

medicine for managers

Knowing the business of healthcare
December 2012

Paediatrics

A simple introduction to paediatric services for finance managers, providing a high-level tour of the specialty and introducing the key players, diseases treated and challenges

Foreword



The HFMA, along with others, has been a keen advocate of increasing the financial management knowledge of those delivering and managing healthcare. Improving clinicians' understanding of how the finances work within the NHS has been increasing in importance alongside developments such as the introduction of payment by results, service line management, patient-level costing and, most recently, the establishment of clinical commissioning groups.

But while clinicians' understanding of financial management has improved, what about finance staff's understanding of clinical and service matters? NHS accountants, particularly those supporting clinical directorates, have a key role in contributing to the delivery of high-quality, value-for-money services. But they can only do this properly if they understand the services they support.

Recent HFMA research has underlined this, with clinicians identifying significant benefits to be gained from finance staff developing greater clinical awareness. This understanding – or 'knowing the business', as I have termed my theme for my year as HFMA president – goes beyond a familiarity with the specific language used and includes an appreciation of the key features of the day-to-day provision of services, the key challenges and inter-relationships

with other services, and the likely impact of future technologies and innovations.

The HFMA is therefore developing *Medicine for managers* – a series of briefings that will provide summary information about a range of specialties. The aim is to enhance the knowledge of finance staff and help them to engage with their clinical colleagues with confidence in order to improve quality and efficiency in their organisation together. The objectives are to develop an awareness of:

- The background, role and structure of a specific specialty
- The staff involved in delivering the care
- The epidemiology of the main diseases
- The key financial facts and figures
- Key service challenges
- Potential service innovations and their likely impact.

There is also a list of recommended reading and helpful websites for those who want to explore the specialty in more detail.

This first pilot briefing – which will test out the value of the series – focuses on paediatrics. We would welcome your feedback and any suggestions you may have for future briefings.

Tony Whitfield, HFMA president

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We have gained benefit over a number of years from being a partner of an HFMA Faculty. The ability to debate and share learning with colleagues within the sector has improved what we do as an organisation and as a group of trusts.

Adam Sewell-Jones, Director of Finance and Performance, Basildon and Thurrock University Hospitals NHS FT

Introduction to paediatrics

What is paediatrics?

There are many slightly different terms used to describe the healthcare provided to children.

Paediatrics is the area of medicine that covers medical conditions affecting infants, children and young people. It is a large and diverse specialty encompassing high technology areas such as neonatology and community-based services such as the management of disabled children.

Typically the term 'child health' is used to describe the public health elements of care – for example, vaccinations and health promotion.

Within a hospital setting – the focus for this briefing – paediatrics is often used to describe the totality of services delivered for children aged 0-16 or 18 years. In this context, paediatrics covers both medical treatment, such as for a serious chest infection, and surgical interventions such as a tonsillectomy. Neonatal care is the care provided to babies in hospital shortly after birth.

Some services falling under the paediatric heading continue to be provided after a child reaches 16. Child and adolescent mental health services (CAMHS) are typically provided up to the age of 18 and some organisations have developed services specifically for young people aged 15 to 19.

Why focus on paediatrics?

A wide range of NHS services is provided to children and young people and total NHS spending on children's healthcare has been put at £6.7bn a year. The number of children and young people being admitted to hospital and attending accident and emergency departments is rising. There is a general consensus that a significant proportion of this activity does not need to be provided in a hospital setting and could be managed more efficiently and effectively in the community.

As well as consuming a significant amount of money, the services provided to children have received much scrutiny. High-profile and distressing cases have highlighted significant failures in the NHS (and other) services provided to some children. Safeguarding children's health, wellbeing and human rights and enabling them to live free from harm, abuse and neglect is a key consideration when caring for children. Recent reviews have made recommendations about what should be done to help improve services for children.

Paediatrics is different from other specialties in several ways. For example, children – especially the very young – are often unable to describe symptoms. They also can become very sick very quickly.

The financial picture

Total spending on child health

Several attempts have been made in recent years to estimate total NHS spending on children and young people in England.

In his 2010 report, *Getting it right for children and young people*, Professor Sir Ian Kennedy states: 'Perhaps the most obvious, although somewhat crude, measure of the priority given to children and young people by the NHS is the amount of funding allocated to their care as a proportion of the total funds of the NHS. The total allocation to the NHS is around £110bn. The overall amount spent on children and young people is not clear (which may itself say something) but the Department of Health estimates the figure is around £6.7bn. The Royal College of Paediatrics and Child Health offers the estimate of £3.1bn (2007). The Healthcare Commission put the figure at £3.2bn (2008). The differences may lie in the extent that a service can be disaggregated and the element wholly dedicated to children and young people can be identified.'

Whatever the actual figure is, a review of the latest literature and policy statements on child health indicates there is a view that it is not enough. Improving child health, and increasing the resources devoted to it, needs to be made a priority within the NHS. This view is not unique to child health, as most specialties claim they are underfunded. Professor Sir Ian Kennedy's report called for greater investment in children's services as this will deliver savings through greater efficiency, co-location of services and the joint planning and commissioning of services.

Analysis of spending levels at one primary care trust, undertaken for this briefing, suggested that of its total budget 6.5% was spent on child-related healthcare. Nearly a third of this was spent on inpatient activity. A further 13% covered outpatients and 5% paid for A&E attendances. A further 15% was shared by critical care (2%), neonatal care (10%) and community services (3%). Health visitors and the family nurse partnership service – a preventative programme for first-time mothers offering home visits from early pregnancy until a child is two – accounted for 8% of paediatric spend. The PCT's

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ILLUSTRATION: JAMIEL JAKOB



programme for five- to 19-year-olds consumed a further 9% of total spend. The other key element, child and adolescent mental health services' spending, accounted for 11% of the total.

Some facts and figures

It is difficult to identify overall activity levels for child healthcare. However, Hospital Episode Statistics (HES) for 2010/11 show that paediatrics account for 11.6% of all inpatient activity (nearly two million finished consultant episodes out of a total 17 million). Nearly three quarters of this was concentrated on children aged 0-4. For all these episodes, the average length of stay was 2.2 days.

This length of stay reflects significant levels of day case activity. Also while there are a small number of long-stay patients in general paediatrics, most patients only require a short admission of 0-1 day, with subsequent care managed in the community or through a paediatric ambulatory unit.

There were 8.7 million outpatient attendances involving patients between the ages of 0-19 across all specialty types (not just dedicated paediatric treatment codes). This was almost equally split between 0-9 year olds and 10-19 year olds and represents just over 12% of all outpatient attendances. Just over three million of these were in areas covered by specialist paediatric service codes.

Reference costs offer a slightly different view of activity. The P chapter of the healthcare resource group classifications HRG4 covers diseases of childhood and neonates, with separate subchapters for paediatric medicine and neonatal medicine. Reference costs for 2010/11 record just over one million episodes across this chapter, with around 85% of the activity undertaken non-electively.

Another million episodes are spread across the other surgery/intervention-based HRG chapters that have separate groups for patients aged 18 or younger. There will be further children's activity within other chapters where there is no age-based split, either because the small numbers involved do not make a split HRG sensible or because the treatment of children and adults have similar cost implications.

In terms of outpatients, reference costs only enable analysis of attendances with a specialist paediatric service code. There were more than three million attendances of all types across all attendances with a specialist paediatric service code, with roughly two follow-ups for every first attendance.

NHS services provided to children and young people

NHS services provided are broadly those in primary care, secondary care (mainly hospital based) and in the community and mental healthcare (CAMHS).

Commissioners

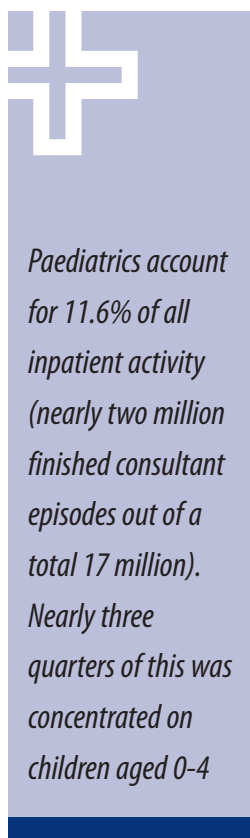
Like health services for adults, services for children and young people will be commissioned by PCTs until the end of March 2013. From 1 April 2013 clinical commissioning groups (groups of GPs) will be responsible for commissioning healthcare on behalf of the people living in their area. This includes most primary and secondary care, whether emergency or elective. Many specialist children's services will be commissioned by the NHS Commissioning Board, with an increasing amount of activity expected to be classified as specialised.

There are a number of challenges facing commissioners of children's health services. These will be discussed later in the briefing, but include the need to improve quality and increase efficiency by reducing hospital activity and improving and increasing services provided in the community. Commissioning services for children can be more complex than commissioning other services because of the linkages and dependencies to other public services such as social care and education.

When making decisions about commissioning healthcare for children and young people, commissioners will use a variety of information sources. In March 2012 the *NHS atlas of variation in healthcare for children and young people: reducing unwarranted variation to increase value and improve quality* was published. The aim of the atlas is to enable commissioners and clinicians to identify where there are variations in performance and whether the variation can be explained.

The atlas contains 27 maps showing performance for a range of indicators, such as percentage rate of accident and emergency attendances per child aged under five by PCT and expenditure on community health services per head of population aged 0-17 years by PCT. Commissioners use the atlas to see where they are out of line from their peers and make decisions about relative investment levels and whether the services provided are the right ones, delivered in the right place and achieving the right outcomes.

The Child and Maternal Health Observatory provided



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some of the data underpinning the atlas and has been mapping variations in child health for several years. It has produced practical tools to tackle unwarranted variation, such as the Disease Management Information Toolkit (DMIT) for long-term conditions.

Primary and community care

The most frequent interaction of children with the NHS is via their GP. It has been estimated that while 80% of childhood illnesses are managed by families at home, in a typical year a pre-school child will see a GP about six times. For a school age child this falls to two to three times a year. Children account for around 40% of a typical GP's workload, but only 19% of the population. A quarter of all the calls to NHS Direct are about children.

Besides GPs there is a range of healthcare professionals that children will come into contact with in the community – for example, dentists, opticians, midwives, health visitors and school nurses. In the community, children may also receive therapy services such as speech and language therapy, physiotherapy, occupational therapy and

dietetics. They are typically provided by a range of professionals, usually as part of a multidisciplinary team. The care will be provided in GP practices, health centres, children's centres and sometimes in schools too.

Where a child has ongoing complex healthcare needs, such as neurodisabilities or social and communication disorders, their care will be overseen by a community paediatrician. It is a highly specialised role and involves the co-ordination of complex community-based care.

Children and young people with mental health problems will also use CAMHS. These services are mostly based in the community and specialise in providing help and treatment for children and young people with emotional, behavioural and mental health difficulties.

Secondary care

Children account for nearly 12% of inpatient episodes and 12% of outpatient appointments *. About a quarter of those attending A&E are children. Some larger hospitals have paediatric A&E

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* HES data 2010/11 inpatient activity (ages 0-14), outpatient attendances (0-19)

COMMUNITY PAEDIATRICIANS

Community paediatricians do not usually deal with one-off, short-term illness, but offer long-term support, co-ordination of services and continuous management to many children with special needs such as a disability or long-term illness. Community paediatricians are consultants and have expertise in the following areas:

- Children with developmental difficulties or disability
- Safeguarding children, including identifying cases of abuse, medical assessment and management, attendance at case conferences and other key meetings, preparing reports for the police and the courts, attendance at court, monitoring children on the Child Protection Register and active participation in Child Protection Committees
- The impact of health problems in educational settings, including supporting parents, children and teachers where there are physical, medical or behavioural problems and participating in and preparing reports for the statutory assessment of children
- Children with autistic spectrum disorders and complex learning difficulties
- Children with behaviour difficulties, such as ADHD
- Children living in special circumstances – for example, children looked after by the local authority, asylum seekers and providing medical input to the adoption process.

Often paediatricians work in geographical patches so that they have excellent links with the schools and other services in their area. Each paediatrician will cover a number of schools.

Referrals to the community paediatric service can be made by a

range of professionals working with children. For example, GPs, health visitors, speech and language therapists, physiotherapists, occupational therapists, education and nursery staff, hospital paediatricians, social workers, clinical and educational psychologists. Children may be seen in a variety of settings including outpatient clinics, schools, health centres, GP surgeries, children's centres, play groups and nurseries.

The community paediatricians work closely with the therapists who serve the same area (physiotherapists, speech and language therapists, occupational therapists, learning disability teams and CAMHS) and with the hospital-based paediatricians. They also have good links with social services and education.



Further information on community child health is available from the British Association for Community Child Health (BACCH), which promotes and protects the good health of children and their families in their communities (www.bacch.org.uk).

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departments that operate alongside the main A&E department. This is because of the specialist nature of treating children, who can become ill very quickly.

Paediatric services in the UK are all considered to be specialist services. However, they can be broadly split into the general children's services delivered through local hospitals and community services and those delivered in specialist centres.

Some facilities – dedicated children's hospitals or general hospitals with specialist children's units incorporated – deliver the whole range of children's services from the very general to the highly specialised. In other areas local hospitals will provide a basic paediatric service and then either transfer or refer more complex cases to specialised, tertiary providers. Some very specialised services are concentrated in just a handful of specialist centres – paediatric epilepsy surgery, for example, is performed in just four specialist centres.

In fact, for a number of paediatric services there is a trend towards the concentration of activity in

specialist centres – or for specialist teams to be sent out to undertake sessions in local units. For example, it is getting rarer for surgery on very young children to be undertaken in district general hospitals. However, the threshold (below which all surgery is undertaken in specialist centres) is a local decision.

For some services the centralisation process is being driven nationally. The announcement in 2012 that children's cardiac surgery would be concentrated in just seven centres, rather than the existing 11 surgical centres, was the result of a formal three-year review. However, in October 2012 secretary of state Jeremy Hunt announced a review of the decision-making process. The findings are expected to be reported in February 2013.

In general the concentration of services in specialist centres is driven by safety and quality issues. In particular, it recognises that clinicians need to have sufficient patient flows and casemix to establish and maintain the necessary skills across different procedures. For example, standards for paediatric cardiac surgery suggest a minimum of four

CASE STUDY 1: ALDER HEY CHILDREN'S NHS FOUNDATION TRUST

Alder Hey Children's NHS Foundation Trust is one of only four stand-alone paediatric trusts in the UK. Its 2,800 staff provide care for more than 275,000 children and young people each year from its main hospital at West Derby in Liverpool, a mental health facility in Sefton and more than 40 community outreach sites – as well as contributing to clinic sessions across the north west. It acts as a general children's service provider for its catchment area as well as delivering specialist tertiary services.

About 30% of its £164m patient care income (2011/12) relates to non-specialised services, while 70% was specialised. It manages its full range of services within six clinical business units or service lines:

- Medical specialties – such as respiratory medicine, rheumatology, nephrology, metabolic diseases, gastroenterology and oncology
- District services – including A&E, general paediatrics, diabetes, dermatology and child and adolescent mental health services
- Critical care and cardiac services – including cardiology, cardiac surgery, intensive care and burns
- Neurosciences, head and neck – including ENT, ophthalmology, neurosurgery and neurology
- Surgery, orthopaedics and theatres – including general surgery, urology, orthopaedics and plastic surgery
- Clinical support services – including radiology, pathology, pharmacy and therapies.

In addition to almost 60,000 A&E attendances, the trust also had nearly 40,000 inpatient episodes (60% elective) and just short of 150,000 outpatient appointments (30% of them first appointments). There are also significant numbers of community and mental health

contacts on top of this basic activity count.

The vast majority of the trust's £64m elective and emergency inpatient income (57% elective) is split across five of its business units (clinical support services account for just £1m of this income), with the surgery unit attracting nearly a third of the total (£21m). Together medical specialties (£15m) and neurosciences, head and neck (£11m) account for a further 40%.

Between them medical specialties (11,500 episodes) and surgery (10,200) account for more than half the inpatient activity. In medical specialties, oncology accounts for just under a third of all episodes.

● *Appendix 2 on page 25 provides a detailed description of the rheumatology service provided by Alder Hey*



WORKING WITH OTHERS

Social services

Children and young people who need both health and social care include those with a disability or long-term condition, those who are looked after and those who are potential or actual victims of physical, mental or sexual abuse or neglect. The links between NHS organisations and social services need to be suitably robust and aligned if the child or young person's health and well-being are to be maximised. A particular feature of these links is the importance of sharing information between professionals.

Education

Children and young people with health problems often require help to enable them to start or continue education – vital if they are to fulfil their potential and live as independently as possible as adults.

Children and young people with long-term conditions or complex needs can be supported in school through specialist equipment and treatment, often supported by community children's nursing teams or school health teams.

Police and criminal justice

The NHS works with the police in relation to safeguarding and caring for vulnerable children and young people, including those who offend against the criminal law as well as those who are victims of abuse. A large proportion of young people in the criminal justice system have a significant need for healthcare, especially in relation to mental health.

- This is an extract from Professor Sir Ian Kennedy, *Getting it right for children and young people: Overcoming cultural barriers in the NHS so as to meet their needs*, September 2010

A big area of development is within community paediatrics. . . This mirrors developments across broader health services to move services closer to patients



consultant congenital cardiac surgeons are needed per unit ideally undertaking a minimum of 500 paediatric procedures in each unit.

While the challenges have been pronounced for cardiac surgery, NHS providers report more general difficulties adequately filling other medical rotas, with a newer generation of surgeons and anaesthetists less able to treat a younger casemix.

Many believe service configuration must change further. The Children's and Young People's Health Outcomes Forum, set up to identify how each part of the health system could contribute to better outcomes, called for the NHS Commissioning Board to ensure there is a 'nationally designated, strategic managed network for children and young people'. It acknowledged that achieving this would mean 'services will have to change: some will be re-designated and others will close'.

The co-dependency of some services also means centralising some activities has a knock-on effect. For example, a paediatric oncology service requires co-location with clinical haematology, specialised paediatric surgery, paediatric critical care and specialised paediatric anaesthesia, but also has close relationships with respiratory medicine, neurology, neurosurgery and nephrology*.

A big area of development is within community paediatrics. Community paediatricians often see children in clinics or their homes – such as those with long-term disabilities such as cerebral palsy, mental health issues, delayed motor skills, growth issues and feeding concerns.

These developments mirror those across broader health services to move services closer to patients and manage patients more proactively to avoid worsening of health and unnecessary hospital admissions.

Those children admitted to hospital are cared for by multi-disciplinary teams and for the younger children, parents and carers play a key role in providing care. The types of conditions treated and the various clinicians involved in the treatment of children in hospitals are considered later.

Case study 1 (left) provides an overview of a foundation trust solely providing paediatric services.

Relationships with other services

NHS organisations and healthcare professionals are required to work collaboratively with other statutory bodies responsible for the health and wellbeing of children. The most important links are with social services and education.

* *Commissioning safe and sustainable specialised paediatric services*, www.dh.gov.uk

TRAINING TO BECOME A PAEDIATRICIAN

- The route to becoming a paediatrician starts at a university medical school.
- After successful completion of a medical degree, the two years following medical school will be spent by a newly qualified doctor in the foundation programme. The foundation programme is a generic training programme giving trainees the opportunity to experience a number of medical and surgical specialties to bridge the move from medical school to specialty training.
- A doctor will specialise in their chosen specialty after completing the foundation programme. Paediatrics is a competence-based training programme that generally takes eight years to complete. It is a run-through programme, so the years of training run continuously, dependent on satisfactory progression.

Source: Royal College of Paediatrics and Child Health

Who is involved in providing hospital-based paediatrics?

Many different professionals are involved in giving hospital care to children. In addition to doctors and nurses, parents and carers have an important role to play and often stay in hospital with their child, particularly if the child is young or has special needs. As well as providing emotional support, parents can, under the guidance of professionals, be involved in the delivery of care. This can make the experience

easier for children and help to develop the skills of primary carers. The different professionals providing paediatric secondary care are considered below.

Paediatricians

Doctors specialising in the care of children are called paediatricians. There are 3,084 whole-time equivalent consultant paediatricians working in the UK. The work of a paediatrician can be complex, emotionally challenging, but highly rewarding. The Royal College of Paediatrics and Child Health (RCPCH) is responsible for training and examining paediatricians in the UK (see left). It also conducts research and issues guidance on paediatrics. The RCPCH recommends doctors considering paediatrics should:

- Be good communicators who enjoy working with children, young people and their families
- Have a good sense of humour
- Have the potential to make a good diagnosis – important because infants and children often present with illnesses they cannot describe
- Be emotionally resilient, patient and sensitive when managing critical illness or disabilities in infants and children.

A doctor will train to become a paediatrician after

DR BOB KLABER, CONSULTANT PAEDIATRICIAN, IMPERIAL COLLEGE HEALTHCARE NHS TRUST

“ Treating children is very different from treating adults. Children can get sick very quickly, but they also get better quickly too. Very young or very sick children are unable to describe how they are feeling, so paediatric medicine is often more focused than other specialties on observing the patient, reviewing their history and undertaking tests. The breadth of medical knowledge required is huge and I find it intellectually challenging and very rewarding.

Supporting families and acting as an advocate for children is an important part of my role. Sometimes communication can be a challenge. You have to find a way of communicating with both the child and their family and involve them in the decision-making process.

Paediatrics is a multidisciplinary specialty. We work in teams, including nurses, therapists and medics from other specialties and rely heavily on each other.

I am one of the seven consultant general paediatricians working at Imperial. We have two types of working week: ‘hot’ weeks, which others may call ‘attending weeks’ or ‘on call’ weeks; and other weeks comprising of outpatient clinics



and other non-clinical work. During hot weeks I am responsible for all paediatric inpatients on the general paediatric wards, alongside a team of junior doctors. The patients are seen on twice daily consultant-led ward rounds. I am usually only called out at night if there is a safeguarding issue, serious staffing matter or there is a deteriorating child. At Imperial we try to work closely with local GPs and encourage them to ring us if they would like advice about one of their patients – for example, whether they should be referred to us or not. During hot weeks I am responsible for responding to these queries.

The ‘other’ weeks are usually taken up with:

- Outpatient clinics, both within the hospital and at other sites such as GP surgeries
- Attending multidisciplinary meetings
- Undertaking clinical audits, quality improvement projects and research
- Management activities such as recruitment and attending monthly business meeting
- Safeguarding meetings
- Managing training programmes and educational initiatives.

Being a paediatrician requires emotional resilience. It is a huge privilege but it is also a significant responsibility. When a child is ill, families let you into their lives in an unconditional way. They trust you to do everything possible to keep their child safe and make them better.

”

completing the foundation programme. One consultant paediatrician, from Imperial College Healthcare NHS Trust, gives his views on his work (see facing page, below).

Other medics

In addition to consultant paediatricians, there are other consultants who deliver services to children. For example, the Royal College of Surgeons identifies paediatric surgery as one of nine surgical specialties. It says there are 150 paediatric surgeons, including urology surgeons. However there will be surgeons within its other specialties (cardiothoracic surgery, for example) who operate only on children. Similarly there are specialist paediatric anaesthetists.

Some medics with expertise in a number of different specialties will provide care to adults and children. They will work alongside the paediatrician when the patient is a child as part of a multidisciplinary team. Usually the paediatrician will be the lead clinician and will be responsible for the coordination of care.

Paediatric nurses

A paediatric nurse works with children with a range of different conditions in hospitals, a child's home, school or other community settings. Paediatric nurses are required to register with the Nursing and Midwifery Council. They care for children while working alongside their families and other healthcare professionals. As with doctors, paediatric nurses need to have a good understanding of children's medical and emotional needs at all ages to be able to plan and deliver the right care. They need good communication skills to be able to explain medical terms so that children can understand.

Nurses may be responsible for practical activities such as making and reporting observations on a child's condition; helping to prepare patients for operations; or setting up drips and administering intravenous drugs. They also play a crucial role in looking after young patients and their families by helping to explain treatments, provide comfort and offer support and advice. The key skills that paediatric nurses require include emotional resilience and sensitivity, the ability to work with others and good listening skills.

Allied health professionals

Allied health professionals provide valuable support to the paediatric healthcare team in many different roles. For example art, drama and speech therapists can work with children to develop their physical, mental or emotional wellbeing; dietitians and

nutritionists can support those with special dietary requirements and physiotherapists can help children and young people with physical disabilities.

Other staff groups

Other staff groups provide valuable input to the provision of paediatric services. This includes those providing support services such as diagnostic services, theatre staff and facilities and estates staff. Management staff are also important. Management structures will differ from organisation to organisation, but typically paediatric services are managed in the same business unit as women's services, such as gynaecology and obstetrics. Most trusts will have a dedicated finance manager who is responsible for providing financial support to paediatric services. These posts can be based in the business unit itself or within the finance department. How this works at Imperial College, which has an annual income of £980m and employs 9,500 staff, is described below.

ANNIKA CARROLL, HEAD OF FINANCE: WOMEN'S AND CHILDREN'S SERVICES, IMPERIAL COLLEGE HEALTHCARE NHS TRUST

“ I provide financial advice and support to the women's and children's clinical programme group (CPG) and am supported by a deputy head of finance and two senior management accountants. The CPG has an annual budget of £82m. Women's and children's services include maternity (on average 9,400 deliveries a year), gynaecology, reproductive medicine, neonatology and paediatrics.

The division of paediatrics provides a wide range of specialist and general services for children. Each year the trust has more than 37,000 paediatric outpatient appointments and treats about 25,000 children in the 24-hour paediatric accident and A&E department. Each CPG has a head of finance with a supporting team who is professionally accountable to the chief financial officer, but managerially to the clinical programme director. We are implementing the Building World Class Finance programme to transform our business processes and to improve our financial management arrangements and the service we deliver to our business partners across the trust.

The finance issues at Imperial are similar to those in other NHS trusts. Making the required efficiency savings is challenging. We have a trust-wide cost improvement target of 7% in 2012/13 and are looking at a range of measures to help us improve efficiency, from traditional cost cutting to service reconfiguration.



Developing and improving forecasting and service line reporting is essential in supporting our business decisions. In paediatrics alone we have 24 service lines due to the number of specialties, which is challenging. I thoroughly enjoy working within the CPG and the paediatric division. My clinical colleagues are among the best in their field and are innovative and personally committed to improving the services we deliver in a challenging financial climate. ”



Current models of secondary care, costs, key diseases and conditions treated

Most paediatric healthcare is provided at home by patients and carers, with support from GPs and other primary care professionals when required. However, in 2010/11, reference costs suggest there were around two million paediatric hospital episodes, costing a total of £1.6bn (including activity easily identifiable as paediatric) in addition to significant amounts of critical care and outpatient activity.

Mirroring pressures in the delivery of services to adult patients, the treatment of paediatric chronic diseases is a particular challenge. There are chronic diseases within each paediatric sub-specialty, a small list of which would include asthma, cystic fibrosis, epilepsy, arthritis, congenital heart problems and chronic kidney disorders.

The treatment of these diseases and conditions can present different challenges to the more acute or episodic aspects of medical/surgical interventions. Treatment and support (for children and their families) can span many years and make a major

contribution to a child's health and quality of life as well as economic cost. Many of the services involve the coordination of care and support across primary, community, secondary and tertiary sectors.

There are three main routes to being admitted to hospital: referral by a GP; via A&E; or by a tertiary referral from a consultant in another hospital. In general the majority of admissions are emergency admissions. The level of emergency admissions can be affected by a number of factors. The most significant are the ease with which parents can access primary care services and the skills, experience and confidence of primary care professionals.

Children admitted to hospital will be under the care of a consultant paediatrician. Depending on the nature of the child's illness, it might be necessary for additional specialists to be involved, particularly when surgery or more complex specialist issues such as neurology are involved. Some larger hospitals will have specialist paediatricians – for example, paediatric cardiac surgeons and those specialising in neonatal care.

CASE STUDY 2: UNIVERSITY HOSPITAL SOUTHAMPTON NHS FOUNDATION TRUST

University Hospital Southampton NHS Foundation Trust provides general children's services for its local population and specialised children's services for the south west. It is also a national provider for the rare inherited condition of primary ciliary dyskinesia.

Income from paediatric activity at Southampton amounts to £38m, about 10% of its overall income of £400m. Paediatric activity breaks down into just over 10,000 elective inpatient admissions, 11,000 non-elective admissions and just over 5,000 outpatient procedures. In addition, the trust records nearly 6,000 days in critical care, sees about 26,000 children in A&E and has nearly 75,000 attendances at outpatients (two thirds as follow-ups).

Children represent 23% of A&E attendances, 20% of elective inpatients, 22% of non-electives and 10% of outpatient procedures. Across all activities children's services account for nearly 20% of total activity.

The trust's 7,500 staff include more than 1,000 medical staff, 2,500 nurses and about 1,300 healthcare assistants and support staff. This includes 400 consultants, with 68 dedicated paediatric consultants and four staff and associate specialist doctors. Most paediatric consultants work solely on delivering services to children. However, cardiac and neurology consultants, dictated by the lower activity numbers, tend to work across both adult and paediatric patients.

In addition, the trust has 11 specialist paediatric consultant anaesthetists, with six of its 11 cardiac anaesthetists also sub-specialising in paediatric cardiac anaesthesia. Some specialist anaesthetists cover both adults and children's services – an

additional nine neuroanaesthetists provide anaesthesia for the whole range of elective and emergency neurosurgery and spinal surgery in adults and children.

Physical environment

All children are treated in dedicated children's wards. The trust's 140 paediatric beds include for example 10 in the paediatric assessment unit, 20 in the medical unit, 20 in trauma, orthopaedics and spines, 14 in surgery and ENT, and 16 in cardiac surgery and cardiology.

Currently children's services are mostly delivered in a separate wing although there are plans to build a dedicated children's hospital. Theatres are also largely dedicated to either adult or paediatric activity, in part reflecting the different equipment needs in children's theatres.

Key service lines

Three-quarters of Southampton's paediatric income is spread across five main service lines:

- General paediatric, £7.5m – the activity typically undertaken by a district general hospital
- Paediatric trauma and orthopaedics, £7.8m
- Paediatric general surgery, £7.4m
- Medical oncology, £2.7m
- Cardiology, £2.6m.

Within general paediatrics, one of the most common inpatient episodes is viral infections – which group to HRG PA19, split by

Care plans will be developed by a multidisciplinary team, who with the child's parents will share the decision-making. The members of the multidisciplinary team are considered on page 9.

There are three main areas of illness that drive admissions: problems with skin, such as eczema; problems with breathing, such as asthma and respiratory tract infections; and diarrhoea and vomiting. A more detailed analysis is set out on page 12. Unsurprisingly, younger children are more frequently admitted to hospital.

Case study 2 below summarises University Hospital Southampton NHS Foundation Trust's approach to the provision of children's healthcare and some of the common conditions treated.

Understanding the costs

The Kennedy report in 2001* debunked the view that children were 'small adults, who simply need smaller beds and smaller portions of food'. There is now broad recognition that children are different to adults and need distinct, tailored services. There is also recognition that this can have an increased cost.

Children's services are often more expensive than delivering equivalent treatments to adults for a number of reasons. Capital and infrastructure costs can be higher. For example, many pieces of equipment need to be in non-standard sizes and will need to be able to cope with patients ranging from tiny babies to teenagers. Drug volumes often have to be calculated and prepared specifically for each child, making for higher pharmacy costs than with adult patients. Pathology costs are also often higher, often because tests have to be undertaken manually rather than automated. Dedicated play specialists are employed on wards and in outpatient areas. And children's wards often have higher staffing ratios than many adult wards.

These differences in cost between children's and adult services are broadly reflected in the tariff. There is a dedicated childhood and neonatal diseases chapter within the HRG4 currency (chapter P), meaning that the costs of treatment in these activities can be captured and used to set prices that on average reflect costs. However, this covers solely medical activity. Paediatric surgery is covered within the various other speciality chapters, where

** Learning from Bristol: the report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary, 1984-1995*

length of stay being under or over one day. Across England in 2010/11, reference costs record more than 65,000 of these episodes, with nearly 90% of them resulting in an inpatient stay of one day or less. Southampton last year recorded nearly 800 episodes within this category (one day or less) – its highest volume HRG within the general paediatrics service line. Almost all this activity is likely to be non-elective, coming in via A&E or emergency referrals via GPs.

The vast majority of these patients presenting at A&E will be assessed, given advice and assurance and sent home. In some cases, children will be admitted to be monitored. This will in most cases be a short-term admission while more serious causes are ruled out.

Dr Peter Wilson, clinical director for child health at Southampton, says there is no clear dividing line between paediatric care that can be delivered in a secondary setting and that which needs a more



specialist, tertiary environment. 'There are some of the HRGs in the PA sub-chapter that can clearly be identified as general paediatrics,' he says. But in other cases it will depend on the complexity. PA12Z (asthma and wheezing) is a good example of a group that could include cases treated in a district general hospital and those seen in a specialist centre. Neonatal activity (sub-chapter PB) in fact only identifies three groups covering all activity (major neonatal diagnoses and minor neonatal diagnoses and group for healthy babies), yet Dr Wilson says there will be fundamental differences in the services provided in secondary and tertiary environments. For instance, a neonatal intensive care unit in a district general hospital may only support premature babies from 30 weeks' gestation. In specialist children's centres, this will be 23 or 24 weeks.

Dr Wilson says the structural changes in commissioning will mean a change in how money flows for paediatric care. 'Under the current or old system about 80% of our paediatric income at Southampton came from primary care trusts, with the rest coming via specialised commissioning groups,' he says. 'Under the new arrangements this will reverse with about 80% coming via the NHS Commissioning Board and 20% locally from clinical commissioning groups.'

There will be a continuation of the trend for more services to be moved out of district general hospitals and into specialist children's centres, he says, but at the same time he anticipates a rationalisation of children's specialist centres. This will be along service lines, with an increased number of specialised services being concentrated in a smaller number of specialist centres.

MORE ON HRGS

Five of the most common HRGs are looked at in greater depth in

Appendix 1 on page 20:

- **PB02Z** Minor neonatal diagnoses
- **PA19Z** Viral infections
- **PA11Z** Acute upper respiratory tract infections and common cold
- **PA21B** Infectious and non-infectious gastroenteritis without complications
- **CZ02T** Intermediate mouth procedures 18 years and under without complications

age splits are used to differentiate the costs of operating on children and adults.

However, there are also cost differences between general hospitals providing general children's services and specialist hospitals delivering a full range of children's services right up to very specialised high-cost and low-volume interventions.

Specialist providers of children's services are eligible for a specialist service top-up to their tariff payments for services covered by the payment by results (PBR) regime. This top-up (50% on top of tariff prices in 2012/13 and planned to be split into two levels of adjustment – 44% and 64% – for 2013/14) aims to cover the additional costs of delivering services incurred by specialist providers compared with, for example, district general hospitals delivering core paediatric services.

Each tariff provides an average price for activities that map to a specific HRG. But each HRG in fact includes a range of less complex through to more difficult cases. A specialist provider will have a more complex casemix and so is unlikely to cover its costs with a tariff based on average costs.

The tariff is also based on spells rather than finished consultant episodes. A child being treated in a

specialist children's hospital is more likely to be a complex case potentially receiving several interventions – the costs of these multiple interventions may not always be covered by a spell-based payment, where the broad episode to spell conversion is based on the average number of episodes in a spell.

Analysis of paediatric payment by results activity

As referred to above, there is no single HRG chapter that covers all paediatric activity. Chapter P *Diseases of childhood and neonates* covers paediatric medicine and neonatal medicine. The chapter does not include any surgical procedures. These are addressed by applying a paediatric age split to surgical HRGs, as defined in other chapter areas. Chapter P is divided into two sub-chapters:

- **PA: Paediatric Medicine** – contains 89 HRGs
- **PB: Neonatal Disorders** – contains three HRGs.

The tables below show the most common HRGs for paediatrics. Table 1 shows the number of PBR spells by HRG code for children aged under 15 years. Table 2 shows the income by HRG code for children aged under 15 years.

TABLE 1: 2010/11 PBR INPATIENT ACTIVITY FOR PATIENTS AGED UNDER 15 (SPELLS)

Rank	HRG code	HRG	Spells
1	PB02Z	Minor neonatal diagnoses	105,926
2	PA19Z	Viral infections	59,840
3	CZ02T	Intermediate mouth procedures 18 years and under without CC	45,714
4	PA11Z	Acute upper respiratory tract infection and common cold	41,897
5	PA21B	Infectious and non-infectious gastroenteritis without CC	36,143
6	PA12Z	Asthma or wheezing	30,728
7	PA14B	Lower respiratory tract disorders without acute bronchiolitis without CC	28,907
8	CZ08T	Minor ear procedures 18 years and under without CC	28,416
9	PA33B	Intermediate upper respiratory tract disorders without CC	27,234
10	PA58Z	Examination, follow-up, special screening and other admissions with length of stay 0 days	25,982
			430,787

TABLE 2: 2010/11 PBR INPATIENT ACTIVITY FOR PATIENTS AGED UNDER 15 (INCOME)

Rank	HRG code	HRG	Income
1	PB02Z	Minor neonatal diagnoses	142,728,592
2	PA19Z	Viral infections	37,637,342
3	PA14A	Lower respiratory tract disorders without acute bronchiolitis with CC	35,158,022
4	HC12Z	Intradural spine minor 1	34,682,488
5	CZ02T	Intermediate mouth procedures 18 years and under without CC	32,029,747
6	HA41Z	Major arm procedures for trauma category 2	27,319,783
7	CZ05T	Tonsillectomy 18 years and under without CC	26,930,624
8	PA15B	Acute bronchiolitis without CC	25,881,314
9	PA14B	Lower respiratory tract disorders without acute bronchiolitis without CC	25,252,752
10	PA11Z	Acute upper respiratory tract infection and common cold	23,381,217
			411,001,881

Current service and financial issues

This section summarises the current issues and challenges facing paediatric service issues.

Increasing pressure on resources and rising demand for services

The NHS has been set a target to save £20bn in the four years to 2014/15. This is because although the government has pledged that the NHS will receive an annual real-terms increase in funding, the pressures on costs from an ageing population, increasing demand for services and new drugs and technologies and the need to improve the quality of some services will exceed the increased funding available.

How the financial pressure will manifest itself will vary from hospital to hospital, but most will have a cost improvement programme (CIP) in place. All services, including paediatric services, will be expected to increase their efficiency and contribute to their organisation's CIP.

In addition, demand for paediatric services has increased over recent years. Admission rates vary among PCTs. There are a number of factors that influence admission rates, including deprivation, the child's age, parental education, and the quality and availability of the care provided in the community. It has also been suggested that admission rates are higher where there are standalone children's hospitals.

Inappropriate accessing of secondary care services

While activity is increasing, some of it could be dealt with effectively in the community rather than in a hospital setting. There is a view that children, young people and their parents or carers are often either unwilling or unable to access the care of a GP or health visiting services and instead choose to go to A&E. This means children attend A&E not only in emergencies but also in cases that could be addressed outside hospital.

This effect is even more pronounced in areas covered by dedicated children's A&E units. Professor Sir Ian Kennedy looked at some of these issues in his review of children's services in the NHS. He published his report, entitled *Getting it right for children and young people: overcoming cultural barriers in the NHS so as to meet their needs*, in September 2010. There have been several other reviews in recent years.

There is evidence that some admissions could be avoided by better clinical care and prevention of ill health by an experienced and well trained workforce outside the hospital setting. Hospital care can be upsetting for children (and for adults) and it is expensive. Some services in the community not only lead to better outcomes for children but can also be more cost-effective. As with adults, recent policies have attempted to encourage NHS organisations to deliver more care closer to home and reduce the dependence on hospital services.

Quality

Most children and young people in England live longer, healthier lives than they have ever done. Technological and clinical advances mean that more children with serious and complex conditions survive and are supported to make the best opportunities for a full and productive life.

However, infant mortality has fallen – though not as fast in England as in other western countries. Children born into disadvantage live shorter, more unhealthy lives than those born into affluence. Recent reviews identify the need for much greater support for young children and their families through the most important part of their development – the first five years of life – if health inequalities are to reduce.

There is a view that paediatric care can improve. Reports suggest the UK's mortality rate for under-16s is the highest in western Europe, 26% of child deaths are potentially preventable, and child mortality from conditions that are treatable is much higher here than in other European countries.

The RCPCH has recently launched an inquiry, under the banner 'Clinical outcome review programme: child health reviews – UK'. This aims to inform clinical practice and improve the healthcare provided to children and young people.

Reconfiguration of children's services

Experts, including the RCPCH, believe that reconfiguring paediatric services is essential. There are currently 218 inpatient units providing children's health services across the UK and the view is that there should be fewer of them. Reducing the number of inpatient units will help to ensure that resources are spread less thinly and would result in an improvement of overall quality.

There is also a shortage of middle-grade doctors or registrars. Hospitals are finding it difficult to appoint

Some services in the community not only lead to better outcomes for children but can also be more cost-effective





to these grades and some consultants are being required to provide cover in addition to their existing responsibilities. Reducing the number of sites would help with this.

In April 2011 the RCPCH published 10 service standards for paediatric units. These standards set out the minimum requirements for general/inpatient paediatrics.

The RCPCH is clear that the standards are not deliverable with the current paediatric service provision in the UK. But in the future it expects the Care Quality Commission and clinical commissioning groups to require all paediatric services to be compliant with these college-defined minimum standards.

Examples of the standards include a requirement for all children admitted to a paediatric department with an acute medical problem to be seen within four hours of admission and for a paediatric consultant to be present in the hospital during times of peak activity.

As well as reducing the number of inpatient units, the RCPCH has also recommended improving community services and delivering more care closer to patients' homes.

Developing the role of the community paediatrician would be part of this, as would an increase in their numbers. Fewer than 50% of GP trainees gain in-hospital paediatric experience. Developing the skills of GPs would increase their confidence in being able to treat conditions in the community and reduce pressure on hospitals.

Hospital-based paediatricians in some areas are already reaping the benefits of working more closely with their GP colleagues. This can be done by holding regular clinics in GP surgeries and by providing a dedicated telephone advice line. The financial aspects of this can be tricky to work through, as treating more children in the community typically results in less income for the hospital.

Safe and sustainable reviews of specialised services

Commissioning specialised services in the NHS is currently managed by a single national organisation working on behalf of 10 specialised commissioning groups of PCTs. Responsibility for specialised services commissioning will transfer to the NHS Commissioning Board in April 2013.

Specialised services help improve the lives of children and adults with rare diseases or disorders, for which there is not enough expertise and experience to commission the services locally.

NHS Specialised Services, the national body, is leading reviews into children's congenital cardiac services and children's neurological services. These two reviews are part of the 'safe and sustainable' programme and aim to:

- Canvas the opinions of all stakeholders, including professional bodies, clinicians, patients and their families
- Weigh the evidence for and against different views of service delivery
- Develop proposals that will deliver high-quality and sustainable services into the future.

Lack of accurate data


Many experts have reported concerns about a lack of accurate child health data. Without this it is not possible to ascertain whether services provided for children and young people are of an appropriate quality.

In his review of children's services, Professor Sir Ian Kennedy said: 'Data in many areas of health and healthcare for children and young people is poor or non-existent. This must change. Data is necessary for effective management. It is also crucial for self-critical professional practice and for efficient commissioning.'

Data from secondary care interaction with children is generally good. But, as is the case for other groups of patients, community data is poor. The Kennedy report identified several priorities for data, relating to maternity, care of the newborn, and children and young people, including health promotion, safeguarding, longer-term conditions, disability and CAMHS.

Paediatric diabetes year-of-care best practice tariff

In 2010/11 the Department of Health introduced best practice tariffs (BPTs) as a new way of paying hospitals to improve the quality of care for several medical conditions. The system is expanding each year and in 2012/13 includes a BPT that requires trusts to meet best practice care for paediatric diabetes. Trusts will be paid the additional BPT rate only if they meet the set of conditions for consistent, high-quality care.



In the future the RCPCH expects the Care Quality Commission and clinical commissioning groups to require all paediatric services to be compliant with college-defined minimum standards



The best practice specified under BPT is detailed and wide-ranging, covering the input of medical staff and support for patients



In 2012/13 the BPT is an annual payment of £3,189, which covers outpatient care from initial diagnosis of diabetes until the young person is 19 years old. It does not include any admitted patient care, which will be paid for under the normal tariff system.

The best practice specified is detailed and wide-ranging, covering the input of medical staff and support for patients. Broadly, it specifies a time limit for patients diagnosed with diabetes to be seen by someone from a specialist paediatric diabetes team.

It also specifies that the patient should receive an education programme about their condition and a minimum of four clinic appointments a year where they can meet dieticians, nurses and doctors.

The BPT will only be paid if trusts carry out retinopathy screenings, haemoglobin measurements, psychiatric assessments and provide access to 24-hour advice and support. Finally, the provider trust must be part of its local paediatric diabetes network.

Safeguarding

NHS trusts' boards have a legal duty relating to safeguarding and promoting the welfare of children and young people. Their responsibilities are clearly

set out in the Children Acts 1989 and 2004 and in the government's statutory guidance. This duty has greatest significance in the context of abuse of children and young people. NHS organisations must take action where there is suspicion that a child is being abused and also provide care and support for victims of abuse.

Health professionals are expected to be aware of the importance of safeguarding and the action they must take to ensure that children and young people are safe. Training is provided to achieve this.

Safeguarding is essential but time consuming and it can be difficult to get the balance right. It requires close liaison with colleagues including police and social services.



New technologies and service innovations

Delivering more care in the community

To improve the quality of care younger patients receive, some paediatricians are exploring how to change the way care is delivered. Such initiatives are aimed at reducing the number of unnecessary referrals and emergency department activity by seeing patients during GP-based outreach clinics.

This involves a combination of new ways of working. First, paediatricians are developing integrated care pathways, working with GPs, either through joint consultations with new and follow-up patients or by seeing patients alone but in the local GP surgery. This approach supports and builds the confidence of GPs to make more appropriate referrals and improves the patient experience. It is further enhanced by face-to-face learning opportunities for GPs with consultants.

Paediatricians can also support GPs virtually by being prepared to discuss cases without the patient being present, via email or phone. The scheme can improve patient satisfaction and outcomes and lead to reductions in outpatient referral numbers and GPs being better equipped to manage children's health.

Another method of delivering more care out of hospital is by bringing the hospital to a patient's home. Many types of ambulatory care can take place in the home. One example, as an alternative to a hospital admission, is for community nurses to administer intravenous antibiotics to children in their homes. This service, although not new, is not widespread. It provides a more comfortable experience for patients by avoiding a hospital stay and reduces bed days for the hospital.

Exploiting new technologies

New medical technologies usually help doctors improve the efficacy of treatments. But current developments allow patients or their parents to take a more active role in the delivery of care.

Medical applications, or apps, installed on smart phones or tablet computers can help in a variety of ways. They can be used to help explain complicated conditions to children and parents using videos and diagrams. This provides educational material and improves doctor-to-patient communication. Apps are also available for the training of doctors.

Apps can be used to help develop and maintain a personalised care plan. They can provide a handy

record of when medicines need to be taken or other parts of the treatment need to take place, along with a schedule of doctor appointments. The app keeps a record of this and any changes in symptoms, so they can be discussed at follow-up appointments or the patient can monitor their own progress – for instance, in losing weight or reaching development milestones. An app can even form a part of the care plan by using interactive educational products that can help with speech and language conditions.

Apps are also useful as part of a support network for patients and parents. They can give access to online forums that discuss specific conditions and provide information, help with symptoms and provide other support to help self-management of care.


Improvements in diagnostic techniques

Two examples of how better diagnostic techniques can improve paediatric care include testing for tuberculosis (TB) and monitoring blood glucose levels in diabetes patients.

The most commonly used method for testing for TB is more than 100 years old and has several drawbacks, such as the length of time to provide a result, low sensitivity especially in children and the inability to detect resistance to drugs. One new test can detect TB and drug resistance in a single test and provide a result within two hours, leading to more appropriate treatment. The testing requires lower levels of training and can take place outside of a laboratory.

Children with diabetes self-monitor their glucose levels using finger-stick monitoring, which involves taking a small blood sample. While providing a snapshot of the current blood glucose level, the patient does not have a clear understanding of the direction the blood glucose level is moving. This could lead to hypoglycaemia if the patient or their parents do not have sufficient warning.

Continuous glucose monitoring devices are designed to improve glucose control by measuring glucose more frequently and automatically by using a sensor inserted under the skin and connected wirelessly to a monitoring device. Patients can receive a new reading every one to five minutes, which helps them take the appropriate course of action to self-manage their blood glucose levels in a safe manner. The devices can even be set to trigger an alarm should the levels fall outside of a preset range, making monitoring less intrusive as well as potentially safer. ■



Community nurses can administer intravenous antibiotics to children in their homes. This service, although not new, is not widespread

WHERE TO GO FOR FURTHER INFORMATION

This briefing has drawn on various sources of information. The most important sources are set out below.

● Royal College of Paediatrics and Child Health

www.rcpch.ac.uk

The Royal College of Paediatrics and Child Health (RCPCH) is responsible for training and examining paediatricians in the UK. The college sets standards for professional and postgraduate medical education. All paediatric specialty trainees are required to be registered with the RCPCH. The RCPCH is actively involved in policy and research projects, working collaboratively with organisations to improve the health services available for children. Publications and tools are available on the RCPCH website.

● Hospital Episode Statistics (HES) Online

www.hesonline.nhs.uk

Hospital Episode Statistics (HES) is a data warehouse containing details of all admissions to NHS hospitals in England. It includes private patients treated in NHS hospitals, patients who were resident outside of England and care delivered by treatment centres (including those in the independent sector) funded by the NHS. HES also contains details of all NHS outpatient appointments in England. Each HES record contains a wide range of information about an individual patient admitted to an NHS hospital. For example:

- Clinical information about diagnoses and operations
- Information about the patient – age group, gender, ethnic category and so on
- Administrative information – time waited and date of admission
- * Geographical information – where the patient was treated and the area in which they live.

● Child and Maternal Health Observatory (ChiMat)

www.chimat.org.uk

The national Child and Maternal Health Observatory (ChiMat) provides information and intelligence to improve decision-making for high-quality, cost-effective services. It supports policymakers, commissioners, managers, regulators and other stakeholders in children's, young people's and maternal health. ChiMat is part of the Yorkshire and Humber Public Health Observatory. Its website provides datasets and tools through a range of online tools such as the data atlas and child health profiles as well as reports and presentations.

● *Getting it right for children and young people: overcoming cultural barriers in the NHS so as to meet their needs. A review by Professor Sir Ian Kennedy, 2010*

www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_119445

This independent review concentrates on understanding the role of culture in the NHS. It was commissioned by the Department of Health amid widespread concern about the services the NHS provides to children and young people. The review focuses on those areas where there are cultural barriers to change and improvement. It examines the NHS position in a wider system of care and support, so as to understand and improve provision of services to children and young people.

The review found cultural barriers to improving services at a number of levels in the Department and local NHS, as well as in contacts between professionals and with children and those looking after them. It makes several recommendations.

● *Achieving equity and excellence for children. Department of Health, 2010*

www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_119449

The Department of Health issued this publication in September 2010, drawing on the health white paper that year and inviting comments on how to ensure high-quality services for children and young people. It builds on the recommendations in Professor Sir Ian Kennedy's report. The document draws together consultation responses and the findings of the independent review to propose new arrangements for the NHS to improve services.

WHERE TO GO FOR FURTHER INFORMATION (continued)

● ***Making it better: for children and young people.* Department of Health, 2007**

www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_065036

This report outlines how services could be reconfigured to meet the needs of patients. It focuses on making changes to fully engage children, young people and their parents in making informed choices about their care and planning of services. It considers how to minimise hospitalisations for those with long-term conditions and enhance support in the home or community by reorganising service delivery. The report also considers advances in treatments for seriously ill children through centralisation of specialist expertise such as paediatric intensive care, to ensure care is received in the most appropriate place.

● ***NHS atlas of variation in healthcare for children and young people: reducing unwarranted variation to increase value and improve quality,* 2012**

www.rightcare.nhs.uk/index.php/atlas/children-and-young-adults/

The atlas was developed by the Department of Health in collaboration with the Child and Maternal Health Observatory (ChiMat). Variations across child health services provided by the NHS in England are presented together to allow clinicians, commissioners and service users to identify priority areas for improving outcome, quality and productivity.

Unwarranted variations are driven by the limitations of the healthcare system and the healthcare professionals working within it, rather than the needs of the patient. Identifying and tackling unwarranted variations in healthcare improves both the quality and efficiency of the care provided and helps deliver the best possible health outcomes for all children and young people.

● ***Giving children a healthy start.* Audit Commission, 2010**

www.audit-commission.gov.uk/nationalstudies/health/publichealth/pages/givingchildrenahealthystart_copy.aspx

This report assesses the local implementation of national policy from 1999 to 2009 on the health of children from birth to five years of age in England. It examines local service planning and delivery, including priority setting, and how local bodies can improve service delivery and access for vulnerable groups such as black and minority ethnic (BME) communities and lone and teenage parents.

The report discusses the impact of government funding on health outcomes for the under-fives; how effectively local bodies manage their resources; and the extent to which they are providing good value for money. It provides recommendations for national and local bodies, as well as examples of notable practice.

GLOSSARY/KEY MEDICAL TERMINOLOGY

- **Acute upper respiratory tract infections (URI or URTI)** Illnesses caused by an acute infection that involve the upper respiratory tract. Commonly includes tonsillitis, strep throat, sinusitis, ear infections and the common cold.
- **Allied health professionals** Provide support to the paediatric healthcare team in many different roles – art, drama and speech therapists, dietitians and nutritionists, and physiotherapists.
- **Appendectomy** Surgical removal of the appendix (located at the beginning of the large intestine).
- **Child and adolescent mental health services (CAMHS)** Includes provision of mental health assessment and treatment services to children, young people and their families/carers, and advice, consultation and support to the other individuals and agencies involved in children's care.
- **Clinical commissioning groups** Groups of GPs that will be responsible for commissioning healthcare on behalf of the people living within their boundary from April 2013. This includes most community and secondary care, whether emergency or elective. Some specialist children's services will be commissioned by the NHS National Commissioning Board.
- **Community paediatricians** Doctors who offer long-term support, co-ordination of services and management on a continuous basis to many children with special needs, such as a disability or long-term illness.
- **Dietetics** Specialism covering nutrition, swallowing or feeding difficulties.
- **Gastroenteritis** Inflammation of the stomach and intestines, from bacterial toxins or viral infection.
- **Gynaecology and obstetrics** Branch of medical science that studies diseases of women, especially of reproductive organs.
- **Intermediate mouth procedures** Include bone-anchored hearing aids, tonsillectomies and dental procedures. Other procedures could be to the larynx, cleft lip, tongue, palate or other part of the mouth.
- **Intradural spine procedures** Include procedures on the spinal cord, including drainage of spinal fluid.
- **Lower respiratory tract disorders** Commonly refers to pneumonia but also lung abscess and acute bronchitis.
- **Minor injury without intracranial injury** Includes superficial wounds, foreign bodies, sprains, dislocations and fractures to any part of the body.
- **Neonatal care** Care provided to babies in hospital shortly after birth.
- **Neurology** The medical speciality dealing with disorders of the nervous system.
- **Occupational therapy** Helps children develop practical life skills including everyday activities such as sitting, feeding or writing. Assessments may lead to the child receiving specialised equipment to help them.
- **Paediatrics** The area of medicine that covers medical conditions affecting infants, children and young people. It is typically used to describe all the hospital-led treatment of children from birth to 16 or 18 years of age.
- **Paediatric cardiac surgeons** Perform procedures on the heart relating to a range of congenital heart diseases.
- **Physiotherapy** Specialism in physical and motor development. Assessment may lead to treatment helping children control their movement, especially sitting, crawling or walking.
- **Speech and language therapy** Includes the assessment and treatment of children with speech and language difficulties. These may be to do with learning disabilities, head injuries or brain conditions. Therapy may also treat eating, drinking and swallowing difficulties.
- **Tonsillectomy** Surgical procedure to remove tonsils, carried out if the patient has frequent sore throats or throat infections or the tonsils have become enlarged, causing problems with breathing or swallowing.

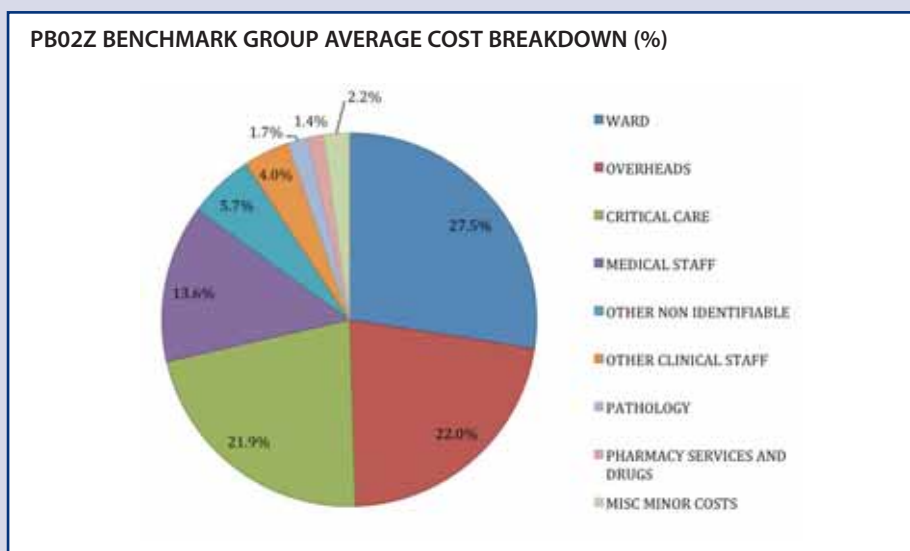
APPENDIX 1: A DETAILED LOOK AT A SAMPLE OF FIVE HIGH-VOLUME HRGS

PB02Z MINOR NEONATAL DIAGNOSES

Explanation of HRG	This HRG is in the neonatal disorders subchapter of the diseases of childhood and neonates chapter. It is diagnosis-based so does not include procedures but does include related diagnosis-driven activity. The HRG covers a wide range of diagnoses with the key factor being the diagnosis is for a patient under 12 months of age, unborn or stillborn. Examples of diagnoses include those relating to low or high weight, injuries and conditions sustained during birth and other conditions associated with newborns. The most common diagnoses in this HRG are low birth weight and neonatal jaundice.
Explanation of common hospital treatment	<p>The treatment depends on the diagnosis. We have selected low birth weight and neonatal jaundice to consider in more detail:</p> <p>Low birth weight</p> <p>Babies are generally considered to have a low birth weight if they are born weighing less than 2.5kg. Treatment will vary according to factors such as birth weight, other conditions and the baby's age. Treatment can include the use of temperature-controlled beds to help maintain the baby's temperature and feeding the baby via a tube into its stomach if it is unable to suck.</p> <p>Neonatal jaundice</p> <p>Jaundice is the name given to yellowing of the skin and the whites of the eyes. Jaundice in newborn babies is very common, is usually harmless, and usually clears up on its own after 10-14 days. Newborn babies produce large quantities of the yellow pigment bilirubin, which is a product of the breakdown of red blood cells. It is normally processed by the liver and passed out of the body through the bowels in stools (faeces). The skin and eyes turn yellow in jaundice because there is an increased amount of bilirubin in the blood. A few babies will develop very high levels of bilirubin, which can be harmful if not treated. In rare cases, it can cause brain damage. The most common treatment is phototherapy. This is a non-invasive procedure where the baby is placed under a special light (not sunlight) which makes it easier for bilirubin to be removed from the body. There are different types of phototherapy depending on the seriousness of the jaundice and the baby's blood will be tested regularly. If the level of bilirubin in the baby's blood is very high an exchange transfusion might be required, which is a complete changeover of blood.</p>
Average length of stay	3.3 days
Average age of patient	Under 12 months
2012/13 tariff	£1,041
2010/11 av reference cost*	£1,181
Benchmark group av cost**	£1,904

* Reference costs may not be directly comparable to benchmark group costs. For example, critical care costs are unbundled from reference costs.

** Data from Patient-Level Benchmarking Group run by Albatross



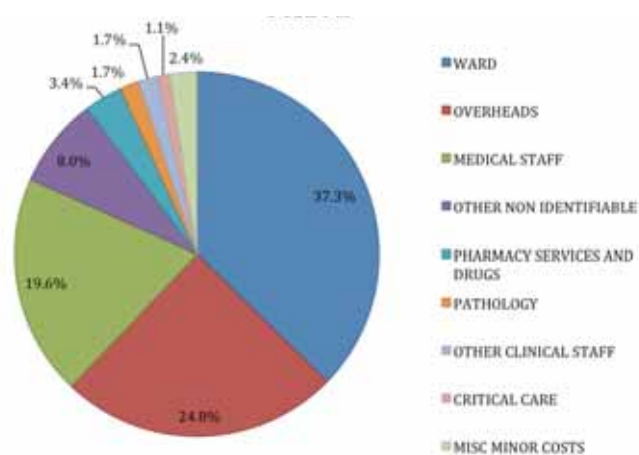
PA19Z (A/B) VIRAL INFECTIONS

Explanation of HRG	This HRG is in the paediatric medicine subchapter of the diseases of childhood and neonates chapter. It is a medical chapter with grouping based on diagnosis, so does not include procedures but does include related diagnosis-driven activity. There are two HRGs covering viral infections for children aged between one and 18 and split by those with a length of stay of one day or less (PA19A) and two days or more (PA19B). Diagnoses include insect, tick and animal-borne viruses and those affecting, for instance, the blood, respiratory system and cells. It also includes specific viral conditions such as polio, conjunctivitis or tonsillitis. The majority of viral infections grouped to this HRG are, however, unspecified in the diagnosis.
Explanation of common hospital treatment	Children will often present with a high temperature and symptoms similar to those of a common cold. Children are admitted to hospital for tests to be carried out to enable more serious viruses – such as bronchiolitis or croup – to be ruled out. Bronchiolitis and croup would be classified as separate HRGs if coded correctly. Doctors are also trying to rule out the presence of a bacterial infection such as septicaemia, meningitis or a urinary tract infection (the diagnosis of which would lead to a different HRG classification). Concern about these bacterial infections will lead many GPs to send patients to hospital for further assessment. Tests that might be undertaken to rule out bacterial infections include urine analysis, blood culture or a lumbar puncture (if meningitis is expected).
Average length of stay	1.4 days
Average age of patient	2 years
2012/13 tariff	£446 – Combined day case/ ordinary elective spells (PA19A) £444 – Non-elective spells (PA19A) £1,255 (PA19B)
2010/11 av reference cost*	£513 (PA19A) £1,500 (PA19B)
Benchmark group av cost**	£865

* Reference costs may not be directly comparable to benchmark group costs. For example, critical care costs are unbundled from reference costs.

** Data from Patient-Level Benchmarking Group run by Albatross

PA19Z BENCHMARK GROUP AVERAGE COST BREAKDOWN (%)

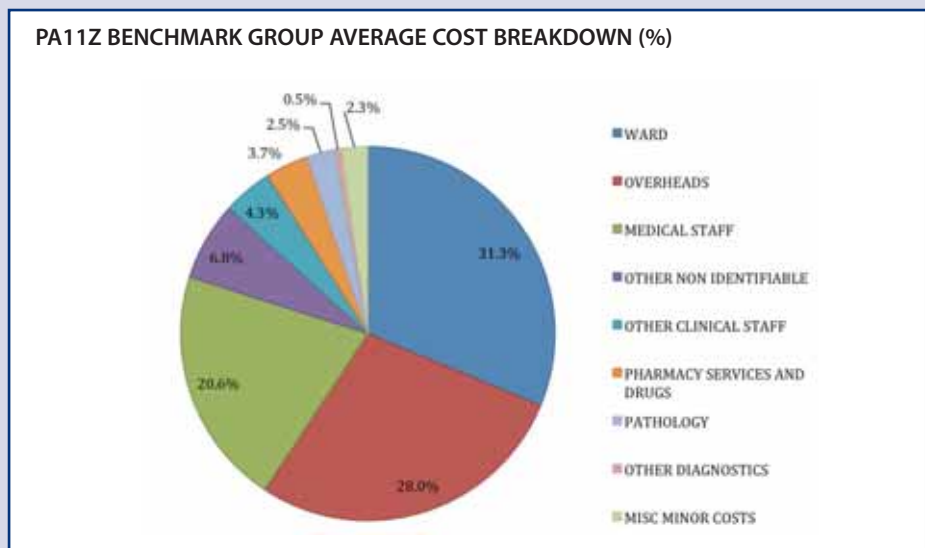


APPENDIX 1: A DETAILED LOOK AT A SAMPLE OF FIVE HIGH-VOLUME HRGS (continued)

PA11Z ACUTE UPPER RESPIRATORY TRACT INFECTIONS AND COMMON COLD	
Explanation of HRG	This HRG is in the paediatric medicine subchapter of the diseases of childhood and neonates chapter. It is diagnosis-based so does not include procedures but does include related diagnosis-driven activity. The HRG covers acute upper respiratory tract infections and the common cold for children aged between one and 18. The majority of infections in this HRG are, however, unspecified in the diagnosis.
Explanation of common hospital treatment	<p>A respiratory tract infection (RTI) is any infection of the sinuses, throat, airways or lungs. It is usually caused by a virus. Health professionals generally make a distinction between:</p> <ul style="list-style-type: none"> ● Infections of the upper respiratory tract, which affect the nose, sinuses and throat ● Infections of the lower respiratory tract, which affect the airways and lungs. <p>Children tend to get more upper RTIs than adults, because they have not yet built up immunity (resistance) to the many viruses that can cause colds.</p> <p>Common upper respiratory tract infections include:</p> <ul style="list-style-type: none"> ● The common cold ● Tonsillitis (infection of the tonsils and tissues at the back of the throat) ● Sinusitis (infection of the sinuses) ● Laryngitis (infection of the larynx, or voicebox) ● Influenza (flu). <p>The vast majority of these patients are not admitted to hospital, but those who are might need treatment with oxygen, antibiotics, analgesia or potentially intravenous fluids or nasogastric feeding.</p>
Average length of stay	1.2 days
Average age of patient	2 years
2012/13 tariff	£626 – Combined day case/ ordinary elective spells £475 – Non-elective spells
2010/11 av reference cost*	£562
Benchmark group av cost**	£743

* Reference costs may not be directly comparable to benchmark group costs.

** Data from Patient-Level Benchmarking Group run by Albatross



PA21B INFECTIOUS AND NON-INFECTIOUS GASTROENTERITIS WITHOUT COMPLICATIONS

Explanation of HRG

This HRG is in the paediatric medicine subchapter of the diseases of childhood and neonates chapter. It is diagnosis-based so does not include procedures but does include related diagnosis-driven activity. The HRG covers infectious and non-infectious gastroenteritis without complications for children aged between one and 18. Diagnoses include bacterial infections, conditions such as cholera, salmonella and botulism and a range of viral infections. The majority of diagnoses in this HRG are unspecified non-infective gastroenteritis and colitis.

Explanation of common hospital treatment

The treatment depends on the condition being treated. We have selected gastroenteritis to consider in further detail:

Gastroenteritis is the inflammation of the stomach and bowel. The most common cause is a viral or bacterial infection. The illness usually lasts for three to five days, and the two most common symptoms are diarrhoea and vomiting.

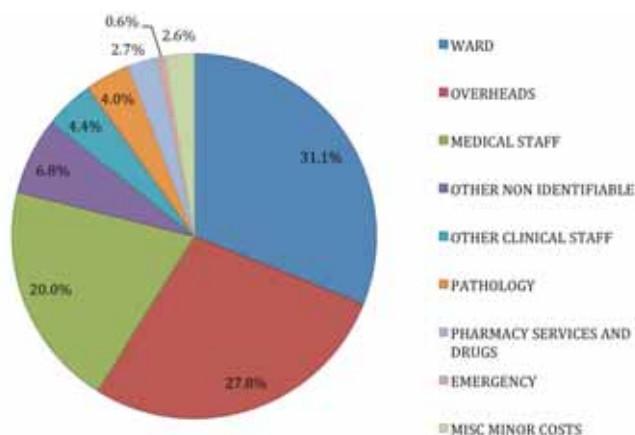
Gastroenteritis can have a number of possible causes, including a norovirus infection or food poisoning. However, rotavirus is the leading cause in children. A rotavirus is an infection of the stomach and bowel. It is spread when a child who is infected does not wash their hands properly after going to the toilet. Most cases of gastroenteritis in children are mild and usually pass within three to five days without the need for treatment. However, young children, particularly those under two years of age, are at risk of dehydration. In England, it is estimated that only 1.5% of children with gastroenteritis will require treatment in hospital. Treatment at hospital usually involves replacing lost fluids and other nutrients directly into the vein (intravenous fluid therapy). Most children respond very well to treatment and are able to leave hospital after a few days.

Average length of stay	1.3 days
Average age of patient	3 years
2012/13 tariff	£705 – Combined day case/ ordinary elective spells £520 – Non-elective spells
2010/11 av reference cost*	£599
Benchmark group av cost**	£883

* Reference costs may not be directly comparable to benchmark group costs.

** Data from Patient-Level Benchmarking Group run by Albatross

PA21B BENCHMARK GROUP AVERAGE COST BREAKDOWN (%)



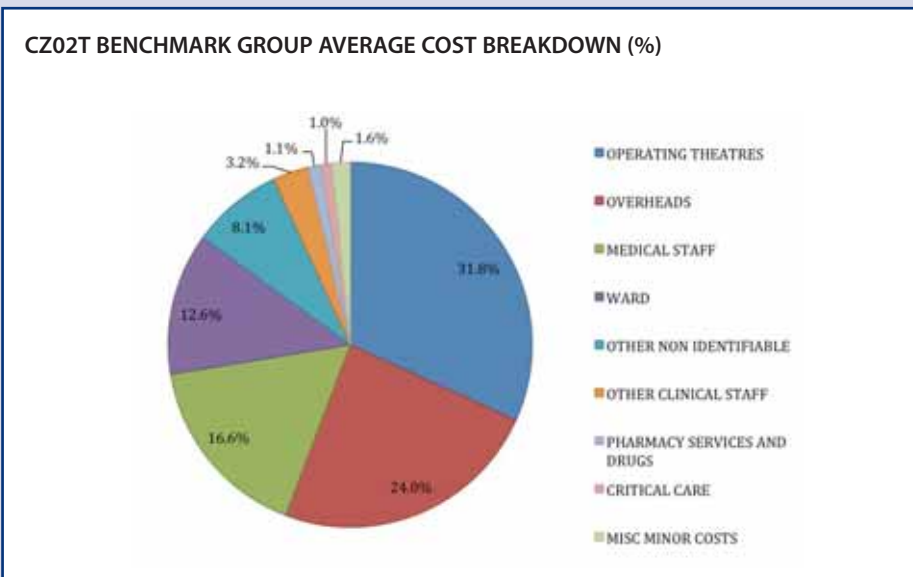
APPENDIX 1: A DETAILED LOOK AT A SAMPLE OF FIVE HIGH-VOLUME HRGS (continued)

CZ02T INTERMEDIATE MOUTH PROCEDURES 18 YEARS AND UNDER WITHOUT COMPLICATIONS

Explanation of HRG	This HRG is in the subchapter for mouth, head, neck and ear procedures and disorders. The HRG covers a variety of mouth and throat procedures of an intermediate complexity. The most common procedures in this HRG are endoscopic examinations of the nasopharynx, pharynx and larynx.
Explanation of common hospital treatment	<p>The treatment depends on the diagnosis. We have selected endoscopic procedures on the larynx to consider in more detail:</p> <p>Laryngitis is the inflammation of the larynx (voice box) usually due to a viral infection or, less commonly, a bacterial infection and causes a sore throat, hoarseness and loss of voice. Most cases of laryngitis get better within three weeks and this is referred to as acute laryngitis. Occasionally other external causes, such as exposure to smoke, can cause recurrence and persistence of symptoms. This is known as chronic laryngitis. Often investigative examinations will be carried out on patients with chronic laryngitis to rule out less common but serious diseases such as laryngeal cancer.</p> <p>Endoscopic procedures include:</p> <ul style="list-style-type: none"> ● Diagnostic endoscopic examination of larynx – where an endoscope is used to visualise the vocal folds and the glottis (may be direct via the mouth – typically performed under general anaesthetic or via the nasal passage – typically using local anaesthetic) ● Diagnostic endoscopic examination of larynx with biopsy – where an endoscope is used to visualise the vocal folds and the glottis and a biopsy is taken of any abnormal tissue (lesion) for pathological assessment ● Microtherapeutic endoscopic operations on larynx – where a microscope is used alongside an endoscope to visualise the vocal folds and the glottis. The microscope provides magnification to allow the more precise and accurate removal of lesions with reduced damage to surrounding healthy tissue. Any lesions, such as vocal cord polyps, benign tumours (such as laryngeal papillomatosis) and malignant neoplasms of larynx are excised typically via cold steel (using a surgical blade) or using a laser. <p>The actual type and technique of procedure performed will depend on the observation made upon examination of the larynx. Children are usually able to leave hospital the same day or day after the procedure is performed.</p>
Average length of stay	1.0 days
Average age of patient	7 years
2012/13 tariff	£1,099 – Combined day case/ ordinary elective spells £1,456 – Non-elective spells
2010/11 av reference cost*	£582
Benchmark group av cost**	£1,024

* Reference costs may not be directly comparable to benchmark group costs. For example, critical care costs are unbundled from reference costs.

** Data from Patient-Level Benchmarking Group run by Albatross



APPENDIX 2: ALDER HEY CHILDREN'S NHS FOUNDATION TRUST'S RHEUMATOLOGY SERVICE

The rheumatology service sits within the medical specialties business unit at Alder Hey and covers a range of diseases that affect joints and muscles, including connective tissue disorders and systemic vasculitides that can involve any organ system. (Vasculitides are disorders involving the inflammation of blood vessels.) With no specialist paediatric rheumatologists in local district general hospitals, the trust provides almost all the paediatric rheumatology care across the North West.

However, some care is delivered on a hub and spoke basis with shared care for some aspects of services – physiotherapy or administration of drugs, for example. At least 58 outreach clinics per annum are run in eight district general hospitals across the Alder Hey catchment area by Alder Hey consultant paediatric rheumatologists. Many local hospitals have a general paediatrician with a special interest in paediatric rheumatology (having spent a year of their training in a paediatric rheumatology environment).

Professor Michael Beresford is one of five consultant paediatric rheumatologists at the trust (four full-time equivalents). He explains why it is such a specialist area. 'The nature of our conditions is that they are rare, chronic and serious. Many are life-threatening, with children generally on immunosuppressant drugs that profoundly suppress the immune system, meaning they can be at risk from serious infection,' he says. 'So even though we may do shared care, many of the children will gravitate back to Alder Hey and even with very simple problems, the general hospital will escalate to us very quickly.'

Diagnosis itself can be very difficult, with often multiple organ systems affected, and the importance of related specialties – radiology, pathology, clinical specialist laboratories, nephrology, neurology and haematology in particular – again reinforcing the use of a specialist environment.

The work breaks down into four main areas:

- Childhood arthritis
- Connective tissue diseases (including lupus, juvenile dermatomyositis and childhood scleroderma) and vasculitides
- Mechanical causes of joint pain
- Unexplained medical problems and chronic pain syndromes affecting the musculoskeletal system.

The most common form of arthritis in children is juvenile idiopathic arthritis (JIA) which includes a range of conditions. Alder Hey has around 700 patients on its books with some form of arthritis, with 60-80 new patients added each year. 'Almost all the diseases are lifelong and go through to adulthood and the patients will require ongoing specialist support,' says Professor Beresford.

In terms of the connective tissue disorders, many are very rare. For example, juvenile onset lupus has an incidence of very much lower than one in 100,000. However, the patients can be among the most

complex treated at the hospital. Children in the early stages can be in hospital for months. In general, Alder Hey will see around 10 to 15 new patients each year across these rare disorders.

Many children, even with the more common JIA, can take a circuitous route to Alder Hey. Some will have seen GPs, casualty doctors, general paediatricians or orthopaedic specialists before being referred to rheumatology – delays can be significant. They may typically present with complications arising from this delay in diagnosis. 'Even with what appears to be a swollen knee, the right diagnosis is vital,' says Professor Beresford. A differential diagnosis effectively uses a process of elimination – for example ruling out infection, cancer, and other important causes.

Tests can be wide ranging. Some investigations may require biopsy (undertaken in theatre) and even MRI scans may need a general anaesthetic, given that the patients can be very young. A full work-up can sometimes take a week or longer. The service makes a big use of day wards in the early part of investigations and ongoing care and treatments. This can include intravenous and subcutaneous administration of immunosuppressants and biological therapies, and intra-articular joint injections under entonox.

Paediatric rheumatology is delivered by a multi-disciplinary team. As a training trust, Alder Hey has foundation post doctors working within the department on four-month placements and trainee specialist paediatricians at every grade, including academic clinical fellows and paediatric rheumatology grid trainees (tertiary specialist trainees – Alder Hey is one of seven centres available nationally for grid training).

But there are major contributions outside the medical community. Senior clinical nurse specialists (band 7) run their own clinics seeing both new patients and running routine follow-ups, while associate nurses (band 6) undertake much of the liaison with GPs and general hospitals around issues such as medication monitoring and ongoing patient care. Alder Hey also has a high number of rheumatology research funded nurses (from commercially and non-commercially funded clinical trials/studies) linked to specific trials that can facilitate access for patients to newer, state-of-the-art treatments.

Physiotherapy is a vital part of the service provision, with an extended scope practitioner and dedicated senior physiotherapists, including three with specialisms in chronic pain, hypermobility and rheumatology. The service also has ties with other allied health professionals such as podiatrists, occupational therapy and orthotists and strong links with clinical psychology.

Each consultant in the medical team runs three outpatient clinics a week – some of them as outreach clinics in other hospitals. A 'consultant of the week' undertakes a ward round at least three times a week with daily rounds carried out by the junior doctors. There is also a 'grand' rheumatology ward round involving several of the

APPENDIX 2: ALDER HEY CHILDREN'S NHS FOUNDATION TRUST'S RHEUMATOLOGY SERVICE (continued)

consultants once a week, which can itself take most of a morning due to patient numbers and complexity of patients. A weekly multidisciplinary team meeting enables the wider team to feedback issues arising in other clinics and settings.

The broad aim of the treatments used is to remove pain and wherever possible to do this by reducing the inflammation, which over time can otherwise damage affected or neighbouring organs and joints. As many of the causes are genetic or environmental triggers, treatment is not all about maintaining a steady state. A child's immune system may respond to many triggers – even a common cold, for example – which at the same time could trigger major joint inflammation or disease flare.

'The problem with many of the diseases is that they can flare up at any time and spread to other joints or involve other organs, which can mean changes and escalation in the drugs used,' says Professor Beresford. 'Many of the drugs used can lead to other problems arising or serious side effects, with abnormalities in liver enzymes or drops in the blood count being simple examples. We therefore need to ensure there is very regular drug monitoring for their safety, as

well as clinical efficacy.' One particularly common problem for children with arthritis is uveitis, inflammation of the eye that can be sight-threatening, which means patients need regular ophthalmology check-ups, typically monthly for the first three months and then less frequently.

Medication is a core part of arthritis treatment and all the related connective tissue disorders and vasculitides. Alongside specific painkillers, non-steroidal anti-inflammatory drugs (NSAIDs) can target inflammation, with steroids (as tablet, infusion or injection, both subcutaneous, intravenous or intra-articular) used in more severe cases. Disease-modifying anti-rheumatic drugs (DMARDs) can slow down the progression of arthritis by blocking chemicals that damage bone, tendons, ligaments, cartilage and other organs. Newer, albeit expensive, biological treatments are also emerging – for example, anti-tumour necrosis factor drugs (anti-TNFs) block the overproduction of TNF proteins that cause inflammation.

The new biologics may signal a revolution in rheumatology although clinical trials specifically for their use with children are running behind those for adult patients.

Published by the Healthcare Financial Management Association (HFMA)

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Acknowledgements

The HFMA is grateful to the following people for sparing the time to contribute to the development of this briefing:

- Albatross Financial Solutions and members of its Patient Cost Benchmarking Group
- Professor Michael Beresford, professor in child health/honorary consultant paediatric rheumatologist, Liverpool University/Alder Hey Children's NHS Foundation Trust
- Annika Carroll, head of finance: women's and children's services, Imperial College Healthcare NHS Trust
- Richard Edwards, efficiency manager, Audit Commission
- Dr Bob Klaber, consultant paediatrician, Imperial College Healthcare NHS Trust
- Emma Knowles, head of health financial management and efficiency, Audit Commission
- Professor Ian Lewis, medical director, Alder Hey Children's NHS Foundation Trust
- Duncan Linning-Karp, care group manager: child health, University Hospital Southampton NHS Foundation Trust
- Sue Lorimer, finance director, Alder Hey Children's NHS Foundation Trust
- Members of the HFMA's Financial Management and Research Committee
- Paula Monteith, principal casemix consultant for design, National Casemix Office, Health and Social Care Information Centre
- John Sandhu, senior manager (analysis and statistics), Audit Commission
- Dr Peter Wilson, PICU consultant, clinical director for child health, University Hospital Southampton NHS Foundation Trust

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