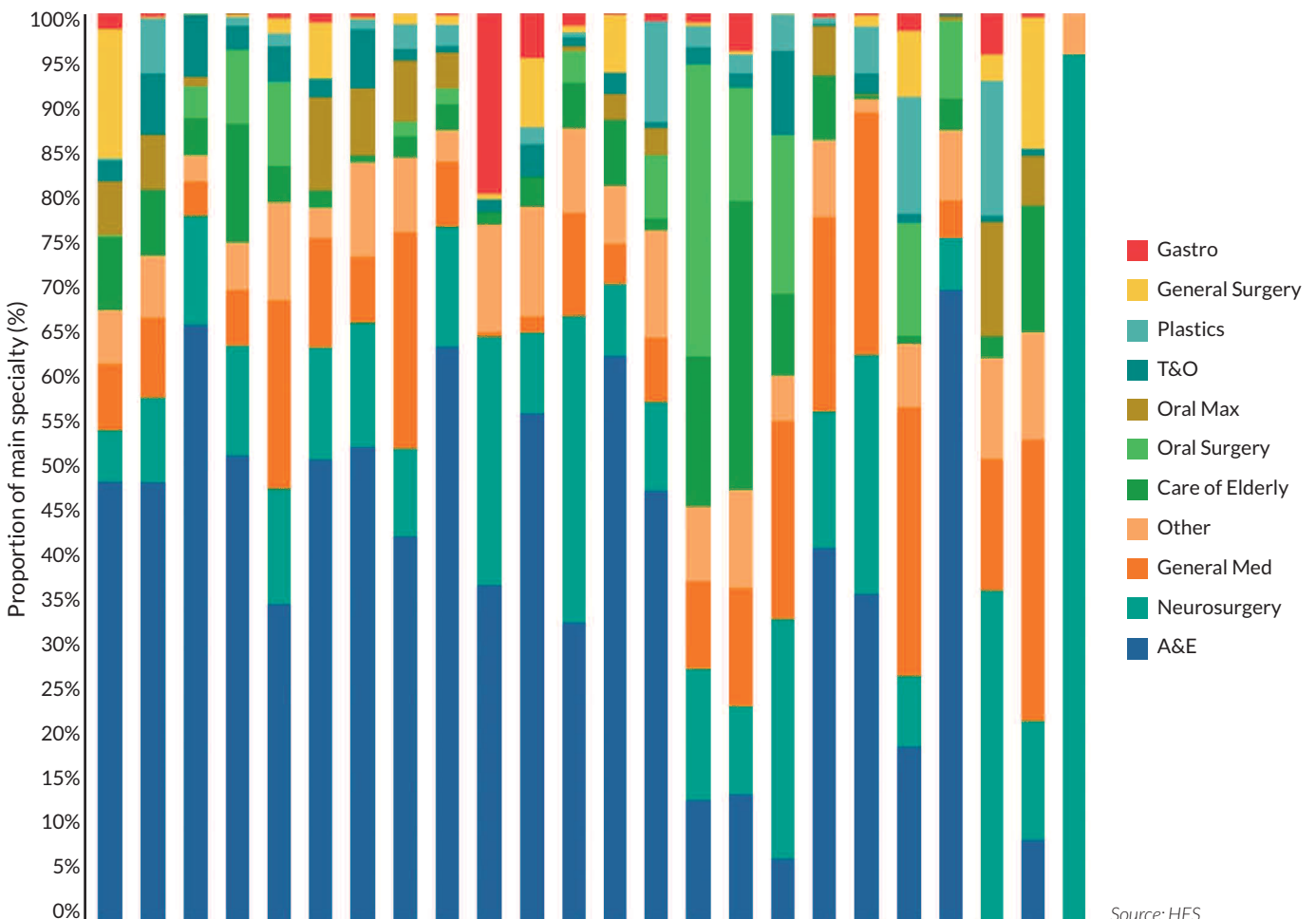
There are several issues related to the data around cranial neurosurgery. As has been highlighted elsewhere in this report, there are lots of areas where the available data refers to neurosurgery as a whole, rather than purely cranial neurosurgery. The GIRFT team does not believe this has negatively affected the process or the core recommendations; however, it limited our ability to test hypotheses generated by deep dives.

Gaining a true picture of activity

There are several areas where richer data would allow us to conduct deeper analysis and potentially make additional recommendations. Recognising the costs associated with use of critical care and particularly delayed discharge from it, it would be beneficial to understand more about how each provider uses critical care and at what point they are ready to discharge patients to the ward. The question of theatre usage has been addressed above but further information about usage patterns and availability could lead to a greater understanding of how long different procedures are likely to take – supporting more efficient planning.

Another key issue in terms of understanding the cranial neurosurgery workload is the involvement of cranial neurosurgery specialists in providing care to patients in other parts of the hospital. Patients who are diagnosed with cranial trauma will often be admitted to other specialties, because they have multiple injuries.

Figure 26: Admitted patient 'dominant specialty attribution', where there is a diagnosis of cranial trauma, by trust 01 Apr 2014 to 31 Mar 2015



Source: HES

It might be assumed that the specialty admitting them is typically the one that will need to operate first; other specialties may be involved in monitoring or advising. However, the chart above shows such wide variation in admissions that it appears there are different decisions being made about where to admit patients, in particular regarding the use of emergency departments, oral surgery and care of the elderly.

This is a topic that merits further investigation to see if there are any factors in the decision-making or advantages in terms of patient wellbeing or outcomes from different admission decisions. For example, it may be that after a fall which led to a minor head injury, the decision to admit an older patient into dedicated care for the elderly to recover would make sense; the available data doesn't answer that.

It is also unclear whether admissions to different departments then lead to different degrees of involvement for cranial neurosurgery staff. For example, an emergency department may well be better equipped to monitor key aspects of a patient's wellbeing following a head injury than a gastro-intestinal department would. A patient admitted to the latter therefore may need more input from cranial neurosurgery staff.

As well as tracking this information from the cranial neurosurgery perspective, this should be considered more broadly in terms of the 'super-spell' – providing a richer picture of the total inpatient pathway across multiple hospitals.

Differences in data recording

As cited earlier, there are also clear differences in the ways that different providers record their activity. The most obvious example of this relates to stereotactic radiosurgery, a type of highly targeted high-dosage radiotherapy that is used to treat small tumours. The GIRFT team was aware that most providers offer this procedure – yet according to Hospital Episode Statistics (HES), only nine conducted any stereotactic radiosurgery procedures and five of these did fewer than 10 in the year under consideration.

Table 1: Stereotactic radiosurgery (SRS) elective procedure count reported, all reporting trusts 01 Apr 2014 – 31 Mar 2015

Trust	SRS procedure count in HES
A	6
B	7
C	10
D	10
E	10
F	54
G	130
H	195
I	827

This data did not represent what was known to be the real situation, as recorded in the radiotherapy dataset (RTDS).

Further investigation into this has indicated a lack of consistency in the specialty code assigned to this treatment with some providers recording as neurosurgery and others as oncology. This inconsistent approach means that providers may not be building up a true picture of their workload – which in turn could affect service design, governance, potentially recruitment and other issues. Purely from the operational perspective, it would benefit providers to have a consistent understanding of the number of procedures they are carrying out.

Measuring outcomes

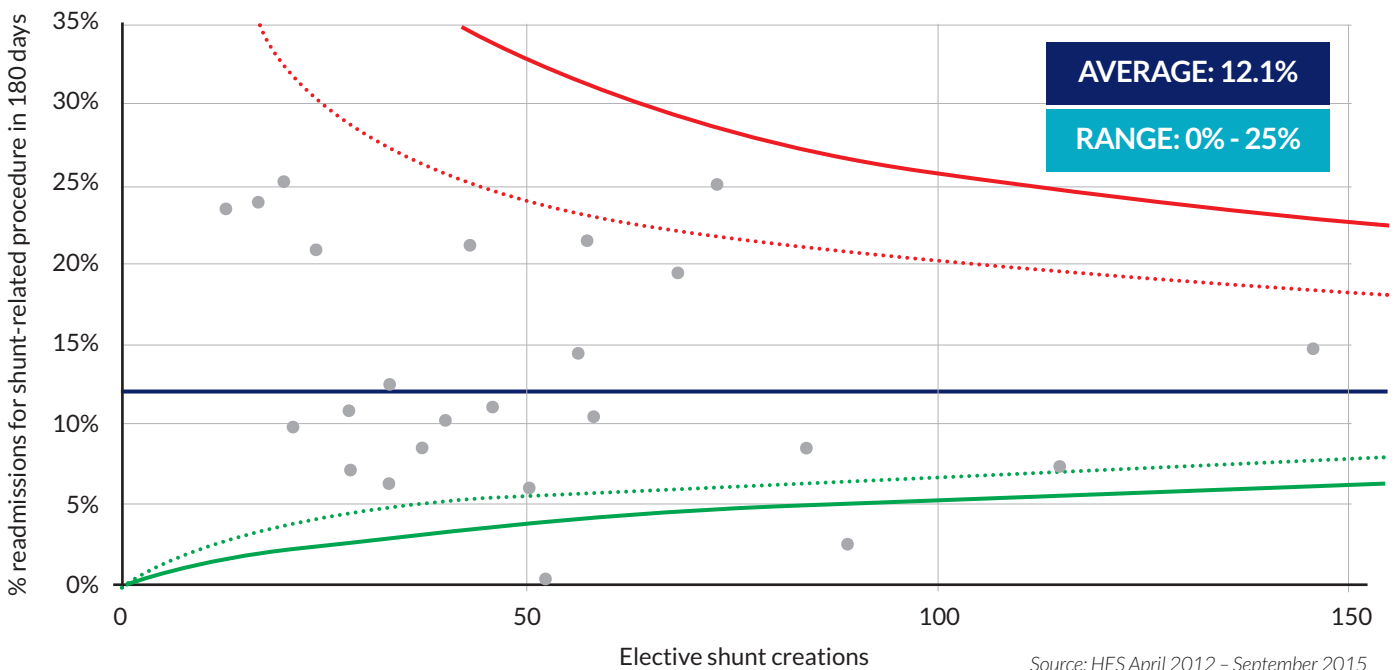
While there are concerns about the accuracy of some of the data around cranial neurosurgery activity, there is a bigger gap to address in terms of data around outcomes.

Very little outcome data was available for consideration in the GIRFT process. Arguably the main outcome measures examined were around readmissions, where the data was inconclusive. While there was sizeable variation in emergency readmission rates, particularly for patients who had a procedure to remove a malignant tumour, the available data did not help explain the reasons for these readmissions or the variation.

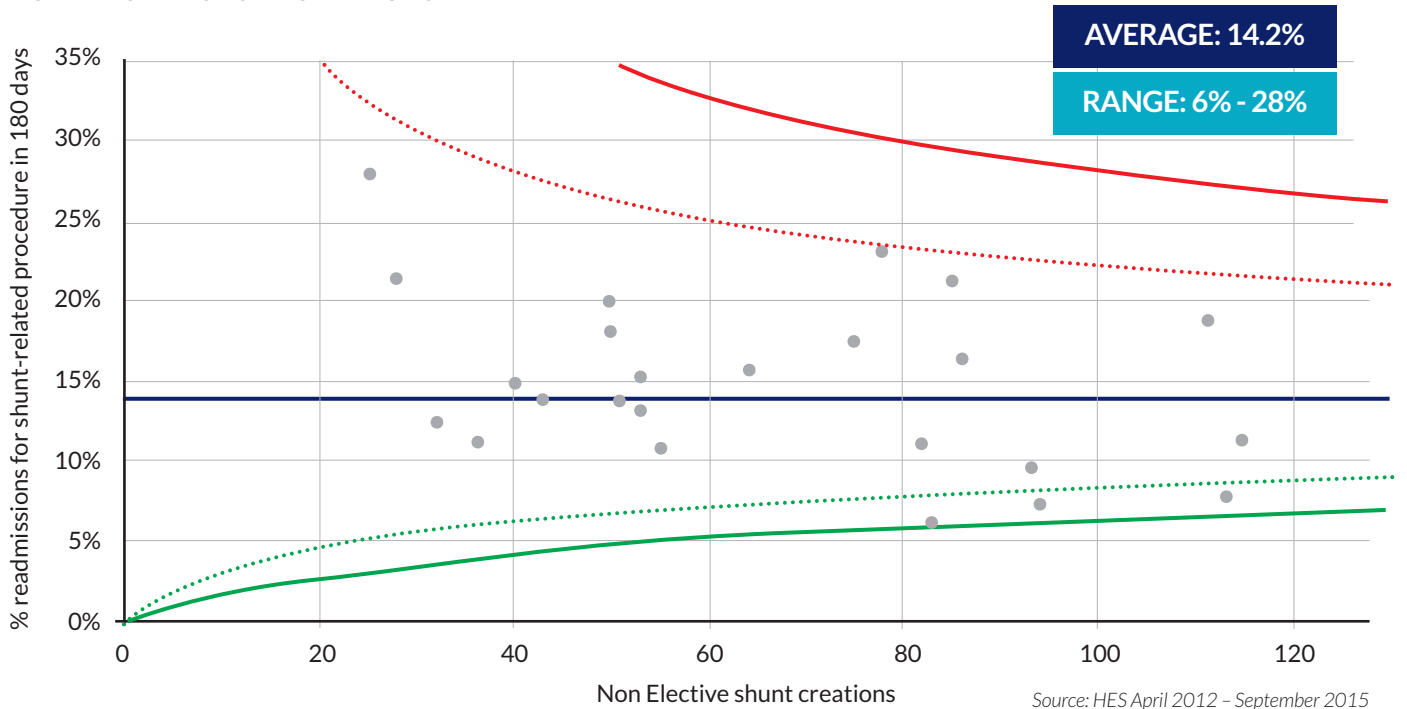
There was also considerable variation in the proportion of patients readmitted for a further shunt-related procedure within 180 days of being discharged after the shunt was created. In the elective stream, while the average readmission was 12.1%, four providers had readmission rates below 5% while seven readmitted more than 20% of patients. There was similarly wide variation amongst non-elective patients.

Figure 27: Readmissions for a further shunt-related procedure within 180 days of discharge following shunt creation

ELECTIVE SHUNT CREATIONS



NON-ELECTIVE SHUNT CREATIONS



Variation of this scale may indicate different practices being adopted; this is a topic for further examination, to see if there is a sound clinical reason for higher readmission rates.

Some previously published reports have shown that mortality rates for patients admitted with serious or severe cranial and spinal trauma are high. It would be useful to interrogate this data and see whether it indicates any opportunities for improvement, or whether it simply reflects the nature of these injuries. One way to assess this would be by comparing UK data with similar datasets in other countries, to see if mortality rates are significantly different.

However, mortality alone is clearly a somewhat crude measure of surgical outcomes; it doesn't help show how many lives are saved through timely intervention or outstanding surgical performance. Therefore, there is a need for more effective and imaginative approaches to outcome measurement across the speciality.

Various sources of data were unfortunately not made available for analysis as part of the programme. There are three national neurosurgical audits underway, but unfortunately, data sharing was not possible. One research network collects some data related to patient outcomes following cranial trauma, including mortality data at various points along the trauma pathway, time, time to CT scanning, time to craniotomy and intracranial pressure monitoring. It also records the grade of surgeons involved in procedures and in assessment of trauma patients in the emergency department.

The GIRFT programme intends to support data collection for these audits, with a view to the data being used for quality improvement to greater effect.

One approach that appears to improve data quality and accuracy is increasing the involvement of clinicians in collecting, coding and recording data on a day to day basis. For example, some trusts have invited members of the trust information team to attend Mortality and Morbidity meetings, so they can hear at first hand what procedures have been conducted and what the outcomes were – thus facilitating more accurate data recording. Another possible step is to require surgeons to confirm the relevant OPCS codes either before the operation or after – perhaps in relevant forms.

Recommendation	Actions	Timeline
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.	13A: GIRFT to work with existing cranial neurosurgery audits to explore scope to improve audit collection.	Improvements to be delivered within 2 years of report publication.
	13B: Surgeons to meet with trust information teams to implement changes to coding practice which would provide improved clinical accuracy as defined by NVR and GIRFT.	Within three months of report publication.
	13C: Trusts to agree any proposed changes internally then, for any change impacting on NHS Standard Contract service conditions on the counting and coding of activity, propose change to commissioners. Any adjustments to prices to be agreed if necessary.	As defined by NHS Standard Contract conditions.
	13D: If and once agreed with commissioners, trusts to implement any change.	As defined by NHS Standard Contract conditions.
	13E: Surgeons to meet trust information team and coders and review activity attributed to them once a month.	For immediate action.
	13F: Trust management to facilitate time for surgeon and coder engagement, using job planning if needed.	For immediate action.
	13G: GIRFT and SBNS to develop guidance on coding, consistent with existing coding guidance, to support improved collaboration between coders and surgeons, following engagement with NHS Digital.	Within 2 years of report publication date.

Increasing consistency and reducing costs in procurement

All specialties examined in the GIRFT process have been tasked to examine variation in procurement. This is easily measured, readily understood and is expected to offer substantial opportunities for cost savings.

In cranial neurosurgery, the data gathered by the GIRFT programme shows huge differences in the amounts different providers are paying for similar surgical products. This was no surprise; variation in procurement is recognised as an NHS-wide issue and there are ongoing initiatives, such as the purchasing price index benchmark (PIIB) programme seeking to address this.

What the data shows

On condition of anonymity, participating trusts were asked by the programme to submit the prices they paid for a 'basket' of commonly used surgical devices and consumables. 20 trusts responded. As the GIRFT programme has found in other specialties, questionnaire-based data collections such as this can be unreliable as they rely on NHS staff entering data manually. That said, and removing obvious outliers, there yet again appears to be significant variation in the prices paid for similar items such as standard ventricular catheters used to drain excess fluid from the brain, and stents used in endovascular procedures.

PIIB data reveals that the NHS spends around £50m a year on products used in cranial neurosurgery such as neuro stimulators, ventricular catheters, kits, stents, passers, neuro coils and balloon catheters. As with other specialties, the data shows considerable brand variation in some of these product groups such as neuro coils, where there are some 50 different brands used across trusts and no clear understanding of which represent the best value for money. In other product groups such as neuro stents and stimulators there is limited competition with markets dominated by two or three major international suppliers.

The data also reveals significant pricing variation, however PPIB does not yet reveal whether pricing of individual products is related to bundled deals from suppliers. For example, average prices paid for a popular brand of ventriculoperitoneal shunts ranges from £150 to £266; this variation clearly needs further investigation. Likewise, 18 trusts purchase the neuro coils from the same range of products and the same manufacturer, yet prices for the most commonly bought item range from £385 to £540 for similarly purchased volumes. Similar variation was demonstrated in the prices paid for coils from a rival brand, with prices varying from £430 to £575 for similar volumes.

In the coming months, the GIRFT team will be working with trusts to understand why this variation exists. Inherent in this question is the recognition that there will often be sound clinical reasons behind the choice of devices and of treatment methods, and that patient quality outcomes, product evidence and product innovation are key considerations alongside supply chain efficiency and best value. As part of this exercise, the GIRFT team will provide a curated Clinical Procurement Benchmarking and PPIB data-pack to trusts' heads of procurement for validation and feedback before any conclusions are drawn or more specific recommendations made.

It should also be noted that many of the product groups used in neurosurgery – such as neuro stimulators and coils – fall under NHS England's tariff-excluded devices, and NHS England is already seeking to reduce some of this variation through their High-Cost, Tariff- Excluded Devices (HCTED) programme. GIRFT is committed to working closely with the HCTED team and the new Category Tower to develop standard specifications for these products.

The GIRFT team will also be working closely with NHS Improvement and the Department of Health to review the potential opportunities that new procurement or payment initiatives such as the Category Towers bring to cranial neurosurgery.

Recommendation	Actions	Timeline
14: Enable improved procurement of devices and consumables through cost and pricing transparency, aggregation and consolidation, and the spreading of best practice.	14A: GIRFT to work closely with sources of procurement data such as PPIB and relevant clinical data to identify optimum value for money procurement choices, considering both outcomes and cost/price.	July 2018
	14B: GIRFT to identify opportunities for improved value for money, including the development of benchmarks and specifications, and locate sources of best practice and procurement excellence, identifying factors that lead to the most favourable procurement outcomes.	September 2018
	14C: Trusts and STPs to work with GIRFT and the new Category Towers, to benchmark their products and seek to rationalise and aggregate demand with other trusts to secure lower prices and supply chain costs.	October 2018
	14D: GIRFT to work closely with NHS England's HCTED programme so that better value can be obtained for HCTED devices.	October 2018

Reducing the impact of litigation

As well as looking at addressing variation in clinical practice, each of the GIRFT programme teams has 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.

Data obtained from NHS Resolution shows that over the last five years, there were 457 negligence claims against cranial neurosurgery. The total estimated cost of litigation over this period was £288.8m.

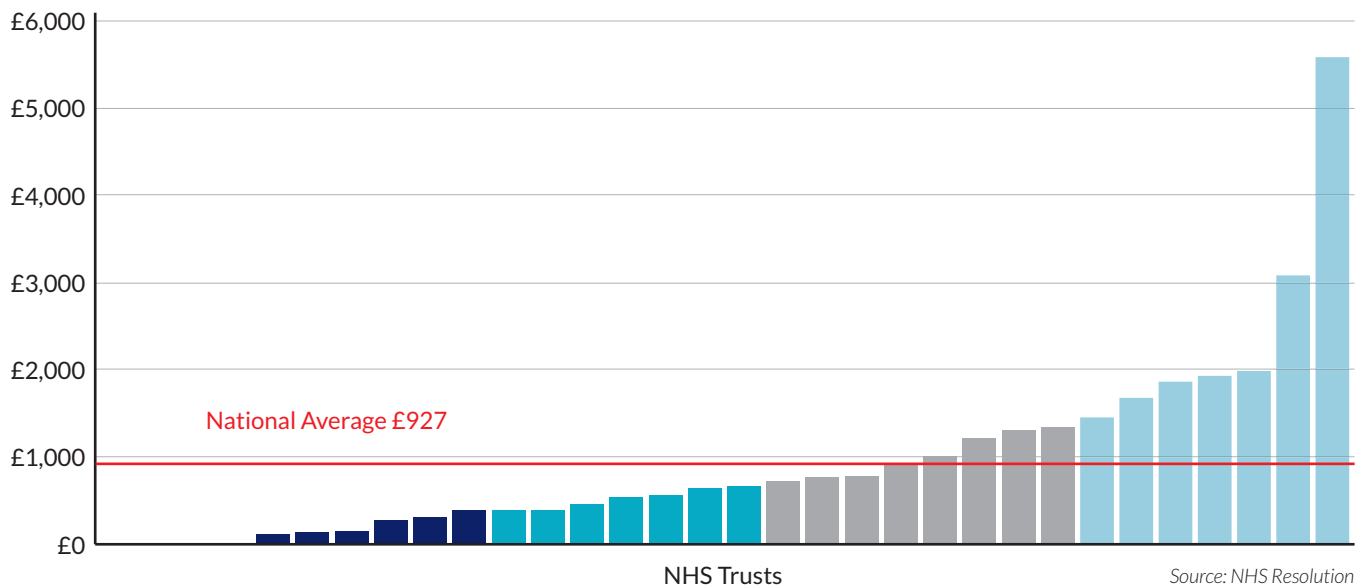
Table 2: Volume and cost of medical negligence claims against cranial neurosurgery notified to NHS Resolution 2012/13 to 2016/17

Years	No. of claims	Annual % change in no. of claims	Total costs in £m (including cost paid and reserve values)	Annual % change in total costs
2012/13	79		£38.1m	
2013/14	108	36.71%	£53.2m	39.68%
2014/15	101	-6.48%	£68.7m	29.30%
2015/16	92	-8.91%	£53.1m	-22.70%
2016/17	77	-16.30%	£75.7m	42.46%
Total	457		£288.8m	

The figure of £288.8m equates to an average cost of litigation per admission under neurosurgery excluding any spinal-related surgery or procedures, over the five-year period, of £927. This is considerably higher than in some other surgical disciplines, reflecting the fact that any claim against cranial neurosurgery is likely to be high value: the average estimated cost of a claim is over £600,000.

There was considerable variation between providers; the provider with the lowest litigation cost per admission had an average of £0 while the highest was £5,610.

Figure 28: Variation in cranial neurosurgery estimated litigation costs per admission in England between trusts. (Denominator includes day case, elective and emergency admission for neurosurgery or paediatric neurosurgery excluding spinal surgery or procedures for back or radicular pain, for patients of all ages)



The most common cause of claims, by some distance, was ‘judgement/timing’ (230 claims, 50.33%). Other common causes were ‘interpretation of results/clinical picture’ (79 claims, 17.29%), ‘unsatisfactory outcome to surgery’ (44 claims, 9.63%), ‘inadequate nursing care’ (39 claims, 8.53%) and ‘fail to warn/informed consent’ (20 claims, 4.38%). Only one ‘never event’ occurred during this five-year period when ‘wrong site surgery’ resulted in tetraplegia.

It is generally recognised that some common causes of claims are avoidable. Issues around judgement and timing could be deemed to relate to surgical experience and decision-making – so there is potentially an opportunity to address these through training.

Also, there is some evidence from other surgical disciplines that claims may not be effectively defended because the provider lacks the documentary evidence to demonstrate correct processes have been followed. While not specifically cited in reference to cranial neurosurgery, it is clear that any such issues could be easily addressed.

It was clear during GIRFT visits that many providers had little knowledge of the claims against them. This includes 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. Further work is needed at both a local and national level to analyse claims to maximise this opportunity to improve patient care.

Recommendation	Actions	Timeline
<p>15. Reduce litigation costs by applying the GIRFT Programme's five-point plan.*</p> <p><small>*As described in GIRFT 'Litigation in surgical specialties data pack', Dec 2017. Note that actions 15A to 15D are part of a continual improvement cycle.</small></p>	<p>15A: Clinicians and trust management to assess their benchmarked position compared to the national average when reviewing the estimated litigation cost per activity. Trusts will have received an updated version of this for cranial neurosurgery in the GIRFT 'Litigation in surgical specialties data pack', December 2017.</p>	For immediate action.
	<p>15B: Clinicians and trust management to discuss with the legal department or claims handler the claims submitted to NHS Resolution included in the data set 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</p>	Upon completion of 15A.
	<p>15C: 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 trust's panel firm should be able to provide support.</p>	Upon completion of 15B.
	<p>15D: Claims should be triangulated with learning themes from complaints, inquests and serious untoward incidents (SUI) and where a claim has not already been reviewed as a SUI, this should be carried out to ensure no opportunity for learning is missed.</p>	Upon completion of 15C.
	<p>15E: Where trusts are outside the top quartile of trusts for litigation costs per activity, GIRFT to ask national clinical leads and Regional Hub directors to follow up and support trusts in the steps taken to learn from claims and share examples of good practice where it would be of benefit.</p>	For continual action throughout GIRFT programme.

Potential impact

This report has sought to identify how cranial neurosurgery providers could deliver a better service to patients, treating them more promptly and to higher standards. It has made recommendations for changes along the entire patient pathway that, if implemented, could free up essential resource – beds, operating theatres and surgeon time – so that the specialty can increase the number of procedures it conducts within the existing resources available.

Clearly, such changes would bring immense benefit to patients. They have the potential to result not only in earlier surgery – potentially saving lives and certainly reducing chronic and acute pain – but also to provide shorter stays in hospital and make cancellations a rarity. There are also substantial opportunities to increase efficiencies through smarter procurement, avoiding unnecessary admissions and using critical care only when clinically required. Again, the resources released in this way can be rechannelled into increasing the number of patients treated.

While the impact in some areas is hard to measure, in other areas there is a clear tangible benefit. For example:

- If all providers adopted a standard approach of admitting patients on the day they need surgery, rather than in advance for a minimum of 80% of patients, it could save over 3,600 bed days per year at a value of £1.4m.
- By reducing the average length of stay in critical care for cranial trauma patients who undergo surgery to five nights or fewer, this could save 2,030 critical care days at a total cost of £1.91m. More importantly, this could free up critical care beds for other patients.
- If all providers reduced the cancellation rate of elective procedures to the national average, this would save 690 spells in hospital per year, equivalent to £630,000. If they moved to the top quartile, reducing cancellation rates to 5.4% or below, this would save 1095 spells, equivalent to £1m – and deliver a major improvement in patient experience and staff morale.
- The national average for use of day surgery for trigeminal thermocoagulation procedures is just 34.2% and for short-stay elective cranial procedures 51%. If all providers achieved the national average in both, it would shift 420 spells a year from an inpatient to a day case. The top quartile for both is 55-62%; if all trusts achieved that, it would impact on nearly 800 spells. Put another way, it could potentially allow hundreds more patients to be treated – again while improving the experience of those patients in for less invasive procedures.
- If all trusts were able to achieve the national average rate for weekend discharge of 14.7%, it would save 495 bed days – while directly benefiting patients who are ready to be discharged. If providers could all move to the top quartile, discharging 16.3% of patients at weekends, the savings would be 890 bed days.

Table 3 below summarises the main potential quantifiable impacts from this first analysis, calculated from metrics used throughout this analysis at various levels of improvement from the current state. As data collection and reporting becomes increasingly mature, there will be further potential quantifiable impacts that appear.

We have elected to display quantifiable impact at two levels:

1. improvement if all providers performing below the national average for an outcome, improve sufficiently to achieve the national average;
2. improvement if all providers performing below the top quartile for an outcome, improve sufficiently to achieve the top quartile performance.

The figures presented show the potential impacts across the country. They represent what the impact of GIRFT implementation would be nationally, assuming improvement across all providers. The impacts are measured against the outcomes our recommendations would improve, rather than the recommendations themselves. This is because:

- multiple recommendations may contribute to a single outcome;
- a single outcome may be achieved by implementing multiple recommendations.

The gross notional financial opportunities put an estimated value on the resource associated with variation. The opportunities would not necessarily release cash, and the figures do not account for warranted variation. GIRFT hubs will agree opportunities locally which account for warranted variation.

Table 3: Potential quantifiable impacts based on current performance

Improvement (opportunities are per annum)	National mean average or better			Top quartile* or better		
	Target	Activity opportunity	Gross notional financial opportunity	Target	Activity opportunity	Gross notional financial opportunity
Reducing elective activity with no procedure (excluding "planned procedure not carried out") - gross notional financial opportunity estimated at one bed day per spell* (assuming alternative care setting for some patients) <i>Source: HES 2014/15</i>	5.2% or below (add-on to elective spells with a procedure)	655 spells	£255k	1.9% or below (add-on to elective spells with a procedure)	1149 spells	£445k
Admitting elective patients on day of surgery - gross notional financial opportunity estimated at one bed day per spell* <i>Source: HES 2014/15</i>	55.4% or above	1600 spells	£620k	80.2% or above	3625 spells	£1,405k
Increasing day case rates for elective trigeminal thermocoagulation procedures - gross notional financial opportunity estimated at one bed day per spell* <i>Source: HES 2014/15</i>	34.2% or above	120 spells	£45k	55.1% or above	245 spells	£95k
Increasing day case rates in short-stay elective cranial surgery procedures - gross notional financial opportunity estimated at one bed day per spell* <i>Source: HES 2014/15</i>	51.1% or above	300 spells	£115k	61.5% or above	550 spells	£210k
Increasing elective (v non-elective) admissions for glioma - gross notional financial opportunity based on bed day reductions, with elective spells having an average LoS which is 7 days shorter than non-elective spells* <i>Source: HES 2014/15</i>	63.8% or above	210 spells 1470 days	£570k	75.4% or above	435 spells 3040 days	£1,180k
Reducing planned procedures not carried out - gross notional financial opportunity based on national average cost of HRG WH50 in neurosurgery, 15/16 reference costs <i>Source: HES 2014/15</i>	7.3% or below (add-on to elective spells not cancelled)	690 spells	£630k	5.4% or below (add-on to elective spells not cancelled)	1095 spells	£1,000k

Table 3: Potential quantifiable impacts based on current performance (continued)

Improvement (opportunities are per annum)	National mean average or better			Top quartile* or better		
	Target	Activity opportunity	Gross notional financial opportunity	Target	Activity opportunity	Gross notional financial opportunity
Reduce critical care bed days for cranial trauma patients with cranial procedure - average number of days in critical care per patient - gross notional financial opportunity based on national average cost difference between neurosciences critical care bed day and neurosurgery excess bed day cost, 15/16 reference costs <i>Source: HES 2014/15</i>	5 days or below	2030 days	£1,910k	3.4 days or below	4375 days	£4,110k
Increase % of subarachnoid haemorrhage patients having surgery in 0-1 days - gross notional financial opportunity based on 1 bed day reduction per spell* <i>Source: HES 2014/15</i>	78% or above	70 spells 70 days	£25k	82.4% or above	140 spells 140 days	£55k
Increase rate of weekend discharges - gross notional financial opportunity based on 1.5 bed day reduction per spell* <i>Source: HES 2014/15</i>	14.7% or above	330 spells 495 days	£190k	16.3% or above	595 spells 890 days	£345k
Reducing shunt readmissions - elective - readmission for shunt-related procedure within 180 days of shunt creation - gross notional financial opportunity based on average PbR cost of readmission spells <i>Source: HES Apr 12 - Sept 15 (pro-rata to 12 months)</i>	12.1% or below	15 spells	£12k	7.9% or below	25 spells	£20k
Reducing shunt readmissions - non-elective - readmission for shunt-related procedure within 180 days of shunt creation - gross notional financial opportunity based on average PbR cost of readmission spells <i>Source: HES Apr 12 - Sept 15 (pro-rata to 12 months)</i>	14.2% or below	15 spells	£18k	11.1% or below	25 spells	£30k
Procurement opportunities - There is an opportunity for efficiencies worth up to £7.5m through smarter procurement.			£5m			£7.5m
TOTAL			£9,390k			£16,395k

* Bed day variations costed at national average excess bed day cost for neurosurgery, 15/16 reference costs

The GIRFT programme

Getting It Right First Time (GIRFT) is a national programme designed to improve medical care within the NHS. Funded by the Department of Health and jointly overseen by NHS Improvement and the Royal National Orthopaedic Hospital NHS Trust, it combines 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 is now being applied in more than 30 different areas of medical 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 NHS-wide improvement; and
- an implementation phase where the GIRFT team supports providers to deliver the improvements recommended.

The programme relies on engagement by NHS trusts and foundation trusts. At the outset of the programme, letters are sent from the GIRFT clinical lead for each area of practice to the chief executive, the medical director and the heads of service for the relevant specialty, of all NHS trusts and foundation trusts in England. This letter calls on the provider to engage with the programme, and to date providers have responded well to this call.

GIRFT and other improvement initiatives

The GIRFT programme is founded on using data to understand unexplained variation to provide an opportunity for standardisation and improvement.

It also reflects experience in the NHS and internationally accepted best practice that the most effective initiatives to improve quality, productivity and efficiency are clinically led. As well as support from the Department of Health and NHS Improvement, it has the backing of Royal Colleges and professional associations.

GIRFT is part of an aligned set of work streams within the Operational Productivity Directorate of NHS Improvement. It is the delivery vehicle for one of several recommendations made by Lord Carter in his February 2016 review of operational efficiency in acute trusts across England.

GIRFT has a significant and growing presence on the Model Hospital portal, with its data-rich approach providing the evidence for hospitals to benchmark against expected standards of service and efficiency. The programme will also work with a number of wider NHS programmes and initiatives which are seeking to improve standards while delivering savings and efficiencies, such as NHS RightCare, acute care collaborations (ACCs), and sustainability and transformation partnerships (STPs).

Data analysis

The data analysis exercise brings together a wealth of existing NHS data in an innovative way to paint a comprehensive picture of this aspect of medical practice. It includes Hospital Episode Statistics (HES), relevant registry or professional body data, mortality data, demographic information and patient survey data. Alongside this, a specific questionnaire is sent out to all trusts that have agreed to participate.

The output is a data pack consisting of standard and novel metrics, covering input, activity, process and outcomes. For example, it will typically address issues such as:

- quality of care – using indicators such as mortality and readmission rates;
- factors linked to outcomes – including adoption of best practice, low volumes of procedures, and time to surgery;
- access – e.g. standardised activity per 100,000 population;
- efficiency – length of stay and costs; and
- patient experience.

The resulting data pack provides a detailed, data-led view of the way this area of practice is currently delivered across the country. It shows where there is variation in both provision and outcomes, and helps identify patterns which could indicate opportunities to improve care or deliver efficiencies.

The data sources are selected and the metrics for each area of practice are developed in partnership with GIRFT programme clinical leads for that area, thus ensuring they are relevant to the decisions a senior clinician in that field may have to make.

The core sources used to analyse cranial neurosurgery are the National Neurosurgical Audit Programme (NNAP), established by the Society of British Neurological Surgeons (SBNS) in 2013, and Hospital Episode Statistics. Further sources were the Intensive Care National Audit and Research Centre (ICNARC) and the NHS England Specialised Commissioning Quality Dashboard Programme for data relating to the use of critical care, trust reference costs and NHS Resolution data.

In a number of areas, the GIRFT team have had to rely on data for neurosurgery as a whole, because there is no separate data for cranial neurosurgery. Furthermore, at present, there are very few widely-used outcome measures for cranial neurosurgery in England. As the programme develops, it is intended to develop more informative and actionable metrics.

The deep-dive visits

With the national picture clear, the data analysis team then generate data packs for each hospital trust that is participating in the programme. These data packs compare the trust's performance with the national data, enabling the trust to see how its activity levels, commissioning decisions, costs and patient outcomes for different procedures measure up to those of its peers.

These individual data packs are not designed for wider publication but rather to give the trust an insight into this area of practice. They are issued to the trust in advance of a scheduled meeting between clinical leads appointed by the GIRFT programme and senior staff at the trust. At the meeting, also known as a deep-dive visit, the clinical leads discuss the data packs with the trust, with a particular focus on the areas where the data shows variation between national norms and the trust's performance. Where the data indicates the trust may be underperforming in some way, this is explored in more detail to see whether there is an alternative explanation for the data; where appropriate, the trust can then draw on the expertise of senior clinicians in the field as they discuss specific challenges they face and consider potential changes to practice.

Conversely, where the data indicates the trust is outperforming its peers, clinical leads seek to understand what the trust is doing differently and how its approach could be adopted by others to improve performance across the NHS.

Feedback from trusts has been uniformly positive and in every case, actionable steps have been identified to improve aspects of local provision.

The report

The Orthopaedic GIRFT pilot project identified that, following about 30 Trust reviews, the problems and potential solutions identified were the same across all subsequent trust visits. After all the visits have been completed, the clinical lead oversees the creation of a national GIRFT report into their specialty. The report provides an overview of the way this area of practice is delivered across the country, examples of best practice and recommendations for potential improvements at the national level. This is one such report.

Implementation

GIRFT has developed a comprehensive implementation programme designed to help trusts and their local partners to address the issues raised in trust data packs and national specialty reports and improve quality.

Supporting the work of the GIRFT clinical leads, GIRFT Regional Hubs have been established. The hubs' clinical and project delivery leads visit trusts and local stakeholders in each region on a regular basis to advise on how to reflect the national recommendations into local practice and support efforts to deliver any trust-specific recommendations emerging from the GIRFT deep-dive visits. These teams will also help to disseminate best practice across the country, matching up trusts that might benefit from collaborating in selected areas of clinical practice.

GIRFT will be working closely with other NHS programmes working at national, regional and local level, such as NHS England Specialised Commissioning, RightCare and STPs, to ensure a complementary approach and to streamline requests to providers.

GIRFT is also working with a range of wider partners such as the Royal Colleges, NICE and national professional associations and societies on ensuring that GIRFT recommendations are reflected in best practice guidelines.

Through all our efforts, local or national, GIRFT will strive to embody the 'shoulder to shoulder' ethos which has become GIRFT's hallmark, supporting clinicians nationwide to deliver continuous quality improvement for the benefit of their patients.

Abbreviated Injury Scale (AIS)

A system created by the Association for the Advancement of Automotive Medicine to classify and describe the severity of injuries. An injury of grade 3 is serious, 4 severe and 5 critical.

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 1 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.

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.

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 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.

NCEPOD

National Confidential Enquiry into Patient Outcome and Death. www.ncepod.org.uk

National Neurosurgical Audit Programme (NNAP)

The Neurosurgical National Audit Programme (NNAP) was established by the Society of British Neurological Surgeons (SBNS). It aims to gather comprehensive data the full spectrum of elective and emergency neurosurgical activity.

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.

Stereotactic radiosurgery (SRS)

Stereotactic radiosurgery (SRS) is a non-surgical radiation therapy used to treat functional abnormalities and small tumours of the brain.

Subarachnoid haemorrhage (SaH)

An extremely serious medical condition where bleeding from a ruptured cerebral aneurysm can cause rapid and extensive brain damage.

Subdural haematoma

A serious condition where blood collects between the skull and the surface of the brain. It's usually caused by a head injury. Symptoms of a subdural haematoma can include: a headache that keeps getting worse.

Trauma Audit and Research Network (TARN)

TARN provides major trauma centre audits and information to help doctors, nurses and managers to improve their services.

Trigeminal neuralgia

Trigeminal neuralgia is sudden, severe facial pain, usually caused by compression of the trigeminal nerve which transmits sensations of pain and touch from your face, teeth and mouth to your brain. It usually occurs in short, unpredictable attacks that can last from a few seconds to about two minutes.

Trigeminal thermocoagulation

A highly targeted procedure in which heat produced by a high-frequency electric current is used to destroy trigeminal nerve tissue – so preventing the nerve from transmitting sensations of pain.

NHS organisations and terminology

Clinical Commissioning Groups (CCGs)

These were created following the Health and Social Care Act in 2012, and replaced Primary Care Trusts on 1 April 2013. CCGs are clinically led statutory NHS bodies responsible for the planning and commissioning of healthcare services for their local area. There are now 207 CCGs in England.

Commissioners

Commissioning is the process through which the health needs of the local population are identified and the services purchased and reviewed to meet those needs.

Hospital Episode Statistics (HES)

Data collected during a patient's time at hospital and submitted to allow hospitals to be paid for the care they deliver. The aim is to collect a detailed record for each 'episode' of admitted patient care delivered in England, either by NHS hospitals or delivered in the independent sector but commissioned by the NHS.

Healthcare Quality Improvement Partnership (HQIP)

An independent organisation led by the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices.

www.hqip.org.uk

ICNARC

Intensive Care National Audit and Research Centre

NHSE

NHS England

NHSI

NHS Improvement

NHS RightCare

Reducing unwarranted variation to improve people's health.

www.england.nhs.uk/rightcare

NICE - the National Institute for Health and Care Excellence

Improving health and social care through evidence-based guidance.

www.nice.org.uk

Specialised services

Services that are not offered in all hospitals and so are not commissioned by CCGs. Instead, they are commissioned centrally by NHS England.

www.england.nhs.uk/commissioning/spec-services

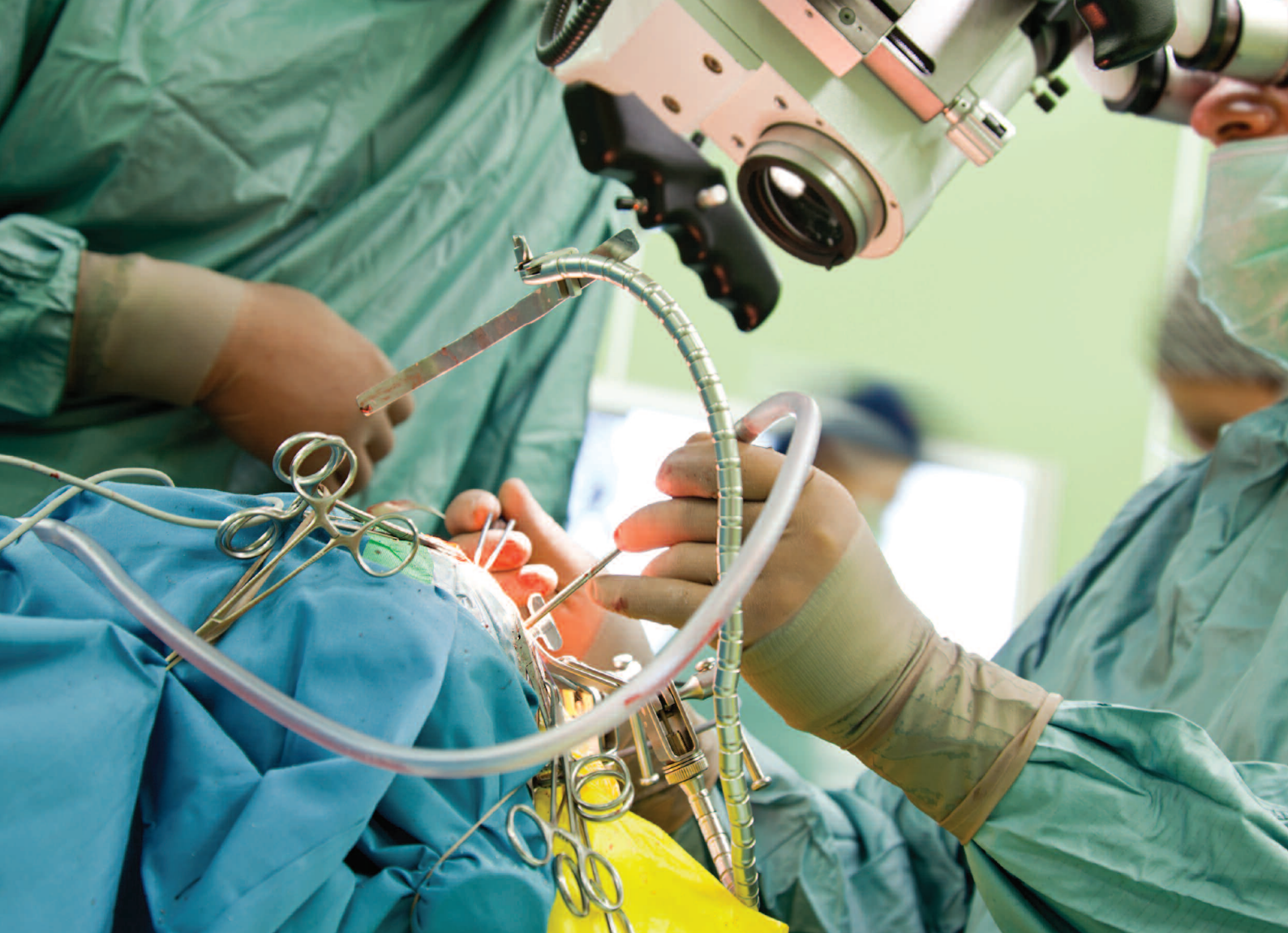
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We appreciate the use of data from many sources to support this work, not least Hospital Episode Statistics (HES - Copyright © 2017, re-used with the permission of NHS Digital. All rights reserved.)



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visit our website: www.GettingItRightFirstTime.co.uk
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The full report and executive summary are also available to download as
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