Recruitment to UK cardiothoracic surgery in the era of public outcome reporting

Stephen Westabya,*, Kamran Baiga, Ravi De Silvab, Jonathan Unsworth-Whitec and John Pepperd

a John Radcliffe Hospital, Oxford, UK
b Papworth Hospital, Cambridge, UK
c Plymouth Hospitals NHS Trust, Plymouth, UK
d Royal Brompton Hospital, London, UK

* Corresponding author. John Radcliffe Hospital, Headley Way, Oxford OX3 9DU, UK. Tel: +44-1865-220269; e-mail: stephen.westaby@ouh.nhs.uk (S. Westaby).

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Abstract

OBJECTIVES: Since 1999 important widely publicized issues have affected morale in UK cardiothoracic (CT) surgery. Because more surgeons are needed, we sought to investigate whether these events have affected recruitment and demographic change in the specialty between 1999 and 2014.

METHODS: We collected information on UK consultant CT surgeons using the SCTS public portal, the GMC Specialist Register and the NHS Annual Workforce Census via the Health & Social Care Information Centre. We analysed the demographics of UK CT surgeons with regard to country of primary medical qualification and ethnicity between 1999 and 2014. We compared the changes with other surgical specialties, cardiology and respiratory medicine.

RESULTS: There has been a worrying decline in UK medical graduates entering the specialty and a 4-fold increase (282%) in consultant appointments from Europe. Whilst consultant numbers expanded by 83% overall, 59% of congenital heart surgeons, 46% of thoracic surgeons and 36% of adult cardiac surgeons are overseas graduates. It is found that 5% are female. Currently, only 32% of trainee surgeons are UK graduates. Of those receiving UK Certificate of Completion of Training in 2013, only 18% were UK graduates compared with 68% in 2000. Comparison with other specialties shows fewer UK graduates in CT surgery with the exception of Obstetrics and Gynaecology (52%). In cardiology, 77% are UK graduates with only 8% from Europe.

CONCLUSIONS: Repeated negative messages have had a detrimental influence on recruitment. Because 55% of UK medical graduates, but less than 5% of CT surgeons are female, recruitment problems may worsen. Action is needed to restore interest in the specialty.

Keywords: Recruitment • Training • Mortality • Surgeon-Specific • Public reporting

INTRODUCTION

Recruitment to a surgical specialty depends upon previous exposure, mentorship and a positive view of lifestyle and career prospects [1]. Cardiothoracic (CT) surgery is a small specialty but the work is physically and psychologically demanding. Unusual personal attributes are needed to open the chest, repair a sick heart or remove cancer from lungs on a daily basis. The operations need coherent teamwork, technical skill and uninterrupted concentration. Depending upon patient factors and the quality of post-operative care, 2–5% of procedures will have a fatal outcome [2].

In the past 15 years, landmark events have had considerable impact on working conditions in the specialty. The Bristol Children’s Heart Scandal turned the public, politicians and press against the medical profession [3]. In 2001, the Dr Foster Organisation and Guardian newspaper published cardiac centre death rates with punitive intention [4]. Surgeon-specific mortality data (SSMD) were then released as a political initiative in 2005 [2, 5]. This launched the now widespread ‘Name and Shame’ culture in the NHS. Lastly, the discredited ‘Safe and Sustainable’ review of congenital heart centres (2010–13) caused professional uncertainty and then loss of established surgeons and paediatric cardiologists through emigration or early retirement [6]. The influence of these events on recruitment to the specialty remains the subject of speculation. UK graduates were inevitably exposed to discouraging media coverage but overseas trainees are unlikely to have been. With the predicted need for workforce expansion, together with the prospect of a 7-day NHS working week, more surgeons are needed [7]. Any recruitment strategy needs to be based upon an understanding of the emerging environment. We therefore sought to identify changes in the demography of UK cardiac and thoracic surgery from before Bristol until the present time (1999–2014).

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MATERIALS AND METHODS

We compiled a database of UK CT surgeons using the Society of CT Surgery in Great Britain and Ireland public portal, which provides information for patients and the public about hospitals and individual surgeons (http://scts.org/modules/surgeons/default.aspx, 1 September 2014, date last accessed).

Using the GMC registration numbers of individual surgeons, we were able to identify the country of primary medical qualification and date of entry onto the specialist register. We contacted the General Medical Council and requested information regarding CT surgeons on the specialist register via the Freedom of Information Act 2000. This information was used to validate the data collected from the SCTS website and helped verify the details of CT surgeons working in 1999. Surgeons were classified according to their country of primary medical qualification as per GMC definitions as: UK medical graduates, European Economic Area (EEA) medical graduates and Non-EEA or International Medical Graduates (IMG).

The details of congenital cardiac surgeons were confirmed using the National Institute for Cardiovascular Outcomes Research Congenital Heart Disease website (https://nicor4.nicor.org.uk/CHD/an_paeds.nsf/vwContent/home, 1 September 2014, date last accessed).

Details of other specialties were obtained from the NHS Annual Workforce Census via the Health & Social Care Information Centre (HSCIC) (http://www.hscic.gov.uk, 1 September 2014, date last accessed). The data were reused with permission of the HSCIC with all rights reserved.

STATISTICAL METHODS

The study did not set out to explore a hypothesis that is framed by a statistical test or analysis. This is an observational study where the changes are simply presented as percentages.

RESULTS

Between 1999 and 2014, there was an overall increase in CT surgeons from 192 to 341 (77%). The proportion of females increased from 2 to 5%. Demographic changes in the specialty are illustrated in Fig. 1 and Table 1. This shows a 3.8-fold increase in European graduates (280%) together with a 2.2-fold increase in non-European (International) graduates (120%), whereas the expansion in UK graduate surgeons was modest (44%).

In congenital heart surgery, there was an expansion in overall numbers from 27 to 39 surgeons (44%) but this occurred exclusively through an increase in overseas graduates. In particular, European-trained surgeons filled many vacant consultant posts with an overall 366% increase in numbers. This trend was mirrored in the thoracic subspecialty where a 3.25-fold increase in workforce numbers occurred through a 388% rise in non-UK graduates. This was predominantly based upon a 15-fold expansion in EEA surgeons (1500%). The relative numbers of UK and overseas graduates for the subspecialties are shown in Fig. 1.

The number of UK graduates entering the specialty has decreased year on year. The GMC Specialist Register for CT Surgery shows that 68% of entries were UK graduates in 2000 but only 14% in 2013 (Table 2). This corresponded with an increase from 10 to 66% of EEA graduates. Currently, only 32% of registrar grade CT surgeons are UK graduates. Of those receiving UK Certificate of Completion of Training in 2013, only 8 of 58 (14%) were UK graduates. This compared with 13 of 19 (68%) in 2000.

From an ethnic standpoint, the proportion of surgeons designated by the GMC as white British fell from 68% in 1999 to 43% in 2014. At the same time, European surgeons have increased from 9 to 19% overall and Asians from 14 to 29%, many of whom trained in the UK. There are now 21 Italian, 10 Greek, 7 German, 7 Polish, 5 Belgian and 4 French consultants working in the NHS. The number of Asian surgeons has increased from 14 to 29% (3.8-fold increase in absolute numbers), but 57 of the total 103 Asian surgeons are UK graduates. This reflects an increasing proportion of Asian students entering UK medical schools. Smaller groups from the Middle East and African countries essentially remained unchanged. With reference to non-European overseas graduates, there are 33 from India, 6 from Iraq, 6 from Pakistan, 4 from Egypt, 4 from South Africa and 2 from Syria together with 10 other nationalities represented. Only one surgeon trained in the USA and he practices in congenital heart surgery.

In 2014, the 20 CT Surgery National Training Number Specialty Training (ST3) posts were filled by 3 white British applicants (15%), 2 Europeans, 13 Asians (65%) and 2 of other origin. The spectrum
was similar in 2013 but 5 of the 20 posts remained unfilled through lack of suitable candidates.

Comparison with consultants in other surgical specialties together with cardiology and chest medicine shows a lower proportion of UK graduates in CT surgery (Table 3). The one exception is Obstetrics & Gynaecology where only 52% of the consultants are now UK graduates. In the closely allied medical specialty cardiology, 77% of consultants are UK graduates with only 8% from Europe.

**DISCUSSION**

These findings raise important concerns with implications for other surgical specialties [8]. Evidence suggests that political intervention following the Bristol Inquiry has had a negative effect on recruitment of UK medical graduates to cardiac and thoracic surgery. Although consultant numbers expanded by 83% during the study period, 59% of contemporary congenital heart surgeons, almost 50% of thoracic surgeons and 36% of adult cardiac surgeons are now overseas graduates. Currently, 25% of surgeons are older than 55 years and this group contains a significant proportion of the remaining UK-trained workforce. Because 55% of UK medical graduates but less than 5% of CT surgeons are female, the prospects for future recruitment are limited. Notably the tough, ‘Macho’ stereotypes associated with CT surgeons discourage women and a considerable number of men from entering the specialty [9].

Predictably, the beleaguered, high-pressure sub-specialty of congenital heart surgery has been hardest hit. An overall 55% expansion in consultant numbers during the study period occurred exclusively through a 188% influx of non-UK graduates. This comprised a 336% increase in European-trained surgeons and an 80% increase in other non-EU nationals. As a result, some congenital heart centres have no UK graduate surgeons.

Ten years ago the NHS was recognized to have inappropriately low rates of lung cancer resection [10]. This warranted an expansion (225%) in the specialized thoracic surgical workforce who increasingly use videoscopic minimally invasive techniques. These consultant posts were filled by a 388% increase in non-UK graduates, the majority from Europe. Similarly, a 65% expansion in CT surgeons who perform both heart and chest surgery was based predominantly on a 125% increase in non-UK graduates. Sub-specialization rightly continues to erode the combined role, which has been virtually obsolete in Europe and the USA for 10 years. The conclusion is that UK-trained males and females in general, now avoid cardiac or

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**Table 1:** Demographic spectrum of UK cardiothoracic (CT) surgeons by country of primary medical qualification 1999-2014

<table>
<thead>
<tr>
<th>Sub-specialty</th>
<th>UK graduate 1999</th>
<th>EEA graduate 1999</th>
<th>Other (IMG) graduate 1999</th>
<th>Total 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>All CT surgeons</td>
<td>145</td>
<td>17</td>
<td>30</td>
<td>192</td>
</tr>
<tr>
<td>Congenital surgeons</td>
<td>18</td>
<td>3</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>Adult cardiac surgeons</td>
<td>75</td>
<td>13</td>
<td>16</td>
<td>104</td>
</tr>
<tr>
<td>Thoracic surgeons</td>
<td>14</td>
<td>1</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>CT surgeons</td>
<td>27</td>
<td>0</td>
<td>4</td>
<td>31</td>
</tr>
</tbody>
</table>

EEA: European Economic Area; IMG: International Medical Graduates.

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**Table 2:** Comparative numbers of UK and overseas graduates in other medical and surgical specialties 2014

<table>
<thead>
<tr>
<th>Specialty</th>
<th>UK graduate</th>
<th>EEA graduate</th>
<th>IMG graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT surgery</td>
<td>201</td>
<td>58</td>
<td>76</td>
<td>335</td>
</tr>
<tr>
<td>Cardiology</td>
<td>787</td>
<td>80</td>
<td>159</td>
<td>1026</td>
</tr>
<tr>
<td>Chest medicine</td>
<td>554</td>
<td>42</td>
<td>155</td>
<td>751</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>174</td>
<td>24</td>
<td>57</td>
<td>255</td>
</tr>
<tr>
<td>Trauma and orthopaedics</td>
<td>1430</td>
<td>117</td>
<td>544</td>
<td>2091</td>
</tr>
<tr>
<td>Plastic surgery</td>
<td>244</td>
<td>36</td>
<td>79</td>
<td>359</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>417</td>
<td>36</td>
<td>116</td>
<td>569</td>
</tr>
</tbody>
</table>

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**Table 3:** Proportion of UK versus overseas graduates obtaining entry on the specialist register for CT surgery 2000–14

<table>
<thead>
<tr>
<th>Year</th>
<th>UK graduate</th>
<th>EEA graduate</th>
<th>IMG graduate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>13</td>
<td>68%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>2005</td>
<td>10</td>
<td>40%</td>
<td>7%</td>
<td>8%</td>
</tr>
<tr>
<td>2010</td>
<td>14</td>
<td>32%</td>
<td>22%</td>
<td>8%</td>
</tr>
<tr>
<td>2013</td>
<td>8</td>
<td>14%</td>
<td>38%</td>
<td>66%</td>
</tr>
</tbody>
</table>

Routes of Entry onto Specialist Register: CCT: Certificate of Completion of Training is the route via which specialty trainees with National Training Numbers are entered onto the Specialist register. EEA nationals may apply for direct entry to the Specialist register through mutual recognition of their specialist medical qualification from their home country. CESR: Certificate of Eligibility for Specialist Registration is the route for entry onto Specialist register for those doctors who have not followed an approved training programme. It was previously known as article 14. This is the route through which many international trainees gain entry. It is a rigorous process with a success rate of 50%.

was similar in 2013 but 5 of the 20 posts remained unfilled through lack of suitable candidates.
thoracic surgery as a career option. The inevitable result is that training posts are filled through immigration in the same way as other jobs that UK workers are not prepared to do.

Why is this once prestigious specialty of such disinterest to UK graduates? Firstly, most professionals prefer to work in a supportive environment [9]. Cardiac and thoracic surgery are high-risk specialties subject to continuous external scrutiny and publication of outcomes [2, 11]. Cardiac surgeons in particular struggle to maintain artificially low mortality rates in outdated facilities with poor team consistency and without basic circulatory support equipment made widely available in other European countries [2]. High-profile suspensions of numerous individuals and even whole congenital heart centres convey the image of a frankly hazardous career and poor lifestyle choice. Abbreviated training and sub-specialization have narrowed the scope of the specialty to a repetitive, less interesting range of operations. Many cardiac surgeons perform little more than coronary artery bypass grafts and aortic valve replacement. Unreasonably restrictive consultant job plans discourage teaching or research and less than 5% of CT surgeons perform little more than coronary artery bypass grafts and aortic valve replacement. Unreasonably restrictive consultant job plans discourage teaching or research and less than 5% of CT surgeons are designated ‘academic’. Fewer are prepared to delegate cases to trainees and mentorship is limited.

A recent US survey on recruitment of CT surgeons showed interest to depend upon exposure during student years, encouragement from strong role models and an interest in cardiovascular medicine [1]. Regrettably few NHS surgeons now recommend their specialty and publication of SSMD has influenced this [12]. The policy was introduced despite full knowledge of the widespread negative effects in four US states in the 1990s [13, 14]. One of these effects was a profound fall-off in recruitment of US graduates to CT surgery and of the quality of candidates [15]. Through the media SSMD convey the incontrovertible impression that one individual bears responsibility for all adverse postoperative outcome. This is equivalent to blaming the pilot for engine failure in an aircraft. Hence, public reporting is not a benign issue. It creates serious professional conflicts of interest simply because the direct route to low mortality is to avoid the sickest patients [16]. Other high-risk specialties have contributed to the debate. Executive Members of the Society of Neurological Surgeons state that ‘attribution of non-elective neurosurgical mortality to individual surgeons perform little more than coronary artery bypass grafts and aortic valve replacement. Unreasonably restrictive consultant job plans discourage teaching or research and less than 5% of CT surgeons are designated ‘academic’. Fewer are prepared to delegate cases to trainees and mentorship is limited.

How does the CT workforce compare with other surgical specialties and UK medicine in general? The GMC reports that 41% of current UK doctors are overseas graduates [17]. This figure is similar to that for CT surgeons in 1999, suggesting that the subsequent disproportionate rise in non-UK graduates emanates from the post-Bristol era. The most telling statistic is that entries onto the Specialist Register for CT Surgery fell from 68% UK graduates in 2000 to 14% in 2013. In turn, European graduate entries rose from 10 to 66% and NHS consultant positions are now commonly filled from Europe. The trend towards increasing numbers of overseas surgeons is less in other surgical specialties except for obstetrics and gynaecology where the risk of litigation and huge insurance premiums are prohibitive. The situation is also different from cardiology and thoracic medicine (Table 3).

What needs to change to improve the prospects for the future? First, the negative influence of SSMD must be recognized as a direct re-run of the US experience in the 1990s [13, 14]. In contrast to stated objectives, SSMD diverts from transparency and has disadvantaged both patients and the profession. The UK process was criticized by medical staff and patient groups alike [5, 6]. A letter from the Society of CT Surgery Executive to the membership on 16 June 2014 acknowledged ‘widespread discomfort within the profession and the inevitable impact of SSMD on patient care’ [18]. ‘Discomfort’ emanates from the fact that individual surgeons are unable to improve their working environment and are justifiably angry about accepting responsibility for deaths that they cannot influence. These are ‘failure to rescue’ deaths from a treatable postoperative complication that is not recognized early enough or treated appropriately [19]. These deaths are dependent upon hospital staffing and infrastructure, not the surgeon’s performance [19]. In turn, the quality of NHS infrastructure is at best variable and may be critically poor [20]. In the era of patient selection by multidisciplinary team review, inappropriate surgery or deaths from surgical errors are rare [21]. Nevertheless, we agree that the public has the right to see and understand outcome data and that disclosure of information is an ethical responsibility of the profession. The US hospital Star Rating system was derived in the light of clear negative effects of SSMD [14]. For an equivalent NHS rating system, centre-specific death rates should be reinstated together with other quality indicators. These might include waiting list deaths, operation cancellation rates, incidence of problems recorded on the WHO surgical check list, failure to rescue rates, blood usage indexed to case type, availability of circulatory support systems and use of locum medical and agency nursing staff. Temporary staff are expensive, preclude team consistency and predispose to failure to rescue events through lack of familiarity with centre structure and process.

Next, in any industry the direct route to interest and growth is through innovation. Innovators challenge the status quo and take intelligent risks to make progress. Contemporary CT surgery strives to improve outcomes against greater comorbidity at both limits of the age spectrum. Whilst concerned about disinterest from UK graduates, we acknowledge the massive contribution made by pioneering immigrant surgeons from South Africa, Europe and Egypt who were attracted to the UK by the exciting developments during the 1960s. They introduced cardiac transplantation, groundbreaking congenital heart operations and the Ross procedure. They have all retired and none believe pioneering work to remain feasible in the prevailing environment of defensive practice. CT trainees historically accounted for a plethora of Royal College of Surgeons (England) research grants, but there has not been a single application from the specialty in the last 3 years. Innovation attracts high-quality candidates. Over-regulated working conditions do not.

Lastly, each author worked a 100 h week. The USA expects at least 80 h per week from trainees but the UK limits this to 48 h [16]. Through political correctness the original 30 000 h of CT training has evaporated to 6000 h with much less operative experience. Given the intimidating consequences of SSMD and an increasing tendency to prioritize work-life balance, UK graduates are less likely to contemplate surgery as a career option. This is bad for patients and the profession.

So, is UK CT surgery ‘safe and sustainable’ in the prevailing environment? Evidence suggests that it is not. Urgent action is needed to resolve the issues and other specialties should anticipate problems if publication of SSMD remains in its current form.

**LIMITATIONS OF THE STUDY**

The data are observational and were verified from multiple sources; hence there are no obvious sources of bias. The records were more comprehensive for the 2014 date with SCTS, GMC and...
HSCIC databases analysed. The composition of the CT surgical workforce is changing continuously but we only have two time points to compare. Because many of the UK graduate surgeons were already present in the specialty in 1999, their imminent retirement may reduce the proportion dramatically in the next 10 years. Equally, we cannot predict whether the number of female surgeons will increase given the predominance of female UK medical students. However, there is no indication from our figures that this will happen [22].

Conflict of interest: none declared.

REFERENCES


Has cardiothoracic surgery lost its attraction?

Leslie Hamiltonab,*

* Corresponding author. Freeman Hospital, Newcastle upon Tyne NE7 7DN, UK. Tel: +44-191-2137309; fax: +44-191-2231175; e-mail: leslie.hamilton@nuth.nhs.uk (L. Hamilton).

Keywords: Cardiothoracic • Trainee • Recruitment • Outcomes

Is our specialty becoming less attractive to trainees? Having looked at the situation in the UK, Westaby et al. [1] certainly think so. In a remarkable piece of work, they used a number of data sources to identify the country of primary medical qualification of cardiothoracic surgeons in the UK, and analysed the trend from 1999 to the present. Looking at those gaining entry onto the