



Children's Surgery – A First Class Service

Report of the Paediatric Forum of
The Royal College of Surgeons of England

May 2000

Review date 2005



The Royal College of Surgeons of England



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Summary of Recommendations

- Important changes in education, training and professional attitudes to sub-specialisation are required to ensure that children receive surgical care which meets the standards of safety and quality to which they are entitled.
- Occasional practice is unacceptable except in the treatment of life-threatening emergencies or minor problems. The surgery of childhood should be concentrated in the hands of appropriately trained designated surgeons with a paediatric surgical sub-specialty commitment and a workload of sufficient volume to maintain competence.
- District general hospitals (DGHs) which meet national standards should retain their important role as providers of surgical healthcare for children. However, in-patient surgery should only be undertaken in those hospitals which provide comprehensive paediatric facilities. Some flexibility will be necessary when planning the provision of surgical services for children in isolated or sparsely populated areas.
- Children should receive care in an environment appropriate to their specific needs. Registered children's nurses, some of whom have undertaken specific education in the relevant surgical sub-specialties, should give nursing care. Community children's nursing services should be available throughout the country.
- The clinical management structure of every DGH should include a multidisciplinary group (representing surgeons, anaesthetists, paediatricians and children's nurses) responsible for overseeing, improving and integrating services for children.
- Hub and spoke patterns for the delivery of surgical care should be developed to integrate specialist tertiary centres more closely with the DGHs they serve.
- Special provision must be made for education and training programmes for surgeons involved in the care of children.
- Intercollegiate examinations should be designed to ensure that all surgeons with clinical responsibility for children have been appropriately assessed in the paediatric component of their specialty.
- Surgeons treating children should engage in meaningful audit and participate in relevant continuing professional development. These requirements are likely to form the basis of revalidation.
- National standards are needed so that all children can benefit from access to surgical care of consistently high quality. A substantial NHS investment in information technology and data collection will be required to ensure that national standards for children's surgery are objective and evidence-based.

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- These recommendations are directly aimed at improving the quality of service delivery, training, individual and team performance in children's surgery. They cannot be achieved without the consultant expansion in all the surgical specialties recommended by the Senate of Surgery.

Introduction

The Royal College of Surgeons of England is committed to ensuring that all children receive surgical care of the highest possible standards of quality and safety. As part of this commitment, The Royal College of Surgeons of England has established a Paediatric Forum comprising nominated representatives of ten surgical specialist associations and the Royal College of Anaesthetists, the Royal College of Ophthalmologists, the Royal College of Paediatrics and Child Health and the Royal College of Nursing.

The aims of the Paediatric Forum are:

- To define a set of national standards for the management of children requiring surgery.
- To ensure that children receive treatment in an appropriate environment.
- To outline the special provisions that must be made within education and training programmes for surgeons involved in the care of children.
- To recommend an appropriate assessment relating specifically to children in the intercollegiate examinations.
- To promote the provision of and encourage participation in audit and appropriate CPD activities for all surgeons involved in the care of children.

The provision of an integrated, high-quality surgical service is increasingly dependent upon collaboration among an extended team of healthcare professionals. In addition to surgeons, those contributing most directly to surgical services for children are anaesthetists, children's nurses and paediatricians. Representatives of these disciplines have contributed to the main report. The specialised involvement of professions allied to medicine such as physiotherapists, orthoptists, perfusionists and others is detailed in the sections relating to individual surgical specialties. Chief executives and senior managers have an important responsibility to ensure that local frameworks for clinical governance within NHS Trusts include specific provisions to safeguard the safety and welfare of children. Within this overall context, the Forum has concentrated principally on the contribution made by surgeons to the care of children and on the requirements for specialist training and accreditation.

It is a truism that children are not miniature adults. Some of the surgical disorders of the paediatric age group are rarely encountered in adult surgical practice. Operative surgery in infants and young children differs in many aspects of technique, including tissue handling, attention to haemostasis, incision and technique of wound closure. These differences also extend to pre- and post-operative care, particularly fluid management and pain control.

Fewer technical limitations apply to adolescents, who are closer to adults in terms of their size and physiological response to surgery. But the broader aspects of care in this age group often demand particular sensitivity since physical development may not be matched by emotional maturity. The communication skills required of any good doctor must be sufficiently flexible to meet the needs of anxious parents as well as those of children and young people.

All surgical specialties make a major contribution to the healthcare of children. Approximately half a million children in England and Wales receive in-patient or day-case surgical treatment annually. In its report *Children First – A Study of Hospital Services*, the Audit Commission noted that there are more annual surgical admissions of children than admissions in the paediatric medical disciplines. This statistic reflects the high volume of routine and day-case surgery and the treatment of minor trauma undertaken in specialties such as otorhinolaryngology, orthopaedics and general surgery – as demonstrated in **Figure 1**. In addition, it is estimated that approximately one-quarter of the childhood population attend A&E departments in any one year. Trauma and minor surgical problems account for 85% of childhood A&E attendance.

Children represent a varying proportion of the overall workload in the different surgical specialties, ranging from 3% in urology to 36% in otorhinolaryngology. With the exception of otorhinolaryngology, children comprise a relatively small proportion of the workload in most specialties. The paediatric component of the total workload of the different surgical specialties is illustrated by reference to Department of Health (DoH) statistics for finished consultant episodes (FCEs) by age and specialty in NHS hospitals in England for the financial year 1997-1998 (see **Table 1**).

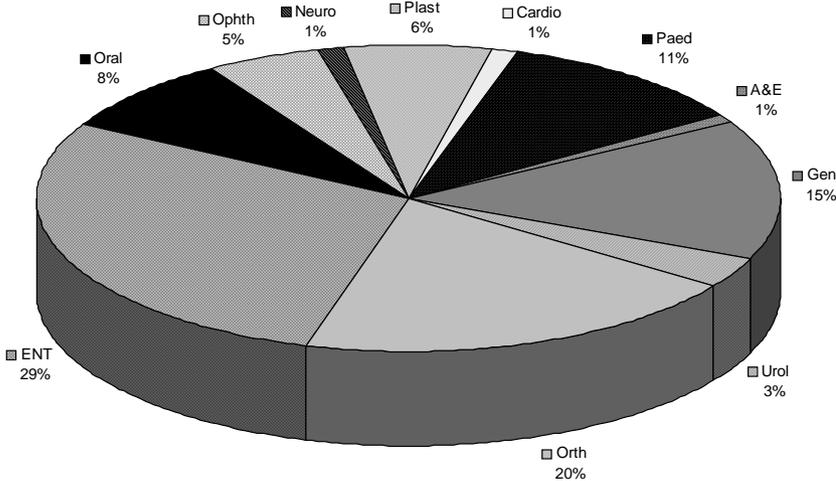
Approximately 75% of elective surgery in specialties such as general paediatric surgery and urology can be undertaken on a day-case basis. The benefits, safety and cost-effectiveness of day-case surgery for children are well-documented.

The ideal surgical services for children are those which achieve an optimal balance between the provision of the relevant specialist surgical and anaesthetic expertise, a dedicated paediatric environment and ease of access for treatment.

With the advent of clinical governance, chief executives have a statutory responsibility for assuring the quality of services provided by their Trust. Whilst broadly welcoming the DoH publication *A First Class Service, Quality in the New NHS*, the Senate of Surgery has expressed concerns regarding the ambitious nature of some of its proposals and has stressed the need for significant additional resources to fund consultant expansion and investment in information technology.

FIGURE 1

Percentage of Total Surgical Workload (Finished Consultant Episodes – FCEs*) in Children Aged 0-14 Years Undertaken by Each Surgical Speciality



Surgical FCEs of Children Aged 0 – 14 in 1997/8

Specialty	Total Aged 0 – 14
Gen = general surgery	67,414
Urol = urology	14,719
Orth = orthopaedics	88,937
ENT = otorhinolaryngology	130,257
Oral = oral & maxillofacial surgery	36,867
Ophth = ophthalmology	22,270
Neuro = neurosurgery	6,130
Plast = plastic surgery	28,951
Cardio = cardiothoracic surgery	4,766
Paed = paediatric surgery	49,931
A&E = accident & emergency medicine	4,156
Total	454,398

Source: Department of Health, Hospital Episode Statistics

* FCE – A finished consultant episode is defined as a period of in-patient care under one consultant within one healthcare provider. The figures do not represent the number of patients as one individual may have more than one episode of care within a year.

TABLE 1**Paediatric Component of Total Surgical Workload in Each Surgical Specialty****Ordinary Admissions and Day Cases: FCEs by Age and Specialty for NHS Hospitals in England 1997 – 1998**

Specialty	All ages	Ages 0-14 years (children)	Child FCEs as a percentage of all FCEs treated by the specialty
General surgery	1382,766	67,414	4.9%
Urology	539,952	14,719	2.7%
Trauma & orthopaedics	773,157	88,937	11.5%
Otorhinolaryngology	364,776	130,257	35.7%
Ophthalmology	363,858	22,270	6.1%
Oral & maxillofacial	193,562	36,867	19.0%
Neurosurgery	53,208	6,130	11.5%
Plastic surgery	172,704	28,951	16.8%
Cardiothoracic surgery	68,461	4,766	7.0%
Paediatric surgery	52,992	49,931	94.2%
Accident & emergency	90,048	4,156	4.6%

Source: Department of Health, *Hospital Episode Statistics*

1 | Current Provision of Surgical Care for Children

1.1 SURGEONS

The majority of surgeons in England and Wales operate on both adults and children. The most comprehensive picture of the involvement of surgeons in the care of children comes from data collected during the course of the **1989 National Confidential Enquiry into Perioperative Deaths (NCEPOD)** devoted solely to children. At that time 12% of general surgeons reported that they never operated on children. Some 19% only operated on children over six months of age. However, 32% of general surgeons reported that they operated on babies less than six months of age but undertook fewer than ten operations in this age group in any one year. All neurosurgeons reported having to operate on children. A total of 93% of orthopaedic surgeons operated on children, although 31% did not operate on children under six months of age.

The authors of the 1989 NCEPOD report concluded that ‘the majority of surgeons in all regions operate on children’ and whilst ‘much surgery and anaesthesia is given by clinicians with a regular paediatric practice, this is not always so’. Amongst the key recommendations were that **‘surgeons and anaesthetists should not undertake occasional practice’** and **‘no trainee should undertake any anaesthetic or surgical operation on a child of any age without consultation with their consultant’**.

Perioperative deaths in children under 16 years of age were the subject of further study in the 1999 NCEPOD enquiry *Extremes of Age*. In a sample of 139 perioperative deaths in this age group, no mortality was associated with common childhood operations such as appendicectomy and tonsillectomy. Perioperative mortality was largely confined to children with congenital anomalies, complications of prematurity, tumours and major head injuries.

Of those surgeons who responded to the 1999 NCEPOD survey, a substantial majority indicated that they operated on children (eg 80% of general surgeons, 88% of orthopaedic surgeons, 93% of ophthalmic surgeons, and 99% of plastic surgeons). Although there appears to have been little overall change since 1989, closer inspection of the recent data does reveal significant shifts in patterns of practice. For example, 29% of general surgeons indicate that they operate on infants less than six months of age compared to 68% in 1989. The percentage of orthopaedic surgeons operating on infants has fallen from 41% in 1989 to the current figure of 19%. Evidence of paediatric sub-specialisation is apparent across a number of specialties. Nevertheless, it is also the case that some consultants persist in performing small numbers of operations on infants and very occasional practice is still a feature of emergency surgery for children.

A relatively small proportion of consultant surgeons currently confines their practice solely to adults. Conversely, a small number of surgeons (approximately 2% of all consultant surgeons in England and Wales) specialise exclusively in the surgery of

childhood, ie surgeons within the specialty of paediatric surgery and a very small number of full-time paediatric cardiac surgeons and neurosurgeons in specialist centres.

In addition the surgical staff of most major specialist centres includes an intermediate category of consultants in specialties such as orthopaedics, otorhinolaryngology, ophthalmic, maxillofacial and plastic surgery whose practice, whilst not exclusively paediatric, includes a substantial paediatric commitment.

1.2 HOSPITALS

Children's Hospitals or Major Children's Departments in Multidisciplinary Tertiary Referral Centres (Major Acute Hospitals)

These hospitals provide a comprehensive range of specialist paediatric surgical services on a regional, sub-regional or supra-regional basis. Surgical services for children are supported by specialist facilities including paediatrics, paediatric anaesthesia, intensive 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 district general-type surgical services. Hub and spoke patterns of out-patient service provision are established features of many specialist children's hospitals. The extension of the hub and spoke concept to operative surgery has only been introduced on a very limited scale.

Single Surgical Specialty Hospitals

Amongst those hospitals devoted solely to the practice of a single surgical specialty are some that have acquired national or international reputations as centres of excellence. Children have been amongst those to benefit from their important contributions to patient care, surgical innovation and specialist training. In addition some specialist surgical units (eg neurosurgery) are still located within adult centres which do not have paediatric cover on site.

The single specialty model of in-patient provision is increasingly seen as outdated. The authors of the 1989 NCEPOD report were critical of the absence of intensive care facilities for children and a lack of skilled paediatric anaesthetists, paediatricians and paediatric nurses in some units, concluding that 'the needs of children in single surgical specialty units are not always fully met'.

The services of some single specialty hospitals have already been relocated to multidisciplinary centres, for example the transfer of adult and paediatric cardiothoracic surgery from an isolated single specialty unit to the General Infirmary at Leeds. In Edinburgh, children's orthopaedic surgery has been relocated from the Princess Margaret Rose Orthopaedic Hospital to join the other surgical specialties for children provided at the Royal Hospital for Sick Children.

In 1996 the Royal College of Paediatrics and Child Health published guidelines for the provision of off-site paediatric medical cover for children in single specialty surgical hospitals. Such arrangements are not ideal. The role of specialist hospitals as providers of surgical care for children is addressed by the Joint Consultants Committee in its recently published report *Organisation of Acute General Hospital Services*. Where highly specialised in-patient surgery is critical to the outcome and cannot be provided elsewhere, the JCC document emphasises the importance of ensuring that the nursing and environmental needs of children are met and that the necessary paediatric expertise is readily available. In the longer term, the JCC document envisages the need to consider accommodating such specialist units on the site of an acute general hospital.

District General Hospitals (Acute General Hospitals)

Equality of access was enshrined as one of the founding principles of the National Health Service. In this respect, DGHs have played a central role by delivering a wide range of elective and emergency surgical services to both adults and children in their locality. The majority of DGHs of all sizes currently provide surgical services for children but differing patterns are already beginning to emerge.

Larger and Medium-sized DGHs (serving populations of 200,000 to 500,000)

The surgical departments of these hospitals generally provide a range of non-specialist elective and emergency surgery for children, in addition to offering access to A&E treatment. Larger DGHs and the majority of medium-sized DGHs will be able to sustain the staffing establishments in paediatrics needed to meet published guidelines on resident paediatric cover to support surgical activity.

Smaller DGHs (serving populations of 200,000 or less)

Smaller district hospitals or those serving isolated populations are now facing increasing difficulty in reconciling the concept of equality of access with the rising expectations of the public, national guidelines on safety and quality, and the introduction of new and sophisticated forms of medical treatment demanding costly expertise and equipment.

Rationalisation of paediatric medical services in some of these district hospitals is already being driven by considerations relating to safety of out-of-hours cover and by difficulties in meeting the statutory requirements of the 'New Deal' on junior doctors' working hours. In-patient paediatric beds and 24-hour paediatric cover have already been withdrawn or restricted in some smaller DGHs. As a result, children may be forced to travel considerable distances for day-case procedures of a minor nature. To overcome this problem, guidelines have recently been issued by The Royal College of Surgeons of England which state that day-case surgery in hospitals without in-patient paediatric facilities can be undertaken by paediatric accredited specialist or sub-specialist consultant surgeons provided certain stringent safeguards are met. (See section 4 A2.... *District General Hospitals*).

Independent Sector Hospitals

With very few exceptions, hospitals in the independent sector do not provide resident paediatricians on site and thus do not comply with published guidelines for in-patient surgery. The Forum strongly recommends that paediatric in-patient surgery should only be undertaken in hospitals which comply with the guidelines set out in this document.

2 Standards and Guidelines

2.1 EVIDENCE-BASED STANDARDS OF SAFETY AND QUALITY

There are virtually no evidence-based standards of practice or outcome against which the performance of individual surgeons can be judged. Data collection within the NHS has been condemned as ‘deplorable’ by the authors of the 1999 NCEPOD report. The deficiency of NHS data collection was highlighted in the 1989 NCEPOD report but very little progress has been made in the intervening decade. There is still too little information to permit reliable calculations of operation or death rates. Moreover, the lack of clinical outcome data makes it impossible to make any objective comparisons between the clinical performance of individual surgeons or units.

Cardiothoracic surgery provides a rare example of specialty-led national audit of clinical outcomes. Voluntary audit has also been undertaken on a more limited scale in some other specialties – for example the British Association of Paediatric Surgeons’ comparative audit (which documented a mean overall mortality rate in specialist centres of 0.23%) – but the overall national picture remains characterised by an almost total lack of clinical outcome and performance data. Establishing, validating and auditing parameters of quality and effectiveness will demand a considerable commitment of time from clinicians. But the most crucial requirement will be substantial investment in information technology and data collection by the NHS.

Surgical mortality is not a reliable indicator of quality in an age group in which death occurs infrequently. Furthermore, major morbidity acquires particular significance in children because of the potential duration of any ensuing handicap, impairment of quality of life and the financial costs of lifelong care. In addition to monitoring clinical outcome audit should encompass broader aspects of quality, including parents’ perception of the service provided to their child.

2.2 AUTONOMY AND CONSENT

The issues relating to informed consent in this age group, and the competence of children to participate in the process of consent, are considered in detailed guidelines issued by the Senate of Surgery, *The Surgeon’s Duty of Care* (1997). Legal responsibility for providing consent to surgery in children under the age of 16 years rests with the person holding parental responsibility. Where possible, however, surgeons should also endeavour

to respect the rights of young patients by providing them with sufficient information to enable them to acquire a level of insight appropriate to their age and emotional maturity. Patience and the collaboration of other professionals are often needed to guide anxious young patients to the course of action judged by adults to be in their best interest. Surgeons should recognise the right of competent young people to decline non life-saving treatment until their co-operation has been achieved. Guidelines on consent have also been published in 1999 by the GMC and the Association of Anaesthetists and by the RCS in 1996 for Jehovah's Witnesses.

3 | Current Patterns of Education, Training & Assessment within the Surgical Specialties

Detailed submissions were prepared by the different specialty representatives comprising the Paediatric Forum. These submissions are published in full in **Appendix 3**. Surgical specialties vary in their approach to educating and training surgeons in the paediatric aspects of the specialty and assessment in the intercollegiate examination. Some differences are inevitable since patterns of training and accreditation will reflect the needs of each specialty and the case mix and volume of the paediatric workload. For example, training in otorhinolaryngology, a high-volume specialty characterised by surgery of minor or intermediate complexity, will differ considerably from paediatric cardiac surgery – a relatively small-volume specialty devoted to complex surgery of a highly specialised nature.

3.1 EDUCATION AND TRAINING

Education and training in the paediatric component of most specialties is broadly sub-divided to meet the needs of two distinct categories of surgeons:

Surgeons with a Mixed but Predominantly Adult Practice – Based Mainly in DGHs

Training in the paediatric component of most specialties is informally interwoven into the programme of higher surgical training. However, some specialties such as ophthalmology and orthopaedics adopt a more structured approach by endeavouring to formally rotate their trainees through specialist paediatric units. In some specialties, notably general surgery, the quality and duration of paediatric training is very variable – being dependent upon local factors and the composition of individual training rotations. The development of paediatric surgery as a separate specialty has made it increasingly difficult for general surgery trainees to acquire formal paediatric experience. Rotational posts which previously provided an opportunity for general surgical trainees to work in paediatric surgery units have been re-designated to meet the needs of an expanding training programme for paediatric surgery trainees. The opportunities for general surgeons to acquire experience in paediatric surgery have been further diminished by the overall reduction in the number of years spent in training. The current deficiencies of paediatric

training are recognised and addressed in the Senate of Surgery report *The Provision of General Surgical Services for Children* (1998).

Specialists whose Practice is Devoted Largely or Exclusively to the Management of Children – Usually Based in Tertiary Centres

Trainees proposing to pursue a career as a paediatric specialist are expected to complete their training by acquiring additional specialist training in a recognised centre in year five or six. Centres providing the required standard of specialist training are designated within each specialty and formally recognised by the relevant Specialist Advisory Committee. Examples include cardiothoracic surgery and neurosurgery.

3.2 INTERCOLLEGIATE ASSESSMENT

Trainees generally sit the relevant intercollegiate examination in the fifth year of the specialist training programme (fourth year in urology and ophthalmology). Intercollegiate examinations in some specialties, eg otorhinolaryngology, urology and orthopaedics, incorporate a mandatory separate oral examination devoted to paediatrics. In general surgery a separate oral examination in paediatrics is available as one of several sub-specialty options but as of September 1999, no candidate had ever opted to be examined in general paediatric surgery. In other intercollegiate examinations, including those in cardiothoracic surgery, neurosurgery, oral and maxillofacial and plastic surgery, the paediatric component is less clearly defined. Paediatric topics feature within the overall content of the examination but candidates are not specifically examined on the care of children in an oral examination devoted to this purpose. **See Tables 2 and 3.**

Table 2

Specialty	Duration and Nature of Paediatric Training During Specialist Training Programme						Years of specialist training programme in which secondment or additional training available for future paediatric specialists
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Accident & emergency ^a	■	■	■	■	■	■	Years 4, 5 or 6
Cardiothoracic ^b			■	■			Years 5 and 6
Otorhinolaryngology	■						Year 6
General ^c	■						
Neurosurgery	■	■	■	■			Years 5, 6 (or post-CCST)
Ophthalmology	■	■	■	■	■		Years 5, 6
Oral & maxillofacial	■						Year 5 (or post-CCST)
Orthopaedics	■	■	■	■			Years 5, 6
Paediatric surgery	■	■	■	■	■	■	
Plastic surgery	■	■	■	■	■	■	Years 5, 6
Urology	■	■	■	■	■		Years 5, 6

■ Formal training in paediatrics – all specialist trainees

■ Not structured – some or most trainees

- ^a Specialist training in A&E medicine must include three months in general paediatrics at SHO or SpR level. *Advanced Paediatric Life Support (APLS)* course mandatory.
- ^b Two SpR posts (years 5 and 6) designated for advanced specialist training in paediatric cardiothoracic surgery at Great Ormond Street and Birmingham.
- ^c Recent Senate of Surgery recommendations stipulate six months' training in paediatric surgery (at any stage in years one to six) as a condition of appointment to consultant general paediatric surgeon post in a DGH.

Table 3

Specialty	Paediatric Assessment in Intercollegiate Examination		
	Interspersed throughout examination. No section specifically devoted to paediatrics	Section of examination dedicated to paediatrics (oral examination or equivalent)	
		Mandatory	Optional
Accident & emergency	■		
Cardiothoracic	■		
Otorhinolaryngology		■	
General			■
Neurosurgery	■		
Ophthalmology	■		
Oral & maxillofacial	■		
Orthopaedics		■	
Paediatric surgery		■	
Plastic surgery	■		
Urology		■	

4 Recommendations

4A Summary of Best Practice

A1 SURGEONS – THE CONCEPT OF THE PAEDIATRIC SUB-SPECIALIST

Responsibility for surgical care of children is currently fragmented amongst large numbers of surgeons, many of whom must be considered occasional operators. The Paediatric Forum takes the view that the welfare of children would be better served by a degree of sub-specialisation. **The surgical management of children should be concentrated in the hands of surgeons specifically trained in the paediatric aspects of their specialty whose paediatric workload is of adequate volume to maintain a high level of surgical competence.** Typically this would equate to a minimum of one paediatric operating session per fortnight. Children requiring surgery should be admitted under the care of a named surgeon.

Proposed Model for General Surgery

In its recent report *The Provision of General Surgical Services for Children*, the Senate of Surgery has recommended that at DGH level **‘the general surgery of childhood should be undertaken by designated general surgeons with a paediatric sub-specialty interest termed “general paediatric surgeons”**’. Trainees appointed to a general paediatric surgical consultant post should, in future, be required to have undertaken a minimum of six months’ training in paediatric surgery in an SAC-accredited specialist paediatric surgical unit. The Senate report also recommends that further training be available for consultants in post who have not already received appropriate training in paediatric surgery.

The Senate recognises that it would not be practicable for designated paediatric sub-specialists to provide continuous out-of-hours cover for children in addition to their commitment to the adult general surgical emergency rota. For this reason the Senate report states ‘if an appropriately trained surgeon is not available and will not be available within a reasonable time the child should be transferred... Initial stabilisation and non-operative management by the duty surgeon may permit the subsequent safe transfer of care to the duty surgeon’s designated colleague or to an appropriate unit’. **The Senate proposals for general surgery could be adapted to serve as a model of DGH sub-specialisation in other surgical specialties. However, it will be important to ensure that guidelines are sufficiently flexible to reflect local circumstances and the differing patterns of elective and emergency paediatric work in the various surgical specialties.** For example, for common emergencies in older children, such as those presenting with right iliac fossa pain or testicular pain, it is appropriate for the general surgical team on call to continue to provide emergency care for such children, subject to arrangements for problem cases to be seen on the next working day by the general paediatric surgeon or to be transferred as appropriate.

A2 HOSPITALS – FRAMEWORK OF NATIONAL STANDARDS

Concentrating the surgery of childhood exclusively in tertiary specialist centres is neither desirable nor practicable. Children and families should not be required to make lengthy journeys to regional centres for surgical care of a non-complex nature that could reasonably be provided locally. Moreover, a substantial shift of resources to tertiary specialist centres would be required to accommodate the influx of routine elective and straightforward emergency surgery currently undertaken in DGHs and non-specialist units. Specialist expertise and resources are more effectively employed in treating children with complex or life-threatening conditions.

- **Surgical services for children should therefore be planned on the assumption that those DGHs which meet national standards will retain an important role as providers of high-quality surgical services for children.**

Children’s Hospitals and Major Children’s Departments in Multidisciplinary Tertiary Referral Centres

- Although large and medium-sized DGHs will continue to provide a range of surgical services for the children in their locality, children’s hospitals and specialist units must nevertheless anticipate a growing referral workload – generated by rationalisation or closure of smaller non-specialist units and the continuing trend towards specialisation.
- Surgery of a major or complex nature should be largely confined to the specialist units with availability of paediatric intensive care.
- **Supra-regional specialisation:** even at a regional level, the incidence of certain rare disorders may be insufficient to generate the workload needed to sustain specialist expertise or make a constructive contribution to research. Biliary atresia, syndromic craniofacial abnormalities and bladder exstrophy are examples of rare disorders for which surgical treatment is already being structured on a supra-regional basis.
- **An integrated surgical service for children:** the hub and spoke pattern of out-patient provision, which is already a long-standing feature of many specialist units, should be expanded further to ensure that tertiary centres are more closely integrated with the DGHs they serve. Operative surgery has only been undertaken on a hub and spoke basis on a very limited scale – and largely confined to day cases.
- The feasibility of expanding hub and spoke surgical services should be explored. An efficient arrangement might comprise a morning theatre list followed by an afternoon out-patient clinic undertaken by the visiting specialist surgeon. Closer professional collaboration between designated paediatric surgical consultants in DGHs and colleagues in tertiary centres would promote the development of more integrated surgical services for children.

Single Surgical Specialty Hospitals

The Forum strongly recommends that where children are receiving treatment in single specialty hospitals, safe workable arrangements are in place to guarantee 24-hour cover by a consultant paediatrician and that children are cared for by appropriately trained anaesthetists and registered children's nurses who have had relevant specialty training. When surgery on children is undertaken at these hospitals, it is mandatory that there should be agreed protocols for transfer with an appropriate PICU. In the future, where these standards cannot be met, further investment will be required to make good the inevitable shortfall in the provision of elective surgical services for children. The Forum expects that specialist hospital Trusts and major children's units should work together to ensure that both surgical quality and patient safety are paramount.

District General Hospitals

The suggested minimum requirements for DGHs providing **in-patient surgery for children** should include the following:

- A dedicated children's ward – either devoted solely to surgical use or a mixed medical/surgical children's ward.
- On-site paediatric medical cover, consisting of a resident paediatrician with a minimum of 12 months' experience in paediatrics supported by a designated on-call consultant paediatrician.
- Levels of children's nurse staffing that comply with the standards defined in the DoH document *Welfare of Children and Young People in Hospital*, eg at least two registered children's nurses (formerly RSCNs) on duty 24 hours a day in all hospital children's wards with the availability of a children's nurse in any department wherever children are nursed. Children's nurse staffing in A&E departments should comply with the recommendations of the Working Party on Accident & Emergency Services for Children.
- The elective surgical workload in children should be concentrated in the hands of appropriately trained designated surgeons with a defined sub-specialty interest in the paediatric component of their specialty.
- Surgical sub-specialisation should be matched by sub-specialisation in paediatric anaesthesia and the provision of radiology, pharmacy and laboratory services adapted to meet the requirements of children.
- Elective surgical admissions for children should be scheduled to constitute designated paediatric in-patient or day-case theatre lists **wherever this is feasible**. These lists should be undertaken on a weekly or fortnightly basis as determined by the volume of paediatric cases.

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- Out-patient activity should ideally be reorganised in such a way that children are seen in designated surgical clinics held in a paediatric out-patient environment rather than in mixed clinics devoted primarily to adults. Where this is not feasible, there should be a segregated area suitably furnished for children.
 - A&E departments treating children should provide ‘child-friendly facilities in an area designated for children within the department. Hospitals providing an A&E service for children should have paediatric support on site, defined as a resident paediatrician with a minimum of 12 months’ paediatric experience’.
 - Trusts should also identify those surgeons who, whilst not designated paediatric subspecialists, nevertheless contribute to surgical services for children. The extent of their paediatric involvement should be defined, for example the provision of on-call cover. All surgeons treating children should contribute to audit and participate in appropriate CPD.
 - Each DGH should establish a multidisciplinary committee comprised of senior clinicians (surgeons, anaesthetists and paediatricians) and registered children’s nurses. This group should be responsible for improving and integrating local hospital services for children and addressing issues of common concern.

Guidelines governing day-case surgery in children have recently been issued by the Council of The Royal College of Surgeons of England. Day-case surgery should only be undertaken in a hospital without in-patient paediatrics by a consultant surgeon who is a trained/experienced children’s surgeon in his/her field of surgery, and providing the following specific safeguards are observed:

- The consultant surgeon will be personally responsible for assessing children to confirm their suitability for this form of day-case surgery.
- An experienced paediatric-trained consultant anaesthetist must be present.
- 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.
- 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.
- Surgeons treating day cases in hospitals without in-patient paediatric support are strongly advised to hold the *Advanced Paediatric Life Support* certificate.
- This pattern of day-case activity should be audited and regularly reviewed.
- Paediatric cover should be provided for the duration of the theatre list – for example by scheduling paediatric outreach clinics or other sessions to coincide with day theatre lists.
- Prior agreement with the local general practitioners should be sought for the introduction of this service.

Independent Sector Hospitals

New regulatory arrangements for independent sector hospitals are currently under consideration. The Paediatric Forum is anxious to ensure that children are not disadvantaged by receiving treatment in the independent sector. Dual standards of safety and quality of care are unacceptable. Implementing the standards proposed for the NHS, however, would pose major (and often insurmountable) problems for independent sector providers. Very few independent hospitals are currently staffed or equipped to meet the criteria proposed for NHS in-patient surgery for children. Meeting the RCS guidelines on day-case surgery in a hospital without on-site paediatric support might be more feasible, but would nevertheless demand significant changes in working practice from surgeons and anaesthetists. NHS Trusts may consider playing a more active role as providers of private healthcare for children.

A3 CARE OF SPECIAL GROUPS

Neonates

The neonatal period is defined as extending from birth to the 44th week of gestational age. Surgical intervention in neonates is required principally for the correction of congenital anomalies and the treatment of certain complications of prematurity. Many major congenital anomalies can now be identified on 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 continue to manage conditions such as inguinal hernia and pyloric stenosis in conjunction with paediatric colleagues. However, this degree of involvement is diminishing since the transfer of newborns and small infants to specialist centres is increasingly governed by anaesthetic rather than surgical considerations.

Neonatal surgery is now concentrated in the hands of paediatric surgeons working in multidisciplinary teams in regional and sub-regional centres. Some surgical neonates are managed in neonatal units which 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 newborns is a specialist neonatal surgical unit closely linked to a neonatal intensive care unit with ready access to appropriate obstetric services.

Adolescents

DoH definitions of childhood allow adolescents up to the age of 19 years to opt for treatment in a paediatric setting. In practice, the upper limit is variable and the timing of transfer to an adult unit is determined by the young patient and by factors including the maturity of the individual, the nature of the disorder and the availability of adult services

needed to ensure continuity of care. Specialties based on systems, such as orthopaedics, are in a stronger position to offer continuing care from adolescence into adulthood under the supervision of the same surgeon.

For surgeons whose practice is limited to children, it is necessary to establish links with the relevant adult surgical disciplines to ensure that follow-up of adolescent patients is provided by a surgical colleague whose expertise is coupled with sensitivity to the particular needs of this age group.

The optimal provision of surgical services for children of secondary school age will vary depending on the local availability of appropriate facilities and the relevant surgical expertise. Individual hospitals and surgical units should therefore be responsible for determining how best to implement the Forum's recommendations in this age group. Although young people at the upper age limit of childhood can be safely treated in either an adult or children's environment, they should, if possible, be offered the choice. **Young patients have been disadvantaged by the arbitrary division between paediatric and adult services and the needs of this emotionally vulnerable age group have been inadequately recognised in the past. A designated adolescent unit is the ideal and the Forum strongly recommends the development of such units, staffed by appropriately trained nurses. Where this is not feasible, general paediatric or adult wards treating adolescents should provide separate facilities specifically designed for this age group.**

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 nevertheless be associated with a disproportionate risk of anaesthetic complications – particularly in relation to 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 individual child is paramount.

Injured Children

Trauma is the predominant cause of death and disability in children and young adults. Although motor vehicle accidents account for fewer than 15% of injuries, they are responsible for most fatalities. Injuries to the head are responsible for the majority of deaths, but injuries of the chest, abdomen and pelvis may also be potentially fatal. Because of the compact target presented by the child, children struck by a car are likely to sustain multiple injuries. Non-accidental injury must be borne in mind, especially in the infant less than one year of age.

Most injured children are seen initially in the A&E department at a DGH, which will not have specialist children's surgical services. The majority of injured children have simple, isolated limb injuries and should be treated in their local hospital. However, children with severe injuries, isolated or multiple, should be transferred to a children's specialist centre where a full range of surgical services is available. Based on the hub and spoke model, lines of communication must be established between the specialist centre and each referring hospital for urgent consultation and there should be clear guidelines for transfer. Problems arise with single speciality centres; although the head injury normally takes precedence, transfer to a neurosurgical or any other specialised unit should not take place without full assessment of the child by a clinician with paediatric training to exclude a co-existing, potentially life-threatening injury.

Any hospital receiving an injured child must have on-site support from paediatricians and paediatric anaesthesia, and a full range of appropriate resuscitation equipment. At a DGH the A&E department must have separate facilities for children, with a full range of equipment for resuscitating the severely injured child. The medical and nursing staff involved should include individuals with paediatric training, including a paediatrician and a general surgeon. There should be early discussion with the specialist centre before specialised investigations or procedures are carried out, with the possible exception of head CT. There must be agreed written procedures for dealing with suspected non-accidental injury.

Transport of the injured child is best done by the referring hospital as soon as the patient has been stabilised; this is usually quicker than sending a retrieval team from the centre. In the case of a baby or infant who may require intensive care during transfer, a retrieval team from the receiving hospital would be preferable.

The receiving specialist centre must have an organised system for managing children with major injuries. Ideally, this should be led by specialist paediatric surgeons and A&E staff and include clear guidelines for communication, response teams, resuscitation, investigation, referral and definitive management to the appropriate system specialists who care for children. Regular audit of trauma management is essential to maintain standards.

Paediatric Intensive Care

Children likely to require high-dependency care or short-term ventilation must only be cared for in units where there is 24-hour, resident, experienced paediatric cover. Those likely to need full intensive care (continued ventilation or level 3) must be treated in a department which has the comprehensive facilities of a Paediatric Intensive Care unit (PICU). Reference should be made to the two DoH documents published in 1997 (see Appendix 2).

Transfer

The 1999 NCEPOD report highlights deficiencies in the arrangements for transferring children to and between regional units and specialist surgical centres. Although current concerns centre principally on critically ill children, changing patterns of DGH practice will make it increasingly important to plan effective regional retrieval services to include children being transferred for more straightforward emergency surgery.

On the Death of a Child

The 1999 NCEPOD report expresses concern regarding the inadequate audit of deaths in children. **Every death should be the subject of meticulous audit. This should be the responsibility of the named surgical consultant caring for the child.** The report also highlighted the low rate of post mortems.

It is strongly recommended that the surgeon in charge should personally counsel bereaved parents and offer them a return visit after an appropriate period of time. This would also provide an opportunity to discuss any post mortem findings.

4B Specialist Training

B1 TRAINING REQUIREMENTS

Full-time Paediatric Surgical Specialists

Surgeons appointed to consultant posts in the specialty of paediatric surgery are already required to have passed the relevant intercollegiate specialty examination (FRCS Paed) and to have been awarded a Certificate of Completion of Specialist Training (CCST) upon the completion of six years of accredited specialist training. For the other surgical specialties, the relevant specialist advisory committees and intercollegiate boards should be asked to define and standardise the requirements (duration of specialist training, formal assessment) for appointment to a post with a full-time commitment to specialist paediatric practice.

Surgeons with a Substantial Commitment to a Paediatric Sub-specialty

Consultants appointed to tertiary referral centres will inevitably require more extensive specialist training than surgeons undertaking paediatric practice in DGHs. It is envisaged that in most specialties this requirement would amount to a minimum of twelve months of specialist paediatric training. Specialist training should also include the *Advanced Paediatric Life Support* course.

District General Hospital Consultants

Surgeons appointed to DGH consultant posts with a designated paediatric sub-specialty interest should, in future, have undertaken a specified period of paediatric training in an SAC-recognised specialist centre. For general surgery, a specialty with a sizeable and varied DGH paediatric workload, the Senate of Surgery has recommended a minimum period of six months. Where DGH practice is of more limited scope and complexity, as

in urology, it may be appropriate to consider shorter, more concentrated periods of accredited training. In specialties such as otorhinolaryngology, where routine procedures in children represent a significant component of most surgeons' workload, paediatric training could be provided in parallel with adult otorhinolaryngology, providing it is structured and the relevant training goals are defined and met. All surgeons appointed to posts with responsibility for treating children should, in future, hold the *Advanced Paediatric Life Support* certificate.

B2 SPECIALIST ADVISORY COMMITTEES AND INTERCOLLEGIATE BOARDS

The Joint Committee on Higher Surgical Training (Joint Committee on Higher Training in Accident & Emergency) and intercollegiate boards in the various specialties should undertake responsibility for ensuring that surgeons are appropriately trained and assessed for the level of paediatric practice they will be required to undertake following consultant appointment.

Specialist Advisory Committees

- Each SAC should include one member with specific responsibility for overseeing paediatric training within the specialty.
- For each surgical specialty the SAC will compile and update lists of centres recognised for paediatric training at the levels required either for appointment to a specialist tertiary unit or to a DGH post with a designated paediatric sub-specialty interest.

Intercollegiate Boards

- The membership of every intercollegiate board should include one surgeon with responsibility for co-ordinating and overseeing those aspects of the examination relating to the treatment of children.
- Each intercollegiate board should ensure that the content and format of the examination adequately reflects the relevant paediatric aspects of the specialty. In future, 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, such as urology, or a sub-specialty option, such as general surgery.

5 Specialty Associations

The specialty associations play an important role in promoting clinical research and postgraduate education. Areas in which specialty associations can contribute to the development of the paediatric sub-specialties include:

- Developing and supporting specialist paediatric groups within the umbrella of the association. Details of existing groups or associations are listed in **Appendix 4**.

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- Collaboration with the relevant specialist paediatric nursing groups and associations to promote good practice, clinical research and post-registration nursing education.
 - Including paediatrics in any national audit frameworks established by the specialty association.
 - Establishing broad advisory guidelines on those conditions within the specialty which might be appropriately managed at DGH level and those which would normally merit referral to a specialist centre.

6 | 'Child-centred' Surgical Services

Surgeons treating children have a duty of care extending beyond the purely technical aspects of surgical management. The professional skills required of any surgeon must be complemented by sensitivity to the emotional needs of children and patience and understanding when dealing with the anxieties of parents.

Surgeons appointed to consultant posts with a paediatric commitment should, in future, have received identified, structured training in the broader aspects of caring for children.

7 | Specialist Paediatric Surgical Nursing

It is important that all children are nursed by appropriately qualified children's nurses. However, it is recognised that it will be necessary to draw upon specialist surgical nursing expertise to complement the skills of the children's nurses in many surgical disciplines, such as plastic surgery, ophthalmology, otolaryngology, maxillofacial surgery and orthopaedics. To this end, collaborative patterns of nursing care should be developed.

The Paediatric Forum wishes to see greater emphasis on the need for surgical post-registration education for children's nurses coupled with enhanced recognition of children's surgical nursing within the professional career structure. There are a few specialist post-registration/graduate courses for children's nurses which focus primarily on developing the knowledge and skills of paediatric surgical nurses. The courses available from the English Board for Nursing, Midwifery and Health Visiting (ENB) considered to be relevant are listed in **Appendix 5**. However, provision seems to be centred on tertiary centres, which are not easily accessible to all paediatric nurses. Some universities have developed their own modules in response to local needs; these are not always validated by the ENB and may vary in quality. Within the courses there is lack of parity in terms of the level, which ranges from certificate and diploma to degree. Furthermore, the viability of courses is threatened when universities do not consider it effective to run a

course for less than 15 students. The need for more flexible education provision and the use of distance learning packages are being considered. These will particularly address the education needs of nurses working in isolated areas.

Nurses are essential members of any effective surgical team. They play a key role in assessing and preparing children for surgery, managing post-operative pain, monitoring progress through the post-operative period and teaching and supporting families with aftercare.

Community children's nursing services, some of which have been initiated by surgeons, facilitate the early discharge of children and assist in the provision of a 'seamless' service integrating hospital and community services. Such services should be available throughout the country. Further development of nursing roles, both in specific specialist clinical expertise as well as general surgical care, will continue. Increased access to appropriate training is necessary.

Trusts should provide the opportunities needed for nurses to maximise their contribution to the creation of high-quality child and family-friendly surgical services.

8 | Paediatric Anaesthesia

Children requiring anaesthesia need specially trained staff and appropriate facilities.

Training

A full-time paediatric anaesthetist will have had at least one year's full-time or equivalent specialist training in paediatric anaesthesia. Consultants whose practice is part-time paediatric, working mainly in DGHs, should have a minimum of six months' whole-time or equivalent, specialist paediatric anaesthesia training. Practising consultants with previous experience are not included in the above categories.

Provision of Service

There should be a nominated lead consultant with appropriate training, who undertakes at least one list or equivalent per week and is responsible for the organisation and overseeing of all anaesthetic services for children in the hospital. This should include pain and resuscitation services and responsibility for ensuring that suitable equipment is purchased and maintained. Theatre staff associated with the anaesthetist must have had the necessary training and should be available at all times to assist the anaesthetist. Recovery staff should have the necessary skills to ensure safe post-specialist care. Wherever possible children should have segregated areas for reception to theatre and recovery with all the necessary equipment.

Age Restrictions

Neonates require treatment in a specialist centre. Where appropriate staff and facilities are not available, children under five years of age may also need transfer to a specialist unit. Regardless of age, children with a complex concurrent medical condition may need to be referred to a

specialist centre. All children under the age of five years undergoing a general anaesthetic should normally be anaesthetised by a consultant or under their direct supervision. Protocols for transfer should be well-documented, especially those for cases requiring a retrieval team.

Day Surgery

The suitability of individual children for day surgery depends on the nature of the surgery and their general medical status. Usually children should be ASA categories I and II, over six months of age. Neonates should not be considered for day surgery. Distance from hospital, social conditions and transport arrangements may also influence the decision. Consultant anaesthetists involved in the care of children in DGHs are recommended to have regular, refresher, hands-on training sessions at the major acute hospitals in order to update their experience and maintain skills.

9 | Time-scale of Change

The recommendations of the Paediatric Forum are aimed at securing tangible and lasting improvements in the safety and quality of surgical care of children. These are achievable goals but radical reorganisation of existing patterns of service provision will be required together with a more systematic and rigorous approach to training and accreditation. Moreover, the far-reaching recommendations will require additional NHS investment and a genuine commitment by the government to consultant expansion. For these reasons, a phased implementation with a corresponding time-scale is envisaged.

PHASE 1 (2000 – 2002)

Administrative Measures Designed to Establish a Framework of Paediatric Sub-specialisation:

- Trusts should identify those consultant posts, surgical and anaesthetic, which involve a commitment to the care of children.
- Where new or replacement consultant surgical appointments include this commitment, it should be clearly specified in the consultant job description and advertisement.
- Surgeons appointed to such posts should be required to have undergone currently available SAC-recognised training and intercollegiate assessment in the paediatric aspects of the relevant specialty.

PHASE 2 (2003 – 2004)

Interim Restructuring of Existing Services for Children:

- Prevailing levels of activity should be re-provided in dedicated children's surgical out-patient clinics and operating theatre lists.
- The surgical workload in children in DGHs and non-specialist units should be largely concentrated in the hands of designated surgeons with a recognised paediatric sub-specialty interest.
- Specialist tertiary centres and DGHs should demonstrate substantial progress in establishing effective hub and spoke models of surgical care for children in their region.

PHASE 3 (BY END 2004)

A First Class Surgical Service for Children:

- The service should be provided predominantly by consultant surgeons who have met national standards of training and assessment as paediatric specialists or sub-specialists.
- Surgeons already in post who wish to acquire designation as a paediatric sub-specialist would be required to demonstrate satisfactory clinical outcomes and participation in CPD. This will be a requirement for revalidation and a feature of clinical governance at Trust level.
- Measures specifically designed to promote the safety and overall quality of surgical care for children and young people should be implemented as part of the framework of quality assurance already proposed by the government and the surgical Colleges.

10 | Future Role of the Paediatric Forum

The publication of this report marks the first phase of The Royal College of Surgeons' long-term commitment to improving the quality of surgical care for children. The Paediatric Forum will acquire a continuing role to enable the College to meet this commitment. Its responsibilities will include:

- Monitoring the implementation of the recommendations contained in this report, particularly those relating to professional standards, education, training, assessment, CPD and audit.
- Revising and updating national standards.
- Collaborating with other Royal Colleges and statutory bodies to develop a more integrated approach to healthcare planning for children and young people.
- Enabling The Royal College of Surgeons of England to respond promptly and constructively to concerns relating to the provision of surgical care to children – either at a national or local level.
- Providing quality information to professionals, parents and children on The Royal College of Surgeons of England web site at www.rcseng.ac.uk

Membership of the Paediatric Forum

The Royal College of Surgeons of England	Miss Leela Kapila (chairman)
	Mr Peter May
The Association of Surgeons of GB & Ireland	Mr Mark Whittaker
The British Association of Accident & Emergency Medicine	Ms Joan Robson
The British Association of Oral & Maxillofacial Surgeons	Mr Leo F A Stassen
The British Association of Otorhinolaryngologists	Mr John M Graham
– Head and Neck Surgeons	
The British Association of Paediatric Surgeons	Professor Lewis Spitz
The British Association of Plastic Surgeons	Mr Brian C Sommerlad
The British Association of Urological Surgeons	Mr David F M Thomas
The British Orthopaedic Association	Mr Michael J Bell
The Royal College of Anaesthetists	Professor David Hatch
The Royal College of Nursing	Dr Annette K Dearmun
The Royal College of Paediatrics and Child Health	Dr Keith Dodd
The Society of Cardiothoracic Surgeons of GB & Ireland	Mr J R Leslie Hamilton
The Society of British Neurological Surgeons	Mr James W Steers

Mr Richard Markham of the Royal College of Ophthalmologists, Dr Susan EF Jones of the Royal College of Anaesthetists and Miss Sue Burr of the Royal College of Nursing also contributed.

Patricia Hagan and Lucy Quinlan were secretaries to the Forum.

Children's Surgery – A First Class Service was compiled on behalf of the Forum by Mr David F M Thomas and Miss Leela Kapila.

Summary of Relevant Reports and Publications

1990: *National Confidential Enquiry into Perioperative Deaths 1989*

The Royal College of Surgeons of England, the Royal College of Anaesthetists, London.

Aim: Nationwide audit of deaths in children zero to ten years of age within 30 days of surgery.

Findings: Few children die following surgery. Overall surgical and anaesthetic care of children excellent. Needs of children in single surgical speciality units not always fully met. Data systems in the NHS inadequate.

Key recommendations:

- Clinical information systems in the NHS should be considerably improved.
- Surgeons and anaesthetists should not undertake occasional paediatric practice.
- Consultants with responsibility for children must keep up to date and be competent in the management of children.

1991: *Welfare of Children and Young People in Hospital (in Scotland entitled *At Home in Hospital*)*

Department of Health. HMSO, London.

Aim: To assist purchasers in identifying the standards they wish to secure and providers in achieving these standards in the delivery of services for children.

Key recommendations:

- Importance of providing for the child's complete physical and emotional well-being, not simply the condition for which treatment is required.
- Child and family-centred service, 'seamless web' of care.
- Children's wards to be staffed by a minimum of two children's nurses, on duty 24 hours a day.

1991: *Just for the Day – Children Admitted to Hospital for Day Treatment*

Thornes, R. Caring for Children in the Health Services, London.

Aim: To provide standards for children admitted to hospital for the day.

Summary: Twelve quality standards which include:

- The admission is planned in an integrated way to include pre-admission, day of admission and post-admission care incorporating planned transfer to primary and/or community services.
- The child is neither admitted nor treated alongside adults.
- Medical, nursing and all staff have received specific training and are skilled in working with children and their families. For nurses, that is a registered children's nurses.
- The organisation and delivery of patient care are planned specifically for day cases so that every child is likely to be discharged within the day.

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- Specific written information is provided to ensure that parents understand their responsibilities throughout the episode.
 - Essential documentation, including communication with the primary/or community services, is completed before each child goes home so that after-care and follow-up consultations are not delayed.
 - Once care has been transferred home, nursing support is provided at a doctor's request by registered children's nurses.

1993: *Children First – A Study of Hospital Services*

Audit Commission, HMSO, London.

Summary:

- Healthcare services for children have developed rapidly over recent years as a result of:
 - changing health care needs;
 - new approaches to the care of children in hospital; and
 - more care at home.
- Although there are well-established principles for the care of children in hospital going back at least as far as the *Platt Report 1959*, they are sometimes not implemented.
- Six main principles of caring for children in hospital are identified: a child and family-centred care, specifically skilled staff, separate facilities, effective treatments, appropriate hospitalisation and strategic commissioning.
- The root problem identified is that clinicians, managers and other staff do not give sufficient attention to the needs of children and their families.
- A specific management focus is needed for children's services in every hospital. As a minimum, the management team should include:
 - a consultant with overall responsibility for policies for all children's services;
 - senior children's nurse above ward sister level, to provide the focus for implementing consistent policies for the care of children in all parts of the hospital; and
 - appropriate management and financial support.
- The solution is mainly to change attitudes and management practices to ensure the well-established recommendations are implemented.

1994: *Setting Standards for Children Undergoing Surgery*

Hogg, *Action for Sick Children Quality Review Series*

Aim: To look at services that should be provided when children go into hospital and recommend standards that are then translated into actions that purchasers and providers of services can follow.

Key recommendations:

- Information on all aspects of the condition, surgery and aftercare is given to parents and to children according to their maturity and understanding.
- Surgeons and anaesthetists with appropriate training and experience undertake surgery on children.

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- Each child is prepared for the operation according to his/her maturity.
 - Routines and procedures for surgery minimise the anxiety for child and parents.
 - The environment and procedures in the anaesthetic and recovery room minimise anxiety for parents.
 - Children and parents are prepared for how the child will feel after the operation.
 - Parents and child are involved before discharge in discussion about arrangements for aftercare.

1996: *Children's Surgical Services*

The Royal College of Paediatrics and Child Health, report of ad hoc multidisciplinary children's surgical liaison group.

Aim: To consider ways of implementing previous guidelines relating to surgical care of children.

Key recommendations:

- Previously published guidelines endorsed.
- Hospitals should identify surgeons currently operating on children.
- Surgeons treating children should be suitably trained and have sufficient paediatric workload to sustain expertise.
- In-patient surgical care should only be provided in hospitals with 24-hour paediatric presence on site.
- Specific arrangements required to provide emergency paediatric cover for single specialty surgical units without on-site paediatric support.

1996: *NHS Patient's Charter: Services for Children and Young People*

Department of Health, HMSO, London.

Aim: Good practice guidelines. Explanation of rights and standards in the *Patient's Charter* – as applied to children's care.

Key recommendations:

- Children to be cared for in a children's ward under the supervision of a consultant paediatrician or paediatric specialist.
- Children admitted to non-children's wards to be supervised by a named consultant paediatrician/ paediatric surgeon/psychiatrist.
- Whether on children's or adults' wards, child patients to have a qualified children's nurse responsible for nursing care. Parents and child to be told the nurse's name.
- Rights of parent to stay in hospital and accompany child to anaesthetic room.
- Additional support for children with special needs.

1997: *A Bridge to the Future. Nursing Standards, Education and Workforce Planning in Paediatric Intensive Care Units*

NHS Executive

1997: Paediatric Intensive Care Units ‘A Framework for the Future’

Report from the National Co-ordinating Group on Paediatric Intensive Care Units to the Chief Executive of the NHS Executive.

1997: Hospital Services for Children and Young People

House of Commons Health Committee, *Session 1996-97, Fifth Report*.

1997: The Surgeon’s Duty of Care

The Senate of Surgery of Great Britain and Ireland, London.

Aim: Guidance for surgeons on ethical and legal issues.

Key recommendations:

- Surgeons should obtain explicit consent for any proposed treatment of a child under the age of 16 from the person with parental responsibility but competent children of any age have the right to consent to treatment.
- Regardless of age or competency, children should be consulted about treatment.
- Where the child refuses treatment, a parent or the court may consent on their behalf. If a child is at risk of death or permanent and serious disability and treatment is refused by the parents, the court is the ultimate arbiter.

1998: Provision of General Surgical Services for Children

The Senate of Surgery of Great Britain and Ireland, London.

Aim: To define standards of training and maintenance of competence for general surgeons treating children.

Key recommendations:

- Creation of new category of sub-specialist general surgeon – the general paediatric surgeon.
- Hospitals to identify posts for general surgeons designated to provide general paediatric surgery.
- General paediatric surgeons to have received six months’ training in paediatric surgery in an SAC-accredited specialist paediatric surgical unit.
- Designated surgeons require adequate paediatric workload to maintain a high level of competence.
- Participation in audit and CME/CPD.
- ‘General surgeons appointed after 1999 who cannot meet these standards should not undertake paediatric surgery.’

1998: *A First Class Service, Quality in the New NHS*

Department of Health, HMSO, London.

Aim: To set out government plans aimed at ensuring consistency and quality across the NHS.

Key recommendations:

- Creation of a National Institute for Clinical Excellence (NICE), setting standards, evaluating treatments, producing guidelines.
- Establishment of a commission for health improvement, monitoring standards, guaranteeing quality.
- Clinical governance: 'The NHS Trust Chief Executive carries ultimate responsibility for ensuring the quality of service that is provided by the Trust'.

1998: *Response to the General Medical Council Determination on the Bristol Case*

The Senate of Surgery of Great Britain and Ireland, London.

Aim: Response of the surgical Royal Colleges and the surgical specialist associations to the 13 points arising from the GMC judgement on the Bristol cardiac case.

Key recommendations:

- Revalidation (performance appraisal for consultant surgeons).
- Performance of individual surgeons to be monitored by nationally based systems for collection of activity and outcome data.
- Further research needed to clarify the causes of poor performance and professional conflict.

1998: *Youth Matters*

Viner R and Keane M. *Caring for Children in the Health Services*, London.

Aim: Evidence-based best practice for the care of young people in hospital.

Key recommendations:

- Location of all adolescents within a dedicated adolescent unit within hospitals.
- Adolescent in-patient units should be established in most DGHs in the UK.

1999: *Organisation of Acute General Hospital Services*

Joint Consultants Committee. (Superseded *Provision of Acute General Hospital Services – Consultation Document, 1998*. British Medical Association, Royal College of Physicians of London, The Royal College of Surgeons of England.)

Aim: To assess the future role of DGHs as providers of high quality, acute services.

Findings: 'The present distribution of hospital units providing acute and emergency medical and surgical care needs to change if patients are to benefit fully from recent advances in acute care.'

Key recommendations:

- Comprehensive services should be concentrated in larger DGHs, including university hospitals serving a population of 450,000 – 500,000.
- A&E departments in DGHs should have paediatric support available on site, provided by experienced doctors who have at least 12 months' experience of acute paediatrics.
- Smaller DGHs should make specific organisational arrangements for surgical emergencies in children under the age of three.
- Single specialty hospitals 'should not continue in isolation' but should share a site with an acute general hospital. In hospitals not adjacent to specialist children's hospitals, resident experienced paediatricians should also be available on site.

1999: *Accident and Emergency Services for Children*

The Royal College of Paediatrics and Child Health, London.

Key recommendations:

- Separation of facilities for children and adult patients within A&E departments.
- Children should only be treated in A&E departments with in-patient paediatric services on site.
- One children's nurse on duty.
- Paediatric trained A&E consultants, close liaison with consultant paediatricians.
- Collaborative planning of A&E services for children – locally and nationally.

1999: *Guidance on Paediatric Anaesthetic Services*

The Royal College of Anaesthetists, London.

Aim: Guidance on ensuring a quality service for children.

Key recommendations:

- Anaesthesia for children requires specially trained staff and special facilities.
- Service to be led at all times by consultants who anaesthetise children regularly.
- Anaesthetists should be supported by staff with appropriate paediatric training.
- Availability of paediatric anaesthetic equipment wherever children are treated.
- Provision for parents to be involved in the care of their children.

1999: *Surgical Services for the Newborn*

British Association of Paediatric Surgeons/The Royal College of Surgeons of England, London.

Aim: Review of developments in neonatal surgery, service configuration and staffing requirements.

Key recommendations:

- Concentration of neonatal surgery in appropriately staffed and equipped specialist units.
- Units should ideally be staffed by a minimum of four consultant paediatric surgeons and one paediatric urologist.
- Recognition of the role of appropriately trained neonatal surgical nurses.

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- Multidisciplinary approach essential for the care of premature neonates and those with complex malformations.
 - Co-ordination of service provision to maximise benefits of prenatal diagnosis.

1999: *Extremes of Age*

National Confidential Enquiry into Perioperative Deaths, London.

Aim: Audit of perioperative deaths in children and the elderly.

Key findings:

- No reported mortality after common operations such as appendicectomy or tonsillectomy. Deaths largely confined to high-risk groups.
- Increasing paediatric sub-specialisation and fewer occasional operators compared with 1989 NCEPOD report.

Key recommendations:

- Further concentration of children's surgical services needed to increase expertise and reduce occasional practice.
- Improvement of regional arrangements for transfer of children between units.
- Perioperative death of any child to be subjected to multidisciplinary peer review.
- Uniformity of data collection.

1999: *Supporting Doctors, Protecting Patients*

Department of Health, HMSO, London.

Key recommendations:

- New approach needed to overcome protracted delays and expense of existing disciplinary procedures.
- Professional self-regulation to remain – but modernised to meet government requirements on behalf of the public.
- Annual appraisal for all doctors working within the NHS.
- Creation of performance assessment and support service.
- Emphasis on support, referral to performance assessment centre not seen as disciplinary act, less reliance on suspension.

2000: *Regulating Private and Voluntary Healthcare: The Way Forward*

NHS Executive

Accident & Emergency Medicine

1 CURRENT PROVISION OF SERVICES

1.1 Consultants

Consultants in paediatric accident and emergency (A&E) medicine are either paediatricians/paediatric surgeons with training in that specialty or are A&E physicians with additional training in paediatrics. Most children attend A&E departments under the care of general A&E consultants who have had at least three months' training in general paediatrics. Consultants in paediatric A&E medicine usually work in children's hospitals.

1.2 Hospitals

A&E departments providing paediatric services should have:

- Audio-visual separation of child from adult patients provided by:
 - separate waiting/play area and treatment rooms in all departments;
 - one or more appropriately equipped resuscitation beds for children effectively screened from those for adult resuscitation; and
 - observation beds for children physically separate from similar beds for adults and staffed by at least one registered children's nurse.
- Paediatric areas with play facilities and decoration appropriate to differing ages of children. These facilities should be supervised by a play specialist.
- Provision for young people including privacy during consultation, liaison with child and adolescent psychiatry, availability of healthcare advice and appropriate amusements.
- Effective health promotion information and advice applicable to the needs of parents and all ages of children.

Only A&E departments that are on the same hospital site as in-patient paediatric facilities should accept children apart from those with minor injuries not requiring hospital admission. Exceptions are departments in geographically isolated Trusts for whom special arrangements must be made. The current situation is that the majority of A&E departments have some but not all of these facilities.

Children's wards should be deemed a safe place for the initial reception of direct emergency admissions only if they have an emergency room for reception, triage and resuscitation appropriately equipped and staffed 24 hours a day.

1.3 Workload

In the UK about 3.5 million children under the age of 16 years attend A&E departments each year. This is between 25 and 30% of the total number of attendances.

1.4 Paediatric Support Services

Medical

Trusts should recruit a consultant who has specialised experience in paediatric A&E medicine for each A&E department which accepts children.

Each Trust with an A&E department treating children must have a designated consultant paediatrician responsible for liaison with the consultant in A&E medicine.

Nursing

There has been a recent increase in the number of registered children's nurses working in A&E departments. Two-thirds of the department surveyed by the Audit Commission reported one or more such nurses on their staff in 1998. Only seven reported continuous children's nurse presence.

Trusts must ensure that all A&E departments receiving children have sufficient registered children's nurses to provide at least one such nurse on duty whenever children are nursed.

Trusts must develop an effective long-term strategy for the recruitment and retention of registered children's nurses for the A&E department.

A registered children's nurse must be employed at a senior level in the A&E department to co-ordinate care for children, facilitate education of other staff and link with senior nurses on the in-patient unit.

A&E departments treating more than 18,000 children a year should recruit a play specialist. Other departments should link with the paediatric department play specialist to gain advice on play and play materials.

1.5 Paediatric Facilities

All children attending hospital as an emergency, whether to an A&E department or to a ward, and whether referred by their general practitioner or self-referred, must be triaged by a trained nurse so that the most seriously ill and most seriously injured children are treated first and in a timely fashion.

Infants and children who are carried into the A&E department must have an immediate assessment to exclude a life-threatening illness or injury.

A children's pain assessment tool must be used at triage. In large departments seeing many children (more than 18,000 per year), there should be a separate triage facility at peak times. A&E departments should adopt the National Triage Scale.

Paediatric and A&E services must work closely together, particularly in relation to ambulatory services.

Trusts must ensure that safe arrangements are in place for the management of emergency surgery in children, including transfer of children to a specialist unit if the necessary surgical, anaesthetic, intensive care and nursing skills are not available on site.

Trusts must ensure that Level 2 intensive care can be instituted and maintained for those children requiring it until the arrival of the paediatric intensive care retrieval team. The DoH should recognise and record a category of in-patient who remains in hospital for less than 24 hours.

All A&E departments should collect data on children's attendances in age bands and including case-mix. This should be done in such a manner as to facilitate joint audit and research between departments and to inform health improvement programmes and local accident prevention programmes.

The availability of these facilities at present is variable.

1.6 Special Needs

There should be interaction with other agencies including:

- general practitioners
- health visitors
- public health doctors
- health authorities
- social services
- ambulance service
- police

If there is a local minor injury unit which treats children then this unit must have close association with the hospital paediatricians and A&E department consultants.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Specialist Training

Paediatrics is an essential secondment in the training of any specialist in A&E medicine. The Joint Committee for Higher Training in Accident & Emergency Medicine (JCHTA&E) currently requires a full-time working attachment of at least three months' duration in general paediatrics as part of the requirement for gaining a certificate of completion of specialist training (CCST) in A&E medicine. This can be undertaken at either senior house officer or registrar level.

At present, paediatric A&E medicine is not included in Schedule II of the European Specialist Medical Qualification Board in 1995. Thus there cannot be a CCST in this specialty. It is possible, however, for trainees in either paediatrics or A&E medicine to undertake training with special experience in paediatric A&E medicine. Details of special experience can be obtained from the JCHTA&E.

Additionally the *Advanced Paediatric Life Support (UK)* course is a requirement for training for doctors of all specialties who will work with seriously ill or injured children.

2.2 Intercollegiate Assessment

The examination for fellowship of the Faculty of Accident & Emergency Medicine includes paediatrics in all sections.

2.3 Specialist Associations

The British Association for Accident & Emergency Medicine includes members who specialise in paediatric A&E care. In addition, there is a British Paediatric Accident & Emergency Group which is affiliated to the Royal College of Paediatrics and Child Health.

The annual meetings of the British Association of Accident & Emergency Medicine, the Faculty of Accident & Emergency Medicine, and the Royal College of Paediatrics and Child Health include sessions relevant to paediatric A&E medicine. In addition, the British Paediatric Accident & Emergency Group have an annual autumn scientific meeting. Throughout the UK other meetings are organised on individual subjects relevant to the specialty. Biannually there is an International Conference of Emergency Medicine rotating between the UK, USA, Canada and Australia which has paediatric sections.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

Full details are in the report of a multidisciplinary working party on *Accident and Emergency Services for Children*. The recommendations in sections 1.2 and 1.5 above or a time-tabled agreed plan for implementation should be in place by 2004.

The recommended ideal nurse staffing will be difficult to implement because of a general shortage of registered children's nurses. A sub-optimal solution is to have at least one registered children's nurse on duty at the peak attendance times.

Paediatric A&E consultants should be in post in departments treating upwards of 18,000 children by 2004 and in all departments treating children by 2010.

It is expected that it will be possible to indicate special experience in paediatric A&E medicine on the specialist register in the future. Postgraduate deans should encourage the setting up of paediatric A&E medicine training programmes in their deaneries.

REFERENCES

Accident and Emergency Services for Children – Report of a Multidisciplinary Working Party, Royal College of Paediatrics and Child Health, 1999.

Accident and Emergency Services Follow Up Progress Against Indicators by Accident and Emergency Design, Audit Commission, 1998.

Ms Joan Robson

British Association of Accident & Emergency Medicine

Cardiothoracic Surgery

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

Cardiac Surgery

Cardiac surgery in children should be undertaken by surgeons with a major sub-specialty interest – reflected in a minimum commitment of two operating sessions per week for patients with congenital heart disease. There is no scope for occasional practice in paediatric cardiac surgery.

The three major large children’s hospitals in England (see section 1.2 ‘Hospitals’ below) have consultants who are full-time paediatric cardiac surgeons (seven posts in total). However, the majority of paediatric cardiac surgeons in the UK (19 posts) also undertake adult practice.

Those surgeons with adult practice in the same hospital are able to provide continuity of care for their paediatric patients into adulthood. Full-time paediatric cardiac surgeons in children’s hospitals make specific arrangements with an adult cardiac unit to ensure continuity of surgical care for their patients.

Thoracic Surgery

Oesophageal problems (including tracheo-oesophageal fistula in the neonate) are dealt with by general paediatric surgeons. In addition, tracheal surgery is often shared by cardiothoracic and ENT surgeons. Children with inhaled foreign bodies can be referred to either a thoracic or ENT surgeon. Patients with lesions in the mediastinum, lung or pleural space are generally referred to the cardiothoracic surgeon – pleural emphysema is the most common. Other conditions requiring thoracic surgery are rare and thoracic surgery is a very small part of a paediatric cardiothoracic surgeon’s practice. Management is always to be shared by paediatric oncologists (for malignant disease) and respiratory paediatricians for lung disease.

1.2 Hospitals

Paediatric cardiac surgery is undertaken in a cardiothoracic unit within a children’s hospital or in paediatric facilities within a specialist cardiothoracic unit attached to a teaching hospital. Until 1995 the supra-regional funding mechanism was used to fund surgery for infants and neonates but at present paediatric cardiac surgery is provided essentially on a regional basis. There are full-time surgeons based in the children’s hospitals in Great Ormond Street (London), Birmingham and Liverpool, while surgeons with a mixed paediatric and adult practice are based in the Royal Brompton, Guy’s and Harefield hospitals in London and in units in Southampton, Bristol, Leicester, Oxford, Leeds, Belfast and Newcastle.

From 1991 to 1998 there has been a unit in Cardiff serving South Wales but the Welsh Office are currently reviewing this provision of service.

In Scotland paediatric cardiac surgery has been undertaken in the units in the children's hospitals in Glasgow and Edinburgh but the Scottish Office have recently announced amalgamation of the service to the unit in Glasgow.

The number of units in the UK should be such that each unit can maintain a sufficient volume of paediatric work to enable two suitably trained consultants to devote a minimum of two sessions per week to paediatric cardiac surgery. The ideal configuration for the provision of paediatric cardiac surgery is currently a matter of national and international debate.

Transplantation

In view of the small number of children requiring heart and lung transplantation, this surgery is only provided at three centres in the United Kingdom: Great Ormond Street and Harefield in London and the Freeman Hospital in Newcastle.

1.3 Workload

Age

All children suspected of having a cardiac problem should be referred to a paediatric cardiologist for investigation and diagnosis. Children requiring surgery are then referred on to the nearest surgical centre.

Adults with Congenital Heart Disease

Whether newly diagnosed or surviving from childhood, adults with congenital heart disease are managed, followed up and investigated by cardiologists with experience in congenital heart disease and then referred to the nearest surgical centre dealing with congenital heart disease in adults.

Scope of Practice

The Society of Cardiothoracic Surgeons of Great Britain & Ireland maintains a national register of cardiac procedures – the number of children undergoing surgery for congenital heart disease has been remarkably constant over the years with just over 4,000 cases annually (approximately 70% require cardiopulmonary bypass). This constitutes 10 to 12% of NHS workload in cardiothoracic surgery but as the number of coronary bypass procedures in adults increases, this figure as a proportion will decrease.

Cases undertaken range from straightforward closure of atrial septal defects with a mortality risk of < 1% to major complex procedures undertaken in sick neonates with a mortality risk up to 50%. Risk assessment for the individual child is difficult because of the spectrum and severity (and relatively small number of cases) within a particular diagnostic category. Recent developments in paediatric cardiology have allowed an increasing number of patients to be dealt with by cardiologists using percutaneous interventional methods (these are by definition the very low-risk surgical procedures).

The result is that an increasing proportion of children having surgery are in higher risk categories.

Day Surgery

Very little paediatric cardiac surgery can be undertaken on a day-case basis.

Premature neonates requiring continuing mechanical ventilation due to high pulmonary blood flow through a patent ductus arteriosus (PDA) usually have ligation of PDA as day cases and are returned to their neonatal special care baby unit for further management. Change of a pacemaker box may occasionally be undertaken as a day case.

However, all attempts are made to minimise the pre- and post-operative stay in hospital and most units have community liaison nurses allowing for earlier discharge of patients.

Emergency Workload

Most neonates and infants presenting acutely with congenital heart disease can be managed by mechanical ventilation and/or prostaglandin infusion to maintain patency of the ductus arteriosus – thus there are a few conditions that require emergency surgery. CEPOD1 (requiring immediate life-saving surgery): neonates with critical aortic stenosis or those with obstruction of anomalous pulmonary venous drainage fall into this category.

CEPOD2 (requiring surgery within 24 hours) and CEPOD 3 (requiring surgery during the same admission): approximately 30% of the workload in paediatric cardiac surgery is carried out on an unplanned basis – these newly diagnosed neonates and infants can be managed with a prostaglandin infusion or mechanical ventilation until an operating list is available. However, surgery out of hours is not unusual as not all units will necessarily have a paediatric list the next day. As most cardiac procedures take a significant amount of time, it is not possible to add cases to an already planned list without cancelling elective cases.

1.4 Paediatric Support Services

Paediatricians/Paediatric Cardiologists

Paediatric cardiac surgeons and paediatric cardiologists work very closely as a team. Neonates and infants who present acutely without a diagnosis will initially be admitted under a paediatric cardiologist. Those coming in for elective cardiac surgery will be admitted under the surgeon. The ideal standard is for shared care between the surgeons and cardiologists in the ward and in the intensive care unit co-operation of the surgeon, cardiologist and anaesthetist is essential. Ultimately, the consultant surgeon is responsible for children undergoing cardiac surgery. Junior medical staff are SHOs and specialist registrars in paediatric cardiology/paediatrics and anaesthesia.

Nursing

Wards: The need for children to be cared for by children's nurses is recognised but this is not always the case at present. For higher grade staff, possession of a teaching qualification or the paediatric cardiology and cardiac surgery qualification is an advantage.

Intensive Care: In most units the nurses are a mixture of children's nurses with ITU experience or specialised intensive care nurses who have children's experience.

Anaesthetists

Children undergoing cardiac surgery should be anaesthetised by anaesthetists experienced in this area. They would be expected to devote a minimum of two sessions per week to paediatric cardiac anaesthesia.

Cover for Post-operative Complications (Including Emergencies)

By the nature of the work, consultant paediatric cardiologists and cardiac surgeons are intimately involved in post-operative care. Emergencies in the ward are covered by junior resident medical staff in paediatric cardiology. The intensive care unit is covered by the resident cardiac surgical SpR and by the SpR in anaesthetics covering the cardiac unit prior to involving the consultant staff.

Perfusionists

Perfusion for cardiac surgery in children should be undertaken by perfusionists accredited by the Society of Perfusionists who have experience in paediatric extra-corporeal circulation.

1.5 Paediatric Facilities

Out-patients

Children with congenital heart disease are seen in separate out-patient clinics (often jointly with paediatric cardiologists) with facilities for children and, in particular, with echocardiography available on site.

Wards

All children are admitted to a children's ward, usually a combined paediatric cardiology and cardiac surgical ward which will have all the necessary facilities including accommodation for parents, play facilities and schooling.

The number of adolescents seen is increasing and the paediatric cardiac units are endeavouring to provide separate ward facilities for this particular group of patients.

Operating Lists

There will be specific paediatric theatre facilities available. Ideally there would be provision for intra-operative echocardiography.

Intensive Care

Following cardiac surgery, children are looked after in a dedicated paediatric intensive care area staffed by nurses with experience in the care of critically ill children.

1.6 Special Needs

A close working relationship is necessary between paediatric cardiologists, surgeons and anaesthetists within the unit. In addition, close links with neonatologists, paediatric nephrologists, neurologists and paediatric surgeons are important, although not necessarily on site. For mothers who have recently delivered their babies (especially by caesarean section), input from obstetricians and midwives is essential.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training

The SAC in Cardiothoracic Surgery has defined a programme lasting six years. During that time, all trainees are exposed to paediatric cardiac surgery – usually during years three or four. This gives them the experience of the sub-specialty with a view to choosing a future career, but more importantly allows them to gain a greater understanding of cardiac physiology.

Trainees do not expect to get significant practical surgical experience – the increasing number of percutaneous interventions undertaken by cardiologists has removed some of the low-risk procedures (eg patent ductus arteriosus, atrial septal defect, aortic and pulmonary stenosis and aortic coarctation) from surgical practice. In the past, these were the procedures that the trainees would have been allowed to undertake under supervision. Thus, the main involvement of the trainee is assisting and providing resident intensive care cover.

For those wishing to follow a career in paediatric cardiac surgery, sub-specialty training is undertaken in years five and six – two posts have been established rotating for one year each between Great Ormond Street Hospital in London and Birmingham Children’s Hospital to provide specific training for those wishing to sub-specialise. Whether or not these posts are filled depends on the anticipated consultant manpower requirements. The posts are obtained by competitive interview and the trainees retain their national training number.

There is now the possibility for a UK trainee who has obtained the CCST to have a specific fixed-term training appointment (FTTA) to undertake a further period of training in a sub-specialty.

2.2 Intercollegiate Assessment

All trainees are exposed to paediatric cardiac surgery during their training and thus it is part of the intercollegiate assessment. Obviously trainees are not examined in great detail at this level.

2.3 Specialist Paediatric Surgical Associations

- Society of Cardiothoracic Surgeons of Great Britain and Ireland
- British Paediatric Cardiac Association (a sub-group of the British Cardiac Society)
- European Association for Cardiothoracic Surgery

2.4 Continuing Professional Development (CPD)

The Annual Meeting of the Society of Cardiothoracic Surgeons of Great Britain and Ireland includes a session devoted to paediatric cardiothoracic surgery chaired by a paediatric cardiac surgeon. In 1998 the Society inaugurated a breakfast session on congenital heart disease.

The European and North American meetings all include at least one session devoted to paediatric cardiothoracic surgery.

The Institute of Child Health in London organises an annual meeting on surgery for congenital heart disease. The Royal College of Surgeons of England provides a masterclass on surgery for the aortic root and also organises regular specialist meetings.

A world congress of paediatric cardiology and cardiac surgery occurs every four years.

There are many journals devoted to cardiology and cardiothoracic surgery all of which would contain articles relating to congenital heart disease. The major journals are *Journal of Thoracic and Cardiovascular Surgery*, *Annals of Thoracic Surgery*, *European Journal of Cardiothoracic Surgery*, *Journal of Heart Valve Disease*, and *Heart and Cardiology in the Young*.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

3.1 Adult Congenital Heart Disease

The number of children with congenital heart disease surviving surgery in early childhood has increased dramatically over the last two decades. This increasing group of now adult patients with congenital heart disease will require specific follow-up and in many cases further surgery. This surgery will be best carried out by paediatric cardiac surgeons. For those surgeons with an adult practice, this will be straightforward continuity of care. Those surgeons practising solely in children's hospitals have made specific arrangements with adult cardiac surgical units for the management of these patients. Thus, there will continue to be a need to provide a geographical spread of units with surgeons with experience in congenital heart disease. A support group specifically aimed at this group of patients has been formed – GUCH (Grown-ups with Congenital Heart Disease).

3.2 Antenatal Diagnosis

At present the live birth rate in England and Wales seems to be falling and therefore fewer babies are born with congenital heart defects (incidence eight per 1,000 live births). In addition, it is suggested that the increasing accuracy of antenatal diagnosis is leading, in some centres, to an increased rate of termination of foetuses with serious congenital heart defects. Antenatal screening for Down's syndrome (babies with Down's syndrome have a high incidence of heart disease) is being developed and this too may have an affect on the incidence of congenital heart disease in the future. It is not possible at this stage to predict these effects with any certainty.

3.3 Transplantation

The results of cardiac transplantation are improving steadily and it may be that an increasing number of children will be referred for transplantation rather than high-risk conventional surgery in the future. This would be particularly so if the current research into xenotransplantation (using pig hearts) came to fruition.

3.4 Percutaneous Catheter-based Interventions

An increasing number of lesions can be tackled by cardiologists using catheter-based techniques. Dilation of stenotic, aortic and pulmonary valves and recoarctations have been standard practice for some time. It is now also standard that a patent ductus in older children will be closed by an umbrella device and collateral arteries can be occluded by coils. More recently, clamshell devices have been used to close atrial septal defects and it is possible that these may be used for ventricular septal defects in the future.

3.5 Bristol Royal Infirmary Inquiry

It is anticipated that this Inquiry (due to report autumn 2000) will make wide-ranging recommendations which will have a significant effect on the practice of paediatric cardiac surgery in the United Kingdom.

REFERENCES

UK Cardiac Surgical Register, Society of Cardiothoracic Surgeons of Great Britain and Ireland.

Mr J R Leslie Hamilton

Society of Cardiothoracic Surgeons of Great Britain and Ireland

General Surgery

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

The general surgery of childhood represents a substantial workload which in England and Wales is largely undertaken by general surgeons – particularly in DGHs. In some cities and conurbations served by specialist paediatric surgical units, general surgeons no longer participate in the provision of surgical care for children. In other cities, however, general surgeons continue to undertake routine or straightforward emergency surgery, with the involvement of the specialist paediatric surgeon being limited to infants and younger children or those requiring surgery of a more specialised nature. In 1997/98, 11% of all childhood surgical admissions were managed by paediatric surgeons and 15% by general surgeons. Of all child cases treated by general surgeons, 26% were aged four years and under. Although general surgeons make a major contribution to the surgical care of children only a small number have a declared interest in the paediatric sub-specialty. In the recent census only 22 general surgeons listed their specialty interest as paediatric general surgery.

1.2 Hospitals

Most specialist paediatric surgical units are located in or closely linked with a university teaching hospital. Most teaching hospital consultant general surgeons do not treat children or their role is limited to the management of routine conditions in older children. The picture is very different in DGH practice where the majority of consultant general surgeons are required to contribute to the elective and emergency surgical service for children in their local population. Informal patterns of sub-specialisation are already evolving in some DGHs, with the elective surgery being concentrated in the hands of one or two general surgeons. DGH paediatricians often have established referral links with one or two consultant surgical colleagues. There are no recognised national or regional general surgical centres staffed by general surgeons since this role is fulfilled by the tertiary paediatric surgical units.

1.3 Workload

Age

The Senate of Surgery document *The Provision of General Surgical Services for Children* states ‘if a surgeon has received appropriate training and other staff and facilities meet the criteria for children’s surgery, then it should not be necessary to proscribe age limits for treatment at a district general hospital. This should be a matter for clinical judgement. However, all neonates, that is infants up to 44 weeks post-conceptual age, should be transferred to a paediatric specialist unit for treatment’. In children under five years of age referral patterns are, in any event, increasingly dictated by anaesthetic rather than surgical considerations.

Scope of Practice

■ General

Elective: 'Groin surgery', ie inguinal herniotomy, surgery for congenital hydrocoele, circumcision, orchidopexy, repair of umbilical hernia.

Emergency procedures: Appendicectomy, testicular torsion, incarcerated inguinal hernia and trauma of a less complex nature.

■ Specialist

The involvement of DGH general surgeons is virtually confined to the management of inguinal hernia in premature babies. The treatment of conditions such as pyloric stenosis and intussusception reflects the availability of expertise in paediatric anaesthesia and radiology.

Day Surgery

It has been estimated that at least 80% of the elective surgical workload managed by a DGH can be undertaken on a day-case basis.

Emergency Workload

Surgical emergencies in children amount to an estimated 10-20% of the overall DGH general surgical workload. At present, all DGH consultant general surgeons contribute to the emergency surgical service for children as part of their overall commitment to the on-call emergency rota. The Senate of Surgery of Great Britain and Ireland has recommended that if an appropriately trained surgeon is not available and will not be available within a reasonable time, the children should be transferred.

1.4 Paediatric Support Services

Paediatricians

Paediatrics is one of the core services provide by DGHs. The provision of 24-hour cover in some smaller DGHs is threatened by difficulties in meeting statutory requirements on the New Deal on junior doctors' working hours and the provision of consultant cover. Day-case general paediatric surgery is being undertaken in a small number of hospitals from which in-patient paediatric medical services have been withdrawn.

Nursing

Children are nursed on wards staffed by children's nurses. There is currently little in the way of specific post-registration educational provision targeted to meet the needs of nurses specialising in general surgery, although the *Paediatric High Dependency Course* includes care of the child requiring surgery.

Anaesthetists

Currently a majority of children are anaesthetised by anaesthetists whose main practice is adult. Sub-specialisation is an increasing feature of DGH anaesthesia.

Emergencies Where a Paediatric General Surgeon is Not Available

Children are managed either by the consultant general surgeon on call or transferred to a specialist centre, depending upon factors such as the nature of the emergency, the availability of a paediatric general surgeon and the age of the child.

Emergency Cover for Post-operative Complications

Complications are managed locally by the surgeon caring for the child, often in conjunction with the paediatrician. Where the complication is of an unusual or life-threatening nature, the child may be transferred to a specialist centre.

1.5 Paediatric Facilities

Out-patients

In DGHs the majority of children are seen together with adults in general adult/paediatric clinics. This falls far short of national recommended standards. In some DGHs, children's general surgical clinics have been established but these are very much the exception.

Wards

Children are no longer admitted to adult general surgical wards. In some DGHs, separate surgical wards for children have been retained but the trend is for children to be admitted to mixed paediatric medical/surgical wards.

Operating Lists

Although there is some variation between hospitals, it is likely that very few DGHs have scheduled theatre lists devoted specifically to children. Paediatric cases are either interspersed with adult cases or scheduled for the beginning of the theatre list to facilitate day-case treatment. Again, this falls far short of national recommended standards.

Theatres

DGH operating theatre facilities are shared between adults and children.

1.6 Special Needs

Apart from the input of paediatricians into the management of some in-patients, the general surgery of childhood consists of routine conditions of minor or intermediate complexity whose management does not require the involvement of other specialities.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training

Exposure to paediatric surgery during the course of general surgical higher surgical training is unstructured and unsatisfactory. Difficulties in providing general surgical trainees with supervised training have been exacerbated by the growth of paediatric surgical units staffed by trainees within that speciality. For many general surgical trainees their only experience of children's surgery is acquired (often on a poorly supervised basis) during the DGH 'slots' of their training rotation. This deficiency has recently been addressed by a working party of the Senate of Surgery which has recommended that general

surgeons treating children should, in future, have had six months' training in paediatric surgery in an SAC-accredited specialist paediatric surgical unit. The SACs in general surgery and paediatric surgery have now recognised appropriate training posts and trainees are now taking part in the programme.

2.2 Intercollegiate Assessment

Paediatric surgery is included as a sub-specialty option in the intercollegiate specialty examination in general surgery but at the time of the publication of the Senate document no trainees had selected to sit this option.

2.3 Specialist Paediatric Surgical Associations

A small number of general surgeons are members of the British Association of Paediatric Surgeons. There is no specialist paediatric sub-group within the Association of Surgeons of Great Britain and Ireland.

2.4 Continuing Professional Development

Arrangements for the provision of CPD for general surgeons engaged in general paediatric surgery are evolving. The Royal College of Surgeons runs an annual course in general paediatric surgery. In addition, a half-day session of the Association of Surgeons' annual meeting is devoted to paediatric surgery.

3 FUTURE IMPROVEMENT AND RECOMMENDATIONS

Detailed recommendations are set out in the 1998 Senate document, *The Provision of General Surgical Services for Children*. Key recommendations include the creation of a new sub-category of sub-specialist general surgeons – the general paediatric surgeon. Hospitals should be required to identify designated posts in general paediatric surgery. Six months' training in paediatric surgery would be a requirement of appointment to such a post and surgeons would be required to undertake an adequate paediatric workload to maintain a high level of competence.

Children should be anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia, and who have access to the relevant paediatric anaesthetic equipment

Elective surgical admissions for children should be scheduled to constitute designated paediatric in-patient or day-case theatre lists, eg on a weekly or fortnightly basis as determined by the volume of paediatric cases.

Out-patient activity should be reorganised in such a way that children are seen in designated surgical clinics held in a paediatric out-patient environment rather than in mixed clinics devoted primarily to adults.

REFERENCES

Guide for Purchasers and Providers of Paediatric Surgical Services, British Association of Paediatric Surgeons, 1995.

Day Surgery: Report of the Day Surgery Task Force, NHS Management Executive, 1994.

Just for the Day, Caring for Children in the Health Service, 1991.

The Provision of General Surgical Services for Children, The Senate of Surgery of Great Britain and Ireland, 1998.

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Neurosurgery

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

Many neurosurgeons continue to have some involvement with paediatric neurosurgery, although this may be largely limited to the initial treatment of emergencies. There are currently full-time paediatric neurosurgeons on the staff of three specialist units whilst a further 11 units have at least one neurosurgeon with a clearly designated major commitment to paediatric neurosurgery. Some larger units are now staffed by two or three neurosurgeons with paediatric neurosurgical training.

1.2 Hospitals

Most neurosurgical services are centralised in major units in neuroscience centres serving well-defined large population areas of sufficient size to allow the development and maintenance of expertise in the management of these less common surgical problems. Paediatric neurosurgery is increasingly concentrated in larger units staffed by full-time or designated paediatric neurosurgeons with intensive care facilities and the support of related paediatric disciplines. Rare conditions or those requiring complex management may be treated in regional or supra-regional centres with specific areas of expertise. The contribution of general neurosurgical units to the care of children centres on the immediate management of emergencies or head injuries.

A survey carried out in 1994 by the Specialist Advisory Committee in Neurosurgery suggests that all United Kingdom neurosurgical units currently undertake some degree of paediatric neurosurgery. There are 36 neurosurgical units within the UK and Ireland which are as follows: Plymouth; Southampton; Haywards Heath; Bristol; Oxford; Cambridge; Oldchurch Hospital – Romford; North Staffordshire Hospital – Stoke, Queen Elizabeth Hospital – Birmingham; Coventry; Queens Medical Centre – Nottingham; Hull; Leeds General Infirmary; Hallamshire Hospital – Sheffield; Manchester Royal Infirmary; Hope Hospital – Salford; Middlesbrough; Preston; Newcastle General Hospital; Walton Centre for Neurology and Neurosurgery – Liverpool; Glasgow; Edinburgh; Aberdeen; Dundee; Cardiff; Swansea; Cork; Dublin; Belfast; and in London: Atkinson Morley Hospital; Kings College Hospital; National Hospital Queens Square; Royal London Hospital; Royal Free Hospital; Charing Cross; and Great Ormond Street Hospital.

1.3 Workload

Age

A cut-off age below which a child must be seen by a designated paediatric neurosurgeon is difficult to define as some neurosurgical conditions would still be best treated by the neurosurgeon whether adult or paediatric with that expertise, for instance cerebral vascular surgery or epilepsy surgery. Where children's neurosurgical facilities exist, the age limit for admission varies.

Scope of Practice

A recent survey suggests that within the average neurosurgical unit paediatric neurosurgery accounts for approximately 10% of the workload – although this proportion varies considerably between units.

■ **General**

Head injuries: Currently children's head injuries are managed by paediatric surgeons, paediatric neurologists, adult neurosurgeons and paediatric neurosurgeons both within and outside paediatric units.

Hydrocephalus and the full range of spinal dysraphic states: With the advent of new techniques and more sophisticated imaging, the treatment of hydrocephalus is becoming more sophisticated and is increasingly undertaken by neurosurgeons with paediatric experience.

■ **Specialist**

Paediatric brain tumours: It is now accepted that such specialist paediatric neurosurgical procedures are best performed by, and the children managed by, neurosurgeons with a special expertise in paediatric neurosurgery. A document *Guidance for Services for Children and Young People with Brain and Spinal Tumours* was recently produced by the United Kingdom Children's Cancer Study Group and the Society of British Neurological Surgeons (SBNS).

Syndromic paediatric cranio-facial surgery is likely to be concentrated in a small number of supra-regional centres.

Day Surgery

Virtually no paediatric neurosurgery is undertaken on a day-case basis.

Emergency Workload

Predominantly the management of head injuries and shunt failure. All neurosurgical consultants should be able to handle paediatric neurosurgical emergencies to ensure that a child with an extra dural haematoma or acute primary brain injury can have their emergency care provided locally.

1.4 Paediatric Support Services

Paediatricians

Not all neurosurgical units have the benefit of paediatric medical support on site. Most children are admitted under the care of a neurosurgeon. The arrangements for ensuring paediatric cover for those neurosurgical units which do not have on-site paediatric medical support are under review and there is now a very clear understanding that it is a requirement to have paediatric support on site.

Nursing

Not all children are cared for by nurses with paediatric and neurosurgical training but wherever possible children are admitted to paediatric facilities and cared for by nurses with appropriate paediatric and neurosurgical training.

Anaesthetists

Not all children are anaesthetised by paediatric anaesthetists although this is the goal sought by the SBNS.

Emergency Cover for Post-operative Complications

For units undertaking paediatric neurosurgery, as recommended by the Society of British Neurological Surgeons, there would need to be the equivalent of two whole-time consultants with paediatric expertise in order to provide sufficient cover. If a paediatric neurosurgeon was not available, there would need to be an arrangement with the nearest paediatric neurosurgical facility.

1.5 Paediatric Facilities

Out-patients

Where neurosurgery is undertaken in a children's hospital, appropriate paediatric out-patient facilities are available. Children treated in adult hospitals are generally seen in combined adult/paediatric out-patient clinics.

Wards

Children are not always admitted to paediatric surgical wards although this is a clearly understood goal and depends on local circumstances. Where children need to be admitted to neurosurgical wards or ICU's then paediatric nurses and other experienced paediatric staff should be available to assist with their management. They should then be transferred to a paediatric environment as soon as is practical.

Operating Lists

Theatre lists dedicated to paediatric neurosurgery are limited to a small number of high-volume specialist paediatric neurosurgical units. Most children, however, undergo surgery on the same theatre lists as adults.

1.6 Special Needs

Children benefit from receiving treatment in a multidisciplinary neuroscience environment. Areas of expertise in adult neurosurgery, eg management of epilepsy or interventional radiology, may also prove of value in the treatment of children. Close liaison with adult neurosurgical practice ensures smooth transition with continuing care from paediatric into adult life.

In the treatment of paediatric brain tumours, a close relationship should exist between the neurosurgeon and the paediatric oncology service. Similarly, paediatric craniofacial surgery, which is undertaken on a supra-regional basis, requires close collaboration with a number of related surgical disciplines.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training

All neurosurgeons in training must have some exposure to paediatric neurosurgery under the supervision of a trained and designated neurosurgeon. Each training programme includes a sufficient paediatric workload to ensure that trainees gain the required level of experience. This is not yet defined in terms of the number of cases each trainee is required to see and treat. The SAC in Neurosurgery is to define the range of procedures to which all trainees must be exposed.

In the case of a trainee wishing to develop a major specialty interest in paediatric neurosurgery they will be required to spend a flexible year in specialist training, either in a specialist centre within the UK or overseas. The specialist centres will be defined in terms of workload and it is likely that there will be between six to ten paediatric neurosurgery centres which would be capable of carrying out all aspects of paediatric neurosurgery.

2.2 Intercollegiate Assessment

Paediatric neurosurgery is included within the overall syllabus but does not formally constitute a separate option or sub section of the examination.

2.3 Specialist Paediatric Surgical Associations

United Kingdom: The British Paediatric Neurosurgical Group provides the focus for paediatric neurosurgery within the UK.

Europe/worldwide: European Society for Paediatric Neurosurgery, International Society for Paediatric Neurosurgery.

2.4 Continuing Professional Development

The European Society for Paediatric Surgery holds an annual training course comprising a three-year cycle. UK trainees expressing an interest in paediatric neurosurgery are strongly encouraged to attend. The SBNS welcomes the submission of paediatric contributions to their scientific meetings. Where the number of papers permits, a paediatric session is held at one of the societies bi-annual meetings.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

Hydrocephalus, spina bifida and head injuries in children should be managed by paediatric neurosurgeons. Many aspects of paediatric neurosurgery require an integrated team of neurosurgeon, paediatric neurologist, intensivist, orthopaedist and experienced paramedical support. The reorganisation of services required to meet this goal will be dependent on the appropriate transfer of resources.

In the future, the management of children's head injuries should become the remit of paediatric neurosurgeons and children should be treated in a paediatric facility. This aim

can only be met by investment in neurosurgical services, the transfer of facilities and resources, and the utilisation of the expertise of the sub-specialties of neurosciences.

Children should be anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia, with access to the relevant paediatric anaesthetic equipment.

Out-patient activity should be reorganised in such a way that children are seen in designated surgical clinics held in a paediatric out-patient environment rather than in mixed clinics devoted primarily to adults

REFERENCES

Safe Neurosurgery 2000, Society of British Neurological Surgeons, London.

Safe Paediatric Neurosurgery, Society of British Neurological Surgeons, London 1998.

Paediatric Workload Survey, SAC in Neurosurgery, 1994.

Report of the Working Party on the Management of Patients with Head Injuries, The Royal College of Surgeons of England, 1999.

Mr A James W Steers

Society of British Neurological Surgeons

Ophthalmology

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

Children comprise 6% of the surgical load in ophthalmology. The majority of surgical work involves the correction of squints, the treatment of blocked nasolacrimal ducts, and repair of injuries. All ophthalmologists who have completed higher specialist training have had paediatric ophthalmological experience and the majority have continuing paediatric ophthalmological experience sufficient to maintain their skills in these procedures. Occasional paediatric practice is discouraged.

Provision of surgical treatment for more complicated conditions such as congenital cataract, congenital glaucoma, retinopathy of prematurity, and retinoblastoma should be concentrated in units where ophthalmologists with special experience are regularly managing these conditions. For some specialised surgery, such as glaucoma procedures, corneal grafting, oculoplastic procedures, vitreoretinal and orbital surgery, the required expertise may be found in units primarily dealing with such conditions in adults.

1.2 Hospitals

Paediatric eye surgery is undertaken in the eye departments of DGHs, teaching hospitals, children's hospitals, and in the eleven separate eye hospitals which admit children for surgery: Bristol Eye Hospital; Prince Charles Eye Unit in Windsor; Sussex Eye Hospital in Brighton; Royal Eye Infirmary in Plymouth; Wolverhampton Eye Infirmary; Victoria Eye Hospital in Hereford (day cases only); Sunderland Eye Infirmary; Royal Victoria Hospital in Bournemouth; Manchester Royal Eye Hospital; Moorfields Eye Hospital in London; and Kent County Ophthalmic and Aural Hospital in Maidstone (day cases only). The current trend is for these units to move to general hospitals but some major hospitals with specialist treatments are likely to remain.

Laser treatment of retinopathy of prematurity often takes place in the neonatal intensive care units associated with maternity units

Supra-regional service

At present one UK centre, St Bartholomew's Hospital in London, has special funding for management of retinoblastoma, which is the only condition to attract this type of funding. The National Specialist Committee Advisory Group has recently recommended the establishment of a second funded centre in Birmingham.

1.3 Workload

Age

Children managed by ophthalmic surgeons range in age from infants with retinopathy of prematurity to young adults with, for example, diabetic retinopathy of juvenile onset.

Scope of Practice

■ General

- Squint
- Lack of patency of the nasolacrimal ducts
- Penetrating trauma and lacerations

■ Specialist

- Lid surgery including congenital ptosis
- Congenital cataract
- Congenital glaucoma
- Retinoblastoma
- Retinopathy of prematurity
- Orbital and optic nerve tumours
- Retinal detachment and retino-vascular conditions

Day Surgery

Almost all ophthalmological surgical interventions can be carried out as day cases.

Emergency Workload

Significant lid lacerations, including those involving the lacrimal canaliculi, and penetrating globe injuries are the main conditions requiring emergency surgery.

1.4 Paediatric Support Services

Paediatricians

There should be a named paediatrician available for liaison with consultant ophthalmologists, and the immediate availability of paediatric advice and cover for any period of time in which the child is in the eye unit, either as a day case or as an in-patient. In the case of the isolated eye units, where the eye unit is on a separate site from paediatric services, this usually means that a paediatrician is not available on site but covers from another hospital.

Orthoptists and Optometrists

All eye units include orthoptists (a profession allied to medicine – PAM) on their staff. They are highly trained in the assessment of vision and squints, and the management of amblyopia in children. Many units have on their staff optometrists skilled in the management of refractive problems in children including the fitting of contact lenses.

Nurses

Not all children are cared for by children's nurses who have experience of eye nursing.

Anaesthetists

Not all those anaesthetising children have adequate training and continuing experience equivalent to at least one full operating list per week, as recommended by *Ophthalmic Services for Children*, The Royal College of Ophthalmologists and the British Paediatric Association, 1994.

In DGHs children are managed by anaesthetists covering mixed adult/paediatric theatre lists. Although some have paediatric training the overall picture remains unclear.

Emergency Cover for Post-operative Complications

Ophthalmologists will be involved in the care of their own patients' post-operative complications. In complex cases this will usually involve the consultant.

1.5 Paediatric Facilities

Out-patients

Separate out-patient facilities with a play area and access to toilet and changing facilities are recommended for children in *Ophthalmic Services for Children*.

Wards

Where in-patient treatment is required, children must be admitted to a children's ward, either in the paediatric department of a general hospital, in a children's hospital, or in a dedicated children's unit within a separate eye hospital. Facilities should include accommodation for parents and play facilities.

Operating Lists

The concentration of children onto separate operating lists is strongly encouraged to utilise fully the skills of anaesthetists and nurses experienced in children's management.

Theatres

Equipment appropriate for paediatric anaesthesia and surgery must be available, although dedicated theatres are not essential.

1.6 Special Needs

The need to remove obstructions to visual development in the 'sensitive period' is frequently a guiding principle in the surgical management of paediatric eye disease. This period may be as short as four weeks and occurs early in life if the obstruction is dense, or unilateral, but is always within the first six years of life approximately.

The window of opportunity for the treatment of retinopathy of prematurity may be as short as two or three days.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training

The Specialty Training Committee (STC) in ophthalmology has defined a programme lasting four and a half years. There is no formal training in general paediatrics but during that time all trainees are exposed to paediatric ophthalmology including surgery for squint, probing of nasolacrimal ducts, and repair of penetrating injuries. The report *Ophthalmic Services for Children: Report of a Joint Working Party of the Royal College of Ophthalmologists and the British Paediatric Association* (1994) advises that more structured programmes should be planned.

More complicated conditions are usually managed by consultants or trainees undergoing advanced specialty training in paediatric ophthalmology. Currently six such advanced specialty training posts (previously known as fellowships) are recognised by the STC as suitable for training surgeons who wish to specialise in paediatric ophthalmology. Many trainees visit units abroad for further training, and this can normally contribute to the training period if approved by the STC in advance. The period of fellowship is normally six to twelve months.

2.3 Intercollegiate Assessment

The report *Ophthalmic Services for Children* recommends that knowledge of child development, as well as normal vision development and techniques of assessing vision in children of all ages, be gained by some exposure to postgraduate paediatric training, preferably by an attachment to a team working with disabled children and to a paediatric neurology service. It also states that such knowledge should be expected from candidates taking ophthalmic examinations and this should be reflected in the content of the examinations and in the composition of the examining board.

2.4 Specialist Paediatric Ophthalmology Associations

Children's Eye Group
European Paediatric Ophthalmology Group
European Strabismus Association
International Strabismus Association
Congenital Cataract Interest Group
British Isles Strabismus Association

2.5 Continuing Professional Development

The Children's Eye Group holds an annual meeting in the UK, providing continuing medical education. Individual eye units also run regular seminars in paediatric ophthalmology, recognised for CPD by the Royal College of Ophthalmologists.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

There is a need for two more advanced specialty training posts across the country for those who wish to specialise in paediatric ophthalmology.

There is an urgent need to attract into the service nurses with experience in ophthalmology.

The final Fellowship examination should always test knowledge of paediatric ophthalmology in candidates, and a paediatrician should be included among the examiners.

The staffing of a children's eye unit should include a person skilled in the handling of young children, ideally a state-registered children's nurse. It is, however, also important that the nursing staff are eye-trained or have experience of eye nursing. In practice, it is not always possible to realise both these ideals.

Children should be treated by anaesthetists with recognised paediatric training who manage children regularly and have access to paediatric anaesthetic equipment.

REFERENCES

Ophthalmic Services for Children, The Royal College of Ophthalmologists and The British Paediatric Association, December 1994.

The Pattern of Medical Services for Children: Medical Staffing and Training, Joint Consultants Committee, 1996.

Mr Richard Markham
The Royal College of Ophthalmologists

Oral & Maxillofacial Surgery

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

Oral and maxillofacial surgeons are specialists in the anatomical area of the mouth, head, face and neck. They sub-specialise in particular aspects of oral and maxillofacial surgery rather than solely in the treatment of children. There is a significant amount of routine/general paediatric oral and maxillofacial surgery. However, there is a tendency for the more specialised procedures to be dealt with by one surgeon who operates on children regularly, ie equivalent to one list per week.

1.2 Hospitals

Maxillofacial surgery is based mainly in sub-regional/regional units based in DGHs, teaching hospitals, children's hospitals and specialist units, eg Canniesburn Hospital, Glasgow, and Queen Victoria Hospital, East Grinstead. Most units cover populations of 400,000-1,000,000 people.

1.3 Workload

Age

All maxillofacial surgeons are exposed to a high volume of paediatric maxillofacial surgery throughout their training. Maxillofacial surgeons specialise in particular aspects of their specialty rather than solely in the management of children, treating the patient from birth, through adolescence into adulthood. The lower age treated is dependent on not only the experience of the maxillofacial surgeon but also the training, experience and interests of anaesthetic colleagues.

Scope of Practice

■ General

Facial trauma, oro-facial infections, dentoalveolar surgery, facial deformity (routine), temporomandibular joint and salivary problems.

■ Specialist

- Complex dentoalveolar problems
- Developmental abnormalities: cleft lip and palate and craniofacial deformities
- Facial deformity, eg hemifacial microsomia, Treacher-Collins Syndrome
- Salivary disease
- Paediatric head and neck oncology (rare)
- Temporomandibular joint – ankylosis

Day Surgery

There is a desire on the part of oral and maxillofacial surgeons to treat children as day cases, thus increasing the availability of general theatre lists and in-patient beds for patients requiring more complex procedures. Day-case surgery includes paediatric pre-

assessment clinics, pain control, follow-up and support. It is estimated that 90% of general paediatric oral and maxillofacial surgery can be treated on a day-case basis.

Emergency Workload

Facial lacerations, dental trauma, facial and craniofacial trauma and orofacial infections are the types of paediatric emergencies seen by the speciality and account for 20-25% of maxillofacial emergencies.

1.4 Paediatric Support Services

Paediatricians

Access to paediatric medical support is not universal, however this support is essential. For hospitals at present without in-patient paediatrics, arrangements for providing paediatric cover are currently negotiated locally and must be easily and readily available. In addition there should be access to intensive care facilities on site when infants or children with complex and/or medically compromised conditions are undergoing surgery.

Nursing

Children are admitted to a children's ward – usually a designated children's surgical ward. Children are cared for by children's nurses. These nurses also have relevant surgical nursing expertise, eg in oral and maxillofacial/ENT surgery.

Anaesthetists

Children are anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia, and with access to the relevant paediatric anaesthetic equipment.

Emergencies Where a Paediatric Maxillofacial Specialist is Not Available

Paediatric surgery constitutes a considerable portion of general oral and maxillofacial practice. In an emergency situation it would be more appropriate for a maxillofacial colleague to treat the child for the acute problem (CEPOD 1) rather than transfer the child to specialised paediatric facilities.

Cover for Post-operative Complications (Including Emergencies)

Maxillofacial consultants, in common with other surgical consultants, assume responsibility for the care of their own patients' post-operative complications. This is particularly true for post-operative supervision of children undergoing complex elective in-patient procedures. In extreme situations, such as acute airway obstructive haemorrhage, it may be more appropriate for a maxillofacial surgeon not specialising in paediatrics to provide immediate resuscitative treatments.

1.5 Paediatric Facilities

Out-patients

Separate maxillofacial out-patients' clinics for children are not generally provided except in specialist children's hospitals. Where possible, efforts are made to create a child-friendly out-patient environment.

Wards

Children are usually admitted to a children's surgical ward staffed by paediatric-trained nurses and nurses with maxillofacial/ENT experience. Maxillofacial surgery and ENT frequently share wards. Although children are admitted under the care of a maxillofacial surgeon, the availability of paediatric medical support is essential.

Operating Lists

Dedicated theatre lists for children are available but usually paediatric cases are included in mixed adult/paediatric theatre lists to make best use of the hospital's facilities. Children are usually anaesthetised by an anaesthetist with paediatric training, experience and interest.

Theatres

Most maxillofacial units have dedicated theatre facilities (specialised equipment) including osteodistractors, low-profile bone plates, microscopes, drills, saws, fiber-optic equipment. Much of this equipment may be shared with adults.

1.6 Special Needs

Of special need is a close working relationship with other head and neck surgical specialities: orthodontists, ophthalmology, plastic surgery, ENT and neurosurgery. It is also desirable to have close links with accident and emergency, general surgery, other dental specialities and other services including radiology, oncology, speech and language therapy and dietetics.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training (Five-year Programme)

Because of the volume of paediatric work in the specialty, all trainees receive some exposure to paediatric oral & maxillofacial surgery in the course of their training. However, there is currently no requirement for trainees to undertake specific sub-specialty training in paediatric maxillofacial surgery.

Specialist registrars would be expected to obtain hands-on experience in the more specialised maxillofacial procedures (cleft lip and palate, craniofacial surgery, temporomandibular problems (ankylosis) and head and neck reconstructive techniques) in their third and fourth years.

A craniofacial training fellowship in Birmingham is open to trainees in oral & maxillofacial surgeons, neurosurgery and plastic surgery. This post is recognised by all the relevant SACs. There is a need to establish more training fellowships to facilitate specialist training in the maxillofacial aspects of craniofacial, cleft lip and palate surgery, and the treatment of maxillofacial deformities in children.

Many trainees visit renowned units abroad during their 'Calman' training and are encouraged to add to this experience post-CCST. These visits vary between three months

to twelve months. A request to the SAC is usually made for recognition of this training as part of the five-year programme and the SAC usually views at least part of these visits in a favourable way.

2.2 Intercollegiate Assessment

Trainees are not specifically examined on paediatric oral & maxillofacial surgery. However, the sections of the examination relating to the various sub-specialties such as craniofacial surgery, trauma, cleft lip and palate, and paediatric facial deformity may include a paediatric component. One or more of these topics is often chosen by candidates as their 'specialist subject'.

2.3 Specialist Paediatric Surgical Association

There is no association devoted to paediatric oral & maxillofacial surgery. The British Association of Oral & Maxillofacial Surgeons (BAOMS) includes a Cleft Lip and Palate Group. Most maxillofacial surgeons with an interest in paediatric maxillofacial surgery will belong to the Craniofacial Society of Great Britain, the European Craniofacial Congress and the International Craniofacial Society.

2.4 Continuing Professional Development

CPD is actively encouraged by the BAOMS and the British, European and international association meetings have 'keynote lectures', symposia and papers on paediatric maxillofacial surgery.

A specialist cleft lip and palate course is held bi-annually in Poole. The BAOMS Cleft Lip and Palate Group hold regular meeting to consider audit, research protocols, surgical procedures, orthodontics and speech therapy. An advanced *Cleft Lip and Palate Masterclass* is held overseas on a bi-annual basis under the auspices of BAOMS Cleft Lip and Palate Groups. A cleft lip and palate course is held every four years by the British Association of Plastic Surgeons, and maxillofacial surgeons are welcome to attend. The current level of CPD in paediatric maxillofacial surgery is sufficient.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

More specialised training fellowships are required to meet the needs of year five higher surgical trainees.

Specialised paediatric oral and maxillofacial practice needs to be concentrated in the hands of fewer people based on surgical skills, audit and quality of service, not institutions (bricks and mortar). The move to amalgamate units with specialist paediatric oral & maxillofacial skills (cleft lip and palate, craniofacial surgery, head and neck oncology) is ideal. External multidisciplinary audit is encouraged.

Consultant paediatric maxillofacial surgeons, anaesthetists and ideally specialist registrars should receive training in how to manage children as patients. In addition they should

hold *Acute Trauma Life Support*® (ATLS) and *Advanced Paediatric Life Support* (APLS) accreditation.

The relationship between the various head and neck specialties are undergoing radical change at present. The relevant specialty associations and groups (the Clinical Specialist Advisory Group, the National Specialist Commissioning Advisory Group and the British Association of Head and Neck Oncologists) are all striving to develop co-ordinated multidisciplinary services. The impact of these changes will be largely limited to the provision of specialised oral and maxillofacial services rather than general paediatric oral and maxillofacial practice.

It is essential to have easy access to paediatric medical support and ideally have an in-house neonatologist and paediatrician to provide medical support. In addition there should be access to intensive care facilities.

Ideally there should be separate out-patient clinics for children. Where there are no separate children's out-patient clinics, a segregated area should be reserved for children and furnished appropriately.

REFERENCES

Children's Surgical Services, Royal College of Paediatrics and Child Health 1996 p13-14, British Association of Oral and Maxillofacial Surgeons' statement.

Cleft care, life after CSAG, Editorial *BJOMS* 36. 81-83,1998.

Mr Leo F A Stassen

British Association of Oral & Maxillofacial Surgeons

Orthopaedic and Trauma Surgery

1 CURRENT PROVISION OF SERVICE

1.1 The Surgeon

Orthopaedics is one of the largest of the surgical specialties and orthopaedic departments exist in most hospitals. The majority of orthopaedic surgeons treat both adults and children and could thus be termed generalists. The paediatric component of their practice centres on the treatment of more routine paediatric orthopaedic problems and fractures. A smaller number of surgeons with a specific interest in paediatric orthopaedic surgery deal with the rarer and more complex problems.

There are 1,368 orthopaedic surgeons in England and Wales. The current membership of the British Society for Children's Orthopaedic Surgery is 130 and could be said to reflect the number of surgeons who have a major sub-specialist interest in paediatric work.

1.2 Hospitals

Most hospitals with an orthopaedic department provide for the treatment of children. Within each department, one or more orthopaedic surgeon is designated as having a particular interest in children. The range of conditions treated in the district hospital reflects the experience and interest of the consultant staff and the level of specialist support. All orthopaedic surgeons working in DGHs are responsible for children's trauma during their night or week on call. There is a broad geographic spread of tertiary centres providing specialist paediatric orthopaedic surgery: Glasgow; Edinburgh; Newcastle; Leeds; Manchester; Liverpool; Oswestry; Sheffield; Nottingham; Birmingham; Bristol; Oxford; Southampton; and London (Great Ormond Street and Royal National Orthopaedic Hospital, Stanmore).

1.3 Workload

Age

Neither the British Orthopaedic Association (BOA) nor the British Society for Children's Orthopaedic Surgery (BSCOS) have formed any views on a cut-off age below which, regardless of the condition to be treated, the child should be referred to a specialist paediatric unit.

Scope of Practice

■ General

At a local level orthopaedic surgeons with a paediatric specialist interest will manage the broad range of paediatric trauma and congenital disorders such as developmental dysplasia of the hip (DDH), club feet and other hip disorders in children – providing continuing follow up into adult life. Surgical procedures include the management of fractures, treatment of common foot disorders including talipes equinovarus, and the simple management of the orthopaedic problems associated with cerebral palsy.

- **Specialist**

Children with serious injuries requiring paediatric intensive care (though orthopaedic treatment usually takes second place to the management of head injuries and other life-threatening conditions) some DDH surgery, slipped upper femoral epiphysis, complex surgery in children with cerebral palsy, limb lengthening, spinal deformity surgery and the treatment of rarer conditions.

Day Surgery

A large proportion of elective paediatric orthopaedic surgery (including the treatment of fractures) is undertaken on a day-case basis.

Emergency Workload

Orthopaedic emergencies in children exhibit a seasonal pattern, with a high incidence in summer months. The majority of paediatric emergencies are simple fractures of the upper limbs – which represent 50% of admissions to hospital. Not all fractures require manipulation.

1.4 Paediatric Support Services

Paediatricians

The majority of orthopaedic units which treat children have on-site paediatric medical support. Some solely elective orthopaedic units do not have paediatric support on site, eg Robert Jones & Agnes Hunt, Royal National Orthopaedic Hospital in Stanmore and The Nuffield Orthopaedic Hospital in Oxford. The Robert Jones & Agnes Hunt has two paediatricians with sessional commitments and the nature of surgery selected avoids multi-system defects. There are two committed anaesthetists with paediatric special interest in children on specific paediatric sessions.

Nursing

The need for children to be cared for by children's nurses is recognised but this is not always the case at present.

Anaesthetists

In DGHs anaesthesia is undertaken by anaesthetists with a special experience in paediatric anaesthesia rather than a designated, specialist paediatric anaesthetist.

Cover for Post-operative Complications or Emergencies

In a DGH, cover for post-operative complications or emergencies is provided by the other orthopaedic surgeons within the department if the surgeon with a designated paediatric interest is not available. Whilst these surgeons may not have a special interest in paediatric orthopaedics, their training will have included paediatric orthopaedic surgery. If the expertise required to manage the problem is not available locally, the child is transferred to the nearest regional centre, but if the problem can wait, they will be transferred to the care of the paediatric specialist the following morning.

1.5 Paediatric Facilities

Out-patients

Separate facilities for children are provided in some centres but in general these are shared with adults.

Wards

Children are admitted to a children's ward – either a children's surgical ward or a mixed medical/surgical ward.

Operating Lists

The situation is unclear but it is unlikely that separate paediatric theatre lists are provided in DGHs. In larger or specialist units dedicated paediatric theatre lists are provided.

1.6 Special Needs

The orthopaedic department needs an appropriate X-ray department with imaging as good, plain X-rays, CT scans, MRI scans and also bone scans are required to carry out a satisfactory service.

A plaster technician and the services of an appropriate orthotist are required. The orthotist should be skilled in the manufacture and fitting of spinal jackets, callipers, ankle/foot orthoses, etc. They should be able to make custom splints.

Physiotherapy is essential for the rehabilitation of patients with certain orthopaedic conditions and, in particular, following injury or surgery for neuromuscular disorders.

Occupational therapy is also of great benefit as there are increasing needs for specialist equipment to be provided for children in hip spicas, ie car seats and buggies. The local STEPS organisation (The National Association for Children with Lower Limb Abnormalities) has helped set up a number of units with this equipment.

Liaison nurses would be useful to deal with patients' problems in the community.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training

Years One to Four

All orthopaedic surgeons will have some exposure to paediatric work during their training. The SAC curriculum states that children's orthopaedic surgery is considered to be an essential component of the first four years of training and all trainees will be exposed to six months' paediatric training in the first four years. This will equip the trainees to deal with all common emergencies and have an understanding of the management of DDH, congenital talipes equino varus (CTEV) and neuromuscular disorders, and other hip conditions affecting children.

Years Five to Six

Those surgeons wishing to develop a sub-specialty interest in paediatric orthopaedics have to undertake advanced training in years five and six. There are two fellowship posts available in the UK: one in London at Great Ormond Street and the Royal National Orthopaedic Hospital and one at the Sheffield Children's Hospital. These posts would be filled by competitive interview and trainees appointed would retain the national training number. A number of other units offer specific year five and six slots which will increase paediatric exposure but these would more usually form part of regional rotations. A large percentage of trainees wishing to pursue a career in children's orthopaedics go abroad for further training.

2.2 Intercollegiate Assessment

The intercollegiate specialty examination includes a separate oral examination covering children's orthopaedics. The intercollegiate examination, which is taken after the first four years of higher surgical training, is designed to assess trainees in the following areas: management of common fractures; understanding of the treatment for DDH; CTEV; cerebral palsy and other neuromuscular disorders; disorders of the hip in childhood; and the treatment of childhood infections.

2.3 Specialist Paediatric Surgical Associations

The British Society for Children's Orthopaedic Surgery (BSCOS).

2.4 Continuing Professional Development

The BSCOS provide educational courses on a regular basis and these form part of the bi-annual meetings. These meetings also include the presentation of free papers on paediatric orthopaedics. The BOA holds instructional courses. Additional courses are held by individual units under the auspices of BSCOS. Some courses include practical instruction, for example in-fracture fixation and leg lengthening.

The senior members of BSCOS attend the European Paediatric Orthopaedic Society and the Paediatric Orthopaedic Society of North America meetings for their own CPD.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

Orthopaedic surgeons subscribe to the view that a paediatric orthopaedic service should be a feature of all DGHs. The DGH service should be complemented by access to regional or sub-regional tertiary referral centres.

There is already a well-established regional referral pattern but further expansion of regional activity is envisaged. Supra-regional centres will have to be defined for the treatment of certain specific conditions. Paediatric orthopaedic surgeons are actively considering the pattern of regional specialisation best suited to the specialty.

Children should be anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia, with access to the relevant paediatric anaesthetic equipment.

Ideally there should be separate out-patient clinics for children. Where there are no separate children's out-patient clinics, a segregated area should be reserved for children and furnished appropriately.

REFERENCES

Service Requirements for Children's Orthopaedics paper by Mr A Catterall for BSCOS.

Training in Children's Orthopaedics paper by Mr A Catterall for BSCOS.

Mr Michael J Bell

British Orthopaedic Association

Otorhinolaryngology

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

Children are normally treated by system specialists and generalist ENT surgeons rather than specifically paediatric ENT surgeons. There are a small number, fewer than six, of purely paediatric ENT surgeons in the UK. In most general units, paediatric work forms 30-50% of the total volume of work and most ENT surgeons are involved in general paediatric ENT such as the management of upper airway problems (tonsillitis, adenoiditis and sinusitis) and otological problems such as glue ears. However, one surgeon is designated as the clinical lead for paediatric ENT in each unit and will care for, or refer to a tertiary centre, the more complex aspects of otolaryngology such as laryngotracheal airway management (and the other subjects listed under section 7 on higher surgical training.)

1.2 Hospitals

General paediatric ENT is distributed evenly between teaching hospitals, specialist paediatric units and DGHs. There are a few tertiary units in the UK which provide an appropriate concentration of experience for specialist work: the Royal National Throat, Nose and Ear Hospital; Great Ormond Street and St Thomas's Hospital in London; Glasgow; Sheffield Children's Hospital; Alder Hey Hospital in Liverpool; Queens University Medical Centre in Nottingham; Birmingham Children's Hospital; and Booth Hall/St Mary's Hospital in Manchester.

1.3 Workload

Age

There are no guidelines but referral to specialist units is condition-specific rather than age-specific. In non-specialist units the management of children of less than two years depends on the provision of specialist paediatric anaesthesia and, in certain conditions, the availability of paediatric intensive care.

Scope of Practice

■ General

Management of upper airway problems such as tonsillitis, adenoiditis and sinusitis, and otological problems such as glue ear and chronic suppurative otitis media

■ Specialist

- management of routine ENT disease in the child with developmental, immunologic and other systemic disease;
- congenital ear surgery;
- special paediatric audiology;
- bone-anchored hearing aids;
- cochlear implants;
- assessment of management of chronic airway disease;

-
- paediatric endoscopy (rhinoscopy, bronchoscopy, oesophagoscopy, microlaryngoscopy);
 - management of laryngotracheal stenosis;
 - choanal atresia repair;
 - management of congenital and developmental malformation of the head and neck;
or
 - head and neck tumour surgery (benign: eg parotid and malignant).

Day Surgery

The proportion of children receiving treatment on a day-case basis in the different age groups is as follows:

- Six months to four years: 72%
- Five to nine years: 64%
- Ten to fourteen years 50%

Emergency Workload

For a general (DGH) unit emergencies constitute less than 5% of the total paediatric ENT admissions and consist either of secondary bleeds from operations (tonsillectomy, adenoidectomy) or of acute mastoiditis and stridor.

Emergencies are likely to be:

- CEPOD 1: eg acute upper airway obstruction from acute supraglottitis and inhaled foreign bodies; post-operative bleeding into the airway; external trauma to the larynx or face.
- CEPOD 2: eg upper airway obstruction stable enough to be transferred to a tertiary centre, bilateral choanal atresia.

1.4 Paediatric Support Services

Paediatricians

On-site paediatric medical support is always available except in three specialist ENT hospitals where special arrangements are in force for 24-hour cover from the nearest paediatric unit. It is essential for paediatric support to be available for any in-patient paediatric ENT unit.

Nursing

The need for children to be cared for by children's nurses is recognised but this is not always the case at present.

Anaesthetists

Anaesthetists with paediatric training and with a significant continuing paediatric caseload treat children in the majority of centres but this is not yet universal. In non-specialist units the management of children under two depends on the availability of specialist paediatric anaesthesia.

Emergencies Where a Paediatric Specialist is Not Available

All ENT in-patient paediatric work should be covered for emergencies 24 hours a day by an in-house ENT team.

Cover for Post-operative Complications (Including Emergencies)

These complications may be common or uncommon. Common complications, such as post-operative haemorrhage, are dealt with by anaesthetists with paediatric training and the ENT team. Uncommon complications, such as cardiopulmonary resuscitation, are dealt with by ENT staff and anaesthetists with paediatric advanced life support training and the covering paediatricians.

1.5 Paediatric Facilities

Out-patients

Where practical, separate paediatric ENT clinics exist. In some centres a separate area of the clinic is furnished for children. However, for reasons of clinic space, timetabling, availability of support staff and, in particular, the numbers of ENT consultants in the UK, this is not practical in most centres at present. There are separate hearing and speech clinics for young children in many ENT units; children under three with hearing and speech problems should be referred to such clinics.

Wards

Children can be admitted to general paediatric surgical wards, general paediatric wards, and specialist paediatric ENT wards in large university centres such as Nottingham and specialised units such as GOS, Alder Hey, Sheffield Children's Hospital and the Royal National Throat, Nose and Ear Hospital. It is the view of the British Association of Otolaryngologists – Head and Neck Surgeons that where there is choice between an ENT paediatric ward staffed by ENT-trained nurses and a paediatric ward staffed by children's nurses, the ENT paediatric ward is a safer environment for routine cases with no developmental or systemic disease.

Operating Lists

Separate child lists are present in some centres, however they are not usually feasible. Children make up a very large proportion of each list and there are insufficient beds to accommodate the number of paediatric admissions needed to fill a dedicated paediatric list. In addition, because of the need for an overnight stay, these children are unsuited to day-case surgery. Separate children's lists are easier to arrange in day-surgery units and do exist.

Most general lists have more children than adults and children are always grouped at the beginning of each list so are separated from adults, allowing specialist anaesthetic and recovery staff to be deployed appropriately.

Theatres

Specialist paediatric theatres for ENT are limited to paediatric hospitals.

1.6 Special Needs

Close links with cardiology, respiratory medicine, paediatric ICU, neonatology, paediatric oncology, paediatric anaesthesia, maxillofacial and plastic surgery, psychologists, speech and language therapists, dieticians and geneticists are needed.

There is also a need for separate hearing and speech clinics for young children in many ENT units which should have paediatric-orientated facilities and staff.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training (Six Years)

All trainees have exposure to paediatric ENT work in the course of their training. This is monitored by the SAC. Only those trainees who wish to develop a specialist interest in paediatric ENT will definitely rotate to a recognised specialist unit for paediatric otolaryngology during their fifth or sixth year. Curricula for both general and specialist training in paediatric otolaryngology were prepared, approved by the SAC in Otolaryngology in November 1998, and sent to the Intercollegiate Examinations Board.

Training in paediatric ENT includes:

- management of routine ORL disease in the child with developmental immunologic and other systemic disease;
- congenital ear surgery;
- special paediatric audiology;
- bone anchored hearing aids;
- cochlear implants;
- assessment and management of chronic airway disease;
- management of laryngotracheal stenosis;
- choanal atresia repair; and
- management of congenital and developmental malformation of the head and neck.

2.2 Intercollegiate Assessment

Since April 1999 there has been a separate mandatory paediatric viva in the intercollegiate exam.

2.3 Specialist Paediatric Surgical Associations – UK/Europe/World

The British Association for Paediatric Otorhinolaryngology (BAPO) is our national association. In 1998 it had a membership of 120: 60 of the 450 UK consultants, 60 of the 170 specialist registrars. It holds annual academic meetings.

There is also the European Society for Paediatric Otolaryngology (ESPO). There are two UK council members, including the president elect. All members of BAPO are automatically members of ESPO. ESPO holds biennial meetings.

There is an official paediatric section of the International Federation of Otolaryngological Societies (IFOS), with a UK representative.

There are two US societies, the American Society of Paediatric Otolaryngology and the Society for Ear Nose and Throat Advances in Children, which UK members attend.

2.4 CPD

BAPO holds an annual one-day meeting aimed at trainees and consultants. There is no formal arrangement for paediatric sections in British Association of Otorhinolaryngology – Head and Neck Surgeons and Royal Society of Medicine meetings or the British Academic Conference in Otolaryngology but paediatric topics are sometimes included. There are joint Royal Society of Medicine meetings with paediatricians, and the last one was extremely well-attended by ENT surgeons.

The annual Glasgow/Newcastle two-day course of paediatric ENT has been running since 1994. There is an annual three-day course at Great Ormond Street in specialist paediatric ENT, an annual Birmingham *Bone-Anchored Hearing Aid* course and several centres run paediatric cochlear implant courses. There could be further provision.

The two-yearly ESPO meetings are well-attended by UK delegates.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

Improved facilities for audiology in younger children.

Further CME provision is highly recommended, particularly in paediatric advanced life support training, although there are no plans at present to make it mandatory.

Some facilities should be concentrated in a limited number of centres, eg cochlear implants, bone-anchored hearing aids, bone-anchored prostheses. This is encouraged by the need for a team approach in these clinical areas, by peer pressure (eg the British Cochlear Implant Group) and by the purchasers.

Clinical guidelines for management of the most common paediatric ENT conditions are being developed by BAPO; draft versions of these guidelines are being examined by the BAPO council, for presentation to the BAO-HNS.

Children's nurses with specialist ENT qualifications are needed. In future, children should be nursed on children's surgical or, failing that, medical wards by nurses who are both registered children's nurses and who have received ENT surgical nursing training.

Children should be anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia who have access to the relevant paediatric anaesthetic equipment

Ideally there should be separate out-patient clinics for children. Where there are no separate children's out-patient clinics, a segregated area should be reserved for children and furnished appropriately.

REFERENCES

Statements of Clinical Effectiveness in Otorhinolaryngology, British Association of Otorhinolaryngologists – Head and Neck Surgeons, 1998.

Mr John M Graham

British Association of Otorhinolaryngologists – Head and Neck Surgeons

Paediatric Surgery

1 CURRENT PROVISION OF SERVICE

1.1 The Surgeons

All consultant specialist paediatric surgeons confine their activity full-time to the care of children, undertaking specialist as well as general paediatric surgery. There is a trend towards increasing sub-specialisation within paediatric surgery, for example, upper and/or lower gastrointestinal surgery, oncological surgery, paediatric urology, thoracic surgery and hepatobiliary.

At present there are 114 consultant paediatric surgeons practising in the NHS. This includes two full professors (London (GOS) and Liverpool (Alder Hey)) and nine readers/senior lecturers (London (GOS) and Lewisham; Oxford; Birmingham; Liverpool; Manchester; Leeds; Newcastle; Glasgow).

1.2 Hospitals

There are 12 free-standing children's hospitals: Booth Hall (Manchester); Royal Manchester (Pendlebury); Royal Liverpool (Alder Hey); Sheffield, Birmingham; Bristol; Great Ormond Street (London); Royal Hospital (Glasgow); Royal Hospital (Edinburgh); Royal Belfast; Our Lady's Hospital (Dublin); and Aberdeen.

There are 15 tertiary units within university teaching hospitals: Southampton; Cambridge; Oxford; Nottingham; Leeds; Newcastle; Cardiff; Leicester; Manchester (St Mary's); Dublin (Temple Street); King's College; Chelsea and Westminster; Royal London; St George's and Lewisham.

There are also three units in the large DGHs in Hull, Norwich and Brighton.

1.3 Workload

Age

Birth to 12-18 years (upper range varies in different units). Involvement in and counselling of prenatal diagnosis.

Scope of Practice

■ General

Elective: Herniotomy, hydrocoele, orchidopexy, circumcision, umbilical hernia, pyloromyotomy.

Emergency: Appendicitis, torsion of testes, irreducible hernia, minor trauma, intussusception.

- **Specialist**

Neonatal surgery, delayed reconstruction of congenital anomalies, eg Hirschsprung's disease and anorectal anomalies, management of straightforward surgical conditions in association with other medical conditions, paediatric oncology, paediatric urology.

Day Surgery

Approximately 60% of the general paediatric surgical conditions can be treated as day cases. These patients may be accommodated in dedicated children's day-care units or in an adult unit given over completely for the use of children on a sessional basis.

Emergency Workload

Minor or major trauma including care of the multiple injured child and emergency paediatric surgery forms more than 50% of the workload of most units. With the exception of Great Ormond Street Hospital, all the units have on-site A&E departments.

Supra-regional Services

Biliary atresia – King's College Hospital, Birmingham Children's Hospital and Leeds.

Exstrophy of the bladder – Great Ormond Street and Manchester (pending).

1.4 Paediatric Support Services

Paediatricians

The children are admitted under the paediatric surgeon but in all units there are close working links with the paediatricians on-site. In some neonatal units the patients are under joint care with a neonatologist or intensivist.

Nursing

All children are cared for by children's nurses.

Anaesthetists

All centres have specialist paediatric anaesthetists.

Emergency Cover for Post-operative Complications

Paediatric surgery is a service provided largely by consultants – who maintain a high level of involvement in every aspect of emergency cover. In most units there are middle grade or basic surgical trainees attached to the unit who provide an on-call rota. In some units cover is provided from the general surgical or paediatric rota.

1.5 Paediatric Facilities

Out-patients

Separate children's out-patient clinics are available. In some units specialty combined clinics are run with respective specialists, for example oncology clinics. Spina bifida clinics are run with neurosurgeons and orthopaedic surgeons. Vascular anomalies clinics are run with plastic and orthopaedic surgeons and dermatologists.

Wards

The majority of units have dedicated paediatric surgical wards. In some smaller units wards are shared with paediatric medical patients and are age-limited.

Operating Lists

There are dedicated children's lists.

1.6 Special Needs

Due to the complexity of specialist paediatric surgery and general surgery in children with other complex associated conditions, it is essential that each unit has a level 2-3 paediatric intensive care facility on site.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Training

The SAC in Paediatric Surgery supervises a six-year training programme for all higher surgical trainees. There are six training consortia comprised of at least two units. Each trainee spends three years in two different centres within the consortia. The trainees are encouraged to spend a year abroad in an SAC-recognised unit or a year in research if this was not done prior to entering higher surgical training. All trainees gain experience in the whole spectrum of paediatric surgery including paediatric urology. This may be acquired in a unit devoted solely to paediatric urology or where there is a major commitment to urology.

Trainees are encouraged to spend six months in neonatology or in paediatric intensive care prior to entering higher surgical training.

2.2 Intercollegiate Assessment

The intercollegiate examination in paediatric surgery may be taken after a satisfactory year four assessment. The examination consists of:

- Clinical examination including a section on communication skills.
- Three *vivas* on neonatal surgery, urology and general paediatric surgery, including a discussion of publications and basic sciences.
- A spot test using slides to test decision-making and diagnostic skills.

2.3 Specialist Paediatric Association

All consultant paediatric surgeons are members of the British Association of Paediatric Surgeons. The Association has an international membership and holds an annual international congress attended by 300-400 delegates. A second meeting is held only for the UK members thus enabling each UK member to attend at least one meeting per year.

2.4 Continuing Professional Development

There are several meetings and workshops held by the various units throughout the year and these are granted CPD approval, for example: an annual *Simpson-Smith Symposium*

and Memorial Lecture Lecture at Great Ormond Street, and bi-annual *Rickham Symposium and Lecture* in Liverpool as well as various courses in paediatric gastroenterology, urology and endoscopy.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

There should be either regional or sub-regional centres with at least five paediatric surgeons each servicing a population of 250,000. There should be one paediatric urologist and four paediatric surgeons, each developing a sub-specialty with appropriate clinics. These units should be on a single site and out-reach clinics and day surgery should be developed where appropriate.

All surgeons should have undertaken the *Advanced Paediatric Life Support (APLS)* course .

REFERENCES

Surgical Services for the Newborn, May 1999, British Association of Paediatric Surgeons and The Royal College of Surgeons of England, London.

British Association of Paediatric Surgeons, *A Guide for Purchasers and Providers of Paediatric Surgical Services* (1995) – currently being revised.

Professor Lewis Spitz

British Association of Paediatric Surgeons

Plastic Surgery

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeons

There are currently about 225 consultant plastic surgeons working in the NHS. Almost all plastic surgeons are involved in the management of children. General plastic surgical practice of the pattern undertaken by the majority of plastic surgeons includes the management of trauma and the treatment of common congenital and vascular anomalies.

Within the specialty it is usual for surgeons to sub-specialise in the treatment of particular conditions across the paediatric and adult age range. Very few plastic surgeons specialise specifically in paediatric plastic surgery. However, children figure prominently in some areas of sub-specialisation. For example, surgeons with a major interest in cleft lip and palate or genital surgery operate on a larger number of children.

1.2 Hospitals

Plastic surgery functions largely on a hub and spoke principle. Plastic surgery units are generally located within university hospitals or DGHs but some relatively isolated plastic surgery units remain. Most are the subjects of either negotiated or planned transfer. Larger units have a staffing establishment of between four and ten plastic surgeons, each with a sub-specialty interest.

Most major units offer a comprehensive service to children with specialists available in all the main sub-specialty areas. Specialist children's hospitals also offer plastic surgery services.

Plastic surgery in children is undertaken both in the larger (hub) and smaller (spoke) units according to the complexity of the surgery and the level of paediatric, anaesthetic and intensive care facilities required.

1.3 Workload

Age

This specialty is based on techniques rather than age or systems.

Scope of Practice

■ General

Trauma (particularly facial and hand trauma), burns, common congenital deformities (such as bat ears), and the management of skin lesions and vascular anomalies.

■ Specialist

Cleft lip and palate surgery, major congenital hand surgery, hypospadias surgery and significant burns in children. Children who have severe burns necessitating paediatric intensive care require both expert burns care and expert intensive care, and these may not be available at one site. The British Burns Association is currently undertaking

a review of paediatric burns care in association with the DoH and looking particularly at burns requiring intensive care.

Day Surgery

In the age range 0-14 approximately 30% of paediatric plastic surgery is undertaken on a day-case basis.

Emergency Workload

Emergencies comprise a high proportion of paediatric plastic surgery with facial and hand trauma and burns being the most common. In addition there are also a number of lower limb injuries and major craniofacial and other injuries. The proportion referred to any one unit depends on the other facilities offered within the hospital and patients are often managed on a multidisciplinary basis.

1.4 Paediatric support services

Paediatricians

Children are usually admitted under a plastic surgeon. Not all plastic surgery units which treat children have on-site, 24-hour paediatric medical support. In units where 24-hour support is not available on site, cover is provided from a neighbouring paediatric unit. Plastic surgical units are increasingly located in large centres with a major paediatric presence.

Nursing

The need for children to be cared for by children's nurses is recognised but this is not always the case at present. It is also desirable that nurses caring for plastic surgery patients (including children with burns) have specialist plastic surgery experience and, if possible, certification.

Anaesthetists

Currently, many anaesthetists who anaesthetise children also anaesthetise adults. It is important that children undergoing both minor and complex procedures are anaesthetised by specialist paediatric anaesthetists with the appropriate level of experience.

Emergency Cover for Post-operative Complications

Children who have had operations that may result in post-operative airway obstruction should be appropriately monitored and on-call staff should have adequate paediatric and resuscitation experience.

1.5 Paediatric Facilities

Out-patients

Separate children's out-patient clinics are available in some hospitals and attempts are made to provide child-centred facilities, particularly in newer plastic surgery units.

Wards

If children are required to be admitted for general paediatric plastic surgery, it is usually possible for them to be admitted to a children's surgical ward.

Operating Lists

Except in children's hospitals, children are usually operated on as part of a general operating list but they tend to be grouped together at the beginning of such lists.

1.6 Special Needs

Paediatric plastic surgery has links with many other surgical and non-surgical disciplines. For example, cleft lip and palate surgeons have close links with orthodontists, speech and language therapists, oral and maxillofacial surgeons and others. Those involved in genital reconstruction have close links with paediatric nephrologists and urologists. Surgeons involved in congenital hand surgery work closely with orthopaedic surgeons and hand therapists. Those involved in the care of paediatric burns work closely with specialists in many paediatric specialties including intensive care.

Facilities for the care of adolescents need to be provided. Seamless ongoing care from childhood to adult life is essential for many conditions such as cleft lip and palate. Special arrangements are necessary where treatment has been in a children's hospital.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Training

The SAC requirements for higher specialist training in plastic surgery indicate that in years one and two all plastic surgery trainees should receive basic sub-specialty training in paediatric plastic surgery, including the general principles of cleft lip and palate management, the general principles of craniofacial surgery, the general principles of hypospadias management, the general principles of congenital hand surgery, the management of other congenital conditions such as prominent ears, and the management of skin and vascular anomalies.

During the middle years of training (years three and four) trainees gain further experience in the sub-specialties. In the final years of training (years five and six), trainees have the opportunity to undertake more advanced sub-specialty training. Only those surgeons who have undertaken sub-specialty training in years five or six or post-CCST would be considered to have had the appropriate training to deal with complex paediatric conditions such as the management of major burns in children, cleft lip and palate care and management of congenital conditions such as hypospadias, the management of major congenital hand surgery and craniofacial surgery.

2.2 Intercollegiate Assessment

The intercollegiate specialty examination in plastic surgery does not include a section or option devoted specifically to paediatric plastic surgery. However the paediatric aspects of the specialty are covered in the parts of the examination dealing with cleft and

craniofacial deformities, other congenital and acquired deformities of the head and neck, congenital and acquired deformities of the trunk, limbs and other sites where provision of skin is a component, and congenital deformities of the urogenital system. The examination also includes the management of trauma and burns and ethics (which would include ethical problems related to children). It is therefore assumed that a trainee who has successfully completed year four in higher surgical training would be expected to have covered these topics to an adequate, though not sub-specialist, level.

2.3 Specialist Paediatric Surgical Associations

Most plastic surgeons belong to the British Association of Plastic Surgeons (BAPS). The BAPS has a Cleft Group which meets annually. Other sub-specialty associations such as the Craniofacial Society of Great Britain (a society concerned with cleft and other craniofacial deformities), the British Society for Surgery of the Hand and the British Burns Association also have a strong paediatric input.

2.4 Continuing Professional Development

BAPS runs a series of advanced courses in plastic surgery for consultants and higher surgical trainees, with three two-day meetings annually over a four-year cycle. Virtually all of these courses include a significant element of paediatric plastic surgery. The BAPS Cleft Group meets annually, either in the units in the UK or abroad. The twice-yearly scientific meetings of BAPS always have a significant paediatric component and local education schemes within units or regions have a strong emphasis on paediatric plastic surgery. Paediatricians and paediatric intensivists may add to the education of both trainees and consultants in paediatric care. Many consultants and trainees are receiving accreditation from *Advanced Trauma Life Support*® (ATLS) and *Advanced Paediatric Life Support* (APLS) courses.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

Within the context of NHS funding and the current organisation of units, the need to develop condition-specific sub-specialisation is more important than the need to develop age-specific sub-specialisation. Isolated plastic surgery units pose particular problems but these are being rapidly moved to more major units. There is a trend toward concentrating work in the paediatric sub-specialties in the hands of fewer surgeons. This may involve cross-referral between consultants in a unit.

BAPS supports the concept of higher volume operators and this does have major implications for the future organisation of plastic surgery units. Adequate numbers of many of the congenital deformities will only be found in major centres and the Association supports a move towards hospitals serving larger populations than those currently served by most DGHs. Plastic surgery units should be sited in such centres. In certain conditions and in some geographical areas there may be a case for intermediate volume operators but the Association would not support low-volume operators in complex conditions. Paediatric plastic surgery is becoming increasingly concentrated the hands of surgeons

with a special interest in the care of particular conditions who treat a substantial number of children.

Children should be anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia, and who have access to the relevant paediatric anaesthetic equipment.

Since almost all plastic surgeons are involved in the care of children, assessment at intercollegiate level should be mandatory in the form of a paediatric plastic surgery *viva*.

Ideally there should be separate out-patient clinics for children. Where there are no separate children's out-patient clinics, a segregated area should be reserved for children and furnished appropriately.

REFERENCES

Plastic Surgery in the British Isles – Present and Future, BAPS, December 1994.

Guidelines on Treatment of Cleft Lip and Palate, The Royal College of Surgeons of England Audit Group, 1990.

Clinical Standards Advisory Group Report – Cleft Lip and Palate, 1998.

A Protocol of Cleft Care, BAPS, 1994.

Plus general references such as the RCPCH Children's Surgical Liaison Group report, *Purchasing Health Services for Children and Young People* (RCPCH) and the recent document on commissioning of specialist services.

Mr Brian C Sommerlad
British Association of Plastic Surgeons

Urology

1 CURRENT PROVISION OF SERVICES

1.1 The Surgeon

Disorders of the genito-urinary tract comprise a substantial proportion of the surgical workload of childhood. In 1998, British consultant adult urologists were surveyed to assess the extent and nature of their role in the care of children. The survey findings indicated that majority of district hospital urologists (87%) treat children but their paediatric practice is broadly confined to routine elective procedures of a minor/intermediate complexity. Only a minority of urologists in teaching hospitals (23%) treat children and their involvement is largely of a collaborative nature. Specialist paediatric urology is concentrated in tertiary centres in the hands of full-time paediatric urologists or paediatric surgeons with a major interest in paediatric urology.

1.2 Hospitals

Routine urological surgery in children is undertaken in most district hospital departments of urology. Infants and older children with more complex problems are managed in specialist tertiary centres. London has four full-time paediatric urologists. Manchester and Birmingham each have two full-time paediatric urologists. The following centres each have one paediatric urologist: Leeds, Liverpool, Southampton and Bristol.

The regional paediatric surgical centres staffed by one or more paediatric surgeons with a major interest in paediatric urology are: Newcastle; Sheffield; Nottingham; Oxford; Cambridge; Cardiff; London North West; London South East; London South West; Glasgow; Edinburgh; Aberdeen; and Belfast.

1.3 Workload

Age

The British Association of Paediatric Urologists recommends that all children under five should be referred to a specialist paediatric urological or surgical unit – ‘although non-specialist paediatric urology for children in this age group may be provided at a DGH where staff and facilities meet the criteria for children’s surgery’.

Scope of Practice

■ General

Urological disorders of minor or intermediate complexity include: phimosis, undescended testis, hydrocele/hernia, urinary tract infection and incontinence. All district hospital urologists manage testicular torsion and two-thirds treat undescended testes. In contrast, only 5% of DGH urologists treat proximal hypospadias and even fewer manage prenatally detected hydronephrosis. Phimosis, testicular undescended and hydrocele/hernia are also managed by general surgeons.

■ **Specialist**

Conditions requiring treatment by a paediatric specialist include hypospadias, hydronephrosis, ureteric duplication, vesicoureteric reflux, posterior urethral valves, genitourinary tumours, exstrophy/epispadias, intersex, neuropathic bladder and laparoscopic surgery including investigation of the impalpable testis.

Day Surgery

'Non-specialist' procedures such as circumcision and orchidopexy represent the bulk of the paediatric urological workload in DGHs. In healthy children these procedures are ideally suited to day-case surgery. An estimated 75-90% of elective DGH urological practice can be undertaken on a day-case basis.

Emergency Workload

The level of emergencies is low, eg acute scrotal pathology – predominantly in older children or adolescents – occasional GU trauma.

1.4 Paediatric Support Services

Paediatricians

Virtually all DGH urologists (98%) have paediatric medical support on site. Middle grade cover is generally provided by urological SpRs, paediatric (medical) SpRs and SHOs. In specialist units middle grade cover is provided by SpRs in paediatric surgery or urology.

Nursing

Some 97% of urologists surveyed reported that their paediatric patients were nursed by children's nurses. Specialist units are staffed according to the recommendations from the DoH (*Welfare of Children and Young People in Hospital*, 1991). Paediatric urological nursing is emerging as a nursing discipline with its own national and international nurse specialist associations.

Anaesthetists

Children treated in DGHs are generally anaesthetised by non-specialist anaesthetists whose clinical sessions are largely devoted to adult anaesthesia. However, sub-specialisation in paediatric anaesthesia is developing at district hospital level.

Specialist centres are staffed by paediatric anaesthetists, ie anaesthetists with the majority of their clinical sessions in paediatric anaesthesia.

Emergencies Where a Paediatric Specialist is Not Available

Paediatric urology generates a low volume of emergency work. Complex cases are mainly referred to specialist centres. Testicular torsion is more appropriately managed at DGH level in view of the urgency of surgical intervention.

Emergency Cover for Post-operative Complications

This is generally shared between urological junior and middle grade staff (often with input from general surgical trainees to meet rota requirements) combined with input from paediatric middle grade staff. Problems can arise if adult urological trainees are unfamiliar with paediatric fluid requirements, etc, whilst paediatricians trained in paediatric medicine may be unfamiliar with the particular problems arising from surgical complications.

1.5 Paediatric Facilities

Out-patients

Most children are seen alongside adults in clinics devoted predominantly to adult urology. Fewer than 20% of urologists hold out-patient clinics dedicated to paediatrics. In specialist units, children are seen in dedicated paediatric clinics.

Wards

All urologists admit children to dedicated paediatric surgical or mixed paediatric medical/surgical wards. No children are admitted to adult wards although the picture is less clear with adolescents. In specialist units children are nursed on paediatric surgical or paediatric urological wards.

Operating Lists

Approximately one-third of DGH urologists have day-case lists dedicated to children. In tertiary centres which do not have a full-time paediatric urologist, paediatric urology cases are interspersed with general paediatric surgery.

Theatres

In DGHs, operating theatre facilities are shared between adults and children although, in some hospitals, designated operating lists are reserved for paediatric cases.

Operating theatres in dedicated children's hospitals are used solely by children. In centres where paediatric surgery is provided in a multidisciplinary hospital, operating theatres are used for adult surgery when not in use for paediatrics.

1.6 Special Needs

At DGH level the main links are with local paediatricians and radiologists. Specialist paediatric urologists work closely with paediatric nephrologists, paediatric endocrinologists, paediatric oncologists and transplant surgeons. Children with stone disease and certain other uncommon disorders benefit from collaboration between paediatric urologists and adult endourologists, reconstructive urologists and interventional radiologists. Access to high-quality diagnostic imaging (including conventional radiology, nuclear medicine and MRI) is essential.

The requirement for continuity of follow-up from paediatric age group to adolescence is low – an estimated 5% of patients. For young adults with conditions such as spina bifida, bladder exstrophy and congenital adrenal hyperplasia quality of care is greatly enhanced

by continuity of follow-up and transfer to an adult urologist with an interest in reconstructive surgery.

2 TRAINING, EDUCATION AND ASSESSMENT

2.1 Higher Surgical Training

General

Paediatric urology forms part of the core curriculum for all urological trainees. A two-day national training course is held annually under the auspices of the British Association of Paediatric Urologists (BAPU).

The SAC in Urology and the BAPU are considering how best to incorporate a period of formal training in the relevant aspects of operative paediatric urology into training rotations.

Specialist

Most paediatric urologists have been trained primarily in paediatric surgery. Sub-specialty training in paediatric urology has been undertaken in specialist units during latter years of the paediatric surgery training programme.

A small number of more structured programmes are planned, which should include a period in adult urology. A training post intended for SpRs proposing to specialise as full-time paediatric urologists has recently been established at Great Ormond Street.

2.3 Intercollegiate Assessment

General

The intercollegiate examination in urology (FRCS Urol) includes a mandatory oral examination in paediatric urology. The prime aim is to ensure that candidates have a safe working knowledge of the paediatric disorders encountered in DGH urological practice.

Specialist

There is no intercollegiate assessment intended specifically for paediatric urologists. The content of the intercollegiate assessment in paediatric surgery includes a substantial urological component. All candidates are required to sit a mandatory oral examination in paediatric urology.

2.4 Specialist Paediatric Surgical Associations

The British Association of Paediatric Urologists (BAPU) currently has 25 full or associate members and a growing membership. The majority of full-time paediatric urologists are also active members of international specialist groups and associations such as the European Society for Paediatric Urology and the Urological Section of the American Academy of Paediatrics.

2.5 CPD

General

The annual scientific meetings of the British Association of Urological Surgeons (BAUS) and the BAPU include sessions devoted to papers on paediatric urology. Postgraduate symposia held in conjunction with the BAUS annual meeting regularly feature paediatric topics of interest to adult urologists.

The national training course in paediatric urology organised by the BAPU is intended primarily for specialist registrars in urology and paediatric surgery but is also attended by consultants.

Specialist

BAPU holds an annual one-day meeting. However the main source of CPD for full time paediatric urologists is at an international level, eg European Society for Paediatric Urology (substantial British input and involvement) and the Urological Section of the American Academy of Paediatrics.

3 FUTURE IMPROVEMENTS AND RECOMMENDATIONS

Training

The SAC in Urology and BAPU are considering how specialist registrar rotations could be planned to include a period of structured training in the management of the common paediatric conditions encountered in DGH practice.

Specialist associations should organise one-day symposia tailored to the interests of adult consultant urologists undertaking paediatric practice (*Paediatric Urology for the Adult Urologist*).

Workload and Service Provision

Adult urologists will retain an important role as providers of routine urological services for children, predominantly in district hospitals. Better training, consultant sub-specialisation and rationalisation of services will enhance the quality of care provided to children.

The number of specialist paediatric urologists will increase as consultant expansion in paediatric surgery enables paediatric surgeons with a major interest in paediatric urology to switch to full-time paediatric urology. In addition, a small number of new consultant posts will be established in major centres where the growing workload justifies additional paediatric urologists.

BAPU has endorsed the concept of supra-regional specialisation for the treatment of bladder exstrophy, which will be centred on two specialist units in England and Wales.

The pattern of service delivery will increasingly be based on hub and spoke models.

Children should be anaesthetised by anaesthetists with recognised paediatric training and a regular commitment to paediatric anaesthesia, and who have access to the relevant paediatric anaesthetic equipment.

Ideally there should be separate out-patient clinics for children. Where there are no separate children's out-patient clinics, a segregated area should be reserved for children and furnished appropriately.

REFERENCES

Fraser M, Thomas DFM: *Urological Services for Children: Findings of a UK Survey* Presentation to British Association of Urological Surgeons Annual Meeting, Glasgow 1999.

British Association of Paediatric Surgeons, *A Guide for Purchasers and Providers of Paediatric Surgical Services* (1995) – currently being revised.

Mr David FM Thomas

British Association of Urological Surgeons

Specialist Paediatric Surgical Groups and Societies

British Paediatric Cardiac Association (a sub-group of the British Cardiac Society)

Association for European Paediatric Cardiology

The British Association for Paediatric Otorhinolaryngology

The European Society for Paediatric Otolaryngology

The British Paediatric Neurosurgical Group

European Society for Paediatric Neurosurgery

International Society for Paediatric Neurosurgery

The British Association of Oral & Maxillofacial Surgeons Cleft Lip & Palate Group

The British Society of Children's Orthopaedic Surgery

The British Association of Plastic Surgeons Cleft Group

British Association of Paediatric Urologists

European Society for Paediatric Urology

Urological Section – American Academy of Paediatrics

British Paediatric Accident & Emergency Group

Association of Paediatric Anaesthetists of Great Britain and Ireland

Relevant Specialist Post-graduate Nursing Courses and Qualifications

A&E Care of the Child

Burns & Plastic Surgery Nursing to Children

Nursing Children with Burns

Nursing Children undergoing Plastic Surgery

Nursing the Acutely Ill Child

Care of the Highly Dependent Child

Managing Pain

Liver Disorder Transplant

*Hepatology and Liver Transplant

*Advanced Trauma Care

* Paediatric Intensive Care

Intensive Care of the Newborn

*Quality Care through Infection Control and Wound Management

* Neurosurgical

Cardiothoracic

Renal (which includes some urology)

*Stoma Care

* ENT

* open to children's nurses but not specifically geared to paediatric subspecialties

A&E	Accident and Emergency
ASA	American Society of Anesthesiologists (Classification of Physical Status)
APLS	Advanced Paediatric Life Support
CME	Continuing Medical Education
CPD	Continuing Professional Development
CCST	Certificate of Completion of Specialist Training
CT scan	Computerised tomography
DGH	District General Hospital
ENT	Ear, Nose and Throat surgery / Otorhinolaryngology / Otolaryngology
FCE	Finished Consultant Episode (a finished consultant episode is defined as a period of in-patient care under one consultant within one health care provider)
FRCS	Fellow of the Royal College of Surgeons
GOS	Great Ormond Street Hospital for Children, London
NCEPOD	National Confidential Enquiry into Perioperative Deaths
NHS	National Health Service
PICU	Paediatric Intensive Care Unit
RCPCH	Royal College of Paediatrics and Child Health
RCS	Royal College of Surgeons of England
RSCN	Registered Sick Children's Nurse (now Children's Nurse)
SAC	Specialist Advisory Committee (of the Joint Committee on Higher Surgical Training)

Neonate = From birth to the 44th week of gestational age

Infant = Up to one year of age

Child = From infancy to puberty