SCTS/SAC CARDIOTHORACIC SURGERY WORKFORCE UPDATE 2018

Section Title: CARDIOPULMONARY TRANSPLANTATION & MCSD THERAPY
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Current Arrangements

Advanced heart and lung failure therapies including transplantation, and bridging to transplantation with mechanical circulatory support devices (MCSD) are provided at seven designated UK centres (Table). These advanced heart and lung failure teams consist of surgeons, physicians, transplant co-ordinators and allied staff (social workers, physiotherapists, psychologists and palliative care staff).

	Adult		Paediatric	
	Heart Transplant	Lung Transplant	Heart Transplant	Lung Transplant
The Freeman Hospital, Newcastle	√	√	√	√
Golden Jubilee Hospital, Glasgow	√	-	-	-
Great Ormond Street, London	-	-	√	√
Harefield Hospital, Middlesex	√	√	-	-
Royal Papworth Hospital, Cambridge	√	√	-	-
Wythenshawe Hospital, Manchester	√	√	-	-

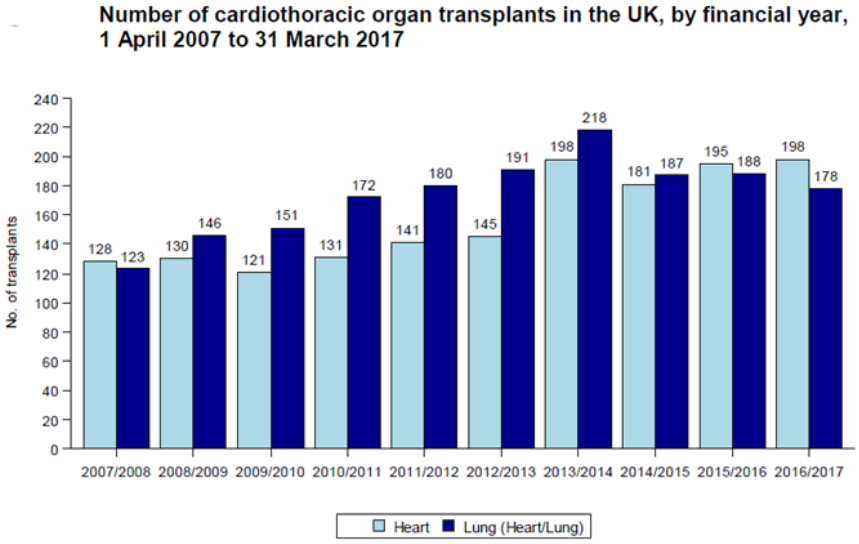
Consultant Cardiothoracic Surgeons at these tertiary centres are involved throughout the patient pathway including:

- assessment of patients with advanced heart and lung failure
- the transplant or MCSD implant operation
- early post-operative care
- dealing with early and late surgical complications of transplantation and MCSD therapy

They will also undertake elective and emergency cardiothoracic surgery alongside their commitment to the transplant program.

Some Consultant Surgeons are also involved in donor assessment and retrieval of cardiothoracic donor organs as part of the UK National Organ Retrieval Service.

Over the last decade, there has been a significant increase in the number of cadaveric donors in the UK which is reflected in a corresponding rise in annual heart and lung transplant activity (Figure).



Heart and lung transplant procedures are demanding since they are often performed as emergencies out-of-hours. Over the last decade, these have become even more challenging because:

1) allocation of donor organs are increasingly prioritised for the clinically more urgent and therefore sicker patients
2) a growing number of heart recipients have undergone previous cardiac operations, or have been implanted with ventricular assist devices as a bridge to transplant making their surgery prolonged and technically difficult.
3) bilateral sequential lung transplant, instead of single lung transplant, has become the standard of care for most end-stage lung conditions as it is associated with superior short and long term outcomes despite the initial surgery being of greater magnitude.

As a result, heart and lung transplant procedures have become more protracted requiring sustained concentration and stamina from the surgical team despite the operations taking place most often through the night. Furthermore,
the close monitoring of early post-transplant survivals in the UK puts added pressure on transplant teams.

Workforce Qualification

In the UK, most heart and lung transplant operations are performed by Cardiothoracic Surgeons, although a small number of General Thoracic Surgeons also perform lung-only transplants.

Currently, there are three 18-month Peri-CCT surgical transplant Fellowships in the UK that provide comprehensive training in advanced heart and lung failure therapies to provide future transplant Consultants. These specialist Fellowships are offered by The Freeman Hospital, Royal Papworth Hospital and Wythenshawe Hospital.

Technology Innovations

There have been major advances in MCSD in the last decade. As survival rates with MCSD therapy improve, clinically unstable patients are increasingly bridged to heart or lung transplants using MCSD. In many countries, implantable left ventricular assist devices are also used as a permanent treatment for patients in advanced heart failure who are ineligible for transplant. Even though this indication is currently not funded in the UK, it is likely that it will eventually become the standard of care.

In terms of donor organ retrieval, there has been intense interest in the development of machines for *ex-vivo* donor organ perfusion after hearts or lungs have been retrieved. Machine perfusion of donor organs can maintain organ viability for longer periods than cold ischaemic storage, has the potential to improve donor organ quality and may even permit reconditioning of suboptimal organs that have initially been turned down for transplantation to be transplanted successfully, thus increasing donor organ utilisation. It may also allow for other therapies to condition the organ prior to implantation to reduce rejection tendencies. It is likely that the use of these novel technologies will call for more Consultant surgeon involvement in donor organ management.

VISION FOR THE FUTURE

National Organ Retrieval Service (NORS) Scouts

Between April 2013 and March 2014, the Cardiothoracic Transplant Advisory Group piloted a NORS "*Scout*" program. This involved sending a trained member of the cardiothoracic retrieval team, the NORS "scout", to the donor hospital to assist with early donor assessment and donor optimisation once consent for organ donation had been obtained. Donor heart utilisation rate in scouted donors increased from 27% to 44%.

An external review of the UK NORS Scout program concluded that it significantly increased donor heart utilisation rate and heart transplant numbers, and recommended that this should become a formally commissioned service. A business case is being put together for NHS Blood & Transplant to consider.

The Scouts are likely to be made up of a new group of allied healthcare professionals who will be trained in advanced donor care including invasive haemodynamic monitoring, trans-oesophageal echocardiogram, fibre-optic bronchoscopy and management of fluids and vasoactive agents. A national curriculum for NORS Scout will have to be agreed and a training faculty will be appointed.

Each of the cardiothoracic transplant units will probably have to recruit sufficient Scouts to provide a 24/7 service. This will represent an exciting new opportunity for allied healthcare professionals with an interested in advance cardiovascular care.

Taking Organ Transplantation to 2020

NHS Blood and Transplant published a strategic document entitled *Taking Organ Transplantation to 2020* containing of a series of recommendations aiming to enable the UK to match world-class performance in organ donation and transplantation.

The goals include:

1. Increase consent for organ donation from 57% to >80%
2. Increase the rate of deceased donors per million population (pmp) from 19.1 to 26 pmp
3. Increase organ utilisation rate by 5% - i.e. increase the donor heart and lung utilisation rate from the current 30% to 35%
4. Increase the rate of deceased donor transplant rate from 49 pmp to 74 pmp

Presumed Consent For Organ Donation

In the current system, people who wish to donate their organs after death have to sign up as a donor on the NHS Organ Donor Register and tell their family, i.e. opting-in.

- In December 2015, Wales introduced a system of presumed consent to organ donation; those who do not wish to be an organ donor can opt out by registering their decision
- Scotland is planning to introduce similar opt-out legislation for organ donation by 2021
- In October 2017, the Prime Minister announced a consultation on changing to an ‘opt-out’ system of *organ donation* in England,

The introduction of appropriate initiatives and changes to the law could potentially result in a 50% increase in heart and lung transplant activities over the next 5-7 years.

Requirement for Future Cardiothoracic Transplant Surgeons

With the initiatives to increase donor organs numbers and the greater use of MCSD therapy for patients with end-stage heart and lung diseases, an expansion of a suitably trained surgical workforce will be required to deliver these highly specialised clinical activities.

Workforce Survey

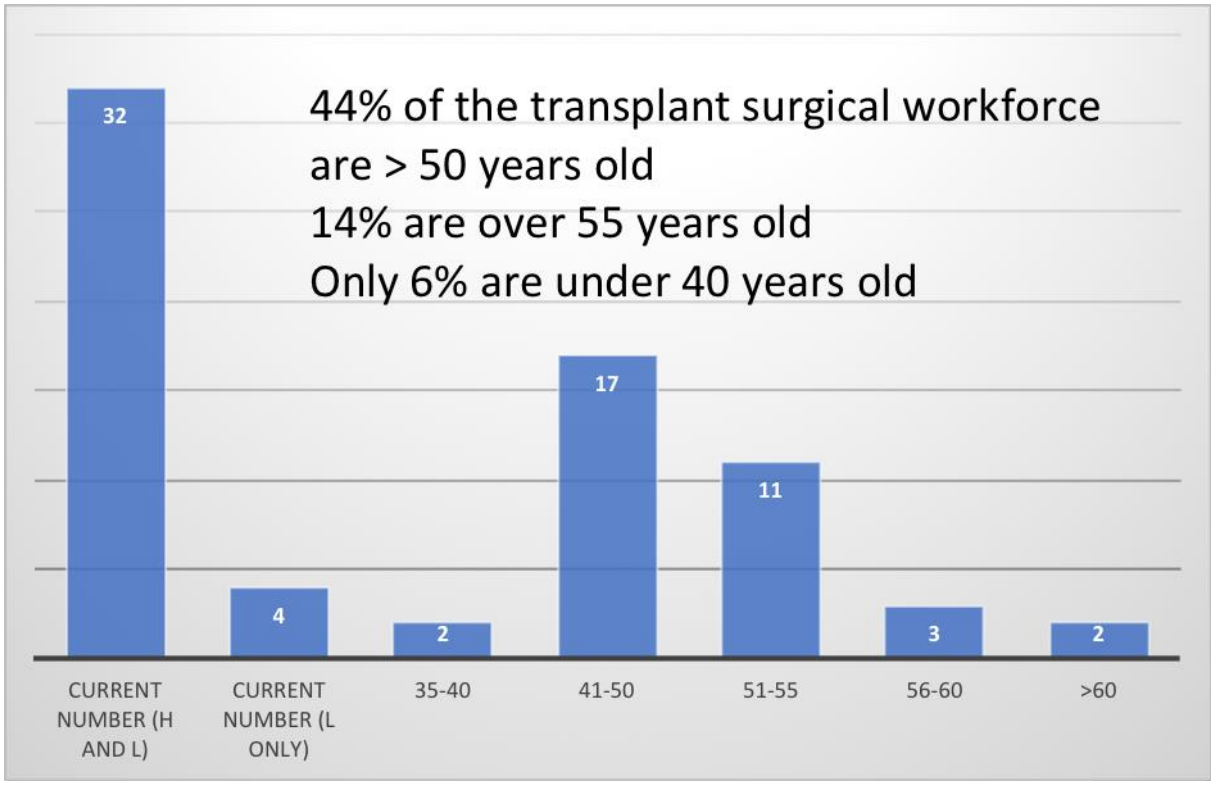
A workforce survey was conducted by direct questioning of each Director of the transplant centres in December 2017.

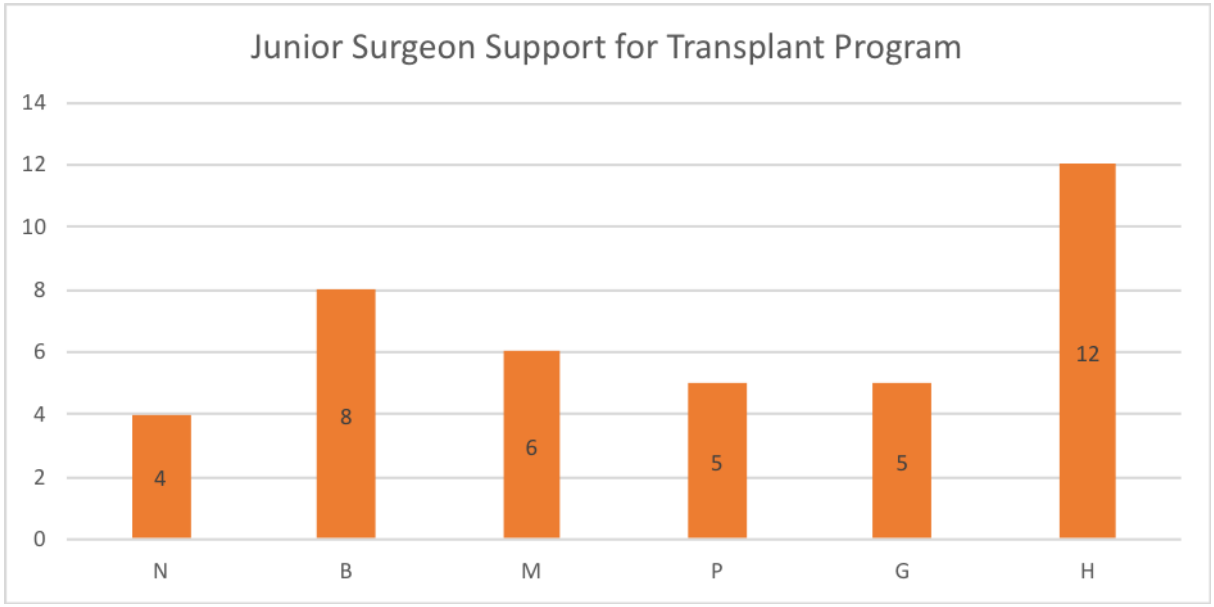
There are currently 36 cardiopulmonary transplant surgeons. 4 of these are thoracic surgeons performing only lung transplantation.

44% of the current Consultant transplant surgical workforce is aged over 50 years old and 14% over 55 years old. Only 6% of surgeons currently practicing transplantation are under 40. Most are job planned to spend 8-10 hours per week on this discipline alongside their routine and emergency commitments in general cardiothoracic surgery.

The units report a likely recruitment need of 4 new posts in the next 2 years and 6 new posts between 2 and 5 years from now. This however maintains the status quo and does not account for the anticipated major increases in activity that are likely through new legislation on donation and the applications of new technologies to increase organ utilisation.

Aside from the anticipated posts to be advertised by individual centres longer term recruitment based on the likelihood of transplant surgeons retiring or leaving the transplant rota as they advance in their career is shown in the graphs below. Given the majority of current surgeons are in their fifties there will be a projected need for substantial recruitment to the discipline from 2023 onwards and recruitment to training posts will need to anticipate this demand in the near future.


44% of the transplant surgical workforce are > 50 years old
14% are over 55 years old
Only 6% are under 40 years old
32
4
2
17
11
3
2
CURRENT NUMBER (H AND L)
CURRENT NUMBER (L ONLY)
35-40
41-50
51-55
56-60
>60


Junior Surgeon Support for Transplant Program
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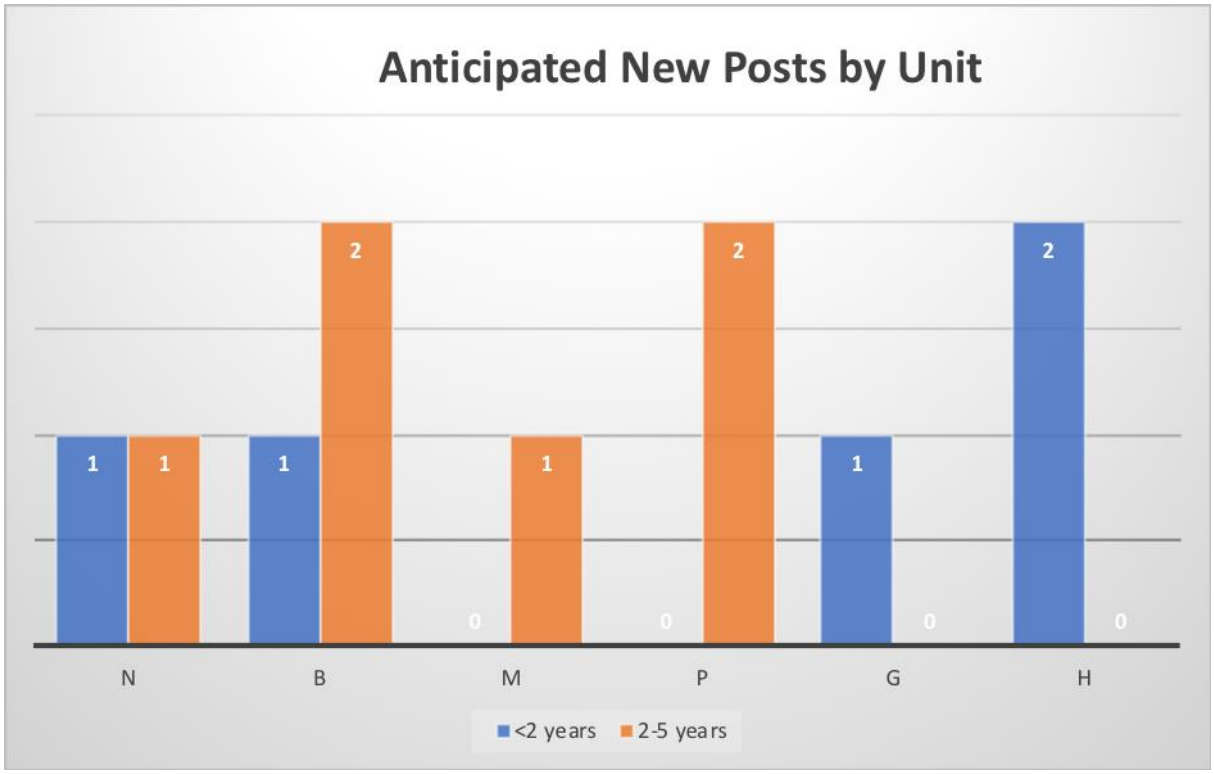
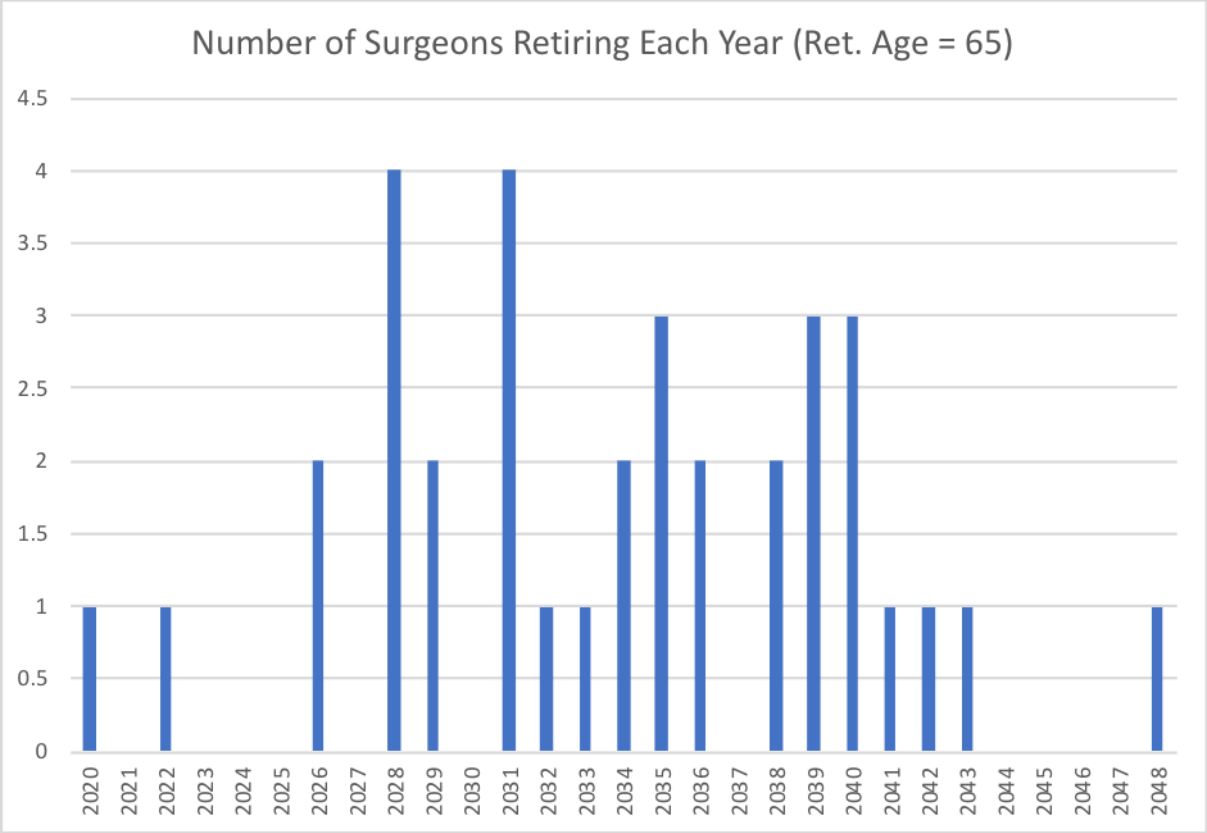


Projecting forwards and assuming all current transplant surgeons remain in post, don't choose to leave the rota or retire early the likely need for future transplant surgeons can be illustrated in the following two graphs giving the demand for new surgeons to 2048. This does not take into account additional staffing requirements in addition to this being mandated by an increase in activity. Recruitment to the Peri-CCT fellowship program will require an 18 month lead time.


Number of Surgeons Retiring Each Year (Ret. Age = 65)
4.5
4
3.5
3
2.5
2
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0.5
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2020
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