Children's Surgery: A national survey of consultant clinical practice

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Children's Surgery: A national survey of consultant clinical practice

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Competing interest statement

All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.

Contributors

D.G. Mason - developed the idea for the study

H Shotton - undertook the analysis of the data

K Wilkinson - reviewed the data and advised on the study

M J Gough - reviewed the data and advised on the study

R Alleway - set up the information system to collect the data

H Freeth - edited and reviewed the data

M Mason, Chief Executive of NCEPOD - edited the final document and acts as guarantor.

Ethical approval

Ethical approval was not sought for this work as it is a review of clinical opinion of the clinician's practice and did not involve patients. All authors are independent of the funding body and only NCEPOD staff had access to the data.

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Article summary

Article focus:

- Do surgeons and anaesthetists involved in caring for children feel that the service provided is adequate?

Key messages:

- This study highlights current deficiencies in postgraduate surgical and anaesthetic training, in delivery of CPD and in NHS provision of paediatric surgical facilities

Strengths and limitations:

- The strengths of this study are that it was self-reported data by clinicians involved in the care of children. Anonymity allowed for great honesty and surgeons and anaesthetists from all hospitals (exc. Scotland) were invited to participate, there was no selection applied. The limitation was that anonymity prevented exact participation to be known.

Abstract

Objectives - To survey clinical practice and opinions of consultant surgeons and anaesthetists caring for children to inform the needs for training, commissioning and management of children's surgery in the UK.

Design - The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) hosted an on-line survey to gather data on current clinical practice of UK consultant surgeons and anaesthetists caring for children.

Setting - The questionnaire was circulated to all hospitals and Medical Royal Colleges covering England, Wales, Northern Ireland and the Channel Islands and was mainly completed by clinicians in District General Hospitals.

Participants - 555 surgeons and 1561 anaesthetists completed the questionnaire.

Results - 32.6% of surgeons and 43.5% of anaesthetists reported deficiencies in their hospital's facilities to provide safe paediatric services. Almost 10% of all consultants considered that their postgraduate training insufficient for current paediatric practice and 20% felt that recent Continued Professional Development failed to maintain paediatric expertise. 45.4% of surgeons and 39.2% of anaesthetists considered that the current specialty curriculum should have a larger paediatric

component. Consultants in non-specialist paediatric centres cared for younger children as emergencies than electively with many these consultants having <4 hours/week allocated for paediatric practice. Only 55.3% of surgeons and 42.8% of anaesthetists participated in any form of regular multidisciplinary review of children undergoing surgery.

Conclusions - There are many obstacles to consultant surgeons and anaesthetists providing a safe paediatric service. Post-graduate curricula must meet the needs of trainees likely to undertake paediatric practice as consultants. Trusts must ensure appropriate support for consultants to maintain paediatric skills and provide the necessary facilities for children's surgery.

What is already known on this subject:

- The majority of children's surgery in the UK is undertaken in District General Hospitals (DGHs) by surgeons and anaesthetists without a specialist paediatric practice.
- There is growing concern that DGH consultants will become deskilled in this aspect of children's practice.
- This reflects in part changes in postgraduate surgical and anaesthetic training, and thus the professional aspirations of new consultants, as well as competition generated between hospitals by commissioning.
- The views of consultants currently undertaking this work are pivotal to ensuring safe delivery of future children's surgical services.

What this study adds:

- This study highlights current deficiencies in postgraduate surgical and anaesthetic training, in delivery of CPD and in NHS provision of paediatric surgical facilities
- Suggests what might be addressed to ensure safe and effective treatment of children requiring surgery in the 21st century.

Introduction

Approximately half a million children and young people undergo surgery and anaesthesia each year in England and Wales.[1] There has been a considerable change in the delivery of surgical services for children in the United Kingdom over the last 20 years. This has resulted from the growing realisation that there is a need for concentration of clinical expertise, and workload along with specialised facilities for some children requiring surgery. This has followed numerous publications advocating high quality child centred services.[2-10] The majority of children's surgery is still undertaken in District General Hospitals (DGH) despite a gradual reduction in the range and proportion of procedures performed outside Specialist Tertiary Paediatric Centres (STPC).[1] Whilst the requirement for specialist centres to undertake more complex surgery is clearly appropriate, some of the reduction in local provision reflects changes in postgraduate surgical and anaesthetic training, and greater sub-specialisation by consultant surgeons and anaesthetists. Competition generated between hospitals by current NHS policies may also be an important factor. As a consequence there is growing concern that surgeons and anaesthetists in DGHs are becoming deskilled in the care of children.[11] Crucially, this is likely to limit their ability to manage critically ill children who present at their hospital.[12] It has been suggested that there is a risk of reaching a tipping point where the surgical and anaesthetic care of children in DGHs becomes unsustainable. Several national organisations have called for an urgent review of paediatric surgical and anaesthetic services to ensure their viability.[13,14]

Whilst most investigations into the delivery of children's surgery has focused on organisational and clinical reviews little attention paid to the views of individual clinicians about the provision of clinical care for children. In 1989 and 1999 the NCEPOD undertook a limited survey of the number of children cared for by individual consultant surgeons and anaesthetists by age.[2,15] There have been no similar surveys in the last 10 years. Consequently NCEPOD considered that a survey of current clinical practice and views of consultant surgeons and anaesthetists caring for children in the UK would be valuable to inform the future provision of these services.

Methods

An on-line questionnaire was devised to survey consultant surgeons and anaesthetists in the UK about their clinical paediatric practice. The questionnaire determined whether the consultant cared for children <16 years of age, their clinical specialty, number of years as a consultant and the category of hospital in which they worked. They were asked about the ages of children they cared for, whether they undertook multidisciplinary care reviews, audit, morbidity and mortality meetings and aspects of their clinical practice that limited their paediatric practice. Finally, their views on their postgraduate training and continuing professional development (CPD) were also determined.

Invitations and reminders to participate in the survey were sent between June-December 2010 using online adverting and e-mail communication via several routes (Association of Anaesthetists Great Britain and Ireland, Association of Surgeons Great Britain and Ireland, Royal College of Anaesthetists, Royal College of Surgeons (England), Association of Paediatric Anaesthetists Great Britain and Ireland, British Association of Paediatric Surgeons). In addition a letter was sent to medical directors of all UK hospitals informing them of the survey. Data analysis and tabulation was performed using Microsoft Excel (2003)

Results

In total 2116 questionnaires were completed by consultants who cared for children < 16 years of age (555 surgeons, 1561 anaesthetists). The majority of consultants were employed in a DGH (Table 1) with most surgeons working in general surgery (Figure 1). The median number of years in post was 11 (IQR 6-16) for surgeons and 10 (IQR 5-16) for anaesthetists.

Elective and emergency care: age of children

Consultants were asked about the minimum age that they were prepared to care for children during elective or emergency procedures. Although there was considerable variation in these ages depending on the category of hospital in which the consultants worked a common finding was that many would be prepared to care for children of a younger age as an emergency compared to that for elective procedures. This was particularly the case for consultants working in a DGH (Figures 2 and 3).

Time devoted to paediatric practice

Responders were asked to provide information on the number of 4-hour units of professional activity (PA) per week devoted to the care of children (Figures 4 and 5 indicate). In total 213/555 (38%) of surgeons and 659/1561 (42%) of anaesthetists had <1 PA allocated for the care of children. The majority of these worked in hospitals other than STPCs. In total 53/555 (9.5%) surgeons and 111/1561 (7.1%) of anaesthetists received ≥10 PAs for paediatric care whilst 70/555 (12.6%) of surgeons and 151/1561 (9.6%) of anaesthetists did not have any dedicated PAs.

Training, CPD and data collection

Consultants were asked whether their postgraduate training had adequately prepared them for their current paediatric practice. Of respondents 52/555 (9.3%) of surgeons and 139/1561 (8.9%) of anaesthetists indicated that this was not the case. Most of these had been in post for ≤10-years (35/52 (67.3%) of surgeons, 71/139 (51%) of anaesthetists). The commonest reasons for this was lack of time within their training programme (64/191, 33.5%) and insufficient emphasis (26/191, 13.6%) on paediatric care within the specialty curriculum. Further, 252/555 (45.4%)

surgeons and 612/1561 (39.2%) of anaesthetists felt that the current curriculum for their specialty should have a larger paediatric component. Table 3 indicates the proportion of training time that these respondents believed should be devoted to paediatric practice. Interestingly consultant anaesthetists suggested a greater increase in this than their surgical counterparts.

In relation to CPD, consultants were asked about the type of activity they had undertaken in the last three years that was specifically relevant to their paediatric practice (Table 4). Of these 113/555 (20.3%) of surgeons and 364/1561 (23.3%) of anaesthetists did not believe that these types of CPD had been sufficient to maintain or update their expertise in their paediatric practice. The reasons for this are shown in Table 5. Critically, the most commonly cited reason for this was a lack of funding or study leave provided by their hospitals.

Most respondents, 1719/2116 (81.2%) collected information on their paediatric practice for audit and/or appraisal purposes although this was more prevalent amongst anaesthetists (1350/1561, 86.5% versus 396/555, 71.3%). The use of a personal logbook was the most widely used method to collect this information (Table 2).

Critical factors limiting safe paediatric practice

Consultants were asked to rank factors from a provided list, in order of importance, to indicate whether they limited their ability to undertake safe paediatric practice. Factors ranked among the 3 most important by each respondent were assigned a score of 3 (most important), 2 (2nd most important) or 1 (ranked 3rd). Scores for each factor are depicted in figure 6. The main factors which surgeons considered as compromising safety were: the skills of their anaesthetist, the facilities in which procedures were undertaken, and the comorbidities and age of the child. Lack of hospital facilities also were considered critical by anaesthetists who also focused on comorbidities, age and paediatric workload.

Deficiencies in hospital facilities for safe paediatric care

181/555 (32.6%) surgeons and 679/1561 (43.5%) of anaesthetists believed that there were deficiencies in their hospital facilities that precluded safe practice. For both surgeons and anaesthetists these opinions were spread equally across all types of NHS hospital. Where hospitals facilities were considered unsatisfactory consultants were asked to rank these from a provided list using the same method as described earlier. A lack of adequately trained theatre and anaesthetic assistance were identified as the most critical factor by both surgeons and anaesthetists followed by inadequate organisational arrangements for the care of children and insufficient hospital management support (Figure 7).

Multidisciplinary review

Tables 6 and 7 indicate the proportion of consultants participating in any form of regular multidisciplinary team review of children subdivided by the category of hospital in which they worked. This analysis reveals that many consultants do not participate in this type of activity, particularly if they worked in a DGH. Of respondents who did undertake this type of activity the majority attended audit and morbidity meetings whilst only 82/656 (12.5%) anaesthetists and 100/303 (33%) surgeons attended preoperative multidisciplinary team meetings (Table 8).

Discussion

To our knowledge this is the first large-scale survey of the clinical practice and opinions of consultant surgeons and anaesthetists who care for children in the UK.

One of the most striking findings of this survey, with a few notable exceptions, is the similarity between the answers provided by surgeons and anaesthetists. In particular, the type of hospital in which the respondents worked and the number of years in post were similar. The majority of surgeons who completed the survey were general surgeons who also had a paediatric practice. The precise number of general surgeons with an interest in paediatric general surgery is unknown but clearly this survey represents a large number of this group's views (personal communication). Due to the poor representation of other surgical specialties care must be taken in generalising the findings of this survey.

There has been considerable debate over the last two decades about who should operate on and who should anaesthetise children in the UK.[2,15-20] Further, numerous measures have been suggested as to how consultants should obtain and maintain their basic skills and competencies; these include postgraduate training, years of experience, workload load by age of child and CPD.[12,18,21-23] In this survey we have attempted to explore some of these factors. In relation to the minimum age at which consultants would care for children, we found that many consultants from DGHs and University Teaching Hospitals (UTH) would care for children of a younger age or without limit to age as an emergency than they would for elective procedures. This is not surprising and has been reported previously by NCEPOD and the Children's Surgical Forum of the Royal College of Surgeons, England (CSF).[2,15,24] The reason for this is usually one of necessity since children of all ages may present as an emergency to hospitals that are not a STPC and which may be geographically isolated. These children could present to at a DGH where this is insufficient workload to justify a separate consultant on call provision for children. Consequently consultant surgeons and anaesthetists who receive these children, particularly out of hours, will have varying experience and there might be no alternative but to care for the child locally, at least for initially prior to transfer to a STPC e.g. severe head injury

or trauma. There is no easy solution to resolving this situation other than good cooperation and funded clinically supported arrangements between STPCs, DGHs and UTH. [12,13,22,25] Formal managed networks of care for children's surgery have been advocated as means for achieving this.[9,22,26]

While workload may be a determinate to maintaining skills and competence, time actually allocated to paediatric practice is equally important. In this survey we believed that under the new consultant contract the number of PAs for paediatric care by surgeons and anaesthetists would be easier to measure. It is clear from this survey that many consultants particularly from DGHs have less than one PA devoted to paediatric practice and the maintenance of skills and competencies will be particularly difficult for them. In these circumstances collecting as much information on paediatric practice will be essential to demonstrate experience for appraisal purposes. It is encouraging that for the group of consultants who completed this on-line questionnaire that the majority collected this information in one form or another.

Postgraduate training is the bedrock of future consultant practice. Therefore having a curriculum that is fit for purpose which includes an adequate component of paediatric training is essential. Thus it is of concern that 9.3% of surgeons and 8.9% of anaesthetists included in this survey believed that their postgraduate training had not prepared them for their current level of paediatric practice. It would appear from our survey that in those trained in the last 10 years this is a particular issue, where inadequate time and emphasis was devoted to paediatric training. Thus, it is interesting that 45.4% of surgeons and 39.2% of anaesthetist's respondents felt that the respective curriculum in their specialty should have a greater paediatric practice training component.

Continuing professional development is an essential part of consultant activity and this should be proportionate to clinical practice. This is as much true for those who care for children as any other consultant groups. In the current economic climate within the NHS there is considerable pressure on supporting professional activities of

consultants and on directed time and funding for study leave in which CPD can be conducted. In this survey approximately one in five consultant surgeons and anaesthetists did not believe that they had had adequate CPD to maintain their expertise in paediatric practice. The most common cited reasons were lack of funding and lack study leave provision. Thus, this survey has shown that there are consultant surgeons and anaesthetists who have a paediatric practice but have limited clinical exposure in terms of PA allocation but who may be required to provide an emergency service for young children and have problems in securing adequate CPD to maintain expertise in their paediatric practice.

There are many factors that may limit an individual consultant's clinical practice in relation to the care of children. In this survey surgeons considered that the skills of anaesthetic colleagues was paramount while anaesthetists considered that child's comorbidities was the most important factor. It is both understandable and important that most surgeons considered that the skills of their anaesthetics colleagues were the most important factor in limiting their ability to undertake safe surgical care. Without appropriately experienced anaesthetists in the care of children any form of surgical practice is severely restricted.

For both consultant surgeons and anaesthetists to carry out their duties safely they need to ensure that the hospital facilities are adequate. The fact that 32.6% of surgeons and 43.5% of anaesthetists considered that there were deficiencies in their hospital for the provision of a safe paediatric service is a cause of concern. This could be a counsel of perfection amongst respondents; however the fact that a recurring theme by both surgeons and anaesthetists was the insufficiency of assistants trained in paediatric care in the operating theatre environment, the insufficiency of trained children's ward nurses and inadequacies of the organisational arrangements for the care of children in their hospital cannot be ignored.

Clinical governance and audit is now embedded in every aspect of health care. Hospitals are required to adhere to guidelines on clinical governance and medical practitioners are required to undertake regular review of clinical practice.[27,28]

Furthermore Multidisciplinary team (MDT) review is an integral part of modern health care and has a valuable role in determining the best care. Thus it is of concern that only 55.3% surgeons and 42.8% of anaesthetists participated in any form of multidisciplinary review of children who undergo surgery. In the latest NCEPOD study reviewing surgery in children we found that only 50% hospitals undertook audit and/or morbidity and mortality meetings that included children. The lack of this form of clinical review by consultants who care for children seems to more of an issue in DGHs. It is just as important that the sharing of clinical experience within the forum of a multidisciplinary meeting is undertaken by consultants in DGHs where the workload of these individuals may be relatively small.

There are a number of limitations of this study. While every effort was made to identify all consultant surgeons and anaesthetists in the UK who are involved in the treatment of children <16-years of age this information is not readily available. Although total consultant numbers have been collated by the Royal Colleges of Surgeons (England) and Anaesthetists these do not identify those who have a paediatric practice. Thus, a denominator for this survey cannot be determined. As stated earlier, as many routes as possible were employed to inform consultants of the survey and encourage them to complete it. However it is possible that some respondents were those with a particular interest in the wider issues relating to children's surgery and anaesthesia and may not be representative of the entire consultant workforce. Despite this, the survey does provide an interesting insight into the practice and opinions of a group of consultant surgeons and anaesthetists working in the UK.

In retrospect, more detailed information could have been sought on various aspects of clinical practice: for example, the number of children cared for in a given time period, team working and on call arrangements. However the number of questions was balanced by an acknowledged need to keep the survey relatively short to improve compliance.

In conclusion, while one might argue whether the findings of this survey are representative of consultant surgeons and anaesthetists who care for children in the UK, it is disturbing that for this group of clinicians at several levels there were so many obstacles in place to provide a safe paediatric clinical practice. Those responsible for postgraduate training of surgeons and anaesthetists should consider reviewing the current curriculum to ensure that it truly supports the clinical care of prospective consultants, most of whom will work in DGHs, and by necessity, may well have paediatric component to the their practice. Furthermore, to ensure surgeons and anaesthetists who care for children do not feel exposed and under undue pressure to practise at the limit of their skills and competency, greater cooperation will be required between all categories hospitals that care for children who require surgery. Finally, all hospitals that provide children's surgery have a responsibility to ensure that consultant surgeons and anaesthetists who care for children are supported in their practice, that they have adequate opportunity to enhance and maintain their skills, and have the necessary facilities in place for children's care, within a clear clinical governance structure.

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Table 1. Category of hospital of surgeons and anaesthetists

Hospital Category	Surgical	%	Anaesthetic	%
District General Hospital (DGH)	320	57.7	974	62.4
Specialist Tertiary Paediatric Centre (STPC)	89	16.0	167	10.7
University Teaching Hospital (UTH)	138	24.9	391	25.0
Private Hospital (PH)	3	0.5	5	0.3
Single Specialist Hospital (SSH)	6	1.1	24	1.5
Grand Total	**555**		**1561**	

Table 2. Methods used to collect information on paediatric practice

	Surgeons		Anaesthetist	
Methods of collection	**n**	**%**	**n**	**%**
Personal log book	294	74.4	925	68.8
Hospital database	194	49.1	617	45.9
National database	66	16.7	7	0.5
Other audit	6	1.5	2	0.1
Other	6	1.5	3	0.2
Subtotal	**395**		**1344**	
Not answered	1		6	
Total	**396**		**1350**	

** Answers may be multiple*

Table 3. Proportion of the training curriculum that consultants considered should be devoted to paediatric practice of consultants that believed it should be greater

Proportion of Curriculum (%)	**Surgical**	**%**	**Anaesthetist**	**%**	**Total**
0-10	131	56.2	169	31.8	**300**
11-19	32	13.7	104	19.5	**136**
20-25	52	22.3	233	43.8	**285**
>25	18	7.7	26	4.9	**44**
Subtotal	**233**		**532**		**765**
Not answered	19		80		**99**
Total	**252**		**612**		**864**

Table 4. Type of Continued Professional Development activity for the care of children undertaken by consultants in the last three years.

	Surgeons n=555		**Anaesthetists n=1561**	
Type of Continued Professional Development	n	%	n	%
a) Presenting work	152	27.4	305	19.5
b) Course – skills update	174	31.4	911	58.4
c) Course – specific technique	77	13.9	284	18.2
d) Private Study	283	51.0	781	50.0
e) Overseas experience	68	12.3	99	6.3
f) Symposium/conference	215	38.7	704	45.1
g) Observation of clinical practice	137	24.7	488	31.3
h) Professional Examination	38	6.8	73	4.7
i) Professional society meeting	175	31.5	483	30.9
j) Other – please specify	98	17.7	107	6.9

**Answers may be multiple*

Table 5. Reasons given by consultants for insufficient Continued Professional Development (CPD) to maintain expertise in paediatric practice.

Reason given	Surgeons n=79	%	Anaesthetist n=221	%
a) Lack of funding	28	35.4	89	40.3
b) Lack of study leave	30	38.0	107	48.4
c) Do not consider this type of CPD relevant	19	24.1	20	9.0
d) Poor quality of type of CPD attended	8	10.1	35	15.8
e) Other	16	20.2	27	12.2

**Answers are multiple: Surgeons 34 not answered; Anaesthetists: 143 not answered*

Table 6. Participation by surgeons in regular multidisciplinary review of children who undergo surgery

Hospital Category	Yes	%	No	%	null	Total
District General Hospital (DGH)	134	41.8	186	58.1		320
Specialist Tertiary Paediatric Centre (STPC)	78	87.6	11	12.4		89
University Teaching Hospital (UTH)	94	68.1	43	31.2	1	138
Private Hospital (PH)		0	3	100.0		3
Single Specialist Hospital (SSH)	1	20.0	4	80.0		5
Grand Total	**307**	**55.3**	**247**	**44.5**	**1**	**555**

Table 7. Participation by anaesthetists in regular multidisciplinary review of children who undergo surgery

Hospital Category	Yes	%	No	%	Grand Total
District General Hospital (DGH)	334	34.3	640	65.7	974
Specialist Tertiary Paediatric Centre (STPC)	144	86.2	23	13.8	167
University Teaching Hospital (UTH)	171	43.6	221	56.4	392
Private Hospital (PH)	3	60.0	2	40.0	5
Single Specialist Hospital (SSH)	16	69.6	7	30.4	23
Grand Total	**668**	**42.8**	**893**	**57.2**	**1561**

Table 8. Form of multidisciplinary review undertaken by consultants

Form of review	Anaesthetist n=656	%	Surgeon n=303	%
Pre-op MDT	82	12.5	100	33.0
Audit meetings	490	74.7	197	65.0
M&M meetings	392	59.8	216	71.3
Informal discussions with Colleagues	373	56.9	174	57.4
Other	18	2.7	15	5.0

** Answers may be multiple*

Figure 1. Speciality of consultant surgeons

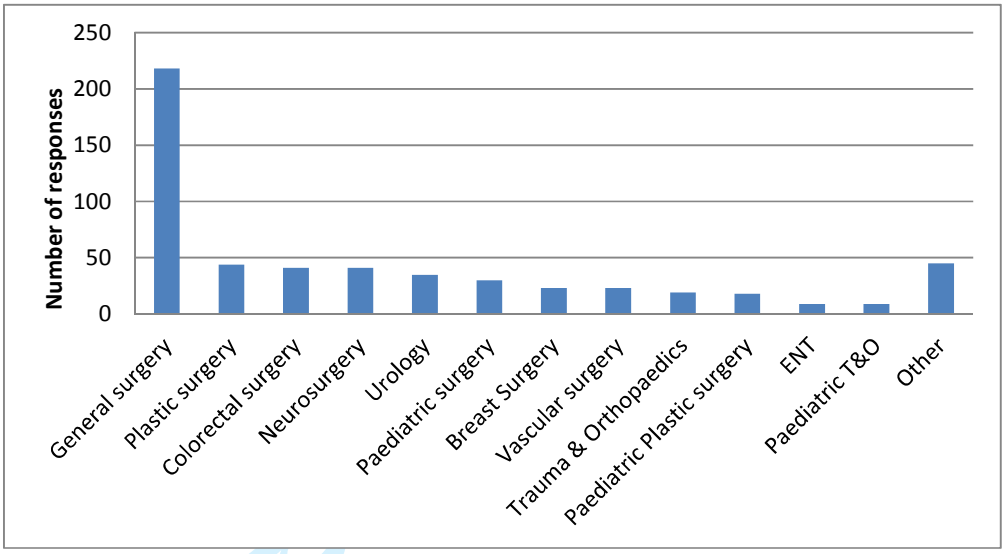


Figure 2. Minimum age that surgeons would operate on children by category of hospital for elective and emergency surgery

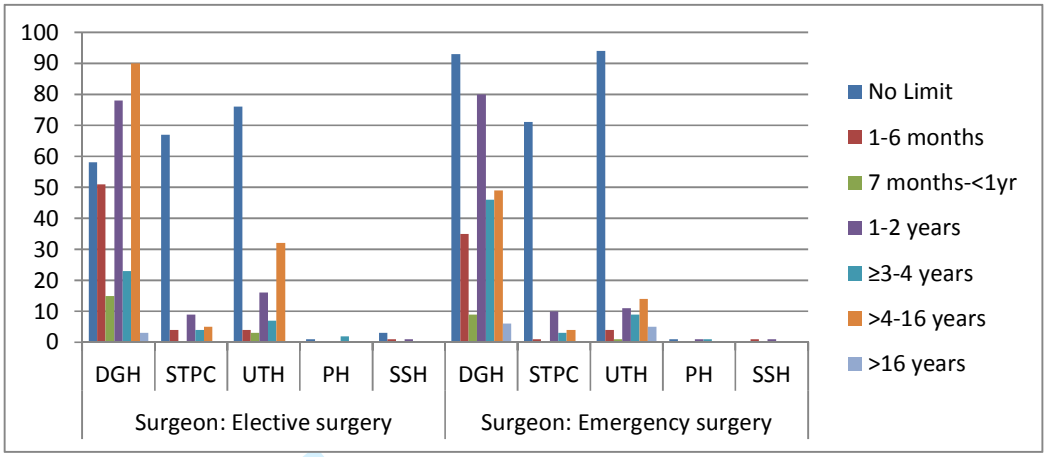


Figure 3. Minimum age that anaesthetists would anaesthetise children by category of hospital for elective and emergency surgery

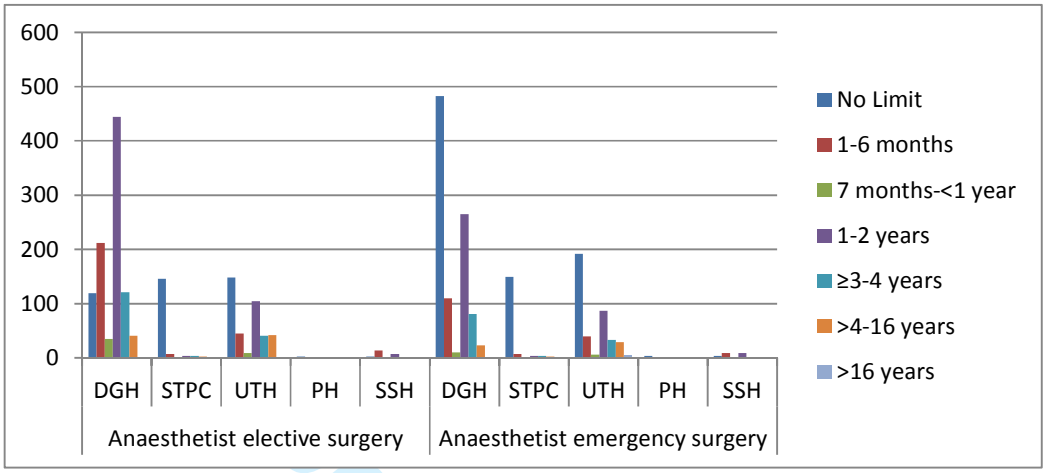


Figure 4. The number of 4 hours units of Professional Activity (PA) devoted to the care of children by the hospital category for surgeons

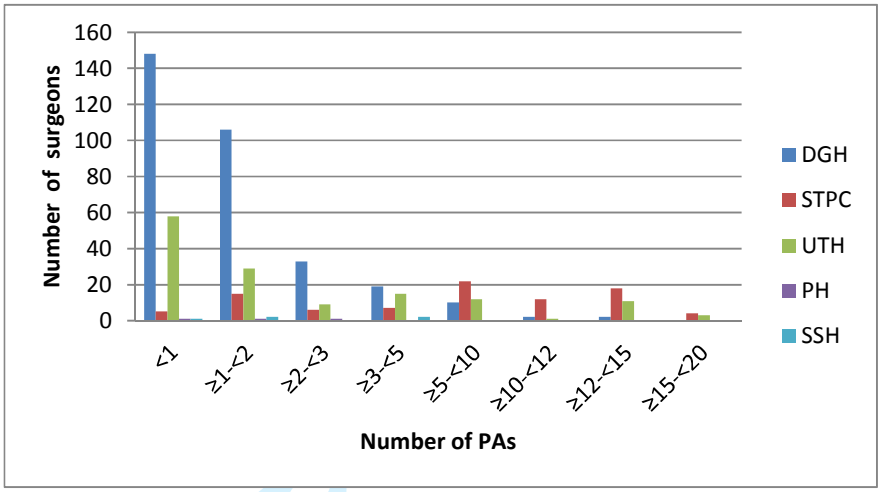


Figure 5. The number of 4 hour units of Professional Activity (PA) devoted to the care of children by the hospital category for anaesthetists

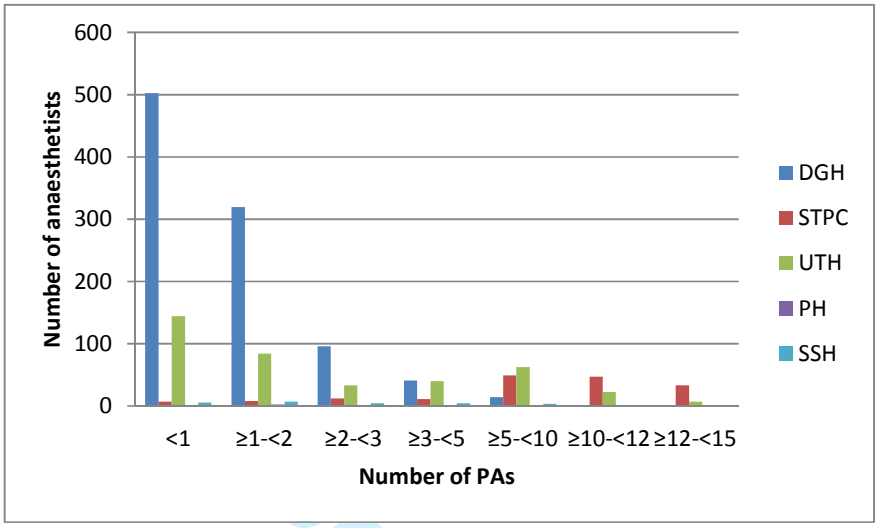


Figure 6. Highest ranked factors that limit the ability of consultants to undertake a safe paediatric practice.

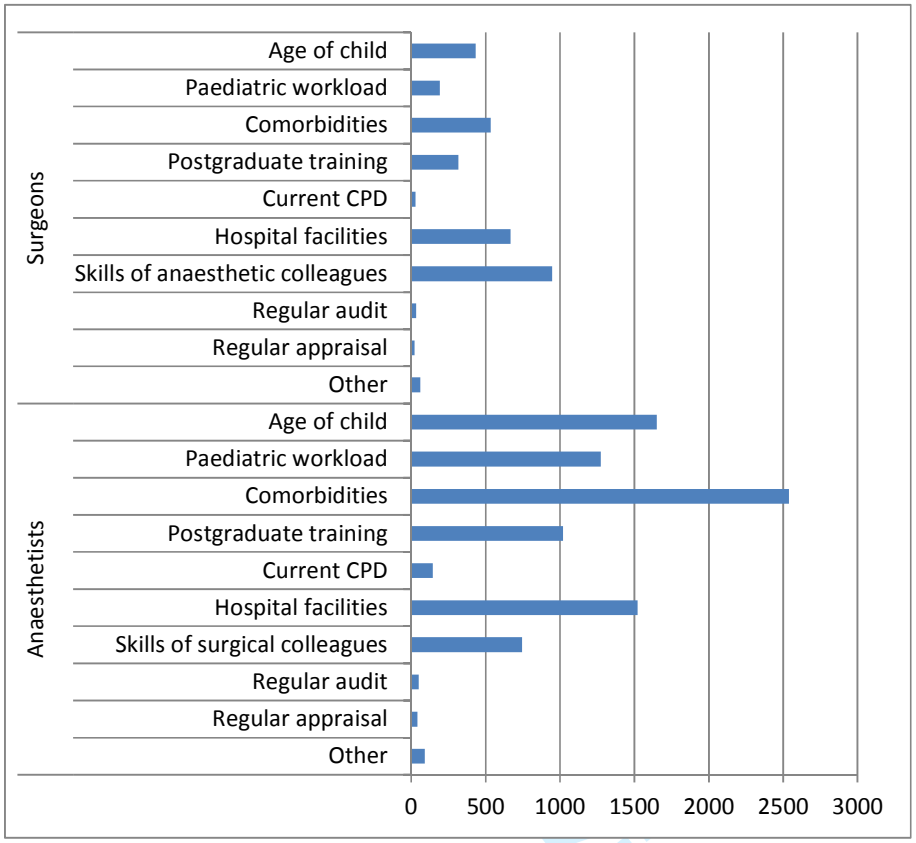
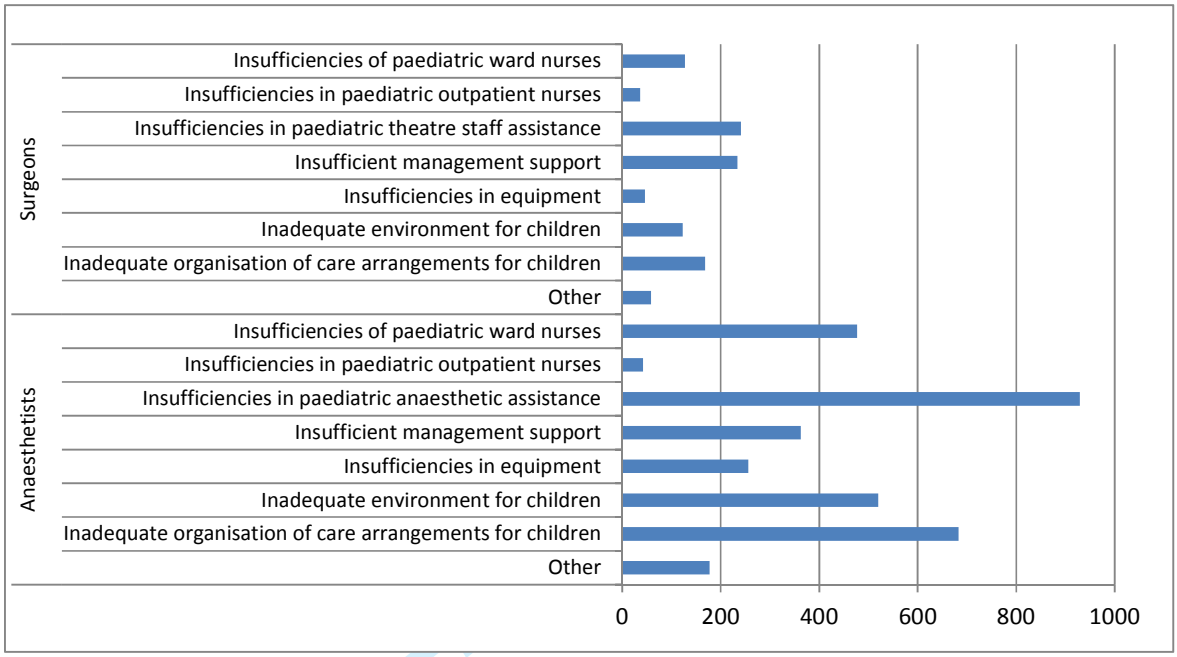


Figure 7. Highest ranked deficiencies in hospital facilities to provide a safe paediatric practice.



Children's Surgery: A national survey of consultant clinical practice

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Children's Surgery: A national survey of consultant clinical practice

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Competing interest statement

All authors have completed the Unified Competing Interest form at www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous 3 years; no other relationships or activities that could appear to have influenced the submitted work.

Contributors

D.G. Mason - developed the idea for the study

H Shotton - undertook the analysis of the data

K A Wilkinson - reviewed the data and advised on the study

M J Gough - reviewed the data and advised on the study

R Alleway - set up the information system to collect the data

H Freeth - edited and reviewed the data

M Mason, Chief Executive of NCEPOD - edited the final document and acts as guarantor.

Ethical approval

Ethical approval was not sought for this work as it is a review of clinical opinion of the clinician's practice and did not involve patients. All authors are independent of the funding body and only NCEPOD staff had access to the data.

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Number of tables: 8

Number of figures: 7

Article summary

Article focus:

- Do surgeons and anaesthetists involved in caring for children feel that the service provided is adequate?

Key messages:

- This study highlights current deficiencies in postgraduate surgical and anaesthetic training, in delivery of CPD and in NHS provision of surgical facilities for children

Strengths and limitations:

The strengths of this study are that it was self-reported data by clinicians involved in the care of children. Anonymity allowed for great honesty and surgeons and anaesthetists from all hospitals in the UK including the Offshore Islands were invited to participate, there was no selection applied. The limitation was that anonymity prevented the response rate to be accurately determined.

Abstract

Objectives - To survey clinical practice and opinions of consultant surgeons and anaesthetists caring for children to inform the needs for training, commissioning and management of children's surgery in the UK.

Design - The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) hosted an on-line survey to gather data on current clinical practice of UK consultant surgeons and anaesthetists caring for children.

Setting - The questionnaire was circulated to all hospitals and to ~~Medical~~Anaesthetic and Surgical Royal Colleges, and relevant specialist societies covering the UK and the Channel Islands and was mainly completed by consultants in District General Hospitals.

Participants - 555 surgeons and 1561 anaesthetists completed the questionnaire.

Results - 32.6% of surgeons and 43.5% of anaesthetists considered that there were deficiencies in their hospital's facilities that potentially compromised delivery of ~~contributing to provide~~ a safe children's surgical service. Almost 10% of all consultants considered that their postgraduate training was insufficient for current paediatric practice and 20% felt that recent Continued Professional Development failed to maintain paediatric expertise. 45.4% of surgeons and 39.2% of anaesthetists considered that the current specialty curriculum should have a larger paediatric component. Consultants in non-specialist paediatric centres were prepared to care for younger children admitted for surgery as emergencies than those admitted electively. Many of the surgeons and anaesthetists had <4 hours/week in paediatric practice. Only 55.3% of surgeons and 42.8% of anaesthetists participated in any form of regular multidisciplinary review of children undergoing surgery.

Conclusions - There are significant obstacles to consultant surgeons and anaesthetists providing a competent surgical service for children ~~paediatric~~. Post-graduate curricula must meet the needs of trainees who will be expected to include children in their caseload as consultants. Trusts must ensure appropriate support for consultants to maintain paediatric skills and provide the necessary facilities for a high quality local surgical service.

What is already known on this subject:

- The majority of children's surgery in the UK is undertaken in District General Hospitals (DGHs) by surgeons and anaesthetists without a specialist paediatric practice.
- There is growing concern that DGH consultants will become deskilled in this aspect of children's practice.

The reasons for the decline in local delivery of surgical care for children are complex. They include changes in postgraduate surgical and anaesthetic training, and the resulting competencies and confidence of new consultants to provide a service. ~~There are also possible disincentives which~~Other factors may include fear of criticism if national standards are not met and competition generated by commissioning arrangements.

The views of consultants currently undertaking this work are pivotal to ensuring safe delivery of future children's surgical services.

What this study adds:

- This study highlights current deficiencies in postgraduate surgical and anaesthetic training, in delivery of CPD and in NHS provision of paediatric surgical facilities
- It identifies constraints that should be ~~Suggests what might be~~ addressed to ensure safe and effective treatment of children requiring surgery in the 21st century.

Introduction

Approximately half a million children and young people undergo anaesthesia ~~surgery~~ and surgery ~~anaesthesia~~ each year in England and Wales.[1] There has been a considerable change in the delivery of surgical services for children in the United Kingdom over the last 20 years. This has resulted from the growing realisation that there is a need for concentration of clinical expertise, and workload along with specialised facilities for some children requiring surgery. This has followed numerous publications advocating high quality child centred services.[2-10] The majority of children's surgery is still undertaken in District General Hospitals (DGH) but there have been a gradual reduction in the range and ~~total~~ volume~~, range and proportion~~ of procedures performed outside Specialist Tertiary Paediatric Centres (STPC).[1] Whilst the requirement for specialist centres to undertake more complex surgery is clearly appropriate, some of the reduction in local provision may reflect changes in postgraduate surgical and anaesthetic training, and greater sub-specialisation by consultant surgeons and anaesthetists. As a consequence there is growing concern that surgeons and anaesthetists in DGHs are becoming deskilled in the care of children requiring routine elective and emergency surgery.[11] An ~~additional and~~ important consequence of this is likely to be a lack of confidence in management of the critically ill child[12]. Thus, i~~i~~t has been suggested that ~~there is a risk~~we might ~~of~~ reach~~ing~~ a tipping point where the surgical and anaesthetic care of children in DGHs becomes unsustainable. National organisations have called for an urgent review of ~~paediatric surgical and anaesthetic~~these services to ensure their viability.[13,~~14~~ 16]

In this survey we focussed on the views of individual clinicians about their ability to provide surgical and anaesthetic care for children, rather than organisational issues. In 1989 and 1999 the NCEPOD undertook a limited survey of the number of children cared for by individual consultant surgeons and anaesthetists by age.[2,~~15~~ 17] and there have been no similar surveys in the last 10 years. We considered that this would be valuable to inform future planning.

Methods

An on-line questionnaire was devised to survey consultant surgeons and anaesthetists in the UK about their clinical paediatric practice. The questionnaire determined whether the consultant cared for children and young people <16 years of age, their clinical specialty, number of years as a consultant and the category of hospital in which they worked. Consultants were also asked about the lower age limit of children they we happy to care for and~~They were asked about the age of children they felt prepared to care for, and the time dedicated on a weekly basis to this. They were also asked~~ whether they participated in multidisciplinary care reviews, audit, morbidity and mortality meetings, and about the factors which potentially limited the safety of their practice. Finally, their views on their postgraduate training and continuing professional development (CPD) were also determined.

Invitations and reminders to participate in the survey were sent between June-December 2010 using online advertising and e-mail communication via several routes (Association of Anaesthetists Great Britain and Ireland, Association of Surgeons Great Britain and Ireland, Royal College of Anaesthetists, Royal College of Surgeons of~~(~~England~~)~~, Association of Paediatric Anaesthetists Great Britain and Ireland, British Association of Paediatric Surgeons). In addition a letter was sent to ~~medical directors~~Anaesthetic departments of all UK hospitals informing them of the survey. Data analysis and tabulation was performed using Microsoft Excel (2003)

Results

In total 2116 questionnaires were completed by consultants who cared for children < 16 years of age (555 surgeons, ~~and~~ 1561 anaesthetists ~~responded~~). The majority of consultants ~~were~~ worked ~~employed~~ in a DGH (Table 1) ~~with~~ and the largest ~~the most highly represented~~ surgical group ~~being from~~were general ~~surgery~~ surgeons. The categories displayed comprise both surgeons who have dedicated paediatric practice and those who have an interest. ~~-~~(Figure 1). The median number of years in post was 11 (IQR 6-16) for surgeons and 10 (IQR 5-16) for anaesthetists. Therefore~~It is interesting that It~~those who had gained CCT relatively recently were highly represented in this survey.

Elective and emergency care: age of children

~~Consultants were asked about the minimum age that they were prepared to care for children during elective or emergency procedures.~~ For elective care the majority of the responding DGH surgeons used a lower age limit of 5 years, whereas for anaesthetists most would care for 1-2 year olds. Although there was considerable variation in these ages depending on the category of hospital in which the consultants worked a common finding was that many would be prepared to care for children of a younger age as an emergency compared to that for elective procedures. This was particularly the case for consultants working in a DGH (Figures 2 and 3).

Time devoted to paediatric practice

Responders were asked to provide information on the number of 4-hour units of professional activity (PA) per week devoted to the care of children (Figures 4 and 5 ~~indicate~~). In total 213/555 (38%) of surgeons and 659/1561 (42%) of anaesthetists had <1 PA per week allocated for the care of children. 70/555 (12.6%) of surgeons and 151/1561 (9.6%) of anaesthetists did not have any dedicated PAs.

Training, CPD and data collection

Consultants were asked whether their postgraduate training had adequately prepared them for their current paediatric practice. Of respondents 52/555 (9.3%) of surgeons and 139/1561 (8.9%) of anaesthetists indicated that this was not the

case. Most of these had been in post for ≤10-years (35/52 (67.3%) of surgeons, 71/139 (51%) of anaesthetists). The commonest reasons for this was said to be lack of time within their training programme (64/191, 33.5%) and insufficient emphasis (26/191, 13.6%) on paediatric care within the specialty curriculum. Further, 252/555 (45.4%) surgeons and 612/1561 (39.2%) ~~of~~ anaesthetists felt that the current curriculum for their specialty should have a larger paediatric component. Table 3 indicates the proportion of training time that these respondents believed should be devoted to paediatric practice with ~~.~~ ~~Consultant~~ anaesthetists suggested a greater increase in this than their surgical counterparts.

In relation to CPD, consultants were asked about the type of activity they had undertaken in the last three years that was specifically relevant to their paediatric practice (Table 4). Of these 113/555 (20.3%) of surgeons and 364/1561 (23.3%) of anaesthetists did not believe that these types of CPD had been sufficient to maintain or update their expertise in their paediatric practice. Further, ~~Of note is the fact that~~ only about a third of responding surgeons had undertaken a course to update their skills. The reasons cited for this are shown in Table 5 with the most ~~.~~ being ~~Critically, the most commonly cited reason for this was~~ a lack of funding or study leave provided by their hospitals.

Most respondents, 1719/2116 (81.2%) collected information on their paediatric practice for audit and/or appraisal purposes although this was more prevalent amongst anaesthetists (1350/1561, 86.5% versus 396/555, 71.3%). The use of a personal logbook was the most widely used method ~~to collect this information~~for this (Table 2).

Critical factors limiting safe paediatric practice

Consultants were asked to rank factors from a provided list, in order of importance, to indicate whether they limited their ability to undertake safe paediatric practice. Factors ranked among the 3 most important by each respondent were assigned a score of 3 (most important), 2 (2nd most important) or 1 (ranked 3rd). The cumulated scores for each factor are depicted in figure 6. The main factors which surgeons

considered as compromising safety were: the skills of their anaesthetist, the facilities in which procedures were undertaken, and the comorbidities and age of the child. Lack of hospital facilities also were considered critical by anaesthetists who also focused on comorbidities, age and paediatric workload.

Deficiencies in hospital facilities for safe paediatric care

181/555 (32.6%) surgeons and 679/1561 (43.5%) ~~of~~ anaesthetists believed that there were deficiencies in their hospital facilities that precluded safe practice, regardless of the type of ~~. For both surgeons and anaesthetists these opinions were spread equally across all types of NHS~~ hospital. Where hospitals facilities were considered unsatisfactory consultants were asked to rank these using a pre-defined list. ~~from a provided list using the same method as described earlier.~~ A lack of adequately trained theatre and anaesthetic assistance were identified as the most critical factor by both surgeons and anaesthetists followed by inadequate organisational arrangements for the care of children and insufficient hospital management support (Figure 7).

Multidisciplinary review

Tables 6 and 7 indicate the proportion of consultants participating in any form of regular multidisciplinary team review of children subdivided by the category of hospital in which they worked. This analysis reveals that many consultants do not ~~participate~~ engage in this type of activity, particularly if ~~they~~ worked in a DGH. Of respondents who did undertake this type of activity the majority attended audit and morbidity meetings (Table 8).

Discussion

We present a large-scale survey of the clinical practice and opinions of consultant surgeons and anaesthetists who care for children in the UK.

There are a number of limitations of this study. While every effort was made to identify all consultant surgeons and anaesthetists in the UK who are involved in the treatment of children <16-years of age this information is not readily available. In 1999 when NCEPOD last collated data on this subject 72% of anaesthetists and 67% of surgeons said they had a paediatric practice (~~that included~~ children ~~and young people~~ up to their 16th birthday), but this ~~of course~~ may have changed ~~markedly~~ in the intervening years ~~15~~[17]. Further, a~~A~~lthough ~~more recent total~~ consultant numbers have been collated by the Royal College~~s~~ of Surgeons of (~~England~~) and the Royal College of Anaesthetists ~~these do not identify~~ those ~~who~~ with a ~~have a~~ paediatric practice have not been identified separately. Thus, a denominator for this survey cannot be determined. As stated earlier, ~~as~~ many ~~routes~~ methods ~~as possible~~ were employed to inform consultants of the survey and encourage them to complete it. However it is possible that respondents with a particular interest in the underlying issues relating to children's surgery and anaesthesia were more likely to respond.~~However it is probable possible that some respondents specifically included were those with a particular interest in the wider issues relating to children's surgery and anaesthesia and thus our findings may therefore not be representative of the entire consultant workforce~~. Despite this, the survey ~~does~~ provides an interesting insight into the practice and opinions of UK ~~a group of~~ consultant surgeons and anaesthetists ~~working in the UK~~.

In retrospect, more detailed information could have been sought on ~~various~~ some aspects of clinical practice: for example, ~~the number of children cared for in a given time period~~workload and casemix, team working and on call arrangements as well ~~as the particular perceived~~as deficiencies ~~within~~ in postgraduate training. However the number of questions was ~~balanced by an acknowledged need to~~ ke~~e~~pt ~~the survey~~ relatively short to ~~improve~~ encourage compliance.

A ~~One of the most~~ striking finding~~s~~ of this survey was ~~, with a few notable exceptions, is~~ the similarity ~~between~~ in the answers provided by surgeons and anaesthetists. The type of hospital in which the respondents worked and the~~ir number of~~ years ~~in post~~of employment were similar. About half of the surgeons ~~who~~ complet~~inged~~ the survey were general surgeons ~~who also had a paediatric practice~~. Although t~~T~~he precise number of general surgeons with an interest in paediatric ~~general~~ surgery is unknown ~~but clearly this~~ the survey ~~may~~ should reflect the views of a large proportion of ~~represent a large number of~~ this group~~'s views~~. Certainly the number of surgeons who replied must represent a large proportion of the 138 (elective surgery) and 147 (elective and emergency) ~~In~~ non-specialist hospitals in England, Wales and Northern identified in a ~~detailed~~ survey published in 2008. ~~, just 138 and 147 non-specialist hospitals in England, Wales and Northern Ireland carried out respectively elective and emergency general surgery for children, out of a total of 325 (Ref 11 detail here).~~[11] Nevertheless, ~~Due to~~ the ~~poor~~ low number of responses from ~~representation of~~ other surgical specialties ~~care~~ must be ~~taken~~ recognised before ~~in~~ generalising the findings of this survey.

There has been considerable debate over the last two decades about who should operate on and who should anaesthetise children in the UK.[2,~~15~~17~~-20~~–22] Further, numerous ~~measures~~ strategies have been suggested ~~as~~ to ensure that ~~how~~ consultants ~~should~~ obtain and maintain their ~~basic skills and~~ competencies; these include postgraduate training, years of experience, workload load by age of child and CPD.[12,20~~18~~,2~~13~~-2~~53~~] In this survey we have attempted to explore some of these factors. Thus ~~In relation to the minimum age at which consultants would care for children,~~ we found that many consultants from DGHs and University Teaching Hospitals (UTH) would care for younger children, ~~of a younger age~~ or without limit to age for ~~as an~~ emergency surgery whilst restricting ~~than they would for~~ elective ~~procedures~~surgery to older children. This is not surprising and has been reported previously by NCEPOD and the Children's Surgical Forum of the Royal College of Surgeons, England (CSF)~~.~~[2,15~~7~~,24~~6~~]. ~~The~~ This reflects the necessity of providing an emergency service, particularly in DGHs that ~~reason for this is usually one of necessity since children of all ages may present as an emergency to hospitals that are not a STPC and which~~

may be geographically isolated ~~, and~~ where the ability to provide rapid transfer to a larger centre may be result in unacceptable delay. Further, t~~T~~hese children ~~can~~ may present to at a DGH where there is ~~generally~~ an insufficient workload to justify a separate consultant on call provision for children. Consequently consultant surgeons and anaesthetists who have no alternative but to care for the child locally~~who receive these children~~, particularly out of hours, will have varying paediatric experience. ~~and there might be no alternative but to care for the child locally, at least for initially prior to transfer to a STPC e.g. severe head injury or trauma.~~ There is no easy solution to ~~resolving~~ this situation other than good cooperation and funded ~~clinically supported~~ arrangements between STPCs, DGHs and UTH. [12,13,2~~2~~4,2~~7~~5] Formal managed networks of care for children's surgery have been advocated as means for achieving this.[9,2~~2~~4,2~~8~~6]

While case numbers may ~~be a determinant in~~facilitate ~~maintainence~~maintenance of skills and competence, time allocated to paediatric practice is also important. Given ~~In this survey we believed that under~~ the new consultant contract the number of PAs for paediatric care by surgeons and anaesthetists ~~would~~ should be easier to measure. ~~It is clear~~Data from this survey reveals that many consultants, particularly from DGHs, have ~~less than one~~<1 PA devoted to paediatric practice ~~per~~ each week and ~~the~~ thus maintenance of ~~skills and~~ competencies will be particularly difficult for them. In these circumstances ~~collecting as much information on~~ detailed ~~audit~~review of their paediatric practice will be essential ~~to demonstrate experience~~ for appraisal and revalidation purposes. It is encouraging that the majority ~~for the~~of ~~group of~~ consultants who completed this ~~on line~~ questionnaire ~~that the majority~~ collected this information in one form or another.

Postgraduate training is the bedrock of future consultant practice. ~~Therefore having~~Thus a curriculum that ~~is fit for purpose which~~ includes an adequate component of paediatric training is essential. It is therefore of concern that 9.3% of surgeons and 8.9% of anaesthetists ~~included in~~completing this survey believed that their postgraduate training had not prepared them for their current level of paediatric practice. This was particularly the case for ~~It would appear from our~~

survey that in those who trained in the last 10 years this is a particular issue, where it was felt that inadequate time and emphasis was devoted to paediatric training. In contrast we noted thatFurthermore, 45.4% of surgeons and 39.2% of anaesthetist's respondents felt that the respective curriculum in for their specialty should have a greater paediatric training component. Revision of the general surgery curriculum in 2010 now includes three modules in paediatric surgery, but these are special interest modules and paediatric surgery was even less formal in earlier versions. From a trainees' perspective there is the risk that they see themselves as surgeons in their chosen specialty, and with the exception of paediatric surgery, it is not until they are appointed as a consultant that they may realise that a period of training in children's surgery would have been of benefit. In this respect In fact the UK general surgical curriculum has had no mandatory paediatric component for more than ten 10 years and both the availability and take-up of optional modules in children's surgery for children has beenis poor. In contrast the anaesthesia anaesthetic the curriculum has throughout the same time period mandatedincludes compulsory paediatric modules at intermediate and higher levels[279, 2308] of training (REF both) and are provided in all parts of the UK. As previously mentioned it may well be that this survey was prioritised for completion by those with a paediatric practice and/or interest and may not reflect a more global view. However, most anaesthetists who felt there were deficiencies in training thought that 20-25% of training the percentage of time should be dedicated to paediatrics. should be of the order of 20-25%.

Continuing professional development is an essential part of consultant activity and this should be proportionate to clinical practice. This is as much true for those who care for children as any other consultant groups. In the current economic climate within the NHS there is considerable pressure on supporting professional activities ofthis for consultants both in terms of time and funding. and on directed time and funding for study leave in which CPD can be conducted. In this survey approximately one in five consultant surgeons and anaesthetists reported that these factors prevented did not believe that they had had adequate CPD to maintain their expertise in paediatric practice.

In summary therefore inadequate post-graduate training, limited clinical time within job plans (PA allocation), and difficulty in accessing CPD are important factors that consultant surgeons and anaesthetists believe adversely affects the quality of service that they are able to deliver for children's surgery ~~The most common cited reasons were lack of funding and lack study leave provision. Thus, this survey has shown that there are consultant surgeons and anaesthetists who have a paediatric practice but have limited clinical exposure in terms of PA allocation. Despite this they but who may be required to provide an emergency service for young children and have problems in securing adequate CPD to maintain expertise in their paediatric practice.~~

There are ~~many~~ other factors that may limit an individual consultant's ~~clinical~~ practice in relation to ~~the care of~~ children's surgery. ~~Thus, In this survey S~~surgeons considered that the skills of anaesthetic colleagues ~~was~~ were paramount while anaesthetists reported ~~considered~~ that a child's co-morbidities was the most important factor. It ~~is both understandable and important~~ is logical that most surgeons considered that ~~that the skills of their~~ anaesthetic~~s~~ skills ~~colleagues~~ were the most important factor ~~in~~ limiting their ability to undertake safe surgical care. Without this ~~appropriately experienced anaesthetists in the care of children any form of~~ surgical practice is severely restricted.

A safe surgical service ~~For both consultant surgeons and anaesthetists to carry out their duties safely they need to ensure that the~~also requires adequate hospital facilities and thus it is concerning ~~are adequate. The fact~~ that 32.6% of surgeons and 43.5% of anaesthetists considered that there were deficiencies in their hospital's ~~for the~~ provision of a safe paediatric service ~~is a cause for concern~~. Although t~~T~~his could be a counsel of perfection amongst respondents~~; however the fact that a~~ recurring theme~~s~~ ~~by both surgeons and anaesthetists was~~were the ~~insufficiency~~ lack of ~~assistants~~ trained paediatric staff ~~in paediatric care~~ in the operating theatre~~, environment~~, ~~the~~ insufficien~~cy~~t ~~of trained~~paediatric nurses on children's ward~~s~~ ~~nurses~~ and inadequacies of the organisational arrangements for the care of children

in their hospital. These are ~~cannot be ignored.~~ aAll are potentially remediable ~~factors~~ if prioritised by Colleges, ~~and~~ professional organisations and ~~by~~ Trusts.

Clinical governance and audit is now embedded in every aspect of health care. Hospitals are required to adhere to guidelines on clinical governance and medical practitioners are required to undertake regular review of clinical practice.[~~27~~29,~~28~~ ~~30~~31,32] Furthermore Multidisciplinary team (MDT) review is an integral part of modern health care and has a valuable role in determining the best care. Thus it is of concern that only 55.3% surgeons and 42.8% of anaesthetists participated in any form of multidisciplinary review of children ~~who~~ undergoing surgery. In the latest NCEPOD study reviewing surgery in children we found that only 50% hospitals undertook audit and/or morbidity and mortality meetings that included children. Whilst this deficiency ~~The lack of this form of clinical review by consultants who care for children seems to~~was particularly ~~more of~~ an issue in DGHs it might be argued that a forum for ~~. It is just as important that the~~ sharing ~~of~~ clinical experience ~~within the forum of a multidisciplinary meeting~~ is particularly important ~~undertaken by~~for DGH consultants ~~in DGHs where~~with a relatively small the workload ~~of these individuals may be relatively small~~.

In conclusion, while one might argue whether the findings of this survey are representative of all consultant surgeons and anaesthetists who care for children in the UK, it is disturbing that ~~for~~ this group of clinicians ~~at several levels there were~~reported so many obstacles ~~in~~ place ~~to~~ providinge a safe paediatric ~~clinical practice~~service. Those responsible for postgraduate training of ~~surgeons and anaesthetists~~ should ~~consider~~ reviewing the current curriculaum to ensure that ~~it~~ they more adequately support~~s~~ the clinical ~~care~~ responsibilities of prospective consultant~~s~~ surgeons and anaesthetists in~~,~~ ~~most of whom will work in~~ DGHs~~,~~ ~~and~~ who, by necessity, will have a paediatric component to the~~ir~~ practice. Furthermore, to ensure that these consultants ~~surgeons and anaesthetists who care for children~~ do not feel exposed and under undue pressure to practise at the limit of their ~~skills and~~ competency, greater cooperation will be required between all categories of hospital~~s~~ that care for children ~~who~~ requiringe surgery. Finally, all

hospitals that provide children's surgery have a responsibility to ensure that consultant surgeons and anaesthetists who have children in their patient caseload~~who are appointed to care for children~~ are supported in their practice, that they have adequate opportunity to enhance and maintain their skills, and have the necessary facilities in place for children's care, within a clear clinical governance structure.

Acknowledgements

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Table 1. Category of hospital in which respondents were employed ~~of surgeons and anaesthetists~~

Hospital Category	Surgical	%	Anaesthetic	%
District General Hospital (DGH)	320	57.7	974	62.4
Specialist Tertiary Paediatric Centre (STPC)	89	16.0	167	10.7
University Teaching Hospital (UTH)	138	24.9	391	25.0
Private Hospital (PH)	3	0.5	5	0.3
Single Specialist Hospital (SSH)	6	1.1	24	1.5
Grand Total	**555**		**1561**	

Table 2. Methods used to collect information on paediatric practice

	Surgeons		Anaesthetist	
Methods of collection	**n**	**%**	**n**	**%**
Personal log book	294	74.4	925	68.8
Hospital database	194	49.1	617	45.9
National database	66	16.7	7	0.5
Other audit	6	1.5	2	0.1
Other	6	1.5	3	0.2
Subtotal	**395**		**1344**	
Not answered	1		6	
Total	**396**		**1350**	

** Answers may be multiple*

Table 3. Proportion of the training curriculum that ~~consultants~~ it was considered should be devoted to paediatric practice by those consultants that believed it should be increased. ~~of consultants that believed it should be greater~~

Proportion of Curriculum (%)	Surgical	%	Anaesthetist	%	Total
0-10	131	56.2	169	31.8	**300**
11-19	32	13.7	104	19.5	**136**
20-25	52	22.3	233	43.8	**285**
>25	18	7.7	26	4.9	**44**
Subtotal	**233**		**532**		**765**
Not answered	19		80		**99**
Total	**252**		**612**		**864**

Table 4. Type of ~~Continued Professional Development~~CPD activity for the care of children undertaken by consultants in the last three years.

	Surgeons n=555		**Anaesthetists n=1561**	
Type of Continued Professional Development	n	%	n	%
a) Presenting work	152	27.4	305	19.5
b) Course – skills update	174	31.4	911	58.4
c) Course – specific technique	77	13.9	284	18.2
d) Private Study	283	51.0	781	50.0
e) Overseas experience	68	12.3	99	6.3
f) Symposium/conference	215	38.7	704	45.1
g) Observation of clinical practice	137	24.7	488	31.3
h) Professional Examination	38	6.8	73	4.7
i) Professional S~~s~~ociety meeting	175	31.5	483	30.9
j) Other ~~– please specify~~	98	17.7	107	6.9

**Answers may be multiple*

Table 5. Reasons given by consultants for insufficient ~~Continued Professional Development (~~CPD~~)~~ to maintain expertise in paediatric practice.

Reason given	Surgeons n=79	%	Anaesthetist n=221	%
a) Lack of funding	28	35.4	89	40.3
b) Lack of study leave	30	38.0	107	48.4
c) Do not consider this type of CPD relevant	19	24.1	20	9.0
d) Poor quality of type of CPD attended	8	10.1	35	15.8
e) Other	16	20.2	27	12.2

**Answers are multiple: Surgeons 34 not answered; Anaesthetists: 143 not answered*

Table 6. Participation by surgeons in regular multidisciplinary review of children who undergo surgery

Hospital Category	Yes	%	No	%	~~null~~Not Answered	Total
District General Hospital (DGH)	134	41.8	186	58.1		320
Specialist Tertiary Paediatric Centre (STPC)	78	87.6	11	12.4		89
University Teaching Hospital (UTH)	94	68.1	43	31.2	1	138
Private Hospital (PH)		0	3	100.0		3
Single Specialist Hospital (SSH)	1	20.0	4	80.0		5
Grand Total	**307**	**55.3**	**247**	**44.5**	**1**	**555**

Table 7. Participation by anaesthetists in regular multidisciplinary review of children who undergo surgery

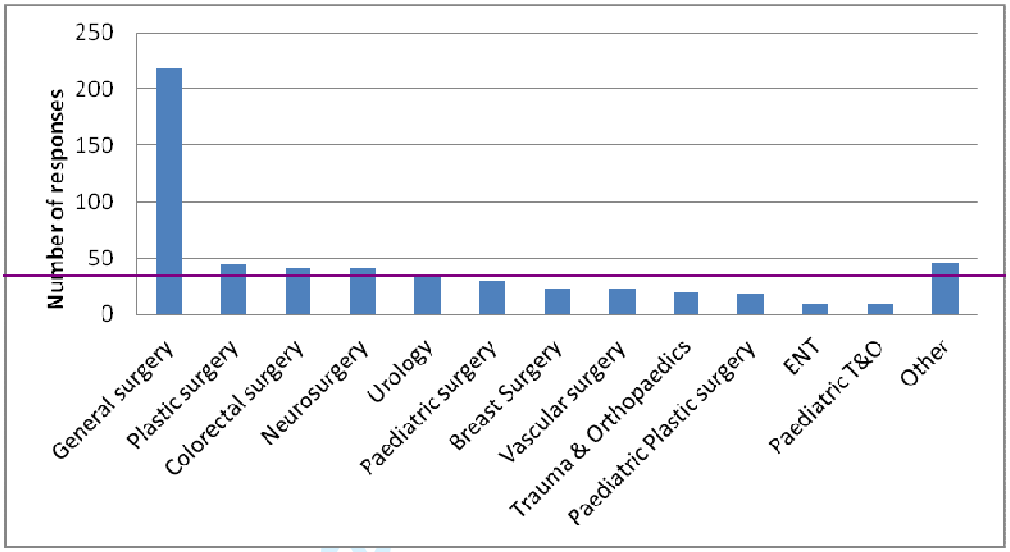
Hospital Category	Yes	%	No	%	Grand Total
District General Hospital (DGH)	334	34.3	640	65.7	974
Specialist Tertiary Paediatric Centre (STPC)	144	86.2	23	13.8	167
University Teaching Hospital (UTH)	171	43.6	221	56.4	392
Private Hospital (PH)	3	60.0	2	40.0	5
Single Specialist Hospital (SSH)	16	69.6	7	30.4	23
Grand Total	**668**	**42.8**	**893**	**57.2**	**1561**

Table 8. Form of multidisciplinary review undertaken by consultants

Form of review	Anaesthetist n=656	%	Surgeon n=303	%
Pre-op MDT	82	12.5	100	33.0
Audit meetings	490	74.7	197	65.0
M&M meetings	392	59.8	216	71.3
Informal discussions with Colleagues	373	56.9	174	57.4
Other	18	2.7	15	5.0

** Answers may be multiple*

Figure 1. Speciality of consultant surgeons completing the questionnaire



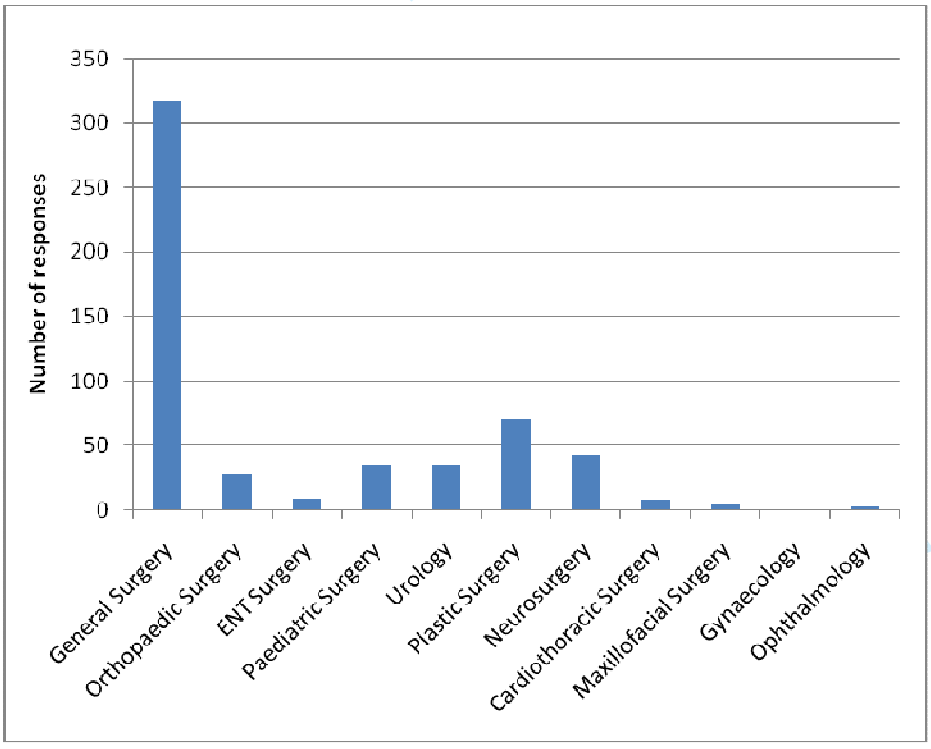


Figure 2. Minimum age that surgeons would operate on children by category of hospital for elective and emergency surgery

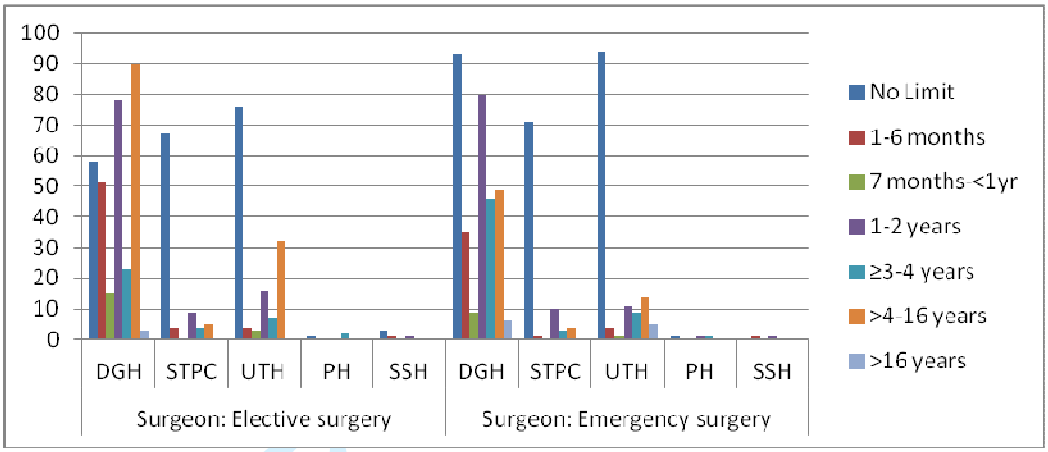


Figure 3. Minimum age that anaesthetists would anaesthetise children by category of hospital for elective and emergency surgery

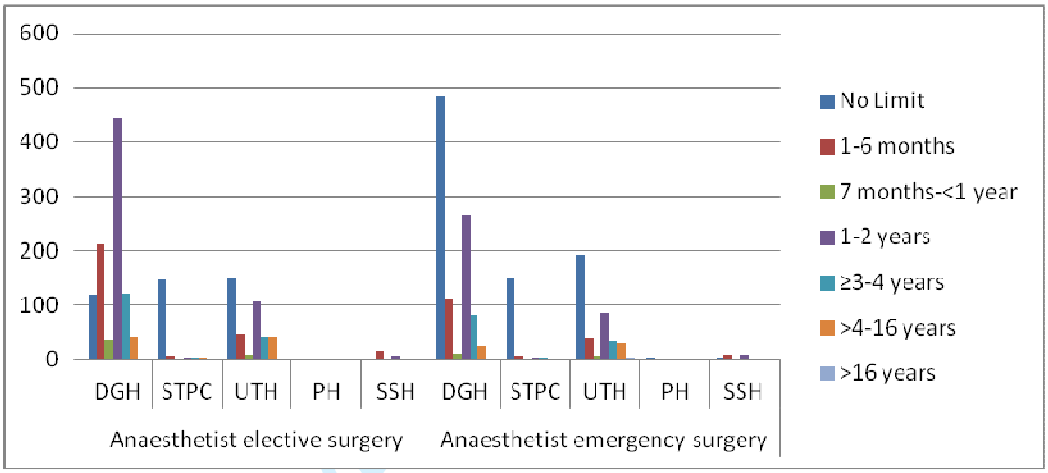
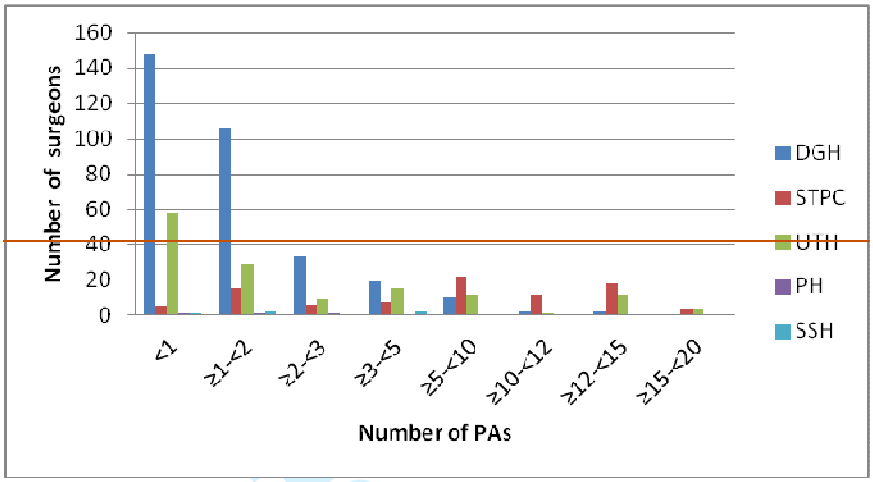


Figure 4. The number of 4--hours units of Professional Activity (PA) devoted to the care of children by the hospital category for surgeons



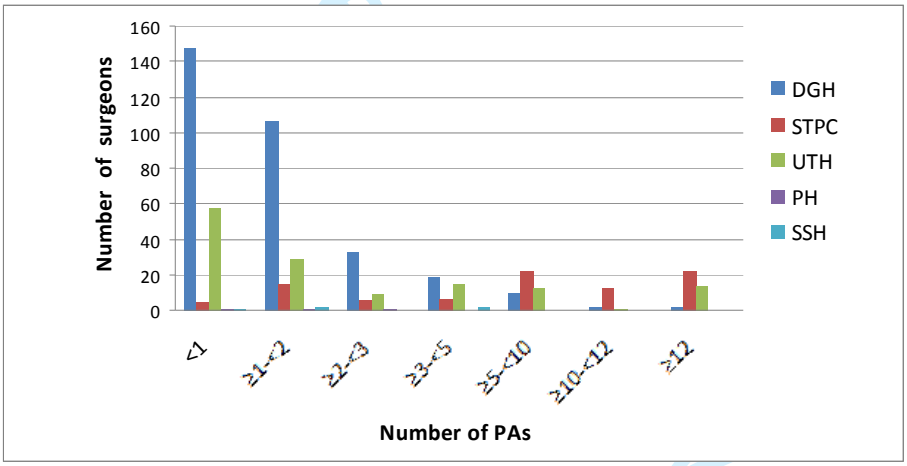
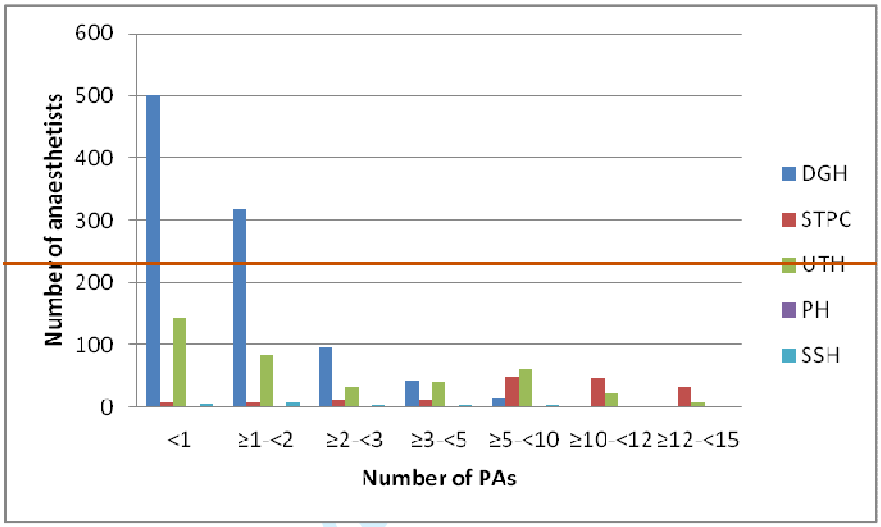


Figure 5. The number of ~~4 hour~~4-hour units of Professional Activity (PA) devoted to the care of children by ~~the~~ hospital category for anaesthetists



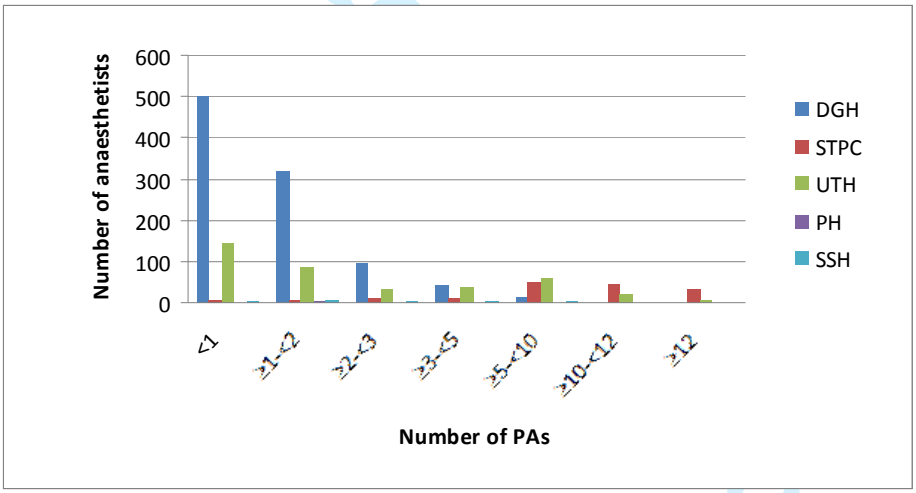
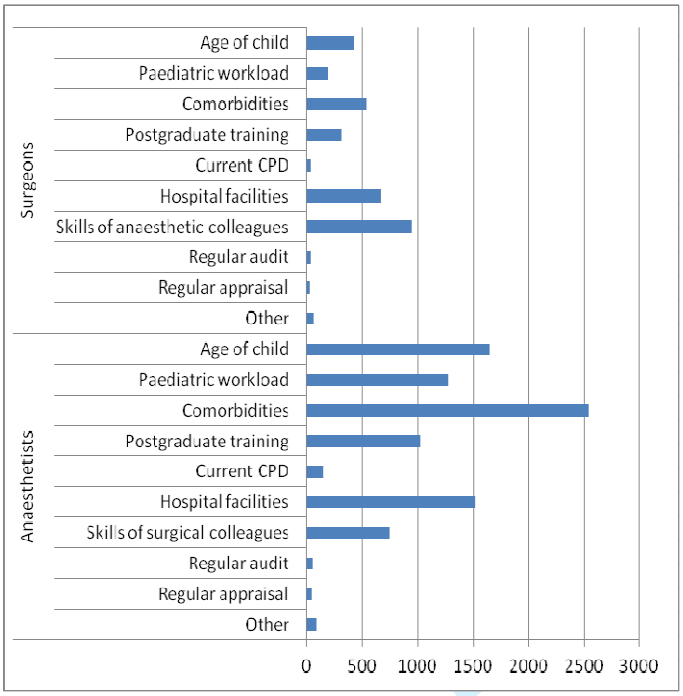


Figure 6. Highest ranked factors that limit the ability of consultants to undertake a safe paediatric practice.



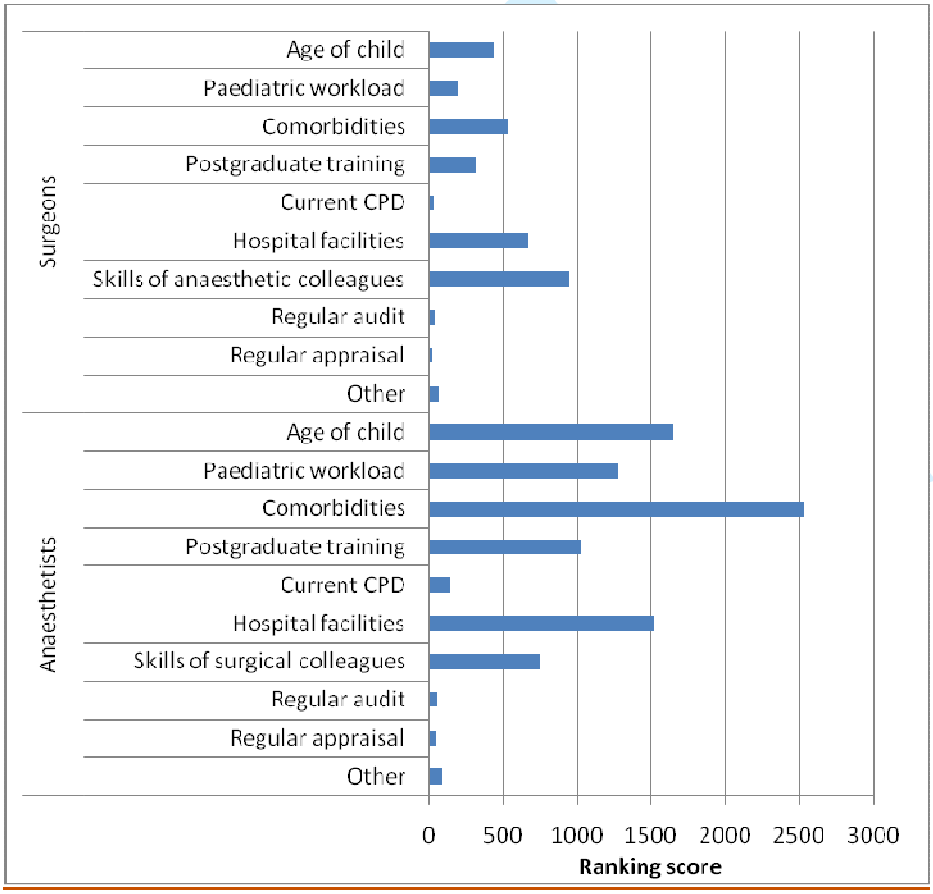
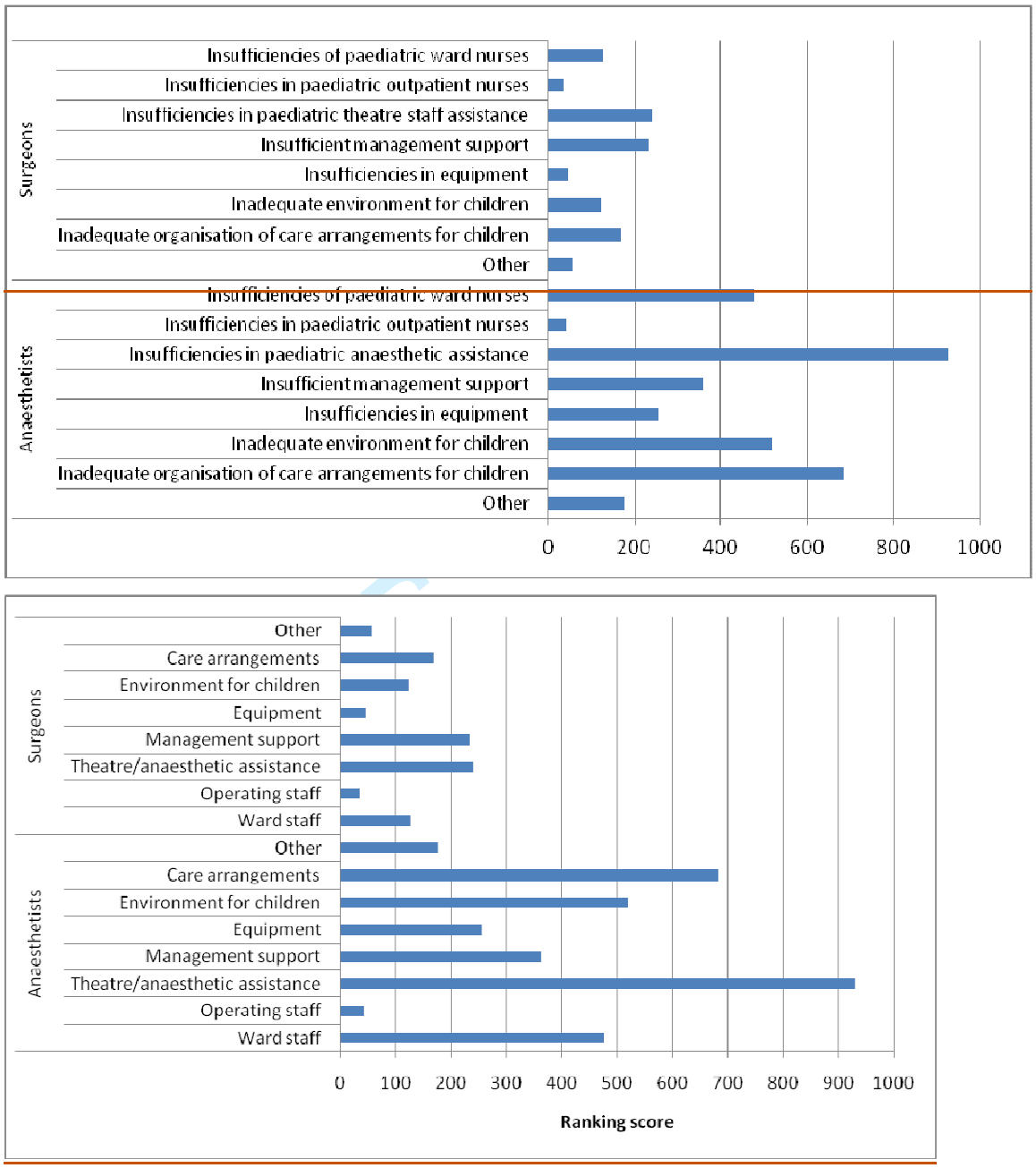


Figure 7. Highest ranked deficiencies in hospital facilities to provide a safe paediatric practice.



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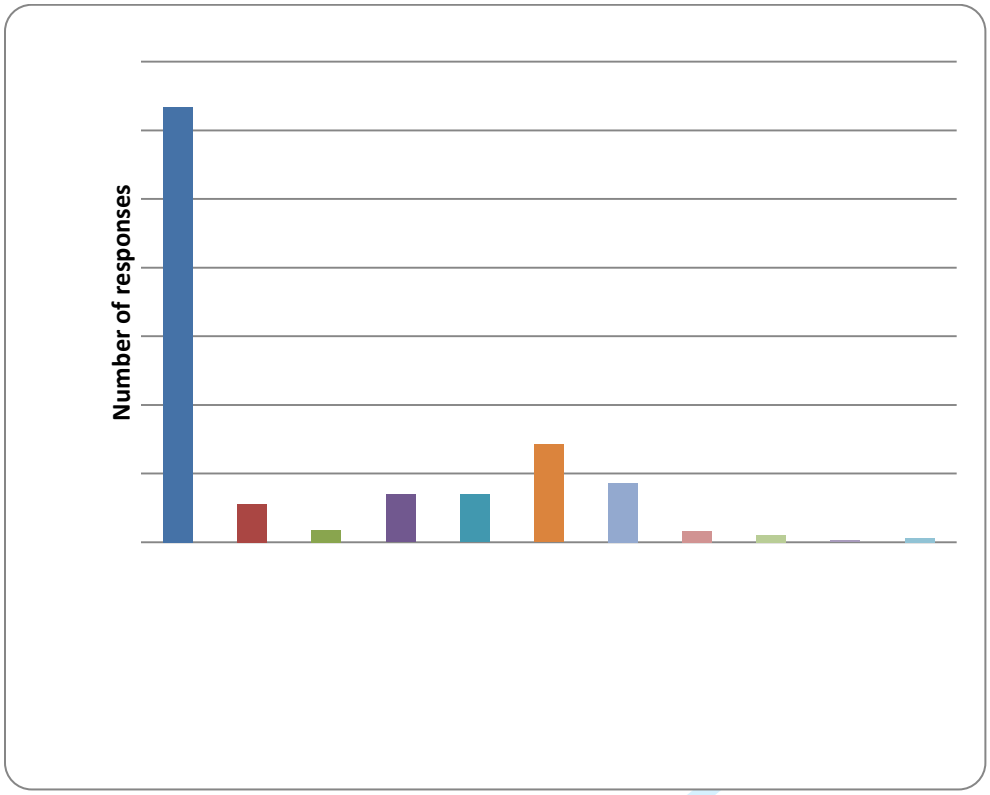

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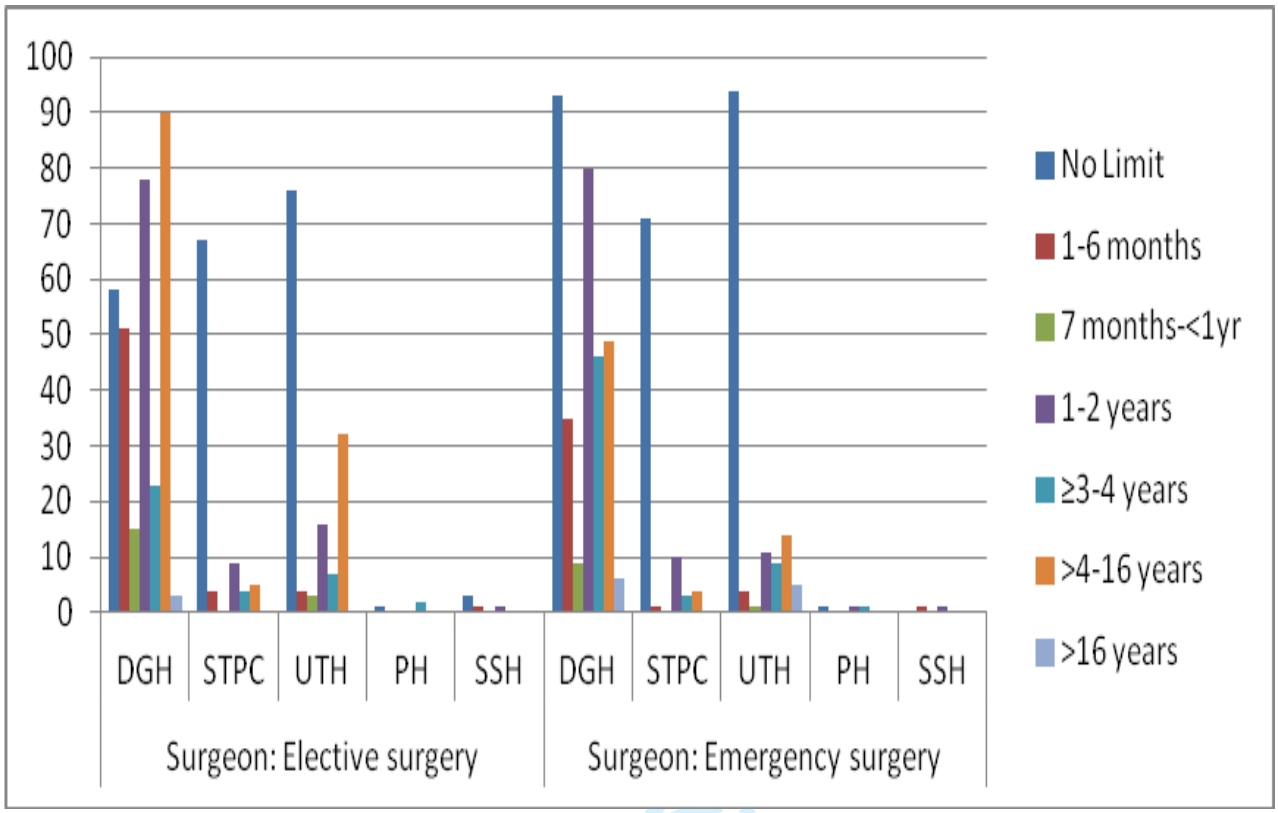

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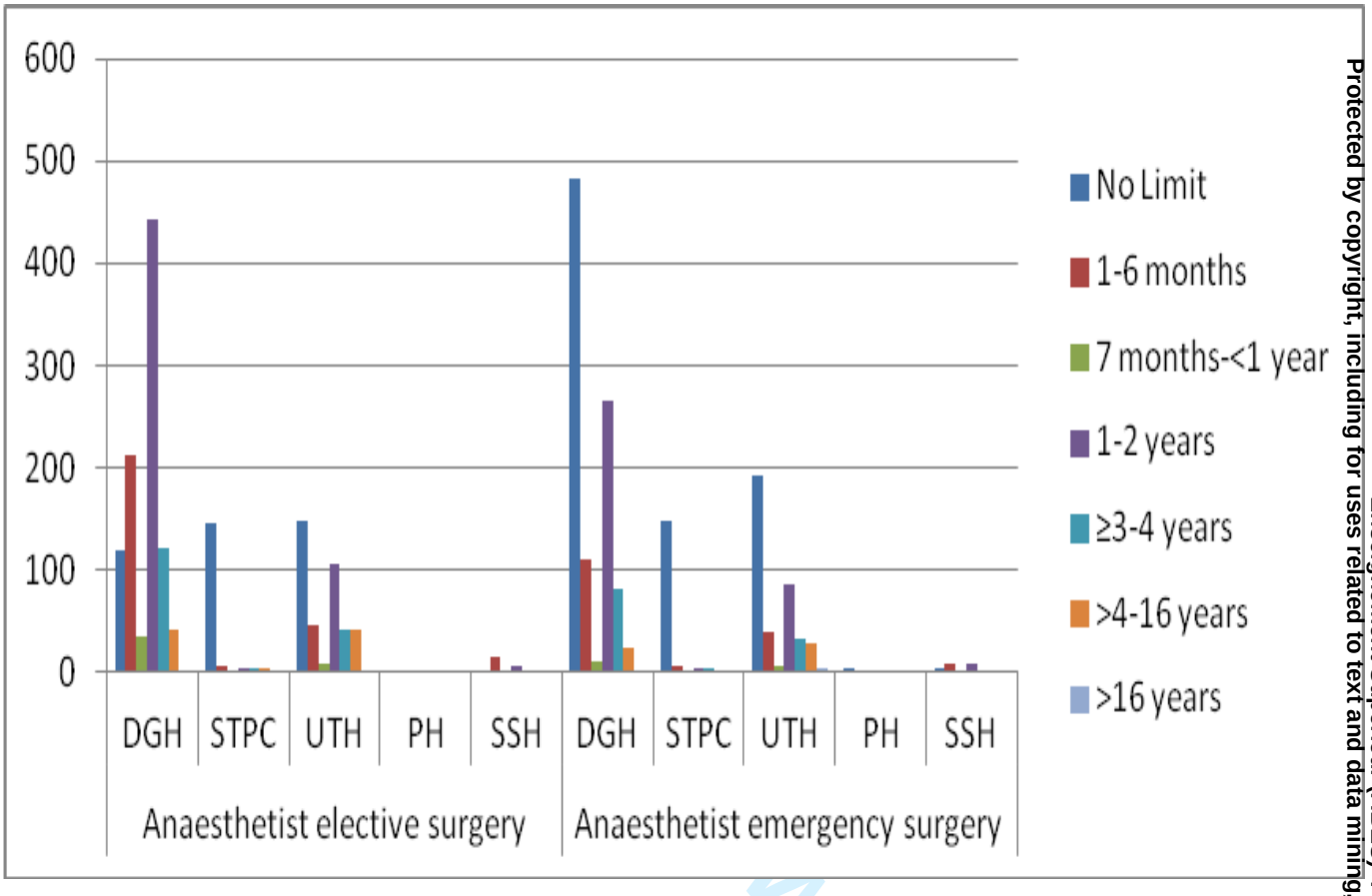


Figure 4. The number of 4-hour units of Professional Activity (PA) devoted to the care of children by hospital category for surgeons

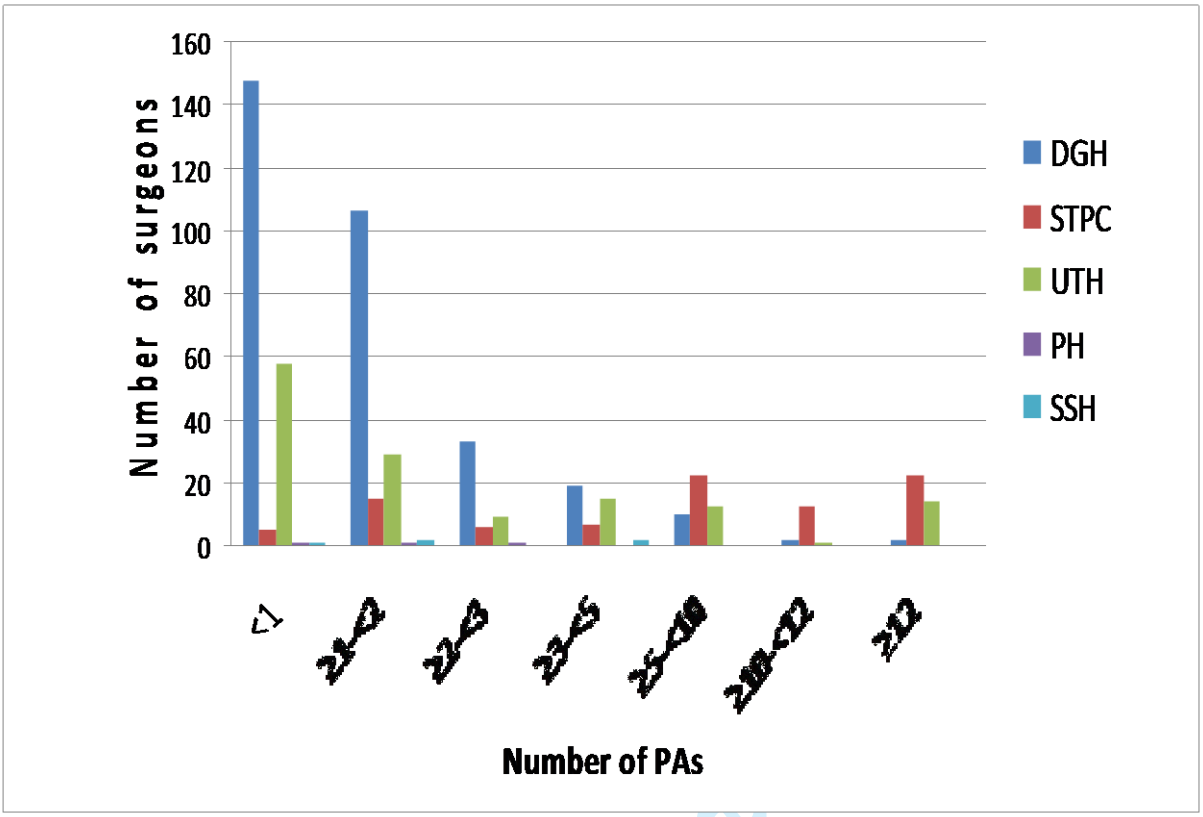
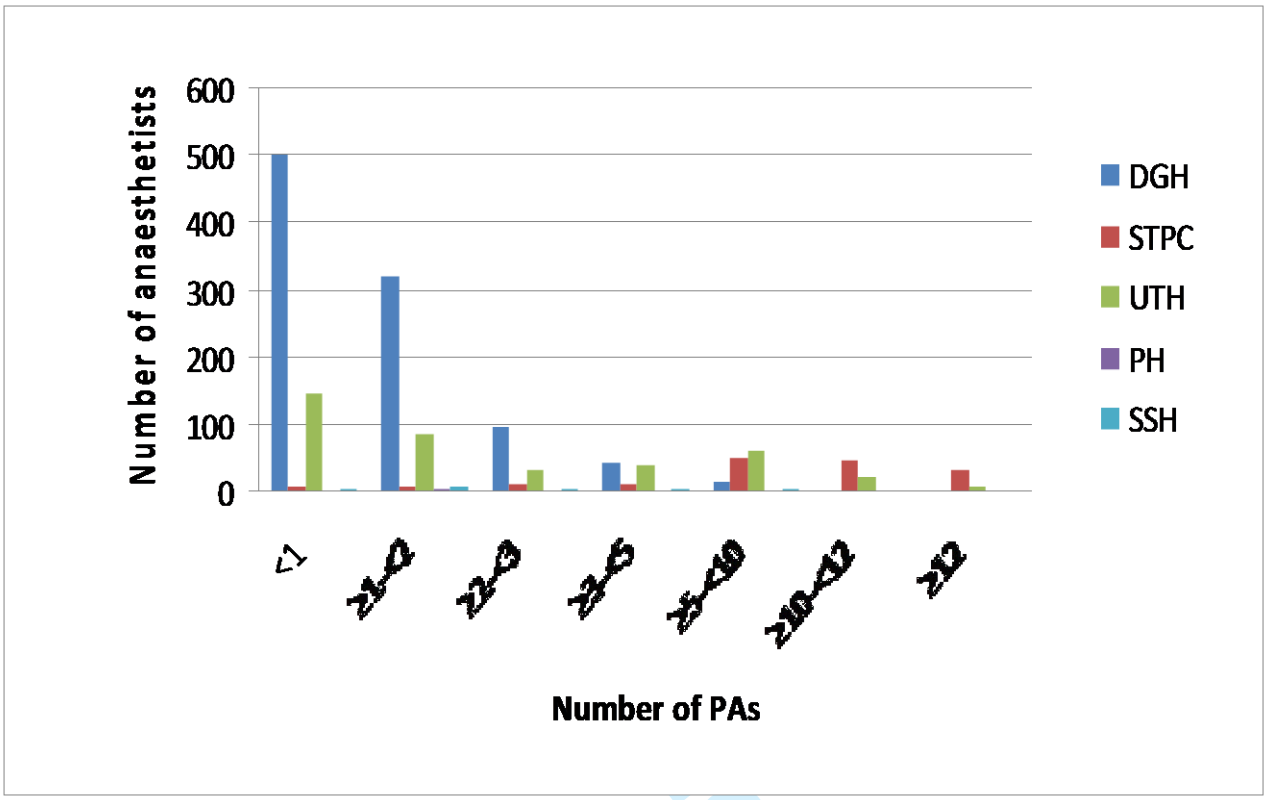


Figure 5. The number of 4-hour units of Professional Activity (PA) devoted to the care of children by hospital category for anaesthetists



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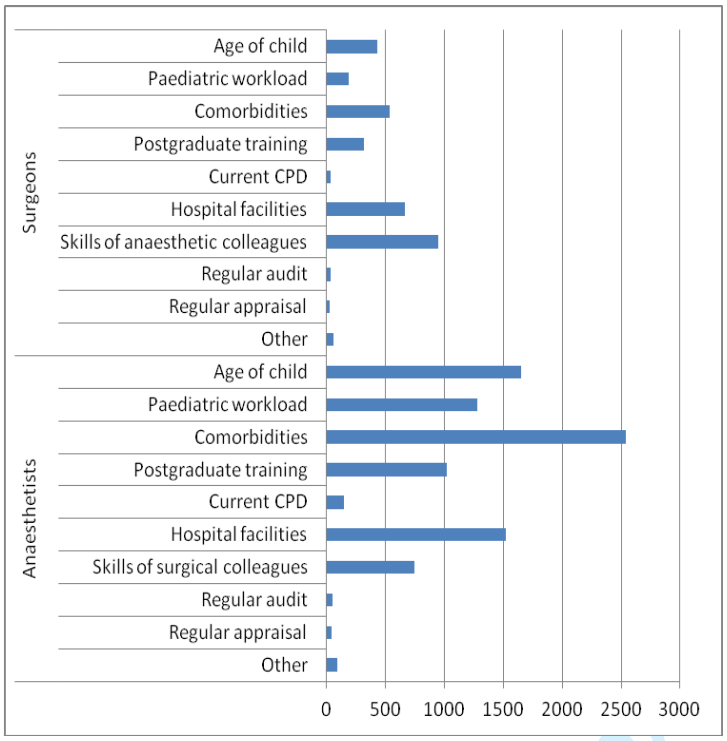

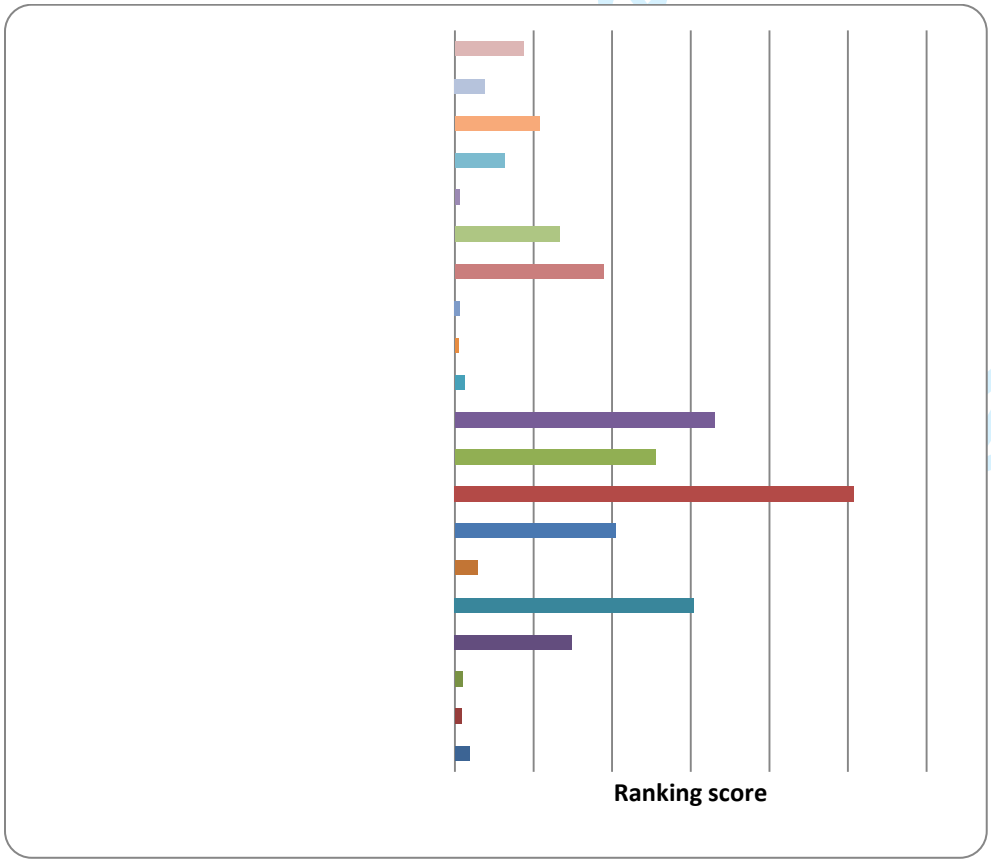

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