Meeting paediatric needs through surgical hubs: experiences and insights from two NHS centres

British Journal of Healthcare Management

Foreword

In April 2024, I had the pleasure of chairing a roundtable discussion with 12 NHS leaders from across the UK, sharing ideas and learnings from their experiences of setting up and running surgical hubs. A key question posed by the group was: how can this model be applied to paediatrics?

This was not only an important issue for those present at the roundtable, but also for the wider healthcare system. While pre-pandemic paediatric elective care tended to see better trends across a number of metrics compared to adults, children's services have generally experienced a slower recovery. The physical, educational and psychosocial impact of waiting for care, both on the child and their family, must not be underestimated, nor should the potential implications for the future of society.

Surgical hubs, which provide ringfenced resources for elective care, have shown substantial benefits, and the application of this model to paediatrics is being increasingly encouraged by bodies such as Getting It Right First Time. However, children's care brings some special considerations, particularly when planning and implementing the physical spaces for paediatric surgical hubs. These include special equipment, child-friendly designs and safeguarding, as well as the universal considerations for optimal surgical hub facilities, such as patient flow, safety and efficiency.

Yet, paediatric surgical hubs are both possible and, in many cases, essential. This article highlights the importance of prioritising paediatric elective services, not only in their recovery from the COVID-19 pandemic, but also for the wellbeing of children and families in the future. Two examples are presented of trusts that have been able to establish a successful paediatric surgical hub model. Although the two approaches differ, they show that solutions can be found, with some creative thinking and the right expertise.

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Introduction

In July 2024, NHS Providers published their 'Forgotten generation' report, based on a survey of healthcare leaders working in services for children and young people across 95 NHS trusts, covering all UK regions. This included data showing that 362,900 people were waiting for paediatric care in England as of May 2024, representing an increase of 105,500 since 2021 (NHS Providers, 2024). Shortly before this, a freedom of information request made by Deith and Harte (2024) found that 20,000 UK children had been waiting over 1 year for planned treatment. Paediatric specialties with the longest waits include general surgery, trauma and orthopaedics and ear, nose and throat (ENT) services (Department of Health, 2024).

While most elective services were faced with a backlog following the COVID-19 pandemic, paediatric waiting lists are reportedly growing at double the rate of adult waiting lists (Royal College of Paediatric and Child Health, 2024). As children wait longer than ever for hospital appointments and operations, it is unsurprising that the number one recommendation on the Royal College of Paediatric and Child Health's (2024) latest manifesto was 'prioritise child health services'.

Getting It Right First Time (2023) have issued guidance for trusts to improve paediatric elective care, including the use of dedicated paediatric operating days and surgical hubs. However, at a roundtable discussion held in April 2024 with 12 NHS leaders, which was published in the *British Journal of Healthcare Management* (Blackwell-Frost et al, 2024), several participants highlighted uncertainty about how to establish appropriate hub facilities for children.

This report highlights the need for action and discusses key considerations for paediatric elective care, using examples from two surgical hubs in Greater Manchester that have taken different approaches to incorporate children into their model.

Why does paediatrics need more attention?

Paediatric elective recovery has been considerably slower compared to adult services (Getting It Right First Time, 2023). Several key professional bodies, including the Academy of Medical Royal Colleges (2023) and the Royal College of Paediatric and Child Health (2023), have argued that paediatric services have not been sufficiently prioritised by the UK government, while NHS Providers (2024) found that insufficient investment was one of the most commonly cited barriers to timely and safe elective care.

Specialisms with particularly long waiting lists may reflect wider problems affecting children. For example, dentistry has one of the largest paediatric backlogs, with tooth decay being the leading cause of hospital admissions in children aged 6–10 years (Academy of Medical Royal Colleges, 2023). NHS dental care has become increasingly difficult to access – 44.6% of UK children have not seen a dentist for over 1 year, meaning missed opportunities for routine check-ups, education and early intervention (Veal, 2024). This makes them vulnerable to more advanced dental disease, for which many younger children will require a general anaesthetic, feeding the dental surgery backlog.

Slower elective recovery in paediatrics may also be related to logistical issues in this specialism; for example, trusts may feel more confident implementing high-efficiency interventions, such as surgical hub models, in adult services, where operations are often simpler and quicker (Deith and Harte, 2024). Anecdotally, trusts may also have less options for outsourcing or insourcing for paediatric surgery compared to adult surgery. Generally, the pool of private sector providers with the appropriate expertise and equipment for paediatric specialties is smaller, so bringing the resources together for an outsourcing

model to target waiting lists may not be feasible for many trusts. This makes innovation and investment in models for NHS paediatric care even more crucial to prevent poor health outcomes in the future. Indeed, this is what many healthcare leaders and trusts are recommending and trialling across the UK (NHS Providers, 2024).

The social impact of delayed care

For all age groups, long waiting times for elective procedures can be distressing and carry potential health risks. However, delayed surgery can have particularly serious consequences for children, as many interventions must be carried out at specific developmental stages. If these timeframes are not met, the child's cognitive and physical development may be impaired, which has long-term implications for their educational attainment, mental wellbeing and family life (Royal College of Paediatric and Child Health, 2024). For example, children who need a cochlear implant for seriously impaired hearing should have this procedure before the age of 1 year, or their language development can be seriously impacted (Campbell, 2023). In some cases, long waits may even lead to a child becoming 'inoperable' (Deith and Harte, 2024).

Childhood is a crucial life stage: interventions to improve health at this time are typically more effective than those received later in life, while evidence suggests that providing high-quality services to children and young people can prevent ill health during adulthood (NHS Providers, 2024). Even procedures considered clinically 'minor', such as tooth extractions or removal of benign cysts, may have substantial benefits for the child, avoiding the detrimental impact that appearing, moving or eating differently can have on self-confidence and social wellbeing. Timely elective care could help to ensure that children experience typical personal development and are able to achieve optimal educational attainment, which is likely to have a long-term impact on their life chances, as well as how they perceive and interact with healthcare services in the future. Conversely, long waits for elective procedures may harm the child and reduce the scope for early intervention, possibly resulting in more complex and resource-intensive care being required later (NHS Providers, 2024).

It is also important to remember that children are not independent individuals – they both affect and are affected by their parents, wider family and schools. As well as the psychosocial impact of having an unwell child, a hospital admission can have financial implications for the family, who may need to pay for transport, food and drink, accommodation and parking, as well as care for other children (Costa et al, 2023; van der Velden et al, 2024). In van der Velden et al's (2024) study, 44.6% of participating families also reported a loss of earnings during their child's admission. Although this study focused on acute admissions, similar costs would likely apply to planned care, particularly if a last-minute cancellation led to wasted transport or childcare costs.

These costs would likely affect lower-income families the most. Therefore, timely, high-quality paediatric care has implications for health inequalities, both for individual families and on a wider societal level. Difficulties accessing services can be both a result of and a contributor to health inequalities. In areas of high socioeconomic deprivation, long waits can lead to a cycle whereby higher demand leads to delayed access, resulting in worse outcomes, poorer health and yet more demand (NHS Providers, 2024).

Investing in paediatric elective care recovery and building sustainable models for planned procedures can be seen as a long-term strategy to prevent future problems at the individual, local and wider societal levels. The true monetary value of this can be hard to quantify. Back in 2013, the chief medical officer's annual report estimated that interventions delivered early in a patient's life

could give an annual return on investment of 6–10%, while helping to reduce the £4 trillion spent on preventable health and social outcomes for children and young people (Strelitz, 2012). However, it is also important to consider the wider impact of a childhood spent in optimal health, including reduced need for adult healthcare services and the ability to contribute fully to the workforce, public services and social community.

Approaches to paediatric surgical hubs

Adding mobile infrastructure
The Starlight Centre, Wythenshawe Hospital

A mobile theatre was added beside the children's ward at Wythenshawe Hospital in March 2020 to create a ringfenced facility for elective paediatric surgery. This surgical hub, known as the Starlight Centre, can be used by various specialties, including those with very high demand, such as ENT. The centre also provides minor plastic surgeries and some general surgery, concentrating on children with an American Society of Anaesthesiologists (ASA) classification of 1 or 2 (low complexity).

The decision to create this additional capacity was based on the need to reduce waiting times for children across the wider trust. Planning for the Starlight Centre began before the COVID-19 pandemic, as the trust had already recognised the need for a protected resource for paediatric elective surgery. However, like many sites, Wythenshawe Hospital's footprint had gradually expanded over many years, leaving very limited space for a new theatre suite. To solve this issue, the trust procured a bespoke mobile theatre, provided by Vanguard Healthcare Solutions (Gloucester, UK), which was installed beside the children's ward. This laminar-flow theatre has its own storage areas and is attached to the hospital via a specially built corridor. The design aims fit this extra capacity into the existing hospital footprint, while maintaining connectivity with the main building (Figure 1).

Efficiency and productivity

As a ringfenced resource for elective care, the Starlight Centre's model allows a high number of operations to be performed in a single theatre. This system helps teams to work through lists more efficiently than in main hospital theatres which, in turn, provides more timely access to care. Diverting less complex cases to the hub also helps to free up capacity in main theatres for more complex patients.

In August 2024, 129 children were treated in the centre – the specialisms and number of cases per day for this month are shown in Table 1. The hub also carries out an annual 'super week' to target high-volume waiting lists; this is a similar ethos to the 'super days' recommended by Getting It Right First Time (2024). During the 2023 super week, 63 children underwent an ENT procedure in the Starlight Centre over a 5-day period.

The higher activity levels possible in the hub are largely a result of efforts to optimise patient flow. For example, one of the main sources of wasted time in surgery is the process of transporting patients to and from operating rooms. Placing the mobile theatre next to the ward circumvents this issue, substantially improving patient flow and ensuring a smooth process for the patient and their family.

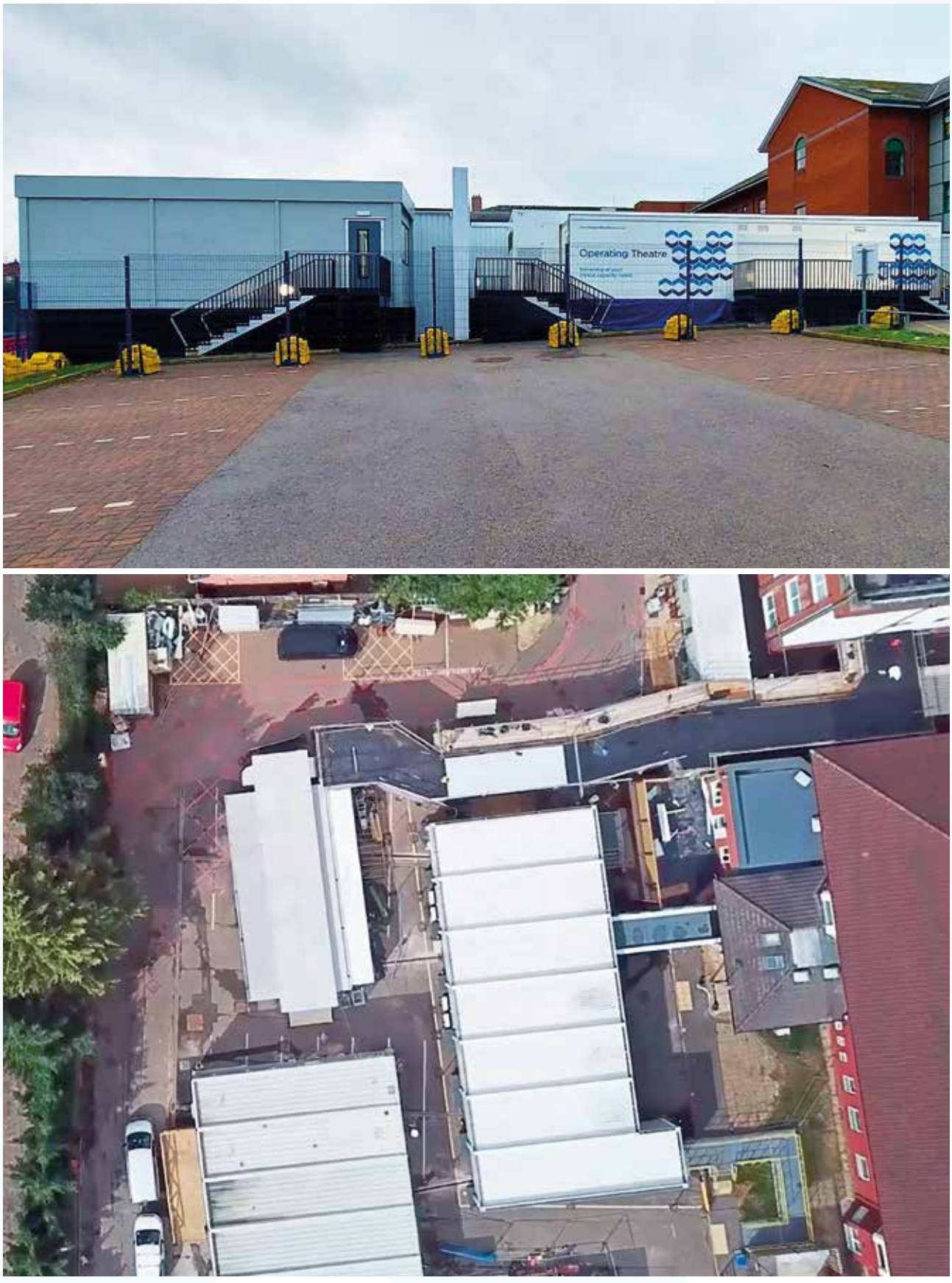

Figure 1. Exterior of the Starlight Centre at Wythenshawe Hospital.

Table 1. Surgical procedures performed in the Starlight Centre's theatre in August 2024 (n=129) and cases per day, by specialism

Specialism	Total cases	Cases per day (range)
Ear, nose and throat	53	8–10
Endoscopy	24	4–9
Plastic	19	5–8
General	17	5–7
Urology	16	3–5

Balancing separation and safety

Like many surgical hubs, an important challenge in the design of the Starlight Centre was to guarantee the delivery of safe care, while keeping a degree of separation from acute activity. As the centre uses a standalone theatre, it is not impacted by issues that may arise in other theatres – the Starlight Centre has regular, ringfenced staff who cannot be reassigned elsewhere. This not only helps to optimise flow in the hub, it also creates a strong sense of focus among the surgical team, with all staff being able to work towards one common goal, without distractions.

However, this separation from the main theatres does bring a sense of isolation that clinical teams and managers must be aware of. Safety was the biggest priority in the implementation of the hub, both in terms of design and list planning. Surgeons working in the centre check all their patients, including pooled waiting lists, to ensure that they are suitable for the hub. Strict criteria are used to guide these decisions. For example, to undergo an operation with a general anaesthetic in the centre, patients must be aged over 1 year and be eligible for day-case surgery. Surgeons may require some additional preparation time to carry out these checks, but this can be balanced against the opportunity to provide access to safe care for more patients.

From a design perspective, the location of the mobile theatre was chosen to ensure appropriate proximity to relevant support. Although only one surgeon and anaesthetist may be working in the Starlight Centre, support from their specialty will be available in the main hospital. The mobile facility is equipped to cope with emergencies, with tried-and-tested processes. For example, in a recent case where a patient went into laryngospasm (a common complication of general anaesthetic) in the hub, the anaesthetist pulled the emergency buzzer and large team arrived very quickly to provide support. This reassured the clinicians and resulted in a positive outcome for the child.

Creating appropriate spaces

To function well, a paediatric surgical hub needs to provide an environment that reassures patients and their families, and instils confidence in staff. The mobile unit was installed with additional infrastructure, including a bespoke corridor to link it with the main

building, making it indistinct from the main hospital footprint. This design element is important, as the journey from ward to theatre can often be the most anxiety-provoking time for children and their families. The corridor is decorated with an under-the-sea theme to provide calming stimulation for patients, while the integrated feel of the unit aims to avoid any potential concerns among parents.

The ability to run regular, reliable lists in the Starlight Centre also allows the trust to provide more certainty to parents, as on-the-day cancellations are far less likely than in main theatres. This has additional benefits for staff morale, allowing them to work efficiently and avoiding difficult conversations with families about last-minute cancellations. Because of this, the centre is frequently used for training, offering a dedicated theatre list and one-on-one time with a consultant. This is seen as highly beneficial, both for current trainees and future paediatric patients.

Converting space for paediatric days: Chorley Elective Surgery Hub, Chorley and South Ribble Hospital

Since June 2023, five theatres at Chorley and South Ribble Hospital's adult surgical hub have been converted into a paediatric facility for 1 day, once per fortnight. While half of the hub remains an adult centre, the other half becomes a paediatric day-case ward with five dedicated theatres, before being reverted back at the end of the day.

During the COVID-19 pandemic, emergency department expansion into the day-case unit at neighbouring Royal Preston Hospital significantly reduced elective capacity at the trust. Efforts to consolidate elective activity at the Chorley site expanded as part of the pandemic response. However, waiting lists for paediatric surgery were recognised as an ongoing challenge, hence the decision to implement these 'paediatric days' at the Chorley surgical hub, which has been accredited by Getting It Right First Time.

The surgical hub has operating theatres in two zones, each with its own entrance. During the paediatric days, one theatre zone is allocated to paediatrics and the single large recovery area is divided using a screen. Six paediatric consultant anaesthetists from Royal Preston Hospital attend the hub – one for each of the five theatres and one to act as additional support. The space provided by the hub allows the trust to treat more children and bring the skills of different paediatric clinicians together.

Increasing productivity

The fortnightly paediatric days have allowed the trust to increase their average paediatric elective activity from 142 to 185 operations per month, representing an average increase of 43 per month. This has been achieved not by increasing the number of sessions, but by consolidating them into 1 day. Surgeons, anaesthetists and nursing staff come from Royal Preston Hospital, so initial investment was only required for additional paediatric surgical equipment. This model allows the trust to provide more paediatric operations by using existing resources.

The paediatric days have run consistently since they began in June 2023. Over time, the types of procedures offered on these days have expanded. This is done gradually and incrementally to allow continuous monitoring for any issues that could arise from an additional procedure being introduced to the hub.

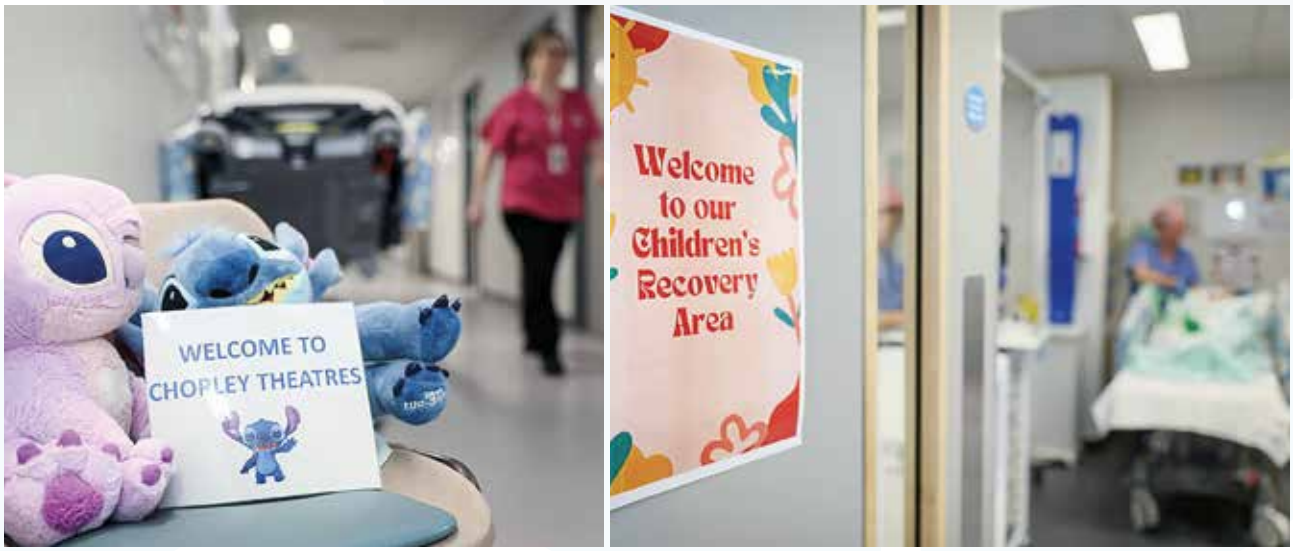

Figure 2. Child-friendly décor installed during the paediatric days at Chorley Elective Surgery Hub.

Creating a safe and appropriate environment

A large amount of planning and consideration was needed to make the hub environment safe and appropriate for children. The day-case ward is converted from an adult to a paediatric space, including decorative changes such child-friendly signage (Figure 2). Royal Preston Hospital provides paediatric nurses, play specialists and play equipment, while specialist clinical equipment and surgical trays are stored at the hub.

As Chorley and South Ribble Hospital does not have acute paediatric facilities, a list of appropriate procedures for the hub was carefully developed, alongside a specific set of exclusion criteria. The additional anaesthetist remains at the hub until the last patient is discharged, and clear transfer policies are in place so that a patient can be admitted overnight at Royal Preston Hospital if they require more recovery time. Similarly, policies are in place in the case of patient deterioration.

Challenges with implementation and future developments

The nature of the initiative meant that very gradual development and implementation was required to ensure buy-in from all stakeholders. Several training and simulation sessions were held during the planning stages, including a 'dry run' of the process and a 'soft start', where paediatric surgical days were trialled in the hub on Saturdays using just one or two theatres. The trust deliberately moved at a cautious pace, partly because of the initial anxiety among teams. However, now that the model is running, staff have become more comfortable and the changeover process from adult to paediatric space runs smoothly.

Key themes and learning points

Despite taking different approaches, both paediatric surgical hubs have been able to work through waiting lists more quickly than would be possible in main theatres, with all experiencing benefits related to efficiency and flow by using a ringfenced resource for elective care. Table 2 shows recommendations from each hub for other NHS trusts looking to introduce or expand paediatric

Table 2. Advice and recommendations from the two case studies for other trusts looking to establish a paediatric surgical hub

Hub	Recommendations and advice
Starlight Centre	Establish an effective patient selection process and have an open mind – although the location is different, in many ways the Starlight Centre's theatre is the same as a normal theatre. Some staff members may be apprehensive, but it is important to look at these solutions so that trusts can provide the best service to patients. Particularly in paediatric hospitals, the winter pressures seem to start earlier and earlier, so having a protected environment that is not affected by the main acute hospital is very helpful. It is also always worth visiting a site that has an established hub to see how it works
Chorley Elective Surgery Hub	Bring everybody who will be involved in the model together at the start of the development process. It will likely be a significant change, so it is important to consider everyone's concerns before implementing the model. It is also crucial to consider any additional equipment that may be needed in a paediatric hub and ensure that the relevant funding can be accessed to invest in this equipment

provision using a hub model. There were similarities in the goals and challenges of the two sites, with the approaches taken providing useful learning points.

Lack of space is a prominent issue for UK hospitals (Gandy, 2020) and this can be particularly challenging for surgical specialties. As has been seen at the Starlight Centre, locating wards and recovery spaces near to theatres can save a considerable amount of time, as well as allowing consolidation of expertise in one area. However, this requires the right space.

New buildings can be expensive, time-consuming and may not fit into the footprint of the hospital. Instead, the Chorley model involves reconfiguring existing facilities, creating space for paediatric provision by temporarily converting an adult elective space. This innovative model is the outcome of a large amount of preparation and, although additional weekday capacity is not currently possible, the trust is planning to trial additional paediatric days at the weekend to extend capacity further. Meanwhile, the Starlight Centre took a different approach, installing a mobile facility to add a dedicated paediatric theatre using as little space as possible. This was a considerable investment, but has created a highly efficient system, especially as it allowed the theatre to be placed next to the ward.

Creating child-friendly environments

Paediatric facilities have specific requirements, including special equipment, play facilities, age-appropriate decoration and the ability to provide family-centred care (NICE, 2021) (Box 1). Both hubs have found ways to meet these requirements. In the Starlight Centre, the use of a high-quality mobile unit that is largely indistinguishable from the main building helps to prevent anxiety among families, while the theatre and connecting corridor were designed to be calming for children going to and from surgery.

At Chorley Elective Surgery Hub, meeting paediatric requirements comes with several logistical considerations, as all clinical and play equipment, as well as decoration, has to be easily inserted and removed at the end of each paediatric day. This has been made possible through careful planning and involvement of all stakeholders, ensuring that equipment can either be stored on site or brought from Royal Preston Hospital.

Box 1. Design considerations for paediatric facilities

Emma Smyth, healthcare architect and head of major projects

Creating a calm environment for children before their surgery is crucial. In adult facilities, there is a tendency towards white and pristine design, as this is typically associated with cleanliness. However, children may find this unfamiliar and anxiety provoking. Therefore, paediatric facilities would benefit from incorporating a 'softer' finish, with features that are more reminiscent of a domestic environment, such as wood-effect flooring and colours. The materials need to be exactly the same as those used for adult facilities for compliance reasons, but can be obtained in a different colour or pattern; this can be beneficial from a hygiene and maintenance perspective, which can help to ensure buy-in from estates teams.

Use of colour is important – this may include stickers, murals, or coloured doors. As well as being visually appealing, colour can also be used to help children orientate themselves in the facility. Younger children typically wayfind using colours, pictures and materials, especially if they cannot read signs, so associating rooms or zones with a particular colour or animal may help paediatric patients feel more secure in their surroundings.

This kind of design can also be used to distract the child, which can help clinicians to carry out assessments and procedures with minimal stress or disruption. For example, a child may be asked to count images of animals on the wall while receiving an injection to prevent distress. Other practical considerations may include smaller chairs and designated waiting spaces for parents and siblings.

There is a legal requirement for paediatric healthcare spaces to be separated from adult spaces. Children have specific needs, while adult wards and recovery areas can be busy and loud, potentially with very unwell patients, which could be traumatic for a child. Furthermore, placing children with adults raises safeguarding issues, as adult patients will not have had the relevant checks. Limitations on space can be a barrier to creating an additional space for children, but both hubs were able to navigate this. The Starlight Centre is a standalone facility that is connected to the children's ward, so it is completely separate from adult spaces. Meanwhile, Chorley Elective Surgery Hub houses both adult and paediatric activity, but has configured the space to divide the specialties.

Managing safety

All surgical hubs must balance the provision of a distinct, ringfenced resource with the need to ensure patient safety. As well as being crucial for patients, a sense of safety can provide a better experience for the family and ensure that staff feel confident and supported. Both hubs have carefully defined patient selection criteria, considering factors such as complexity and age, alongside procedures to ensure that complications can be managed and escalated appropriately.

These examples also highlight how safety can be embedded into the design of the facility. For example, the positioning of the Starlight Centre's mobile theatre considered the need for proximity to appropriate support if the emergency button is pulled, demonstrating how the flexibility of this approach can allow additional capacity to be added safely, despite limited space on the hospital site.

Meanwhile, one of the noted benefits of Chorley Elective Surgery Hub is the ability to bring paediatric specialists together, made possible by the space available at the hub site. This includes one additional anaesthetist to provide support if needed and to stay on site until the last patient is discharged, ensuring that safe care can be delivered throughout the patient's journey through the day.

Limitations

The information in this article is based on reported information from two NHS hospitals, in one area of the UK, but does not provide a formal evaluation or data analysis of these sites. Further research regarding the short- and long-term impact of the surgical hub model on paediatric services is strongly encouraged to corroborate the information reported here and assess how this applies to other areas of the UK. This research should include data on aspects such as safety, cost effectiveness and patient satisfaction.

Conclusions

The examples explored in this report show two approaches to the delivery of paediatric elective care through a surgical hub model. There is a clear need to

ensure optimal lay out in these facilities to achieve the efficiencies needed to bring down waiting lists and deliver timely care to children and young people. This is essential to prevent long-term physical and socioeconomic harm to children and families, which also has implications for wider society. As more surgical hubs are established, and the principles of protecting elective care become more widespread, services for children and young people must be prioritised.

Developing a paediatric surgical hub, or implementing paediatric provision within an existing hub, can bring logistical challenges, especially if the trust is working with limited space, or using facilities that were originally designed for adults. It is important to consider how children and families will experience the hub and make their journey through the space as straightforward as possible.

There are many special considerations for paediatric surgery. While official guidance from bodies such as Getting It Right First Time and the National Institute of Health and Care Excellence is essential, learning from the experiences of existing paediatric hubs can also be extremely useful. It is hoped that the examples described in this report will help to guide other trusts through the implementation and management of a paediatric surgical hub model.

Key points

- Placing increasing emphasis on elective provision for children could have significant long-term benefits for patients, families and wider society.
- Surgical hubs can facilitate more efficient elective care, helping trusts to reduce waiting times and provide timely treatment for children.
- Optimising the layout of a paediatric hub is crucial to ensuring the delivery of safe, efficient and child-friendly care.

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