



# Surgery for Children

DELIVERING A FIRST CLASS SERVICE

Report of the Children's Surgical Forum

JULY 2007



The Royal  
College  
of  
Surgeons  
of  
England



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## Foreword

The Children's Surgical Forum (CSF) brings together a range of professionals involved in delivering surgical services to children. Those represented include the medical royal colleges, the surgical specialist associations, the Department of Health (DH), the Royal College of Nursing and the Patient Liaison Group of The Royal College of Surgeons of England. The CSF's recommendations are primarily for England, Wales and Northern Ireland.

In the seven years since the CSF published its report *Children's Surgery – A First Class Service*<sup>1</sup> the surgical landscape is almost unrecognisable and there are major challenges to the standards of surgical care for children. While it may no longer be possible to treat children in the ways to which the population is accustomed, there must be in place networks of care that maintain the best quality of treatment for them. It is against this background that the CSF has brought up to date the thinking on the organisation and delivery of surgical care to the young. The aims of this report are to provide:

- > a definitive guide on standards for all those responsible for the delivery of surgical care to the young;
- > safe models of care for children; and
- > information and support for service development in the interests of improved care.

Many contributed to the document, all sharing the ideal of doing the best possible for those early in life. There was no difficulty in pulling together all the groups involved and thanks go to all of them. It is reassuring to note there is unanimous agreement that surgical care for children, if safe and appropriate, should be delivered locally. We have worked to a coordinated plan that makes an integrated document, relevant 'across the board'. In this way it is anticipated that an individual practitioner or group has information and support for service development in the interest of improved care.

We are pleased to present this report. It contains important messages and advice for clinicians, support staff, service planners, commissioners and policy makers. We hope it will be a useful contribution and provide a foundation for improved surgical care of the young. We welcome your comments. Please email us at [csforum@rcseng.ac.uk](mailto:csforum@rcseng.ac.uk) or see our website at [http://www.rcseng.ac.uk/service\\_delivery/children](http://www.rcseng.ac.uk/service_delivery/children).



**David Jones, FRCS**  
Chairman, Children's Surgical Forum

## Children's Surgical Forum membership

Mr David Jones, Chairman, The Royal College of Surgeons of England

Mr Nicholas Baker, British Association of Oral and Maxillofacial Surgeons

Ms Sarah Cheslyn-Curtis, Association of Surgeons of Great Britain and Ireland

Mr Paul Hurley, Association of Surgeons of Great Britain and Ireland

Dr Chris Heneghan, Royal College of Anaesthetists

Dr Peter Crean, Association of Paediatric Anaesthetists

Dr Bill Coode, College of Emergency Medicine

Mr David Hunt, British Orthopaedic Association

Dr Annette K Dearmun, Royal College of Nursing

Mr Mark Henley, British Association of Plastic, Reconstructive and Aesthetic Surgeons

Dr Robert Pugh, Royal College of Paediatrics and Child Health

Dr Simon Lenton, Royal College of Paediatrics and Child Health

Mr Peter Robb, British Association for Paediatric Otorhinolaryngology

Mr Ken Pearman, British Association for Paediatric Otorhinolaryngology

Professor Raymond Fitzgerald, British Association of Paediatric Surgeons

Mr Victor Boston, British Association of Paediatric Surgeons

Mr Pat Malone, British Association of Urological Surgeons

Miss Sarah Creighton, Royal College of Obstetricians and Gynaecologists

Mr Michael Clarke, Royal College of Ophthalmologists

Dr Flora Jessop, Royal College of Pathologists

Dr Derek Roebuck, Royal College of Radiologists

Mr Leslie Hamilton, Society for Cardiothoracic Surgeons in Great Britain and Ireland

Mr Andrew Parry, Society for Cardiothoracic Surgeons in Great Britain and Ireland

Mr Ian Pople, Society of British Neurological Surgeons

Mrs Mary Gay, Patient Liaison Group, The Royal College of Surgeons of England

Dr Ted Wozniak, Department of Health

Dr David Simpson, Scottish Colleges Committee on Children's Surgical Services

Dr Vicky Osgood, NHS Workforce Review Team

Mrs Jo Cripps, The Royal College of Surgeons of England

## Executive summary

- > All children must be treated by appropriately trained professionals in an environment suitable for their needs.
- > All surgical specialties involved with children can be organised effectively to ensure that routine services are available locally.
- > Most complex surgery should be centralised to provide the best outcomes.
- > The CSF supports the provision of children's surgery via clinical networks and there are many excellent examples. Current health policy reforms that introduce competition can, however, provide a disincentive for Trusts to collaborate and payment by results can make it difficult for different parts of the network to receive appropriate reimbursement. These reforms should not be allowed to jeopardise the provision of safe, local care for children.
- > Commissioners must ensure that Trusts deliver effective networks of surgical care that support local service provision when safe and possible and specialist care when needed. Planning and delivery of children's surgical services would be simplified if they were commissioned independently of surgery overall.
- > In planning children's surgical services, it is vital to involve all support services at an early stage in order that appropriate staff and equipment can be commissioned.
- > Day case surgery should be encouraged as much as possible.
- > Occasional practice is undesirable, particularly for elective surgery. However, an active surgeon who deals with the same type of work in adults would not need to treat large numbers of children for successful outcomes.
- > Arrangements for the care of the acutely or critically sick or injured child must be in place in any unit treating children. These will include robust transfer arrangements where services cannot be provided locally.
- > Trusts must ensure that staff are appropriately skilled and trained to care for children and provide opportunities for continuing professional development (CPD) to facilitate this. Arrangements must be made for secondment opportunities.
- > Cohesive workforce planning is required to ensure that the requisite number of surgeons are trained. Modernising Medical Careers (MMC) must provide this workforce for service needs.
- > The number of specialist paediatric surgeons needs to be increased.
- > More children's nurses and clinical nurse specialists are needed for inpatient and outpatient care.
- > Specialist advisory committees (SACs), intercollegiate boards (ICBs) and the Postgraduate Medical and Education Training Board (PME/TB) must include members with specific responsibility for overseeing paediatric training.
- > Surgeons must acquire skills according to their level of involvement in obtaining consent, communicating with children and child protection issues.
- > Sufficient staff must be trained in life support. Basic life support is usually sufficient. However, in clinical areas (such as the emergency department (ED), inpatient wards, surgical recovery areas and day case facilities) access to advanced life support skills should be available.
- > All surgeons operating on children should undergo basic paediatric life support training. It is also recommended that all paediatric surgeons in training undertake an *Advanced Paediatric Life Support* course.



- > All units must have effective pain management policies.
- > There must be standardised and audited procedures in place for the sedation of children. Policies are currently variable across hospitals and available guidelines in the UK are inconsistent. The National Institute for Health and Clinical Excellence might consider sedation practices as a viable topic for future clinical guidelines.
- > All units should have transition arrangements in place for children requiring ongoing care into adulthood.
- > There should be fewer but larger paediatric cardiac centres, each with four or five surgeons.
- > Paediatric neurosurgery in the UK should be concentrated in major centres with large catchment populations (eg 6–8 million).
- > The clinical governance structure of each hospital providing children's surgery must be multidisciplinary and include surgeons, anaesthetists, paediatricians and children's nurses. Lead clinicians for surgery will play an important role in this group.

## SECTION I: Generic issues

### Chapter I: Standards of care

#### I. Environment of care

##### I.1 Health service reforms

Over the last decade the NHS has seen unprecedented levels of investment. This has been coupled with the introduction of challenging and controversial reforms. Recent government policy aims to introduce a plurality of service providers and promote competition within the health service using methods such as payment by results, patient choice and the increased use of the independent sector to provide surgical services.

##### *Reorganisation of services*

Whereas it is accepted that some reorganisation of services will be required in order to provide safe and effective care, the CSF strongly opposes reconfiguration for the sake of managerial, financial or political expediency.

The centralisation of some complex paediatric surgical procedures is appropriate. However, it is vital that children and their families are able to access more routine surgery locally where safe to do so and such services must be protected from the forces of competition and contestability. Routine and complex surgical services must be adequately funded to remain sustainable. This may require an uplift in the tariff paid for children's services so that Trusts can retain the staff and resources to keep children's surgery in the locality.

It is unclear whether increased levels of investment will be sustained after 2008 and therefore many Trusts will remain vulnerable financially. When considered along with payment by results, patient choice and contestability, the next few years will be difficult in terms of sustaining local services for children.

It should be the responsibility of strategic health authorities (SHAs) to ensure adequate and equitable provision of services for children. This is most likely to be achieved by the establishment of clinical networks. Collaboration and not competition is necessary for this.

##### *Patient choice*

The 'Choose and Book' initiative, coupled with techniques such as referral management centres will change traditional patterns of referral. For example, it may not be possible for a GP to refer a child directly to a consultant. In some specialties consultant-to-consultant referrals will effectively be stopped. Doctors involved in the care of children must be able to refer them to the most appropriate clinician and this responsibility cannot be devolved. There must be an effective flow of information and communication between those delivering care both in and outside hospital.

##### *Independent sector treatment centres*

The first wave of independent sector treatment centres (ISTCs) did not include paediatric surgery. It is likely, however, that subsequent contracts will include children. The CSF has been approached by the DH for help in setting standards and insists that any surgical care delivered by independent sector providers must meet required standards.

## 1.2 Working time directive

There can be no greater influence on the practice of surgery in the UK than the implementation of the working time directive (WTD). At present trainees are restricted to a 58-hour working week, which will reduce to 48 hours in 2009.

Many specialties within medicine will be able to cope with the requirements of the WTD but in craft specialties, such as surgery, the regulations are not compatible with continuity of care and attainment of surgical skills and experience. (See [http://www.rcseng.ac.uk/service\\_delivery/wtd/](http://www.rcseng.ac.uk/service_delivery/wtd/).)

The WTD has a particularly adverse effect on training in children's surgery. The conditions treated may be rare and complex, and the young surgeon, through shift working or restricted hours, should not be denied the opportunity to be involved with the whole pathway of care for an individual child.

While discussions on the WTD continue, doctors are able to opt out of the directive in the interest of care for an individual patient or developing skills for the future. They cannot, however, opt out of the requirements for compensatory rest, making rota planning difficult.

The number of surgical trainees has increased significantly over recent years and these surgeons provide a major source of service delivery and out-of-hours cover. Further expansion in the consultant workforce is required so that trainees can become supernumerary and therefore able to gain and maintain the skills they require within shortened working hours.

## 1.3 Modernising Medical Careers

Recent years have seen unprecedented change in the training of future surgeons and other professionals. The MMC initiative (discussed in further detail in Chapter 3) aims to streamline training and provide demonstrably competent specialists able to deliver the necessary care for the majority of patients in the NHS.

For MMC to succeed, it must provide the requisite workforce for service needs. This requires cohesive planning to enable the required number of surgeons to be appointed. Thereby, issues such as the provision of general paediatric surgery in district general hospitals (DGHs) should be resolved.

The introduction of MMC will also have an impact on other health care professionals. There will be a need for close working among medical and clinical staff and clear boundaries where role expansion has occurred, for example with clinical nurse specialists and nurse consultants.

## 1.4 Facilities

Children undergoing surgery need an appropriate range of supporting services, facilities and personnel throughout their peri-operative journey. These include anaesthetic care, the knowledge and skills of children's nurses, pain management, medical aftercare, radiology and pathology. They also need all staff to appreciate the importance of a family-friendly environment. These services are most likely to be found on a site with inpatient general paediatrics.

As far as possible, adults and children should be segregated in all service areas including outpatient clinics, operating theatres, day care units, wards and EDs. This is desirable for adults and children alike. The following are guidelines for each area.

### *Outpatient departments*

Where possible, children should be seen in designated surgical clinics rather than in clinics with adults.<sup>2</sup> It may be helpful to pool all children's referrals into a weekly or fortnightly session run by a consultant with an interest in children's surgery or by a visiting surgeon. Urgent referrals could then be seen at the beginning or end of an adult clinic. Examples of good practice exist and clinicians are encouraged to develop separate children's clinics that meet the standards set out in the National Service Framework.<sup>2,3</sup> If separate clinics cannot be arranged because of access to appropriate support services or equipment (eg fracture clinics), it is good practice to segregate adults from children or see them earlier in the clinic.

### *Emergency departments*

Where possible, children should have access to a child-friendly environment in EDs. There must also always be appropriate cover for emergencies in children. All units receiving sick or injured children must be equipped with appropriate drugs and equipment. Further guidance on services for children in EDs is available.<sup>4</sup>

### *Elective surgery*

Elective surgical admissions for children in DGHs should be scheduled on dedicated children's theatre lists on a weekly or fortnightly basis according to need. Many hospitals have such lists but some are still mixed, which falls short of recommended national standards.<sup>3</sup> Where child-only lists cannot be achieved, cases must be scheduled for the beginning of the list to facilitate day case care and minimise pre-operative starvation.

Parents will normally be given the choice to accompany their child in the anaesthetic room and recovery area but there may be exceptions that should be explained to them.

Day surgery is well suited for children provided they have been assessed appropriately. Where operations are performed in a day unit there should be a named paediatrician available for liaison and immediate advice and cover. The highest standards and efficiency are more likely if a separate paediatric day ward is available. Day case surgery is examined in more detail on page 23.

### *Wards*

Children should not be admitted to adult surgical wards or critical care facilities other than in special circumstances, in which case there should be full discussion with key children's services personnel to enable risk assessment and exploration of the alternatives before the decision is made. Some hospitals retain separate surgical wards for children but the trend is for them to be admitted to mixed medical/surgical children's wards, which is not ideal. Accommodating surgical patients on a general paediatric ward can create difficulties with the emergency paediatric workload, leading to cancellation of operations and increased risk of cross-infection from children who are medically ill to those who are well but undergoing elective surgery.

## **1.5 Staffing**

All surgical services for children should be affiliated to a centre whose philosophy provides a child-friendly environment and family-centred care.

These objectives are best achieved when the patient is admitted to a children's or young person's unit (adolescent unit) staffed by appropriately qualified children's nurses. There may be exceptional circumstances where children require care from specialist surgical nurses or specialist facilities within an adult setting. In such cases, a named registered children's nurse must be made aware of these children and it will be necessary for specialist and children's nurses to work together. Consideration needs to be given to the educational opportunities for children's nurses working in specialist areas to develop the requisite knowledge and skills for safe practice. At

present there are few post-registration courses for children's nurses working in surgical specialties and this needs to be addressed by Trusts and higher education institutions working together.

Children will sometimes be admitted to other departments (for example, the ED, x-ray and, in exceptional cases, adult wards). In order to maintain consistent quality in these areas there should be a process of liaison with a named nurse in the inpatient children's unit to ensure that appropriate advice is available (for instance, on consent issues and pain management). The advice of hospital play specialists should be sought on preparation, distraction techniques and therapeutic play. There is anecdotal evidence that access to the expertise of registered children's nurses and play specialists educates nursing staff and raises awareness of the needs of children.<sup>5,6</sup>

### *Family-centred care*

Parents play key role in providing physical and psychological support. A planned approach to parental involvement in the care of the child offers a more positive experience for all.<sup>7,8,9</sup> Parents should be involved in all decisions affecting care as they often need to become experts in day-to-day management. However, in order to do this meaningfully, they need accurate, clearly understandable information and the opportunity to appreciate the difficult and complex decisions that surgeons might face. The honesty and communication skills of the team in raising awareness of the potential dilemmas are crucial in this process.

The standards for children undergoing surgery can be summarised<sup>10</sup> but unfortunately are not always met:<sup>3</sup>

- > The decision to operate should include the provision of information, informed consent and confidentiality.
- > The appropriate experience and training of surgeons, anaesthetists and the availability of nursing staff with appropriate knowledge and skills should be a prime consideration.
- > Pre-operative preparation for children and parents should use a range of media and pre-admission programmes, with contributions from all members of the multidisciplinary team.
- > Procedures should minimise anxiety (for example, shortest fasting times, allowing children to wear their clothes to theatre, imaginative modes of transport to and from theatre, taking into account safety and good communication among staff to minimise waiting times).
- > The anaesthetic room should be child-friendly and parents given appropriate support to reassure and comfort their child during induction.
- > There should be a separate recovery area for children and parents should be able to be with their child when they wake up.
- > There should be appropriate post-operative pain assessment and management policies, supported by a pain team.
- > There should be appropriate preparation for timely discharge, liaison between acute and community services, and community children's nurses available to provide support when required.

## **1.6 The Patient Liaison Group**

Hospital staff and parents have a special duty of care to children and a legal responsibility to protect the child's rights, interests and wishes.

The Patient Liaison Group of The Royal College of Surgeons of England provides guidance about these rights and responsibilities in relation to hospital treatment (Appendix 1).

## 2. Ensuring standards of care

### 2.1 Lead clinicians for surgery

Clinical governance systems must address the specific needs of children and young people including an annual report on children's services to the Trust board.

Following publication of its report in May 2000,<sup>1</sup> the CSF recommended that each hospital where children's surgery took place should appoint a lead clinician for children's surgical services to help implement the recommendations of the report. It was agreed that this lead clinician should:

- > liaise with the clinical director and the designated executive member of the board with responsibility for children;
- > ensure that collection of data is carried out by the Trust for audit purposes;
- > coordinate a multidisciplinary committee concerned with children's surgery in all specialties; and
- > forward any concerns that cannot be resolved locally to the CSF for consideration.

The multidisciplinary committee should comprise a paediatrician, anaesthetist, surgeon, pharmacist and registered children's nurse. It should define local protocols to establish the level of surgery possible in each hospital with regard to such matters as the age and condition of patients, extent of elective and emergency surgical provision, staffing, local environmental constraints and thresholds for transfer to a larger or tertiary unit. The committee should be responsible for the overall management, improvement, integration and audit of anaesthetic and surgical services for children.

The CSF recognises that its relationship with lead clinicians needs to be strengthened by taking immediate steps to ensure that lead clinicians for surgery are identified in each hospital and independent sector organisation undertaking children's surgical services. The CSF is developing methods of communicating with the lead clinicians on a regular basis.

### 2.2 Audit

Audit is important for quality assurance and measuring performance. Simple indicators such as unplanned inpatient admission after day case surgery or unplanned admission to a critical care unit after surgery can easily be measured and the reasons documented for analysis and comparison with accepted norms.

There should be departmental audit and morbidity and mortality meetings relating to children's surgery. Where appropriate, this should be multidisciplinary and incorporate input from parents, guardians and patients. In particular, the death of a child within 30 days of operation should be formally reviewed in a multidisciplinary forum.<sup>11</sup> Audit should include the regular analysis of critical incidents. Serious events and near misses need to be investigated thoroughly and reported to the National Patient Safety Agency in line with national requirements. There should be an audit of all children transferred between hospitals, which should be monitored by the hospital paediatric committee. Investment in information technology is essential for such audit.

Clinical practice must be evidence-based where possible and confirmed with validated outcome measures where available.

The quality of trauma management should be measured against national standards through Trust membership of the Trauma Audit Research Network (<http://www.tarn.ac.uk/>).

### 3. Working with children

#### 3.1 Consent

In accordance with Fraser guidelines,<sup>12</sup> it is recognised that the child or young person should be involved in their own care and contribute to decisions according to their understanding and competence.

Issues of consent for children and young people are complex. *Good Medical Practice* contains the responsibilities of doctors in matters of consent<sup>13</sup> and the General Medical Council (GMC) will shortly issue supplementary guidance for doctors treating children and young people.<sup>14</sup> In addition, the GMC document *Seeking Patient's Consent: The Ethical Considerations*, soon to be updated, is useful.<sup>15</sup> It should be recognised that consent rules vary among countries in the UK.

In general, hospitals should follow the DH guidance on consent.<sup>16</sup> Trust policies should specifically address young people and their families who need accurate information appropriate to their level of understanding before deciding whether to consent to treatment. Trust policies should also cover disagreements between a comprehending child and parents, and cover issues of life-saving treatment. There are special cases (for example, in the treatment of Jehovah's Witnesses) where additional guidance is available.<sup>17</sup>

Consent is a process and patients should be provided with appropriate information on the procedure to be undertaken and its associated risks. Such information should be provided in written format wherever possible to support patients and their families in making informed decisions. There are excellent examples of such guidance.<sup>18,19</sup>

It is necessary for those involved in the care of children to understand that consent is not always required to share information about a child. Even confidential information may be shared without consent in certain circumstances.

#### 3.2 Child protection<sup>20</sup>

All who come into contact with children and parents need to have undergone a Criminal Records Bureau check. They must also be aware of their responsibility to safeguard and promote the welfare of children and young people and must undertake child protection training at Level 1. Those with a more substantive caseload involving children should undertake Level 2 training.

Clinical governance systems and services must be in place to protect children from harm and include the management of child abuse and neglect. Staff providing services for children and their families should have ongoing training to fulfil their responsibilities for the child's welfare. Training programmes should be tailored to the needs of staff at different levels and stages of professional development. All health professionals must have access to information and advice from those designated to safeguard children. Employing Trusts must ensure they are discharging their responsibilities in this regard. Special consideration must be given to child protection when a child is being cared for in an 'adult' environment, as on an adult ward or in a single-specialty hospital.

In the wake of the Victoria Climbié inquiry, it was recommended that all designated doctors in child protection and all consultant paediatricians must be revalidated in the diagnosis and treatment of deliberate harm and in the multidisciplinary aspects of a child protection investigation.

There are a range of responsibilities placed on health professionals who work with children and families. These include the ability to:

- > understand the risk factors and recognise children in need of support and/or protection;
- > recognise the needs of parents who may need extra help in bringing up their children, and know where to refer for help;
- > recognise the risks of abuse to an unborn child;
- > contribute to enquiries from other professionals about a child and their family or carers and liaise closely with other agencies and health care professionals;
- > assess the needs of children and the capacity of parents/carers to meet these needs;
- > plan and respond to the needs of children and their families, particularly those who are vulnerable;
- > contribute to child protection conferences, family group conferences and strategy discussions, and to planning support for children at risk of significant harm;
- > help ensure that children and their families have access to support services; and
- > provide ongoing promotional and preventative support through proactive work with children, families and expectant parents.

It is recognised that many surgical teams will not routinely work exclusively with children and there is a need to ensure that members of these surgical teams are aware of their responsibilities to child protection. It was therefore agreed that the CSF should propose child protection competencies to be achieved at each level of the new surgical curriculum across all specialties, as follows:

#### **Foundation years**

The legal framework:

- > How to understand and apply the principles of child protection procedures
- > Knowledge of child protection procedures, inter-agency referral routes (eg police, social services) and when to involve them
- > How to demonstrate an awareness of child protection
- > The ability to take a history in non-routine circumstances (eg possible child abuse/neglect)
- > Knowledge of risk factors for disease, including child abuse

These competencies are included in the foundation years curriculum.<sup>21</sup>

#### **Specialty training**

Trainees should have the following knowledge:

- > Trust and local safeguarding children's boards' child protection procedures;
- > basic understanding of child protection law;
- > an understanding of children's rights;
- > types of maltreatment, presentations, signs and other features (primarily physical, emotional, sexual, neglect and fabricated or induced illness);
- > an understanding of one's personal role, responsibilities and appropriate referral patterns;
- > an understanding of the challenges of working in partnership with children and families; and
- > management of child abuse relevant to their specialty.

Trainees should be able to:

- > recognise the possibility of abuse or maltreatment;
- > recognise the limitations of their own knowledge and experience and seek appropriate expert advice;
- > urgently consult immediate senior support in surgery to enable referral to paediatricians;



- > keep appropriate written documentation relating to child protection matters; and
- > communicate effectively with those involved in child protection, including children and their families.

These competencies have now been incorporated into the surgical curriculum. (See <http://www.iscp.ac.uk/>.)

### 3.3 Communication

All those involved in the care of children should understand the importance of sharing information. Children, young people and their parents can only participate fully as partners in care if they have access to accurate information that is valid, reliable, up to date, timely, understandable and appropriate. Information about specific conditions, medicines, procedures and relevant support groups should be available. Guidance for health care professionals dealing with difficult situations, such as breaking bad news or the death of a child, must be available.

The Healthcare Commission's review of children's services found that training in communication skills was 'patchy'.<sup>3</sup> This is being addressed, partially via the undergraduate and foundation years curriculum.

### 3.4 Resuscitation and life support training

All areas in which children are seen should have a mechanism for identifying a deteriorating child and protocols for alerting appropriately trained personnel as necessary. This mechanism should be regularly audited.

Wherever care is provided to children, there must be sufficient staff trained in life support on any one shift. Basic life support is generally adequate in most areas of the hospital. However, in clinical areas (such as the ED, inpatient medical and surgical wards, recovery areas and day case facilities) this should be to advanced levels, for example *Advanced Paediatric Life Support (APLS)* or *European Paediatric Life Support (EPLS)* or equivalent.<sup>22</sup>

Members of the hospital resuscitation team should have at least undertaken a one-day paediatric life support course. The team should be led by clinicians with the skills and knowledge to identify the key features of life-threatening illness and to institute emergency treatments as taught on multi-day courses (such as the *APLS/EPLS* course). As a minimum, an ED receiving children should have someone trained in paediatric airway management and venous access on duty at all times. All areas where children may be treated will need access to appropriate equipment and drugs to enable the resuscitation and stabilisation of a collapsed child.

It is vital that staff trained in paediatric life support receive regular updates and scenario practice. However, even where this has not been possible, and skills have not been updated recently, the duty to the patient remains paramount: all must offer their best efforts as some will have the greatest available skill even if not recently refreshed. This particularly applies to the trained anaesthetist's airway skills.<sup>22</sup>

All surgeons operating on children should undergo basic paediatric life support training. It is also recommended that all paediatric surgeons in training undertake an *APLS/EPLS* course.

### 3.5 Sedation and analgesia for diagnostic and therapeutic procedures

Sedation and analgesia for painful and painless diagnostic and therapeutic procedures in children can be problematic.

Those undertaking sedation of children must have adequate knowledge, skills, training and ongoing experience in effective and safe techniques. They must also be able to rescue a child should the level of sedation deepen, with loss of verbal contact.

Core competencies include: basic paediatric life support, knowledge of drugs and doses, assessment of pain, safe and effective use of local anaesthesia, and use of opioids. Safe sedation practice encompasses patient selection and preparation, informed consent and use of appropriate techniques, equipment, facilities and environment.

As recommended by the Academy of Royal Colleges, every hospital should have a multidisciplinary sedation committee whose role is to establish local needs for sedation and how these should be met. Local practice should be audited regularly and care pathways defined. Adverse effects and critical incidents due to sedation should be reported and practice adapted. Particular care is required in children when multiple sedative agents are administered concurrently. There must be a local plan in the event of failure of sedation, which can occur in up to 20% of cases. This should involve consultation and agreement with local departments of anaesthesia. General best practice guidelines are available from the Scottish Intercollegiate Guidelines Network and the American Academy of Pediatrics.<sup>23,24</sup> Individual specialties such as dentistry, emergency medicine and radiology have also published specific guidance. There is debate in the UK about the use of agents such as ketamine, propofol and potent opioids in children by those who are not specifically trained in paediatric anaesthesia or critical care, particularly where the use of these agents is to be outside the operating theatre or critical care unit.

There must be standardised and audited procedures in place. Policies are currently variable across hospitals and available guidelines in the UK are inconsistent. The National Institute for Health and Clinical Excellence might consider sedation practices as a viable topic for future clinical guidelines.

### 3.6 Pain management

Hospital policies for assessing and managing children's pain should apply to all children in every department, including neonatal units. There must be a properly staffed and funded acute pain service that covers the needs of children and a regular audit of the effectiveness of such a service. Units must develop and implement a pain control policy that includes advice on pain management at home and the provision of 'take home' analgesia.

An adequate understanding of children's physiology and development is necessary in the management of pain, or of recovery after surgery. Analgesia guidelines appropriate for children should be readily available and pain scoring should be performed routinely in any child who has undergone an operation. A member of the acute pain team should attend children's wards daily and all children who have had major surgery should be assessed regularly.

In order to treat children's pain effectively, a thorough pain assessment is necessary. Particular attention should be given to children who cannot express pain because of their level of speech or understanding, communication difficulties, or their illness or disability.

### 3.7 Transition of care for young people

DH definitions of childhood allow adolescents up to the age of 19 years to opt for treatment in a children's or young person's setting.<sup>25</sup> In practice, the upper limit is variable and determined by the young patient and factors including maturity, the disorder and availability of adult services for continuity of care. If there is difficulty in agreeing the best course of action for a young person, the matter should be referred to the children's services lead on the Trust board.

The optimal provision of surgical services for young people will depend on local resources. Individual Trusts are responsible for how best to implement DH recommendations.<sup>26</sup> Although young people can be safely

treated in an adult or children's environment, they should, if possible, be offered the choice. Where a designated young person's unit is not feasible all wards treating young people should provide separate facilities.

Every Trust should have a policy and an identified lead for the transitional care of young people. Some may remain with the same consultant into adult life and specialties based on systems, such as orthopaedics, are in a stronger position to offer this. However, with increasing surgical specialisation, transition is becoming more of an issue.

Surgeons who treat only children will need to establish a network with adult colleagues to ensure continuity of care.

Transition is a process and not a single event. It should be planned, involve the young person in decision making and improve clinical and social outcomes. There is no single model but excellent advice is available.<sup>26</sup>

## Chapter 2: Service delivery

### I. Workload

In England and Wales in 2005 the population of those under the age of 15 was over 10 million and about 13 million for those under 19.<sup>27</sup> There are large local variables and therefore the requirements for surgical care will also vary.

Table 1 shows the number of patients aged 0–16 seen by each specialty, the number of patients admitted and finished consultant episodes (FCEs) in England.

Table 2 shows the differences in FCEs in England over a decade by specialty. Notably, general surgery, orthopaedics, otorhinolaryngology, cardiothoracic surgery and ophthalmology have seen a significant reduction in the number of children treated, reflecting changes in demand and clinical practice.

Specialty	Total patients	Admissions	FCEs
Paediatric surgery*	45,518	51,952	55,941
General surgery	48,865	51,041	53,824
ENT surgery	96,823	105,252	106,580
Trauma and orthopaedics	74,128	86,773	89,989
Oral and maxillofacial surgery	4,789	4,885	5,059
Oral surgery	45,296	47,035	47,309
Plastic surgery	32,154	36,009	36,530
Urology	14,270	16,326	16,985
Neurosurgery	4,605	6,659	7,031
Cardiothoracic surgery	3,655	2,845	4,808
Ophthalmology	16,866	19,867	20,003
<b>TOTAL</b>	<b>386,969</b>	<b>428,644</b>	<b>444,059</b>

Table 1: 2004–2005 patient counts, admissions and FCEs for surgical specialties for children aged 0–16 (England) (Source: Department of Health Hospital Episode Statistics)

\*Operations undertaken by specialist paediatric surgeons, includes general and specialist paediatric surgery

Specialty	FCEs 1995–1996	FCEs 2004–2005	Change 1995–1996 to 2004–2005	% change 1995–1996 to 2004–2005
Paediatric surgery*	50,268	55,941	5,673	11%
General surgery	96,599	53,824	-42,775	-44%
ENT surgery	168,697	106,580	-62,117	-37%
Trauma and orthopaedics	104,702	89,989	-14,713	-14%
Oral and maxillofacial surgery	N/A	5,059	N/A	N/A
Oral surgery	44,144	47,309	3,165	7%
Plastic surgery	33,635	36,530	2,895	9%
Urology	16,883	16,985	102	1%
Neurosurgery	6,609	7,031	422	6%
Cardiothoracic surgery	5,294	4,808	-486	-9%
Ophthalmology	26,214	20,003	-6,211	-24%

Table 2: Change in FCEs 1995–1996 to 2004–2005 by main specialty for children age 0–16 (England)  
(Source: Department of Health Hospital Episode Statistics)

\*Operations undertaken by specialist paediatric surgeons, includes general and specialist paediatric surgery

## 2. Surgical workforce

Whereas traditionally the majority of surgeons operated on adults and children, increasing sub-specialisation has led to a much lower percentage of surgeons remaining involved with children. For example, the percentage of orthopaedic surgeons with an interest in paediatrics is 14.3%.<sup>28</sup>

It is suggested that the volume of work undertaken by a surgeon to maintain skills in working with younger children should be the equivalent of 100 cases a year.<sup>3</sup> However, it is difficult to find evidence to support this. An active surgeon who deals with the same type of work in adults would not necessarily need to treat large numbers of children for successful outcomes.

## 3. The provision of children's surgical services

Throughout the surgical specialties, increasing numbers of younger children are being transferred to regional centres for emergency and elective surgery with little attention to planning or provision of adequate resources.

Figure 1 shows that the number of FCEs with operations carried out on children in DGHs has decreased by approximately 9,700 each year over an 11-year period (1994–2005).<sup>29</sup> The graph also shows that there was an increase of approximately 7,000 FCEs per year in the specialist centre. This was most marked in those aged 0–4 years.

Specialties showing an increase in tertiary centre FCEs and a related decrease in DGH FCEs were trauma and orthopaedics, plastic surgery, ophthalmology and cardiac surgery. General paediatric surgery showed a decrease in FCEs both in specialist centres and DGHs, probably an effect of changes in practice.

A fuller picture of the change in workload would need to take into account the complexity of cases, length of stay and complication rates.

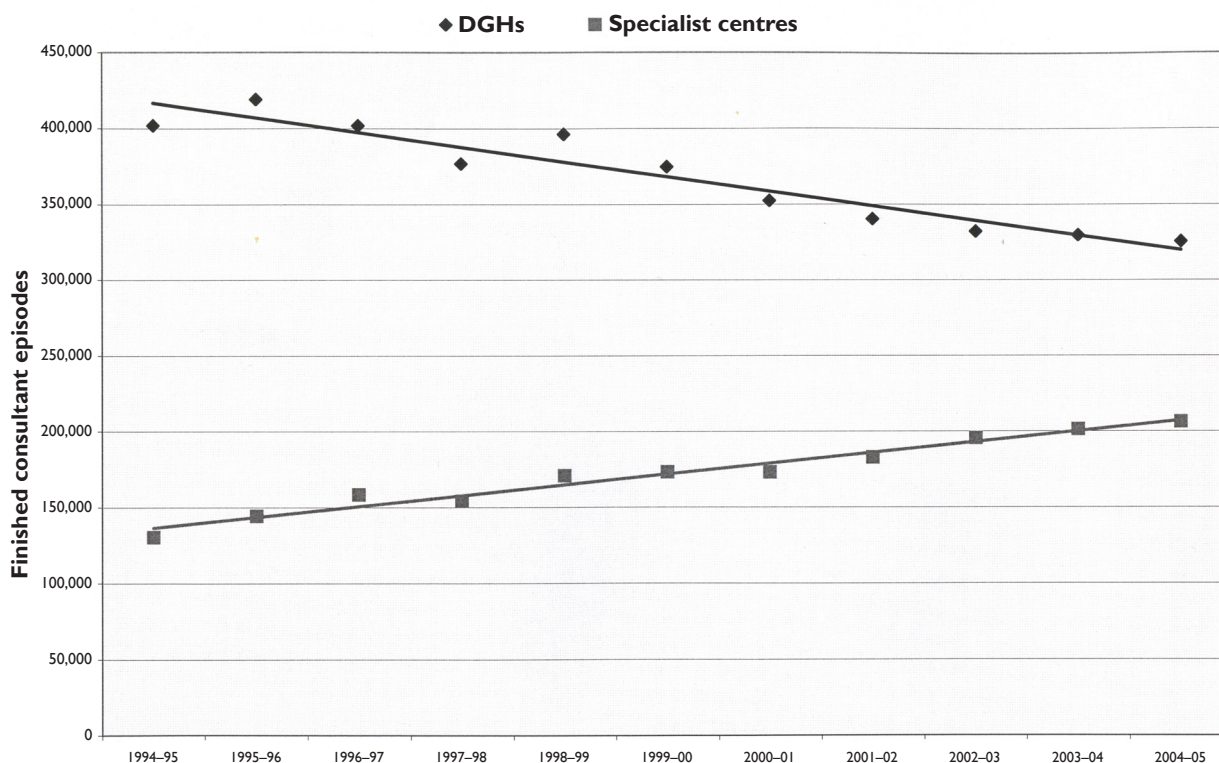


Figure 1: The trend of increasing work in the specialist hospital is mirrored by a decreasing trend in DGHs. (Source: Department of Health. *Trends in Children's Surgery 1994–2005: Evidence from Hospital Episode Statistics Data*. London: DH; February 2007. [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH\\_066322](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsStatistics/DH_066322).)

There may in future be difficulty in providing surgery for children at DGH level and this is a training and recruitment problem.<sup>30</sup>

In general surgery there is increasing sub-specialisation with a very low take-up of training opportunities in general paediatric surgery. As a result, routine surgical operations are increasingly being moved to tertiary centres thereby de-skilling staff in the DGH where many clinicians, concerned about occasional practice, refer ever more procedures to specialist centres.

A comprehensive survey by the Association of Surgeons of Great Britain and Ireland found that 70% of non-tertiary hospitals in England, Wales and Northern Ireland provided emergency general paediatric surgery (GPS) and 66% provided elective GPS.<sup>31</sup> When those general surgeons currently providing children's services retire, the delivery of elective GPS in local hospitals will not be possible unless a new generation of surgeons is trained. The survey revealed that 68% of hospitals currently providing GPS could continue to do so for the next five to ten years. Importantly, consultants from 86% of hospitals thought it was important to continue this service locally.

Children's services should be defined as essential in order to protect them from market forces.<sup>32</sup> The CSF opposes the wholesale shift of paediatric surgery to tertiary centres. It should be delivered on a networked basis, with more complex referrals going to the centre, and outpatient clinics and minor/intermediate surgery being undertaken locally, using outreach services as appropriate. This issue cannot be left for the 'market' to decide and the CSF feels strongly that national action is required to secure safe services locally.

The CSF convened a high level meeting to discuss the issue of the future provision of GPS in the DGH. A statement was developed by representatives from the CSF, the Association of Surgeons of Great Britain and Ireland, the British Association of Paediatric Surgeons, the specialist advisory committees in general surgery and paediatric surgery, the Royal College of Anaesthetists, the Association of Paediatric Anaesthetists, the Royal College of Paediatrics and Child Health, and the DH.<sup>33</sup> This will form the basis of a strategy to engage clinicians, hospital Trusts and service commissioners to ensure that GPS surgery continues to be provided locally.

#### **4. Workforce planning**

The types of services to be provided in small/medium and large DGHs have been defined<sup>30</sup> and workforce planning should ensure that these can be delivered as locally as possible.

Workforce planning must consider not only local problems but also note existing examples of staffing services including networking arrangements.<sup>22</sup> In addition, the opportunities afforded by extending the nurses' role may also facilitate exploration of the use of support staff.

#### **5. Commissioning paediatric surgical services**

Where specialist commissioners find excessive flows of routine services to a specialist unit, they should work with local commissioners, Trusts and clinicians to encourage and support local Trusts to retain or restore services wherever possible.

It is acknowledged that surgery for children is most commonly commissioned as part of overall service level agreements. Once tariff issues have been resolved, payment by results may support correct remuneration for activity undertaken within these commissions. However, there would be a greater likelihood of the CSF's service delivery recommendations being implemented if children's surgery was commissioned independently of overall surgical commissions. This would simplify planning and delivery to meet the needs of children.

Commissioners must also consider associated resources for the delivery of children's surgery (for example, transport arrangements for inter- or intra-hospital transfer, accommodation facilities for parents and carers, etc).

#### **6. Models of care**

In order to achieve the correct balance between local and specialist units, clinical networks must be expanded with close collaboration among professionals in both.

Successful networks for children's services are more likely to be meaningful and successful when developed and led by clinicians working together.

##### **6.1 Supra-regional centres**

The care of certain unusual and complex conditions (such as congenital heart disease, gastrointestinal malformations, craniofacial abnormalities, spinal deformity, bladder exstrophy, transplant surgery and musculoskeletal tumours) is rightly concentrated on a single or small group of hospitals where comprehensive

skills and regular experience are available for those affected. Special funding arrangements for such services are usually in place.

## 6.2 Regional centres

These hospitals provide a comprehensive range of specialist children's surgical services on a regional, sub-regional or supra-regional basis. Surgical services for children are supported by specialist facilities including paediatrics, anaesthesia, critical care, radiology, pathology and other diagnostic services. In addition to functioning as tertiary referral centres, specialist children's hospitals also meet the needs of local children by providing a range of DGH-type surgical services.

Dedicated children's hospitals have much to offer local hospital clinicians in terms of mentorship and maintenance of skills. The CSF encourages secondment of local hospital specialists to regional units and this includes nursing staff. Such arrangements need to be recognised in consultant job plans and CPD. Specialist centres and DGH Trusts must allow this. See Chapter 3.

## 6.3 District general hospitals

Children and their families must be able to access minor/routine surgery and outpatient facilities for more specialised conditions locally. Surgical services should therefore be planned on the assumption that those DGHs that meet national standards will continue to play an important role.

Larger DGHs and the majority of medium-sized DGHs will be able to sustain the staffing establishment needed to provide resident paediatric cover to support surgical activity.

Smaller district hospitals or those serving isolated populations can experience difficulties in providing safe and high quality services for children but local services must be provided for remote areas. Rationalisation of services for children can only be justified on the basis of clinical need and with suitable networks in place for transfer. Wider assistance is needed at DH level to support the provision of children's services to the local population. Children's surgery should be defined as an 'essential service' and steps should be taken to protect it from competition, contestability and reforms such as payment by results.

Inpatient paediatric beds and 24-hour paediatric cover have already been withdrawn or restricted in some smaller DGHs. As a result, children may need to travel considerable distances for day case procedures of a minor nature. If there are defined, robust cover arrangements in place, the surgical care of children can continue in the absence of resident paediatricians. See section 6.7.

## 6.4 Single surgical specialty hospitals

Many of the hospitals devoted to a single surgical specialty have acquired national or international reputations as centres of excellence. Children have been among those to benefit from their important contribution to patient care, surgical innovation and specialist training. Obvious examples are the specialist orthopaedic hospitals that were established between the two world wars.

Some specialist surgical units (for example, for neurosurgery) are still located within adult centres that do not have paediatric cover on site. The single specialty model of inpatient provision is increasingly seen as outdated. Because of the lack of paediatric support facilities (eg critical care, children's wards) and the lack of paediatric specialists (particularly anaesthetists and nurses), the authors of the 1989 NCEPOD report concluded that 'the needs of children in single surgical specialty units are not always fully met'.<sup>34</sup> However, where highly



specialised inpatient surgery is critical to the outcome and cannot easily be provided elsewhere, the CSF believes that single specialty hospitals, working with local paediatricians and with experienced anaesthetic and nursing staff on site, can provide safe, high quality surgery and demonstrate proper cover and transfer arrangements.

## 6.5 Independent sector hospitals and treatment centres

A major part of the government's reform agenda has been to encourage a plurality of providers into the NHS. This has seen the expansion of independent sector hospitals and the establishment of ISTCs. The first wave of ISTC contracts did not include provision of surgery for children. However, with any further expansion of the ISTC programme, second wave contracts may do so. The CSF is in contact with the DH Commercial Directorate in order to set the required standards of care to be achieved in ISTCs providing paediatric services. The section on day case surgery, below, outlines how services can be provided in hospitals both with and without inpatient paediatric cover. All units will need to follow these recommendations closely.

It is clear that minor and routine surgery for children undertaken in the independent sector could further undermine paediatric provision in local DGHs. The CSF urges DH policy makers to keep close watch on the impact on paediatric provision and ensure that patients can access safe elective and emergency treatment locally at all times.

## 6.6 Emergency care

Not every DGH needs to provide emergency surgical care for children. A comprehensive emergency surgical service can be achieved by concentrating services for a larger population and networking among local hospitals. Emergency surgery in children should only take place in hospitals that have inpatient children's facilities and provide regular elective surgical care. They should be part of a clinical network providing access to tertiary services and critical care.

All teams undertaking emergency surgical care of children in DGHs should have received training in this and should regularly update their skills in the care of the critically ill child.

The skills of the entire emergency team need to be used to assess patients presenting as an emergency. The decision to treat younger patients or those requiring more complex interventions at the local DGH must be taken bearing in mind the skill and expertise of the professionals on site and the availability of supporting staff and resources. Appropriate transfer arrangements should be made if the required skills are not available locally. The DH provides comprehensive information about emergency treatment of children.<sup>22</sup>

## 6.7 Day case surgery

There is an increasing trend for day case surgery in children. The following safeguards must be observed when treating children on this basis:

- > Although the consultant surgeon will remain responsible for care of the child, the assessment and conduct of day case surgery may be undertaken by senior experienced trainees or other career grade surgeons.
- > An experienced paediatric-trained consultant anaesthetist must be present.
- > Parents and carers should receive clear instructions on follow up and written information on arrangements to deal with any post-operative emergency (including out-of-hours contact telephone numbers).

- > Day case sessions must be staffed by children's nurses.
- > Units must develop and implement a pain management policy that includes advice on pain assessment and management at home and the provision of 'take home' analgesia.
- > Play specialists should be available and the environment should be child- and family-friendly.
- > The pattern of day case activity should be audited and regularly reviewed.
- > There is prior arrangement with a nearby hospital where critical care facilities are available for the transfer of patients should complications arise.

Additional standards for centres undertaking day case children's surgery **without inpatient paediatrics** include:

- > The surgery should be undertaken by a surgeon experienced in the condition.
- > The surgeon must remain at the hospital until arrangements have been made for the discharge of all patients or (exceptionally) patients have been transferred to the surgeon's base hospital.
- > At least one member of the team involved in treating day cases should hold the *APLS/EPLS* certificate and other team members must have up-to-date basic skills for paediatric resuscitation.
- > While the child is in the unit, at least one member of staff with up-to-date skills in basic paediatric life support should be present.
- > A neighbouring children's service should take formal responsibility for the children being managed in the unit.
- > Agreed and robust arrangements should be in place for paediatric assistance and transfer if required.

## 7. Paediatric anaesthesia

The bulk of anaesthetic activity in children is non-specialist and occurs in DGHs. Most operations are elective, straightforward and undertaken on relatively fit patients. Children with significant medical problems, those undergoing complex procedures, neonates and small infants are usually referred to specialist units or tertiary centres.<sup>35-38</sup> Nevertheless, DGHs should have arrangements for managing and treating simple surgical emergencies and should be able to resuscitate and stabilise seriously ill children, prior to their transfer.

At all times anaesthesia in children should be undertaken or supervised by consultants who have undergone appropriate training in paediatric anaesthesia.<sup>39</sup> They should have regular and relevant paediatric practice sufficient to maintain core competencies. Children may also be anaesthetised by staff grade or associate specialist anaesthetists, provided they fulfil the same criteria and there is a nominated supervising consultant. When trainees anaesthetise children they should be supervised by a consultant with appropriate experience.

All consultant anaesthetists with a CCT will have obtained basic paediatric anaesthetic training, after which they should, as a minimum, be competent to provide anaesthesia for straightforward elective and emergency surgery in otherwise fit and healthy children who have reached their fifth birthday. However, there will be consultants who have acquired more advanced competencies, thus allowing provision of a more extensive anaesthetic service. Unless there is no requirement to anaesthetise, resuscitate or stabilise children it is expected that these competencies will need to be sustained through regular exposure, CPD and/or refresher courses.

When a child undergoes anaesthesia, the anaesthetist must be assisted by dedicated staff (operating department practitioners, assistants, anaesthetic nurses) with specific paediatric skills and training.

## 7.1 Organisation of care

Children admitted for surgery should be under the care of a surgeon or the joint care of a paediatrician and surgeon. Where this is not the case, a named paediatric medical consultant should oversee care in conjunction with the child's surgeon.<sup>40</sup>

A full range of monitoring devices, paediatric anaesthetic equipment and disposable items should be available in theatres and all areas where children are anaesthetised.<sup>41</sup> Resuscitation drugs and equipment, including an appropriate defibrillator, should be routinely available at all sites where children are to be anaesthetised.

In hospitals where children undergo anaesthesia, there should be evidence-based guidelines and protocols relating to resuscitation, peri-operative care and the management of conditions such as anaphylaxis and malignant hyperpyrexia.

Paediatric high dependency and intensive care services should be available as appropriate for the type of surgery performed.<sup>42,43</sup> (See paediatric critical care section on page 26.)

All units must have a properly staffed and funded acute pain service that covers the needs of children.

There should be hospital protocols for the management of critically ill children. Clinical management will require close co-operation and multidisciplinary teamwork among nurses, paediatricians, surgeons, anaesthetists, intensivists and other relevant clinicians. Both during and after the initial resuscitation of a critically ill or collapsed child, it is important that further stabilisation and management is not the sole remit of the anaesthetist.

## 7.2 Training

Consultants with a substantial commitment to paediatric anaesthesia, including full-time paediatric anaesthetists, are usually appointed to posts in specialist children's hospitals or tertiary paediatric units. They will normally have satisfactorily achieved advanced paediatric anaesthetic competencies in a tertiary centre during years 3–5 of the specialist training programme.<sup>44</sup>

Some consultants are appointed to posts with a designated sub-specialty interest in paediatric anaesthesia at DGHs. In many instances, they are nominated as the lead consultant for paediatric anaesthesia. Typically, they might undertake one children's list (or equivalent) per week and are responsible for coordinating and overseeing anaesthetic services for children. These individuals would have undertaken at least six months or equivalent of full-time paediatric anaesthesia training in a specialist paediatric unit during specialist training years 3–5 to gain the necessary competencies. They should also have advanced training in life support for children and have maintained these skills.

Anaesthetists must recognise and work within the limits of their professional competence. Some anaesthetists working in DGHs do not have a regular paediatric commitment; they may, in the absence of a separate paediatric rota, have to provide out-of-hours cover for emergency surgery in children. Anaesthetic involvement may also be required in the management of critically ill children who, on presentation, require intubation, resuscitation and initiation of intensive care before the arrival of a retrieval team and eventual transfer to a paediatric critical care unit. While virtually all career grade anaesthetists, as trainees, will have received some formal training in paediatric anaesthesia, several years may have elapsed since this was obtained. It is important that such consultants obtain training in paediatric resuscitation and are able to maintain these skills. In addition, there should be arrangements for undertaking supernumerary attachments to paediatric lists, or

secondments to specialist centres/paediatric simulator work, in order to update and maintain knowledge and skills. Nevertheless, it is also important to realise that even where such training and updating has not been undertaken for some time, a trained anaesthetist's paediatric airway skills will usually be better than those of anyone else available and the interests of the patient require them to be offered and applied, however long unused.<sup>22</sup>

There must be arrangements that are fully funded to enable all consultants and career grade staff who provide anaesthesia or anaesthetic cover for children to participate in appropriate CPD. In particular, consultants who have no fixed paediatric lists but have to provide out-of-hours cover should be encouraged to undertake regular annual CPD that involves supervised work with a colleague experienced in paediatric anaesthesia.

### 7.3 Standards

Audit is necessary for quality assurance and measuring performance. A number of suggested topics, specifically relating to paediatric anaesthesia or adaptable from those suggested for adult anaesthesia, are set out by the Royal College of Anaesthetists.<sup>45</sup>

## 8. Paediatric critical care

Paediatric high dependency and intensive care services should be available as appropriate for the type of surgery. Paediatric critical care is provided in designated units, staffed by doctors and nurses with specialist training. Most paediatric critical care facilities are based at children's hospitals or tertiary centres and serve a defined geographical area; they must comply with national standards.<sup>46</sup> Children who might require intensive care following an operation should therefore have their surgery performed in a unit with designated paediatric critical care facilities. However, arrangements for the immediate care of critically ill children should be in place in any hospital that manages children. It must be recognised that this need can arise suddenly and unpredictably in the ED, the operating theatre or on the wards. In-house arrangements are therefore required for emergency treatment, initiating intensive care and stabilising critically ill children, prior to their transfer to the appropriate facility.

Transfer of critically ill children to specialist care services is normally undertaken by a paediatric emergency transfer team operating from the appropriate critical care unit. When this is not feasible the hospital making the referral may have to undertake the transfer of a critically ill child who is intubated and ventilated. Under these circumstances there should be a designated consultant with responsibility for the transfer. Functioning portable monitors, transfer equipment, drugs and relevant guidelines must be available. Patients should be accompanied by a doctor (normally with two years' post-registration experience and relevant experience in paediatric life support) and a suitably trained and competent assistant.

The Paediatric Intensive Care Society published guidance in 2001,<sup>47</sup> with an updated document due in 2007. This will emphasise close consultation with other specialties that treat children in the patient journey from the DGH to the critical care unit as well as with parents and guardians, specialist services commissioning bodies and the DH.

## 9. Neonatal care

The neonatal period is defined as extending from birth to the 44th week of post-conceptual age. Surgical intervention in neonates is required principally for the correction of congenital anomalies and treatment of certain complications of prematurity. Many major congenital anomalies can now be identified by antenatal ultrasound, thus affording opportunities for prenatal counselling, termination of pregnancy or in-utero transfer to permit delivery in a tertiary centre with neonatal surgical facilities on site.

The role of general surgeons in the care of neonates is now virtually confined to those DGH surgeons who, with paediatric colleagues, manage conditions such as inguinal hernia and pyloric stenosis. However, this degree of involvement is diminishing since the transfer of neonates and small infants to specialist centres is increasingly governed by anaesthetic rather than surgical considerations.

Neonatal surgery is now largely concentrated on paediatric surgeons working in multidisciplinary teams in regional and sub-regional centres. Some surgical neonates are managed in neonatal units that do not have other paediatric surgical and anaesthetic services on site. In other units neonatal surgery is undertaken without the benefit of an adjacent neonatal intensive care unit or accommodation for parents. Both models are sub-optimal.

The ideal setting for surgical neonates is a specialist unit closely linked to a neonatal intensive care unit with ready access to appropriate obstetric services. Commissioning standards for neonatal surgical care need to be developed based on present best practice and with a review of existing referral patterns and centres.<sup>48</sup>

## 10. Fetal care

Increasing accuracy in antenatal diagnosis by ultrasound allows a wide spectrum of malformations to be detected on a routine anomaly scan. Craniofacial, musculoskeletal, cardiothoracic and urological conditions are examples. The subject is well described by the UK National Screening Committee. (See <http://www.screening.nhs.uk/fetalanomaly/home.htm>.)

## 11. Children with multiple disabilities and special needs

Children with special needs associated with developmental delay or multiple disabilities are best managed by multidisciplinary teams. Surgical decisions should not be taken in isolation. Relatively routine procedures of minor complexity may be associated with a disproportionate risk of anaesthetic complications, particularly airway problems and post-operative respiratory infection. Lengthy or complex procedures often carry a far higher risk than in the normal paediatric population and skilled paediatric anaesthesia is required to minimise these risks. For these reasons, the surgical treatment of children with developmental delay or multiple disabilities should generally be undertaken in specialist centres. The potential benefits of surgery should be balanced against the additional risks and parents should be closely involved in the decision making process. Ultimately, the welfare of the child is paramount.

## Chapter 3: Training, education and skills

Not only are teaching and training vital to the next generation of surgeons but the skills of the present generation must also be maintained. The craft of surgery requires practice and extensive exposure to cases. These principles are especially relevant to the surgical care of children.

The governance and responsibility for postgraduate training lies with the PMETB (see <http://www.pmetb.org.uk/>), which has not yet addressed the surgical care of children in detail.

### 1. Specialist paediatric surgeons

Surgeons appointed to consultant posts in paediatric surgery are required to have passed the relevant intercollegiate specialty examination (FRCS Paed) and to have been awarded a CCT upon completion of accredited specialist training.

### 2. Other specialists treating children

For the other surgical specialties, the relevant SAC and ICB set the curriculum and define the requirements (duration of specialist training, formal assessment) for appointment to a post with a full-time commitment to specialist paediatric practice. The specialty submissions in section 2 discuss this in more detail.

Consultants appointed to tertiary referral centres will inevitably require more extensive specialist training than those undertaking paediatric practice in DGHs.

Surgeons appointed to DGH consultant posts with a designated paediatric sub-specialty interest should have undertaken a specified period of training in an SAC-recognised post.

In specialties such as otorhinolaryngology, where routine procedures in children represent a significant component of the workload, paediatric training should be provided in parallel with adult ENT services, providing it is structured and the relevant training goals are defined and met.

The supervision of trainees must be appropriate to their level of competence.

### 3. Maintaining skills

Arrangements should be made between specialist paediatric units and DGHs to facilitate CPD and refresher training in the surgical care of children. This will help to keep children's surgical services in the locality. Where appropriate, joint appointments may be considered, allowing designated consultants from DGHs a regular commitment within a dedicated tertiary paediatric centre.

Provision must be made in job plans for all staff to participate in CPD activities. Specialist paediatric surgical centres should support, develop and provide CPD and methods of assessment for staff providing paediatric surgical care. The establishment of regional groups/networks of paediatric health care professionals will facilitate this.

## 4. Professional bodies

### 4.1 Surgical specialist associations

The specialist associations play an important role in promoting clinical research and postgraduate education. Areas in which they can contribute to paediatric sub-specialties include: developing and supporting specialist paediatric groups within the umbrella of the association; collaborating with the relevant specialist paediatric nursing groups and associations to promote good practice; clinical research; post-registration nursing education; the inclusion of paediatrics in any national audit frameworks established by the association; establishing broad advisory guidelines on those conditions that could be appropriately managed at DGH level and those that would normally be referred to a specialist centre.

### 4.2 Specialist advisory committees

The SACs are responsible for the content of specialist training programmes. All surgeons providing treatment to children must undergo specific training, education and assessment as required by the relevant SAC. The CSF recommends that each SAC should include one member with responsibility for paediatric training in that specialty. Each SAC will compile and update lists of centres recognised for paediatric training at DGH or specialist level.

### 4.3 Intercollegiate boards

Each ICB should ensure that the content and format of the examination adequately reflects the relevant paediatric aspects of its specialty. The CSF recommends that the membership of every ICB should include a surgeon with this responsibility. Eligibility for appointment to a consultant post with clinical responsibility for children should be conditional upon satisfactory intercollegiate assessment in paediatrics either as a mandatory part of the examination (as in urology) or a sub-specialty option (such as general surgery). In cardiothoracic surgery, however, sub-specialty training in congenital heart surgery is undertaken after the examination.

## 5. Modernising Medical Careers

The MMC initiative aims to create competent specialists suitable for consultant appointment and to streamline training. The MMC process requires workplace assessments, which will add an additional burden on consultants and create further service pressures.

The CSF is anxious that paediatric patients receive the care they require and that the high standards of training for surgeons treating children are maintained.

It is hoped that once the MMC reforms bed down, the system will be capable of identifying and training appropriate numbers of surgeons with appropriate skills in, for example, general paediatric surgery and paediatric orthopaedic surgery within years 5–6 of the curriculum. This will help to reduce the current pressures on local service provision.

## 6. The new surgical curriculum

The Intercollegiate Surgical Curriculum Project (<http://www.iscp.ac.uk/>) aims for a unified competence-based curriculum across the nine surgical specialties. The framework for this initiative is modular, identifying standards in four key domains: specialist knowledge, technical skills, clinical judgement and professionalism.

All nine specialties share a common definition of professionalism for which there is a generic curriculum.

The evaluation report of the pilot phase found that those involved in surgical training were poorly resourced in terms of recognised contractual time or otherwise had little faculty development, no recognised career structure and little incentive to be involved in training. These matters must be addressed to ensure the success of the curriculum project within the restraints of the WTD, consultant contract arrangements and service requirements.



## SECTION 2: Specialty-specific guidance

### Introduction

This section contains edited submissions from all of the clinical specialties involved in children's surgery. Issues repeatedly raised by individual specialties were incorporated into section 1 of the report.

The CSF asked the specialties for information under the following key headings:

- > workload;
- > provision of care;
- > organisation of care;
- > training and education requirements; and
- > specialty-specific recommendations for the provision of children's surgery

All specialties responded and provided a strategy to cover work in DGHs and specialist hospitals.

## Emergency medicine

### Workload

A quarter of all patients attending EDs are children, estimated at 3.5 million per year. The large majority of these have minor conditions. Over half will present with minor paediatric trauma and another 25% with minor paediatric illnesses. The remaining 25% will have significant pathology, including trauma, medical illness, eye/ENT problems and occasional obstetric emergencies and (increasingly common) drug and alcohol related attendances.

### Provision of care

All EDs should have a consultant surgeon with a special interest in paediatric emergency medicine responsible for developing guidelines and clinical governance for the care of children in their department and liaison with other departments, specifically that of paediatrics. The day-to-day workload will be carried out by other staff in the department, mainly consultants, middle grade doctors, foundation doctors and emergency nurse practitioners.<sup>49</sup>

### Organisation of care

There is debate over whether an ED should accept children if there is no inpatient paediatric support on site. Development of short stay or observation units should be considered as an alternative to transfer of low risk children to a main paediatric centre. There are many examples where an ED without inpatient paediatric support accepts children. A safe service can be provided through good organisation that includes developing clinical networks and increased investment in training and staffing.

Tertiary referrals are organised at a local level. Regional networks with clear guidelines for the common emergencies requiring referral, such as the need for paediatric critical care and transfer of major trauma, must be established. The ED does not organise supra-regional referrals.

### Training and education

A whole section of the curriculum for ED clinicians is devoted to children, not only in terms of the physical aspects of disease but also ethical and emotional aspects of childhood illness. All ED staff should be trained in basic paediatric life support. Senior emergency medicine trainees and consultants should be *APLS/EPLS* trained. Foundation year doctors would be taught paediatric emergency medicine during their attachment to the ED in formal teaching sessions, which would include resuscitation, care of complicated paediatric emergencies, child protection procedures and other ethical and legal aspects of emergency paediatric care.

### Recommendations<sup>4</sup>

- > All units receiving sick or injured children must be equipped with appropriate drugs and equipment.
- > All staff in units treating children must be trained in basic paediatric life support. ED nursing staff should be trained in paediatric life support or equivalent. Senior trainees and consultants in emergency medicine, paediatrics and anaesthetics dealing with acutely unwell children should be trained in *APLS/EPLS* (or equivalent).
- > Urgent help must be available at all times for advanced airway management.
- > All hospitals receiving acutely ill or injured children must have the facilities and staff required to establish high dependency care and intensive level care for airway and respiratory support.
- > Regional networks must be in place to develop protocols for the stabilisation and transfer of children to critical care units.
- > Regional networks must be in place to provide early advice and transfer for trauma and surgical patients.
- > All paediatric departments supporting an on-site ED seeing more than 16,000 children per year should aim to appoint a paediatrician with sub-speciality training in paediatric emergency medicine.
- > All ED attendances in children must be notified to the primary care team: ideally, both GP and health visitor or school nurse.

## General paediatric surgery

### Introduction

The provision of GPS in the DGH setting is reaching a crisis. The underlying problem is a failure to train and recruit general surgeons with appropriate paediatric skills and experience. If this trend continues, local access to treatment for common emergency and elective surgical disorders will be unsustainable and families will have to travel greater distances for simple general surgery, thereby resulting in more children requiring inpatient rather than day case surgery.

Since the CSF's first report, in which guidelines and requirements for training were published,<sup>1</sup> many hospitals have stopped providing this type of surgery and an increasing number of children are being transferred to regional centres for emergency and elective surgery without the transfer being planned or resourced. Currently, 70% of acute hospitals perform emergency general surgery in older children and two-thirds continue to provide an elective service.<sup>31</sup> (See also Table 3.) There is major concern that paediatric skills are being eroded and lost in the DGH, which is inevitably impacting on other specialties. The CSF has developed a statement on the future provision of GPS.<sup>33</sup>

Provision of GPS	Number of hospitals	Percentage of hospitals
Elective and emergency GPS	138	66%
Emergency GPS only	9	4%
No elective or emergency GPS	63	30%
<b>TOTAL</b>	<b>210</b>	<b>100%</b>

Table 3: Provision of GPS in non-tertiary acute NHS hospitals in England, Wales and Northern Ireland

### Workload

GPS involves relatively common disorders that do not require a specialist unit. Emergency and elective workloads differ in the types of conditions treated, age of children and resources required.

#### Emergency

The most common emergency procedures are appendicectomy (laparoscopic or open), fixation of testes for torsion and incision, and drainage of abscesses. Less common conditions are irreducible inguinal hernia, the acute abdomen from other causes and trauma. Surgical emergencies in children amount to an estimated 10–20% of the overall DGH emergency general surgical workload and approximately 50% of the GPS workload. All DGH consultant general surgeons who contribute to the on-call emergency rota have a commitment to provide the emergency surgical service for children. If an appropriately trained surgeon is not available nor would be available within the time required to manage a child with a surgical condition, the child should be transferred. Most emergencies occur in older children and can be managed by general surgeons who have not had specific GPS training.

#### Elective

The most common elective conditions are inguinal hernia, congenital hydrocele, maldescent of the testis, conditions of the foreskin and umbilical hernia. It is recommended that orchidopexy should be performed at age one year or as soon as diagnosed thereafter. Circumcision, previously a common operation, is rarely indicated before five years of age and only occasionally afterwards. Other conditions managed by the general surgeon include the removal of skin and subcutaneous soft tissue abnormalities and treatment of minor anal conditions. Depending on local expertise, the practice may be widened to include endoscopic procedures. In the fully trained general paediatric surgeon's elective practice 50% of children seen will be under five years old.

### Complexity

The treatment of conditions, such as inguinal hernia in premature babies and neonates up to 44 weeks and pyloric stenosis, should not be undertaken in the DGH unless there is specific local expertise in paediatric anaesthesia for this age group and sufficient numbers are performed for surgeons and anaesthetists to maintain competence. Intussusception is an uncommon emergency and requires transfer to a specialist paediatric unit because its management depends on expertise in therapeutic radiology. This cannot be provided in most hospitals because of the small numbers involved. Major trauma, particularly children with multiple injuries, should be transferred to a specialist unit with full paediatric critical care facilities. Children with a general surgical problem who have significant co-morbidity, such as complex congenital heart disease, should be treated in a specialist centre.

### Provision of care

GPS still represents a substantial workload, which in England and Wales has historically been largely undertaken by general surgeons, particularly in the DGH. Urologists perform some general surgery, largely confined to circumcision, orchidopexy and urological trauma. The only emergency condition treated is torsion of the testis. Paediatric surgeons in specialist units usually provide general surgery for the local population. With the retirement of general surgeons practising paediatric surgery and the restrictions placed on paediatric training for the general surgeon these surgeons have not been replaced, resulting in significant reduction in GPS performed in the DGH.<sup>29</sup>

The FCEs for GPS operations in DGHs fell from 59,852 in 1994 to 31,591 in 2005.<sup>29</sup> Whereas the fall in other specialties correlates with increased activity in specialist centres, for general surgery there appears to be a reduction in general paediatric surgical operations in DGHs as well as the specialist centre. Between 1994 and 2005 in DGHs the number of FCEs per year for circumcision, herniotomy and orchidopexy fell by 2,926 (50%), 3,670 (46%) and 4,195 (60%) respectively. Similarly, in the specialist centre there was a reduction in circumcision by 642 (26%) but the increase in FCEs per year for herniotomy and orchidopexy has only been 667 (15%) and 434 (20%) respectively.<sup>29</sup> This is likely to be the result of changing surgical practice rather than an alteration in incidence of the condition.

There is still a substantial operative GPS workload of 31,591 FCEs per year being performed in DGHs, accounting for 81% of circumcisions, 46% of herniotomies and 52% of orchidopexies performed. To prevent further reduction in the provision of GPS in the DGH, there is an urgent need for recognition that this service needs to continue and for general surgeons to be trained in GPS.

### Organisation of care

Most general surgery is still performed in DGHs where the majority of consultant general surgeons contribute to the emergency surgical service for children in their local population. Emergency GPS should only be admitted to a hospital where there is inpatient paediatric support and appropriate anaesthetic cover.

In DGHs that provide an elective general surgical service, sub-specialisation has evolved with elective children's surgery provided by one or two general surgeons performing at least one dedicated operating list every fortnight.

The joint statement on the provision of GPS proposed a three-centre model, forming a managed network of care for general and specialist paediatric surgery.<sup>30</sup>

- 1 The small DGHs should be able to provide resuscitation and stabilisation of all infants and children with surgical conditions. It should be able to provide elective children's surgery depending on the availability of suitably trained surgeons, anaesthetists and other resources. Normally, neonates and infants would not be offered elective surgery. Management of urgent and emergency surgical problems in young children (<5 years) will depend on the training and experience of the available surgeon and anaesthetist and may require transfer to an intermediate or regional centre.

- 2 The intermediate centre (large DGH or university hospital) should be large enough to employ specialist paediatric surgeons to undertake GPS or general surgeons with an interest in paediatric surgery who will provide emergency and elective GPS including babies but not normally neonates.
- 3 The specialist or regional/tertiary centre should provide the full range of paediatric surgical care including neonatal, urological and cancer surgery, supported by neonatal and paediatric intensive care and full retrieval facilities. Care will be provided by specialist paediatric surgeons and anaesthetists. General paediatric surgeons from these centres may provide outreach clinics and operating lists in network hospitals. For further details see the section on specialist paediatric surgery.

## Training and education

### *Higher surgical training*

Exposure to elective paediatric surgery in training has declined dramatically with the reduction in the number of general surgeons performing paediatric surgery. The trend for more GPS to be performed in specialist centres has led to the perception that general surgeons will not in future undertake paediatric surgery. All general surgical trainees become trained in the management of emergency conditions such as appendicitis, torsion and abscesses. They develop generic surgical skills that apply equally to adults and children despite having no formal training or experience of GPS. This enables them to treat general surgical emergencies in most children. Some general surgical trainees get exposure to elective children's surgery but it is often not taught as the post is not recognised for such training.

### *General paediatric surgeon*

The previous recommendation that general surgeons treating children should undergo six months' training in paediatric surgery in an SAC-accredited specialist paediatric unit has been relaxed. However, it is recommended that at least six months of training during years 4–6 of higher surgical training are spent wholly or partly in a specialist unit. (See <http://www.iscp.ac.uk/>.) Part of the training may be undertaken with an experienced general paediatric surgeon in a DGH. Special training posts have been approved by the SACs in general surgery and paediatric surgery. Additional nationally funded posts were introduced in 2004 to increase the number of surgeons training in GPS. Not all these posts have been taken up, particularly in specialist paediatric units.

It is proposed that general surgical consultants working in DGHs that provide a high volume of general paediatric surgery should be identified to provide GPS training to general surgical trainees. Those who demonstrate aptitude and interest should receive further training through secondment to a specialist paediatric centre, by attachment to general surgical consultants who provide GPS, or a combination of these.<sup>33</sup>

Approximately 70% of non-tertiary units provide emergency GPS services and 68% can continue to do so for the next five to ten years with the current available workforce. Consultants in 86% of hospitals want to continue providing such a service and it is therefore important that steps are taken to ensure its future provision. The joint statement outlines solutions.<sup>33</sup>

## Recommendations

- > The current downward trend of provision of GPS in DGHs needs to be halted and reversed. To achieve this, all general surgical trainees need exposure to paediatric surgery to obtain basic competencies and a proportion of trainees need to undergo formal training in GPS. The numbers of adequately trained and experienced surgeons performing paediatric surgery in each DGH needs to be further defined to determine where this training can be provided.
- > Each hospital within a region should be assessed to determine its role in the overall provision of emergency and elective GPS. A managed network of care for general and specialist paediatric surgery should evolve. Where possible, a minimum of two surgeons should provide GPS in a hospital. This

may mean performing GPS on fewer sites where hospitals are geographically close together. In some hospitals it may be appropriate to have outreach clinics and day case operating provided by surgeons from specialist centres.

- > Paediatricians in DGHs should be closely involved in the management of children with surgical emergencies, particularly in the very young. Retrieval and transfer arrangements will need to be developed further if an increasing number of children needs to be transferred between hospitals for emergency surgery.

## Specialist paediatric surgery

### Workload

The specialty of paediatric surgery embraces a wide range of organ systems and is the only specialty defined by the age of the patient as well as the disorder. Paediatric surgery comprises specialist paediatric surgery (including paediatric urology) and general paediatric surgery.

This definition of paediatric surgery does not include specialty surgical services for children that have devolved from adult services and are provided either by surgeons who combine adult and paediatric practices or full-time paediatric specialists in these disciplines. These include otorhinolaryngology, oral and maxillofacial surgery, ophthalmology, orthopaedic surgery, plastic surgery, neurosurgery and cardiac surgery. GPS and some urology is also performed by surgeons with combined adult and paediatric practices.

The GPS service in the specialist centre meets the needs of its local population and those referred from DGHs where there is inadequate provision for children. Outreach GPS clinics and day case operating are undertaken in many local DGHs using consultant paediatric surgeons from specialist centres. This avoids the inconvenience of travel for families. Furthermore, it provides the opportunity to maintain skills in the DGH and can be a useful educational tool for the DGH general surgical trainees and anaesthetists.

There is evidence of a shift of paediatric surgery in many specialties to specialist centres, which has been largely unplanned and unfunded. At first sight this does not seem to apply to general paediatric surgery.<sup>29</sup> However, the statistics do not take into account the significant number of patients with conditions where an operation is not carried out, for example head injuries and acute non-specific abdominal pain. Anecdotally, there appears to be an increase in this kind of activity at specialist centres.

Specialist paediatric surgery consists of the following categories:

1. Neonatal surgery is defined as the surgery of infants up to 44 weeks' post-conceptual age (gestational age + postnatal age).<sup>50</sup> With the availability of antenatal diagnosis, neonatal surgical care includes counselling of parents and advising on antenatal therapeutic intervention. As fetal therapy develops it may be advisable to have an obstetric unit adjacent to the paediatric surgical unit.
2. The surgical management of infants and children with conditions requiring specialist expertise. These include:
  - > complex congenital abnormalities such as ano-rectal malformations;
  - > benign and malignant tumours\* (notably abdominal, thoracic and soft tissue tumours) and provision of central venous access;
  - > hepatobiliary disorders;
  - > major or potentially complex gastrointestinal abnormalities including gastro-oesophageal reflux surgery, intussusception, inflammatory bowel disease;
  - > major trauma\*\* and care of non-accidental injury;
  - > abnormalities of the chest including oesophageal atresia, congenital lung abnormalities, empyema and chest wall deformity;
  - > endocrine disorders;
  - > vascular and lymphatic abnormalities;
  - > other soft tissue abnormalities;
  - > certain variants of common abnormalities, such as the impalpable testis;
  - > diagnostic endoscopy; and
  - > endoscopic surgery.

3. The management of infants and children with relatively straightforward surgical conditions who have an associated disorder that in itself requires management in a specialist centre. An example is a child with an inguinal hernia who also has congenital cardiac disease or who requires specialist anaesthetic management.
4. Paediatric urology is the surgical management of congenital and acquired anomalies of the genito-urinary system in children (such as hypospadias, bladder exstrophy, urethral valves, ureteric obstruction, vesico-ureteric reflux, the neuropathic bladder and urinary tract stone disease). In particular, expertise is needed for the pre- and post-natal management of congenital anomalies of the urinary tract discovered on prenatal screening.
5. Adolescent and adult surgery requiring the expertise of a paediatric surgeon (for example, congenital conditions recognised late or requiring further reconstruction, such as female genital anomalies).

*\*Oncology:* Childhood tumours are biologically different to adult malignant tumours and the best outcomes are achieved in specialist paediatric oncology centres. Children with suspected malignancy should be referred to a specialist centre for investigation, including biopsy, and treatment.

*\*\*Major trauma:* Trauma is the leading cause of death in children over one year of age. Optimal management is provided at specialist centres with collective experience and an understanding of the unique anatomical and physiological characteristics of the injured child.<sup>51</sup> This is particularly relevant to the non-operative management of abdominal solid organ injuries and the psychological effects of injury. The emotional needs of the child must also be provided for. The specialist paediatric surgeon plays an important role in coordinating the care of the child with multiple injuries.

## Provision of care

Continuity of care in specialist centres will depend more than ever on the senior paediatric surgeons within a unit due to reduced hours and shift working among junior doctors. Against this background there has been a move towards specialist centres of patients who would otherwise have been treated in the DGH. These factors will necessitate an increase in the numbers of paediatric surgeons to maintain safe provision of services. This is likely to result in the dilution of the individual specialist's workload with potential de-skilling. As a consequence, the role of the paediatric surgeon is likely to change. It is probable that the majority will undertake GPS and a minority will treat specialist problems. This differs from the current position where all consultant paediatric surgeons are trained and capable of safely managing selected specialist problems such as neonatal surgery.

### *How many paediatric surgeons are required?*

Until recently, it was estimated that one consultant paediatric surgeon for each 300,000 of the population in a region would be adequate.<sup>52</sup> It is now accepted that the ratio should be 1:250,000. This has been achieved in Scotland and Northern Ireland but in England and Wales there are only 104 consultant paediatric surgeons,<sup>53</sup> which is significantly below the estimated requirement of 256 by 2010.<sup>54</sup> Considering the heavy demands of out-of-hours work and increasing responsibilities for consultant surgeons, it is inevitable that their numbers will need to increase further. The number of paediatric surgeons in each unit will vary according to the size of the populations served for secondary and tertiary care. The British Association of Paediatric Surgeons recommends a minimum of five specialist paediatric surgeons plus one or two paediatric urologists in a specialist centre serving a population of 2.5 million. These numbers are likely to have to increase in view of the circumstances outlined above.

Teamworking in paediatric surgery is important for maintaining skills and for newly appointed, less experienced surgeons. Moreover, paediatric surgeons may work with adult surgeons who have expertise in conditions that are uncommon in children, such as thyroid and parathyroid disorders and certain gastrointestinal conditions.



Some specialist paediatric surgery is provided in smaller units with two or three specialist paediatric surgeons. These smaller centres should establish links with their regional centre for the management of less common major surgical conditions.

Supra-regional services have been designated by the National Commissioning Group in England and Wales for the management of biliary atresia and bladder exstrophy.

## Organisation of care

The specialist care of children at tertiary level should be concentrated in designated units where there are the appropriate staff and facilities and a critical mass of patients sufficient to ensure an effective level of experience.<sup>55,56</sup> Most specialist paediatric surgery is based in large regional units located in a children's hospital or in the children's wing of a regional hospital, with access to the full range of specialist paediatric services and to maternity units.

A specialist paediatric surgical service will include:

- > Specialist paediatric surgeons and paediatric urologists accredited by the Joint Committee on Surgical Training through the SAC for paediatric surgery. They should have paediatric resuscitation skills (preferably *APLS* or *EPLS*) and knowledge of non-accidental injuries in children, child protection procedures, communication skills and consent as it applies to children.
- > A full range of specialist services for children, including paediatric medicine, neonatal medicine, paediatric intensive care, 24-hour paediatric radiology and paediatric specialists in neurosurgery, orthopaedics, plastic surgery, nephrology, cardiology, oncology, gastroenterology and pathology, as well as child psychiatry and child psychology. Ideally, these should be on a single site.
- > A surgical neonatal unit on the same site as the paediatric surgical unit
- > Robust transfer arrangements, to take into account the projected increased movement of children from DGHs to specialist centres. This is particularly relevant for emergency GPS that cannot safely be provided peripherally.
- > Laboratory services appropriately staffed and equipped for children
- > Accommodation for parents, who in general should have unrestricted access to their child and should participate in their care
- > An organised system for the emergency care of injured children, including a trained paediatric trauma team<sup>57</sup>

## Training and education

Specialist training in paediatric surgery is provided at specialist centres in programmes approved by the SAC for paediatric surgery. These are competency-based according to the intercollegiate surgical curriculum. (See <http://www.iscp.ac.uk/>.) Whereas currently all CCT-holders in specialist paediatric surgery are expected to have skills to enable independent practice in such areas as neonatal surgery, under the new MMC programme, CCT-holders may in future have more general competencies, acquiring specialist skills post-CCT.

Undergraduate teaching in paediatric surgery is provided at specialist centres and DGHs linked to a medical school.

Consultant job plans and planning of outpatient clinics and operating lists must include the time needed for teaching and training and take into account the training of general surgeons to undertake GPS in the DGH.

## Recommendations

- > Where local expertise in GPS does not exist in the DGH, it should (if possible) be provided using clinical networks from the specialist centres, as outreach outpatient clinics and day case operating. For emergency GPS, if the DGH surgeons or anaesthetists do not have the required skills, children should be transferred to a unit with this expertise. All other GPS and specialist paediatric surgery should be treated in the specialist centres.
- > Robust arrangements need to be developed to ensure prompt and safe transfer of children to the appropriate unit for their care. Transport arrangements must be responsive to patient flows. Current provision is inadequate and would lead to increased risk for these patients if not expanded significantly.
- > Paediatric surgery must be supported by children's specialists in other disciplines (notably anaesthesia, paediatrics, pathology and radiology), trained children's nurses and facilities designed specifically for children.

## Cardiothoracic surgery

### Workload

Within the specialty of cardiothoracic surgery the amount of paediatric thoracic surgery is small and shared with several other specialties. Paediatric cardiac surgery predominates and some surgeons work only in this field.

*Paediatric cardiac surgery:* Approximately 8 babies in every 1,000 have congenital heart defects, ranging across a wide spectrum of anatomical and physiological severity. Some need urgent surgery as neonates while others do not need surgery until adulthood. Some operations (open) require cardiopulmonary bypass while others (closed) can be done without this support. There are just under 3,000 open heart cases and just under 1,000 closed cases per year in the UK and these numbers are relatively constant year by year.

*Paediatric thoracic surgery:* This includes surgery on the airway (often shared with ENT surgeons), chest wall (shared with orthopaedic surgeons), mediastinum, lung and pleural space (performed in some centres by paediatric surgeons).

Children presenting with inhaled foreign bodies may be referred to a paediatric cardiothoracic surgeon, a general paediatric surgeon or an ENT surgeon. Oesophageal problems (including tracheo-oesophageal fistula in the neonate) are dealt with exclusively by specialist paediatric surgeons.

### Provision of care

Currently, CCT-holders will have trained in all aspects of heart and lung surgery in adults. Those dealing with children have undertaken specific sub-specialty training.

*Paediatric cardiac surgery:* This is the ultimate example of teamwork. Surgery is not possible without the support of paediatric cardiac anaesthetists and intensivists, paediatric cardiologists and perfusionists. All require specific training and understanding of surgery for congenital heart defects. Specialty-trained nursing staff in both the ward and intensive care unit are also integral to the team. All patients undergoing cardiac surgery require intensive care in a unit with medical and nursing staff skilled in the management of congenital heart defects.

There is also a need for close liaison with adult cardiology teams, both with the provision of sub-specialty expertise (eg electrophysiology and transplantation) and also to provide for a smooth transition into adult care.

At present the majority of surgeons undertaking paediatric cardiac surgery in the UK also undertake surgery in adults with acquired heart disease. The changes due to the WTD and the new consultant contract are likely to reduce operating time and it is foreseen that most cardiac surgeons will concentrate on congenital heart disease in children and adults.

All units submit comprehensive data on patients undergoing paediatric cardiac surgery to a national database, the Central Cardiac Audit Database. (See [http://www.icservices.nhs.uk/ncasp/pages/audit\\_topics/chd/pcschds-old.asp](http://www.icservices.nhs.uk/ncasp/pages/audit_topics/chd/pcschds-old.asp).)

### Organisation of care

There is a need in the UK for approximately 20–30 surgeons undertaking surgery for congenital heart defects.

The report of the Paediatric and Congenital Cardiac Services Review sets the standards.<sup>58</sup> Paediatric cardiothoracic surgery should be undertaken at tertiary referral centres planned on a national basis. All referrals

to paediatric cardiac surgeons come from paediatric cardiologists based in supra-regional centres. They receive referrals from outreach clinics and directly from paediatricians. A proposal is that there will be 'hub and spoke' units or networks of care, which may prompt the appointment of paediatricians with an interest in paediatric cardiology.

## Training and education

The SAC in cardiothoracic surgery has developed a competency-based curriculum that includes two modules in congenital heart disease: one for adult trainees having their first exposure to the sub-specialty and the second for those wishing to specialise. Trainees who wish to specialise in surgery for congenital heart defects undertake a two-year training programme after their training in adult cardiothoracic surgery.

At present the FRCS examination requires knowledge of congenital heart disease expected of a general cardiothoracic surgical trainee. There is no formal assessment of specialist paediatric cardiac surgical training (apart from the record of in-training assessment process). This is also the position internationally and the issue is being addressed by the European Association for Cardiothoracic Surgery and the Society of Thoracic Surgeons (in the US).

The issue of minimum volume of surgery to be undertaken is currently being debated but one suggestion is two full operating days per week. The European Association for Cardiothoracic Surgery has suggested a minimum of 125 cases per year. In addition, it is established practice that consultant surgeons operate together on complex cases.

## Recommendations

The Paediatric and Congenital Cardiac Services Review recommended that there be larger (and therefore fewer) units. A consensus statement is currently being prepared by the DH on the future provision of paediatric cardiac surgery. The initial conclusions suggest that each centre should have four or possibly five surgeons. This would mean a significant reduction in the current number of centres. Appointment of more surgeons to the current centres is not the solution as the number of cases in the UK is relatively fixed and each surgeon needs a minimum level of operating to maintain their skills. Reconfiguration will involve difficult political decisions.

## Paediatric and adolescent gynaecology

### Workload

The workload is in two main areas:

- > Common gynaecological complaints such as vaginal discharge, labial adhesions and menstrual dysfunction. These can present at any age to a gynaecologist.
- > Complex congenital anomalies such as disorders of sex development. Gynaecological input is usually required at puberty and through adolescence.

Also, teenage pregnancy must not be overlooked. Pregnant adolescents are cared for in antenatal or termination clinics with appropriate social work and child protection evaluation.

### Provision of care

There are no activity figures available. However, most hospitals will have a gynaecologist responsible for and interested in paediatric and adolescent gynaecological problems.

Complex congenital anomalies are uncommon and the gynaecologist should be part of a multidisciplinary team with endocrinology, urology, psychology and specialised investigation and imaging. This is usually within a tertiary referral centre.

### Organisation of care

Common paediatric and adolescent gynaecological complaints often only need outpatient assessment and treatment, which should ideally be located in a paediatric and adolescent outpatient setting.

Complex anomalies should be part of a multidisciplinary service. These anomalies are life-long and attention must be given to transition of care.

### Training and education

Paediatric and adolescent gynaecology is a requirement for the membership examination of the Royal College of Obstetricians and Gynaecologists (RCOG). Those who wish to develop further skills may undertake the RCOG advanced training skills module in paediatric and adolescent gynaecology. This new programme has been designed jointly by the RCOG and the British Society for Paediatric and Adolescent Gynaecology.

### Recommendations

- > All hospitals should have a named consultant responsible for paediatric and adolescent gynaecological patients.

## Neurosurgery

### Workload

Approximately 100 paediatric neurosurgery operations are performed per million of the general population each year. This equates to 6,000 operations per year in the UK, of which approximately 70% are emergency and 30% elective. Most emergency operations are performed on children with hydrocephalus, head injury or brain tumours. Hydrocephalus accounts for about 3,000 of the 6,000 annual procedures and central nervous system tumours, craniofacial disorders and epilepsy each account for about 400 cases per year. The remaining workload comprises children with spinal dysraphism and miscellaneous disorders.

Paediatric brain and spinal tumours are the most demanding cases technically, emotionally and in terms of time required of the paediatric neurosurgeon for each child and their parents during the acute and follow-up periods.

### Provision of care

Most of the above operations are carried out by trained paediatric neurosurgeons or neurosurgeons with a paediatric interest. However, they are mostly based in general neurosurgical centres and only two UK centres have a dedicated paediatric neurosurgery consultant rota. Others rely on joint rotas with emergency-competent adult colleagues. A small and decreasing proportion of operations on children is carried out by adult neurosurgeons or general neurosurgical trainees.

Children with syndromic or complex craniosynostosis are treated in one of four craniofacial centres designated by the National Commissioning Group.

### Organisation of care

Paediatric neurosurgical work should preferably be carried out in major paediatric centres serving a large population. Ideally, a population of 6–8 million would justify a separate on-call rota of 4 or 5 full-time consultant paediatric neurosurgeons, supported by at least one tier of trainees and additional nurse practitioners. Emergency life-saving procedures for raised intracranial pressure (for example, acute extradural haematoma) should be performed whenever necessary in the nearest neurosurgical centre by an emergency-competent on-call neurosurgeon.

Sufficient critical care facilities should be available for inpatients, together with easy access to neuroradiology, paediatric neurology, neuropathology and paediatric oncologists.

### Training and education

A paediatric neurosurgeon must have undergone an indicative 12 months' training in a major paediatric neurosurgery centre. There is no formal assessment of relevant paediatric practice in the specialty's intercollegiate examination although paediatric issues are occasionally covered.

Skills should be maintained by attendance at regular specialist meetings, supplemented by short sabbaticals to other units and regular joint case operating. Competence in emergency paediatric procedures should be maintained by adult neurosurgeons through regular updates from, or visits to, paediatric neurosurgery centres.

### Recommendations

- > To avoid de-skilling, paediatric neurosurgery activity in the UK should be concentrated in major centres with large catchment populations (eg 6–8 million). This will enable sufficient workload to provide pre- and post-CCT training, opportunities for research and sub-specialisation and a dedicated paediatric neurosurgery rota, staffed by four or five neurosurgeons.
- > The capacity and capability for occasional simple immediate life-saving emergency operations on children presenting to their nearest general neurosurgical unit should be maintained as far as possible in all neurosurgical centres in the UK.

## Ophthalmology

### Workload

The ratio of outpatient to inpatient/day case work is higher in ophthalmology than in other children's surgical specialties. Outpatient attendance figures are of the order of 500,000 new and return appointments per year. There were approximately 20,000 FCEs in ophthalmology involving children under 14 in 2004–2005.

Ninety per cent of children's hospital ophthalmic appointments involve conditions such as unilateral amblyopia, strabismus and nasolacrimal duct obstruction. Serious visual loss in childhood is uncommon, with 6 of every 10,000 children born in the UK each year becoming severely visual impaired or blind by their 16th birthday and probably a further 12 becoming visually impaired (worse than 6/18 or 0.5 to 1.0 Log MAR). Thus, there are at least 4 newly visually impaired children each day in the UK and 2 per 1,000 children are visually impaired or blind, of whom 50% will have associated neurological impairments.

Screening by hospital eye departments occurs in the community for school and preschool eye tests, and in neonatal units for retinopathy of prematurity. Targeted clinical surveillance is carried out for uveitis in juvenile idiopathic arthritis, optic pathway glioma in neurofibromatosis and in a number of other conditions.

The surgical workload predominantly comprises squint (strabismus) but includes laser treatment for retinopathy of prematurity, surgery for congenital cataract and glaucoma in centres with appropriate anaesthetic and surgical facilities. Paediatric eye tumours are treated in supra-regional centres.

### Provision of care

The team involved in the care of children with eye disorders in a hospital setting includes: ophthalmologists (doctors trained in the diagnosis and management, including surgery, of disorders of vision); anaesthetists; ophthalmic nurses (including nurse specialists with training in the diagnosis of eye disorders in children); orthoptists (allied health professionals trained in the diagnosis and management of ocular motility disorders, ocular misalignments, amblyopia and screening for eye disorders; and optometrists (health professionals trained to detect and correct refractive errors, screen for eye disorders and prescribe treatment for some common eye conditions).

Consultant ophthalmologists who have undertaken core professional training and are on the specialist register carry out much of the hospital-based care of children with eye disease. Most units will contain one ophthalmologist with sub-specialty training in paediatric ophthalmology and strabismus and who will act as the lead clinician for children within the unit. Other sub-specialist ophthalmologists such as corneal and retinal surgeons are involved with the care of children requiring their expertise.

### Organisation of care

The organisation of ophthalmology services is covered in depth by the Royal College of Ophthalmologists.<sup>59</sup>

Tertiary referrals are made at the discretion of the treating consultant surgeon, usually to the regional paediatric centre. Such referrals are commonly made for congenital eye malformations, cataract and glaucoma, retinopathy of prematurity requiring laser treatment, childhood onset retinal dystrophies and neuro-ophthalmic disorders.

Supra-regional arrangements exist for the treatment of children's eye malignancy, particularly retinoblastoma.

### Training and education

Paediatric ophthalmology is an essential part of the core specialist curriculum (<http://www.rcophth.ac.uk/education/new-curriculum>) and is assessed as part of the membership examination. The Royal College of Ophthalmologists has an active and audited programme of CPD and many regions have regional paediatric

ophthalmology groups where consultants with a paediatric interest meet regularly to discuss matters relevant to the care of children with eye disease.

## Recommendations

- > A senior member of staff in each eye unit should be designated as lead for children's eye services.
- > Every ophthalmic unit should have recognised emergency cover arrangements and access to paediatric advice and facilities.
- > A senior member of staff should have designated responsibility for retinopathy of prematurity screening and ensuring arrangements are in place to cover periods of leave.
- > Ophthalmologists should provide ready access to their first available outpatient clinic for those children in whom serious visual disability or ophthalmic disease is suspected by GPs or paediatricians.
- > Significant visual disability should be notified to the district visual disability team and community child health services.
- > There should be ready access to investigations and special services necessary for electrophysiology, neuro-imaging, genetic counselling and low vision aids.



## Oral and maxillofacial surgery

### Workload

Oral and maxillofacial surgery is a major provider of paediatric services for children requiring surgery involving the mouth, face, head and neck. In 2004–2005, 23% of the 200,972 oral and maxillofacial hospital admissions were in the 0–14 age range. The majority of procedures are undertaken as elective day cases in otherwise healthy children in DGHs and largely comprise routine dento-alveolar surgery. A proportion of more complex cases requiring hospital admission and overnight stay including orthognathic (facial deformity) surgery are also routinely undertaken in this setting.

Emergency care in children forms approximately 20–25% of all maxillofacial emergency admissions and usually occurs in children without significant co-morbidity. The majority of admissions involve facial lacerations, dog bites, fractures and orofacial infection and are managed in the DGH.

Complex maxillofacial paediatric surgery is usually undertaken in specialist centres following tertiary referral. This includes craniofacial deformity, cleft lip and palate, and paediatric head and neck oncology. Children with significant co-morbidity require referral to specialist centres where appropriate specialist paediatric services are available.

### Provision of care

Most oral and maxillofacial surgeons are involved in general paediatric care and emergency cover. There are a small number involved in the management of cleft lip and palate and craniofacial surgery whose practice is largely paediatric.

### Organisation of care

The majority of paediatric cases including the provision of emergency care should continue to be treated in the DGH with appropriate paediatric and anaesthetic support.

Children and adolescents with facial deformity are usually seen on separate joint orthognathic clinics with orthodontic colleagues in the DGH. In maxillofacial surgery, adolescents with chronic conditions will tend to be treated by the same clinician into adulthood with no need for transition of care.

### Training and education

Specialist trainees are exposed to children throughout their training. The syllabus in oral and maxillofacial surgery includes areas specific to paediatric patients involving cleft lip and palate, craniofacial surgery, orthognathic surgery and distraction osteogenesis. Specialist trainees wishing to work in tertiary referral centres will undergo fellowship beforehand. All areas of paediatric care form part of the in-training assessment and are examined in the intercollegiate specialty examination before completion of training. The majority of consultant maxillofacial surgeons undertaking routine elective and emergency practice will have a workload satisfactory to maintain clinical competence.

### Recommendations

- > Training in oral and maxillofacial surgery should continue to ensure that all surgeons have competence in the management of all aspects of elective and emergency general paediatric maxillofacial care.
- > Surgeons appointed to specialist posts in tertiary referral centres should undergo fellowship training in a recognised sub-specialty following completion of training.

## Orthopaedic surgery

### Workload

A DGH serving a population of 250,000 people would provide children's orthopaedic services for approximately 50,000 patients. Each year that population will produce approximately 10,000 attendances at the ED and can be assumed to generate approximately 1,000 new fracture clinic appointments with 2,000 follow-up appointments. Approximately 350 children will require emergency admission.

The population would also generate approximately 1,000 new elective paediatric referrals. In this population it can be assumed that 50 children will be born with a hip abnormality and approximately 10 will be born with cerebral palsy. Between 10 and 15 will be born with talipes or other foot deformities. There will be a large number of children under the age of six years presenting with benign torsional and angular abnormalities in the lower limbs.

### Provision of care

It is estimated that of the 1,700 orthopaedic surgeons, 250 (15%) have an interest in children's orthopaedic surgery. In 25% of units there is no such consultant surgeon. In most units fracture care is provided by surgeons who have a mixed adult and children's practice. Elective surgery is provided by consultant orthopaedic surgeons in DGHs with an interest in paediatrics and in tertiary centres with dedicated paediatric orthopaedic surgeons.

At present, recruitment to paediatric orthopaedic posts is difficult. Within the British Society for Children's Orthopaedic Surgery, 35% of members are over the age of 56 years. If these surgeons were to retire and not be replaced, 31 units would lose their paediatric orthopaedic service.

### Organisation of care

Most fracture care should be performed in the DGHs. A hospital admitting children through the ED must have adequate facilities including appropriately trained anaesthetic support.

For more complex care, a network model is required. In this model the tertiary centre would act as the hub. Such a centre would normally have four to six specialist paediatric orthopaedic surgeons and dedicated fracture clinics. The centre would be capable of treating the multiple-injured child and would have a paediatric ED and critical care unit for all major specialties. The tertiary centre would normally be expected to treat problems such as major limb reconstruction, spinal deformity and neuromuscular disease.

The DGH would act as the spoke and should have a paediatric ward and recovery zone.

The hub and spoke(s) would interact. Speciality clinicians would either visit the DGH or surgeons could operate in the tertiary centre. Arrangements for the treatment of complex cases would be discussed at local level.

### Training and education

All specialist trainees in trauma and orthopaedics are examined in children's orthopaedics and fractures, and should be capable of basic paediatric orthopaedic care in the DGH.<sup>28</sup> Those seeking posts in a tertiary centre will have undergone fellowship training. Paediatric orthopaedic consultants in tertiary centres would be expected to continue their training by attending meetings and ensuring that their portfolio is updated on a regular basis and examined by quality assurance mechanisms. Standards are maintained through the British Society for Children's Orthopaedic Surgery. A new scheme offering visiting professorships is designed to ensure that quality is maintained.

## Recommendations

- > The managed clinical network principle of care should be further established.
- > At least one orthopaedic surgeon should have a commitment to children's orthopaedic surgery in a DGH.
- > Regional and national centres must have additional facilities required to provide a service for more complex problems.
- > A paediatric orthopaedic surgeon working in a tertiary centre should have received, in addition to the six months' (indicative) formal training, a further period in a dedicated fellowship.

## Otorhinolaryngology

### Workload

The specialty of ENT surgery is a major provider of paediatric services. In 2004–2005, 29% of the 329,000 ENT admissions in England were in the 0–14 age group. The large majority of these cases were otherwise healthy children admitted for elective surgery. A high proportion of admissions is for day surgery. This routine caseload includes minor ear procedures, tonsillectomy and adenoidectomy. Most ENT emergencies also occur in children without other problems and are a small proportion of the total workload. Emergency work includes the management of foreign bodies in the ear, nose and throat, infections secondary to ear and sinonasal disease, head and neck abscesses and the arrest of bleeding following adenotonsillar surgery.

Sub-specialist paediatric otorhinolaryngology includes routine ENT surgery in children with substantial developmental, immunological or other systemic disease; congenital ear surgery; bone anchored hearing aids and prosthetic ears; cochlear implantation; management of laryngo-tracheal stenosis and other airway problems; repair of choanal atresia; management of severe congenital and developmental conditions of the head and neck; and ENT aspects of head and neck tumour surgery.

Referral rates to tertiary centres are rising; this particularly applies to the very young.

### Provision of care

Most ENT surgeons are involved in general paediatric otorhinolaryngology, with very few purely paediatric ENT surgeons in the UK. Most large units have one surgeon who is designated as the clinical lead for paediatric otorhinolaryngology and will care for more complex cases or refer them to a tertiary centre.

While there is a need for continued consultant expansion in the specialty generally, there is no particular difficulty with consultant cover for elective paediatric ENT work.

### Organisation of care

Most general paediatric ENT surgery should continue in DGHs and teaching hospitals that have appropriate paediatric support. Tertiary paediatric otorhinolaryngology should continue in children's hospitals and major teaching centres with the necessary support services. Paediatric outpatient work and day surgery for suitable cases may be performed at outlying units and day centres with appropriate support arrangements.

Children with general ENT conditions requiring emergency admission should only be admitted to units where both on-site ENT and acute paediatric services are available. Some less pressing 'emergencies' (for example, foreign body in the ear) may be managed in a routine outpatient clinic or on the next available operating session.

While the majority of ENT surgeons with a paediatric interest will be able to offer advice on neonates, most who require complex investigation or early intervention will need to be transferred to tertiary centres.

Sub-specialist paediatric otorhinolaryngology is largely provided in major regional children's centres by ENT surgeons specialising in paediatric otorhinolaryngology. The aid of adult otorhinolaryngologists is enlisted where specific sub-specialist expertise is needed. At present most major centres generally have only one or two paediatric otorhinolaryngologists, making a 24-hour emergency airway service difficult to maintain. The national shortage of paediatric critical care facilities also has an impact on this service. There is a need for more paediatric otorhinolaryngologists and specialist paediatric facilities.

### Training and education

For all ENT surgeons, paediatrics comprises about 30% of the workload. Paediatric ENT surgery is included in the training curriculum. Many trainees have some exposure to tertiary work during training and most will

continue with a significant paediatric component to their work throughout their consultant careers. While there are clearly differences between adult and paediatric ENT practice, the common pathologies treated do not differ greatly between adults and children so the skills required for children's work are relatively easy to teach and maintain.

Since April 1999 there has been a separate obligatory paediatric section in the intercollegiate FRCS (ORL–HNS) examination.

The majority of ENT surgeons undertaking routine, elective and emergency ENT practice will have a workload more than sufficient to maintain clinical competence. There is a small number of surgeons who do adult-only or highly sub-specialised work. Many of these will have generic skills and training that permit them to continue out-of-hours paediatric cover. Where this is so, departments should make arrangements to ensure appropriate cover for paediatric ENT care.

## Recommendations

- > Continued consultant expansion is highly desirable in both secondary and tertiary units. This would permit further sub-specialisation in the paediatric aspects of the specialty, improve patient access to specialist care and permit the development of managed clinical network arrangements where appropriate.

## Plastic, reconstructive and aesthetic surgery

### Workload

Plastic surgeons undertake reconstruction and the correction of deformity with the aim of achieving normal function with the most normal appearance. The specialty is particularly aware of the psychosocial impact of deformity upon the child and family. Treatment is therefore delivered in a manner intended to result in the least possible disruption to family life. Most plastic surgeons are involved in the provision of care to children although increasing sub-specialisation tends to focus the care of the child onto a smaller number of surgeons in child-friendly settings. Plastic surgeons are principally involved in the correction of congenital and post-traumatic deformity including burns.

### Scope of practice

*General:* common congenital deformities including bat ears, burns and soft tissue trauma especially of the face and hands and the management of skin lesions and vascular anomalies

*Specialist:* craniofacial surgery, cleft lip and palate surgery, congenital hand surgery, hypospadias surgery, ear reconstruction and significant burns

*Emergency workload:* Emergencies comprise a high proportion of paediatric plastic surgery with burns, hand trauma and facial lacerations being the most common. In addition, there are a number of lower limb injuries and soft tissue defects resulting from acute infection, iatrogenic injury from extravasation injuries and tube trauma in the neonatal period.

### Provision of care

Children are treated in an increasingly consultant-based environment with only a small proportion of the work undertaken unsupervised by non-consultant grades.

In all of the specialist areas of practice the service is provided in a child-friendly environment by consultants acting as part of an appropriately constituted multidisciplinary team.

### Organisation of care

It is estimated that approximately 75% of plastic surgical operations in children could be undertaken as day cases.

In general, plastic surgery services are currently delivered according to a managed clinical network (hub and spoke) principle. Outpatient clinics are undertaken at most DGHs for general and tertiary services. Where possible, day case and short stay procedures not requiring specialist facilities are undertaken to provide as much as possible of the service close to the patient's home. A popular combination is for a consultant surgeon and one or two trainees to visit a hospital and undertake a combination of an outpatient clinic with minor surgical operations so the consultant can both consult and supervise the surgery.

Services such as those related to cleft lip and palate are provided as part of a regional network. This comprises a central administrative and surgical hub combined with a multidisciplinary network across the region. Where possible, reviews and interventions are undertaken close to the patient and include the provision of general paediatric and outreach nursing care, speech therapy, insertion of grommets and orthodontic treatment. Plastic surgery clinics are undertaken at regular intervals across the region but all specialist investigation and surgery is undertaken at the base hospital.

Following the burn care review,<sup>60</sup> the management of burns is evolving towards three to five supra-regional centres dealing with large and complex burns, linked to a number of sub-regional centres dealing with burns of up to 40% bsa (body surface area) and local units dealing with burns of less than 15% bsa. Burns care is

shared among facilities. Children with major burns are initially treated at supra-regional centres but, as their condition permits, treatment is continued at the nearest sub-regional unit to the patient's home. Intermediate burns are treated in a similar manner but at the next level down, again with the aim of inflicting the least possible disruption to the family.

Where numbers are very small, as in craniofacial surgery, patients travel to one of the five supra-regional centres with accommodation and family support provided.

### **Training and education**

Trainees in plastic surgery are exposed to paediatric plastic surgery at all levels of training and it forms an integral part of the specialty fellowship examination. All plastic surgery trainees are expected to demonstrate competence in the generality of paediatric plastic surgery procedures as well as triage and appropriate referral of the more specialist conditions.

Training in specialist areas is undertaken as a senior trainee, with experience at designated training centres often including an attachment to overseas centres of excellence.

### **Recommendations**

- > There is a global shortage of burns specialists and there must be recognition that the current situation of small numbers of consultant plastic surgeons undertaking evermore focused practice in burns surgery is not sustainable without attention to improvement of their working lives.
- > Plastic surgeons continue to develop mutually supportive relationships with other surgical specialties so as to achieve cross-fertilisation.

## Urology

### Workload

Responsibility for childhood urological disorders is shared among specialist paediatric urologists, paediatric surgeons with an interest in urology and adult urologists whose practice includes children. The scope of the specialty includes congenital anomalies (often detected ante-natally), acquired conditions such as trauma and tumours, and the investigation and management of common disorders such as urinary tract infection and bladder dysfunction.

DH data for England in 2003–2004 indicated that approximately 16,000 children aged 0–14 years were treated by adult urologists. Paediatric surgeons (including paediatric urologists) treated approximately 53,000 children. Separate workload information for paediatric urology is not available but this is generally estimated to account for 30–40% of the general/urological surgical workload in children. Extrapolating these figures for the UK suggests that the paediatric urological workload between specialist and non-specialist urologists is in the order of 35,000–40,000 children per year.

The emergency workload is low, mainly acute scrotal pathology (notably testicular torsion and trauma), and, in specialist paediatric urology, the management of acute obstruction and infection.

The bulk of the elective non-specialised workload consists of surgery of minor or intermediate complexity (for example, circumcision, orchidopexy, hydrocele surgery), of which an estimated 90% can be undertaken on a day case basis. More specialised routine surgery includes treatment for urinary tract obstruction, open and endoscopic correction of vesico-ureteric reflux and correction of hypospadias. Complex specialised paediatric urology includes bladder reconstruction and the management of conditions such as posterior urethral valves and disorders of sex development.

The treatment of bladder exstrophy and epispadias is now organised on a supra-regional basis and is limited to two designated centres in the UK.

### Provision of care

The routine urological surgery of childhood is undertaken both by adult urologists in DGHs and specialist paediatric urologists and paediatric surgeons in regional units. In a survey published in 2001, approximately 90% of DGH urologists stated that they treated children.<sup>61</sup>

Specialised paediatric urological services are provided by full-time paediatric urologists or paediatric surgeons with a commitment to paediatric urology. A census undertaken on behalf of the SAC in paediatric surgery in February 2006 identified 15 full-time paediatric urologists.

In addition, there are around 30 paediatric surgeons whose practice includes a significant commitment to urology but who also undertake some elective or emergency GPS. Full-time consultant paediatric urologists and paediatric surgeons/urologists therefore currently comprise approximately a third of the UK's total paediatric surgical/urological workforce of 150 consultants.

There is little structured or validated quality assurance data on the provision of paediatric urology. Workload data (FCEs) are collected centrally for children treated by adult urologists. However, it is not possible to identify the workload undertaken by specialist paediatric urologists and paediatric surgeons/urologists since DH FCE data make no distinction between paediatric urology and general paediatric surgery.

### Organisation of care

The routine elective urological surgery of childhood can be provided by suitably trained adult urologists in a DGH setting where supporting staff and resources can be provided.



Specialist paediatric urological services should be concentrated predominantly in regional units. Paediatric urologists in larger regional units work closely with specialist paediatric nephrologists to provide comprehensive services for children. Paediatric urology nurse specialists play a vital role, particularly in the assessment and management of children with severe urinary incontinence.

Clinical networks are already established or are being developed in many parts of the UK. Currently, these are mostly confined to outreach clinics but are likely to extend to include day case theatre lists. Patterns of service provision should be determined by the needs of the local population and level of paediatric urological expertise available in DGHs.

Supra-regional services are currently limited to the management of bladder exstrophy and primary epispadias.

## Education and training

Paediatric urology is included in the curriculum for all trainees in urology and is an obligatory component of the intercollegiate examination. A two-day national training course for specialist trainees in urology and paediatric surgery is provided annually by the British Association of Paediatric Urologists. Exposure to children's urology is now provided within most urological rotational training programmes in the UK.

There is no separate CCT in paediatric urology. Training for specialist paediatric urologists and paediatric surgeons with a major commitment to paediatric urology is therefore provided within the curriculum leading to a CCT in paediatric surgery. There are six approved posts designated for paediatric urology in the UK that are intended for trainees in years 5 and 6 of specialist training. Although these posts have so far been filled predominantly by trainees from paediatric surgery, they are also open to trainees from an adult urological background.

The intercollegiate examination in paediatric surgery (FRCS Paed) includes a substantial urological component including two oral examinations devoted to paediatric urology.

Opportunities for CPD in paediatric urology include annual scientific meetings and courses.

## Recommendations

Most routine urological surgery in children can be provided, on a largely day case basis, in DGHs subject to the following recommendations:

- > The paediatric workload should be concentrated in the hands of one or two urologists in each DGH to enable them to maintain a high level of expertise.
- > Specialist paediatric urology should be concentrated in major regional units, typically staffed by two or more full-time paediatric urologists working with consultant colleagues (notably in paediatric nephrology and endocrinology) to provide an integrated and comprehensive service to children and their families.
- > In smaller regional or sub-regional specialist units the service should be provided by one or more paediatric surgeons whose contribution to the GPS emergency rota is combined with a major service commitment to urology.
- > Paediatric urology patients may require long-term follow-up care. Greater priority should be given to the transition of care.

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# Appendix I

## Children in Hospital: Rights and responsibilities of children and parents

Best practice means that everyone has a right to expect quality care while in hospital. Hospital staff and parents have a special duty of care to children and a legal responsibility to protect the child's rights, interests and wishes. While in hospital...

### A child can expect:

- > to receive treatment promptly on the basis of clinical need;
- > courtesy, respect for privacy and dignity, and the opportunity to talk to staff without a parent present, if appropriate;
- > treatment in a children's facility appropriate to age, development and medical condition, and with play and education available, wherever this is possible;
- > nursing care by appropriately trained children's nurses;
- > to be given support and age appropriate information, in writing when necessary, to enable them to understand as far as possible their illness and treatment options and what they will involve;
- > an introduction to the staff caring for them;
- > their initial assessment, operation and post-operative care to be carried out by, or under the supervision of, a surgeon with appropriate training and experience in the care of children;
- > anaesthetic from an anaesthetist, trained and experienced in the care of children; and
- > effective and direct communication between all clinicians involved in their care.

### As the parent or guardian of a child you can expect:

- > to be with your child during treatment, including anaesthetisation and awakening, unless it puts either of you at risk, and to stay overnight, where possible, if you wish;
- > to choose to have a relative or friend with you during consultations and examinations;
- > to be given time to ask questions about your child's medical problems and suggested treatment and to receive clear information (written information may be available);
- > to be given a name and telephone number of someone you can ring for information;
- > to take part in all decisions about treatment and aftercare and to be advised fully of the advantages and disadvantages, risks, side effects and alternative treatments possible;
- > to be informed about what is happening, how you can best support your child and immediately, day or night, of any worsening in your child's condition;
- > staff to understand that worry and anxiety may affect the way you or your child behave;
- > to be told the reason for any delay when you arrive for an appointment and how long you may have to wait;
- > to know the names, jobs and professional status of the staff involved in your child's care and to receive written information about their roles;
- > to have all details about you and your child treated in confidence (except where required by law) and your permission sought for any sharing of this information;
- > to have the right to see any information kept about your child or family;

- > to be able, without fear of adverse repercussion, to complain if you are unhappy with the treatment you or your child receives (a copy of the complaints procedure is available on request);
- > to be given an explanation and, where appropriate, an apology if things do not go as planned;
- > to choose whether or not your child may be seen by medical students and whether training practice may be carried out when less distress may be caused by a more experienced practitioner; and
- > to be respected and your needs as a family unit recognised.

### **You and your child have a responsibility:**

- > to treat all staff, other patients and families with courtesy and respect;
- > to let the hospital know at once if you change your address or telephone number;
- > to make known to medical staff the person who has parental/legal responsibility for a child where parents are separated/divorced or where there are other guardianship arrangements in place;
- > to understand there are pressures of time and resources on the NHS and those working within it;
- > to give staff full information about your child's condition and to let the staff know if your child has any physical or learning disabilities, allergies, sensitivities, conditions or changes in their health and of any medicines they are taking, including over-the-counter remedies;
- > to tell staff if your child is being, or has been, treated by other health care professionals;
- > to tell staff if you do not understand or are uncertain about any part of the diagnosis or treatment and ask for more information or clearer explanation (in writing, if it helps);
- > to follow the instructions given to you on the care of your child before going into hospital for an operation;
- > to make sure your child follows the advice on what to do after the operation (eg exercise, diet, etc), takes any medicine as instructed and that you seek medical advice before stopping or changing treatment;
- > to think about and be aware of what might happen if you or your child refuse the recommended treatment or do not follow the doctor's advice and accept responsibility for those actions and the subsequent results for your child;
- > to ensure your child attends follow-up appointments and that all appointments are attended on time or that cancellation, with reasonable notice, is arranged; and
- > to make sure you, your child and all accompanying visitors follow all the hospital and ward rules..

## Appendix 2

### Glossary

APLS	<i>Advanced Paediatric Life Support</i> training
CCT	Certificate of Completion of Training: Surgeons require the CCT in order to apply for consultant posts.
Commissioning	The mechanism by which Primary Care Trusts or practice-based commissioning groups purchase services to be provided to the local population. Services are provided according to agreement on funding, levels of activity and quality standards.
Competition	Competition is used to improve standards and provide better value for money in the market place.
Contestability	In market theory, contestable markets have no barriers to entry. The threat of potential new entrants to the market is sufficient to ensure that existing providers act competitively to ensure lowest costs and reasonable profits.
CPD	Continuing professional development
Day case	Surgery that is performed on a 'same day' basis. The patient may remain in hospital for up to 23 hours.
DH	Department of Health: the government department responsible for health and social care services in England
DGH	District general hospital
Elective surgery	Surgery that is planned in advance
ED	Emergency department
EPLS	<i>European Paediatric Life Support</i> training
FCE	Finished consultant episode
GMC	General Medical Council: the statutory regulatory body for doctors in the UK
Hospital Episode Statistics	Hospital Episode Statistics provide information on admitted patient care delivered by NHS hospitals in England.
ICB	Intercollegiate board
ISTC	Independent sector treatment centre: a private sector surgical centre providing routine operations for NHS patients in England
Joint Committee on Surgical Training	Controls and administers the scheme of specialist surgical training representing the four surgical royal colleges and the relevant specialist associations



MMC	Modernising Medical Careers: the new method of postgraduate medical training introduced in August 2005
Multidisciplinary team	A team of health care professionals providing medical care to a patient
National Service Framework	National Service Framework for Children, Young People and Maternity Services: clear national standards for services to improve quality and reduce unacceptable variations in standards of care and treatment
National training number	Each doctor who is accepted for a specialist training programme requires an NTN. This number is unique to the doctor and is held until training is completed and the doctor has left the grade.
Outreach services	Services provided in the community: Such services may be provided by primary or secondary care professionals and/or social services.
Payment by results	A funding mechanism that allows Primary Care Trusts to pay providers for units of activity
Plurality	The introduction of a range of service providers to the market place to ensure competition
PMETB	The Postgraduate Medical Education and Training Board formed in 2002 to supervise postgraduate medical education and training.
PCT	Primary Care Trust: locally managed and free-standing NHS organisation that is responsible for commissioning and delivering health care to a defined population
SAC	Specialist advisory committee: sub-committee of the Joint Committee on Higher Surgical Training
SHA	Strategic health authority: the tier between the Department of Health and NHS Trusts/Primary Care Trusts (PCTs). SHAs ensure the delivery of improvement in health services locally and hold PCTs and NHS Trusts to account through performance agreements.
Specialist association	Membership associations for doctors: There are nine specialist associations for the surgical specialties. For example, the British Orthopaedic Association is the membership organisation for orthopaedic surgeons.
Workforce Review Team	The NHS body responsible for workforce planning
WTD	Working time directive – originally a European directive, the WTD has now been enacted into UK health and safety legislation. It limits working hours for both training and non-training grade doctors.

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