



Vascular Surgery UK Workforce Report 2014

*Results of a Survey of the Consultant Vascular Surgery
Workforce in the UK*

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On behalf of the Council and Membership of the Vascular Society of Great Britain & Ireland

Foreword

Workforce planning is the process by which an organisation ensures it has the right number of employees with the right knowledge skills and behaviours in the right place, at the right time. Bodies such as the Centre for Workforce Intelligence (CfWI) are working in conjunction with the Royal Colleges, Specialty Associations and the National Health Service to plan for the future needs of the health service. Systems can be implemented now to try and ensure we have the workforce needed in the future¹. Workforce plans are the foundation that resource management activities such as recruitment, selection, orientation, training, and retention are built upon.

There are many factors that may impact on the shape of our vascular surgery service in the future, and the workforce needed to provide it. These include: reconfiguration of services; advances in healthcare practice; financial and political decisions. The Vascular Society of Great Britain & Ireland made recommendations on the standards for a vascular surgery service in their document “The Provision of Vascular Services 2012”². The Vascular Society has also made recommendations on the standards for Specialist Training in Vascular Surgery and Vascular Surgery Training Centres³. Of course, any planning must recognise the uncertainty of the future, but by using good intelligence robust estimates can be made.

Vascular Surgery became a new specialty in 2013 and represents one of the smaller physician specialty workforces, yet we treat a disease that is the number one killer in the United Kingdom and affects the fastest growing segment of the nation’s population, i.e. atherosclerosis in the elderly. Vascular Services have evolved to incorporate the management of a vast array of conditions affecting the body’s vascular system, including the arteries, veins, and lymphatics. Like the complex network of blood vessels throughout the body, so too there are many complex interactions between vascular surgeons and other specialists who manage some of the most common and morbid conditions that affect our population such as stroke, heart disease, diabetes, trauma, and cancer. The Vascular Society in conjunction with the Colleges and Commissioning Groups has produced guidance on the scope of vascular disease as managed by vascular surgeons⁴. Thus, as we anticipate the changing demographics and treatable disease patterns over the next 40 years, we consider it inevitable that our specialty will be in short supply at a time when demand for our services is growing rapidly.

Before we can determine plans for the future we must have a clear understanding of the present situation. This paper discusses the current evidence, including that obtained from a survey of the vascular surgery workforce in 2013, and presents a strategy for the future.

Executive Summary

The Vascular Surgery UK Workforce Survey was conducted on behalf of the membership of our Specialty Association, the Vascular Society of Great Britain & Ireland.

We received completed surveys from 352 Consultant Vascular Surgeons in the United Kingdom in 2013. We analysed the completed surveys by Region and Postgraduate Deanery in the UK so that the results reflect both Regional and National contemporary practice in Vascular Surgery.

The Vascular Society of Great Britain & Ireland made recommendations on service re-configuration in *The Provision of Vascular Services 2012*². From our survey there is evidence of re-configuration of inpatient Vascular Surgery Services across the United Kingdom with specialist Vascular Surgeons within all regions joining together to provide emergency duty rotas in central hub hospitals with the necessary facilities and inpatient services. Our survey also provides evidence of a move towards fewer high-volume centres catering specifically for the management of the most complex vascular conditions.

The National Vascular Registry records 458 surgeons in UK as conducting AAA repair, which many consider to be an index procedure for a specialist vascular surgeon and an essential skill for a Vascular *Generalist* equipped to manage un-selected Vascular Surgery Emergencies. Assuming a UK population circa 63 million, this suggests that the current ratio of vascular surgeons equipped to manage un-selected Vascular Surgery Emergencies is approximately 1 per 137,000 population. We anticipate significant upward pressure on the numbers of consultant vascular surgeons needed to provide the current level of service in the future towards 1 per 100,000 population for the following reasons:

- Rebalancing the workforce gender ratio will result in increased levels of part-time working, job-sharing, and career breaks.
- Dual-consultant operating is becoming more frequent for reasons of patient safety and less dependency on trainees.
- Overstretched consultant job-plans, emergency duty rotas, and overall working-hours need to be bought within the recommended safe limits.
- Provision of a 7-day service will require increased numbers of consultants on-duty at weekends, with obligatory compensatory rest periods.

Consultant Vascular Surgeons working in the UK are 9-times more likely to be men than women. This gender imbalance is not specific to Vascular Surgery as it is seen across a range of surgical specialties and indeed to a lesser degree in the total NHS Consultant Workforce in general. This is an imbalance that must be addressed and more women than men were appointed to ST3 in Vascular Surgery in 2013.

The vast majority of Vascular Surgeons work full-time for the NHS. The vast majority also work more than the recommended standard consultant contract of 10 Programmed Activities per week. The majority estimate they work more than 50 hours per week, and more than one-fifth report that they work more than 60 hours per week. Many Vascular Surgeons are providing emergency duty cover more frequently than is considered safe or sustainable by working a 1 in 4, or more frequently.

More than 80% of Consultant Vascular Surgeons work in Large Acute Hospital NHS Trusts in teams of 4 or more (range 2 to 10). However, a significant minority (17%) of Vascular Surgeons work in smaller teams of 3, or less and often lack the essential services required to assess, diagnose, and treat Vascular Emergencies 24/7. A significant minority of Consultant Vascular Surgeons work in Level 1 Trauma Centres and as such also provide emergency support for Vascular Trauma. Some of these vascular surgeons also participate in general trauma duty rotas. Dual-consultant operating for major procedures is becoming increasingly common for reasons of patient safety, and because less trainees are available to provide assistance. This will require an increase in consultant numbers.

The vast majority (over 90 percent) of Consultant Vascular Surgeons perform all the major index Vascular Surgery procedures and are thus equipped to manage un-selected Vascular Surgery Emergencies. Whilst the majority of vascular surgeons perform endovascular aneurysm repair, less than one-fifth conduct peripheral endovascular procedures. The training programme for the new specialty of vascular surgery includes imaging and endovascular skills. With the introduction of new technologies, such as robotics, existing consultants will require additional time in their job plans to acquire these new skills.

The majority of Vascular Surgeons report that they enjoy and feel satisfied in their job. Unfortunately, a majority also feel stressed at work on a weekly basis due to long-hours and fulfilling a demanding acute surgical role with a significant emergency workload. This has significant implications for the mental and physical health of our Workforce and if not addressed could result in *burn-out* in some cases. A good example of this problem is that 35% of respondents intend to retire within the next 10 years.

Recommendations

On the basis of the data collected from this survey which reflects the views of 352 consultant vascular surgeons, working in 95 Acute NHS Trusts, and reporting from all regions of the United Kingdom, the Vascular Society of Great Britain and Ireland makes the following recommendations.

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- **An increase in the number of Consultant Vascular Surgeons in the United Kingdom will be required within 10 years to accommodate changes in workforce with respect to gender rebalance, dual-consultant operating, and compliance with mandatory hours of rest.**
 - **The recommended provision of a comprehensive 7-day elective and emergency service for vascular surgery will require an increase the overall number of Consultant Vascular Surgeons.**
 - **Additional training numbers are urgently required to fill the vacancies created by the 35% of Consultant Vascular workforce who intend to retire within the next 10 years.**
 - **Training a new Consultant Vascular Surgeon takes a minimum of 10 years from graduation, including 6 years of specialty training. If we are to meet the minimum projections of future demand we need an immediate increase in National Training Numbers (NTNs) allocated to Vascular Surgery from 20 per year to 26 per year, based on on a requirement for 36 additional Consultants. We would need an increase of 136 Consultants to provide a ratio of 1 Consultant per 100,000 population, as found in many other countries, i.e. a doubling of NTNs to at least 40 per year.**
 - **Acute NHS Trusts who wish to host a vascular surgery service must provide 24/7 availability of the facilities necessary to assess, diagnose, and treat vascular emergencies. To provide 24/7 vascular emergency care in a safe and sustainable way we will need larger teams working in fewer hospitals, ideally linked with acute stroke, cardiothoracic, renal and major trauma services.**
 - **The new Specialty Training Programme for Vascular Surgery has been designed to ensure that future Consultant Vascular Surgeons have all the appropriate diagnostic, medical, open and endovascular interventional skills to deliver a modern vascular surgery service.**
 - **We need to make a career in vascular surgery more family friendly with reduced hours, less unscheduled care, and more scope for part-time working.**

1. Introduction

Workforce planning is the process by which an organisation ensures it has the right number of employees with the right knowledge skills and behaviours in the right place, at the right time. Bodies such as the Centre for Workforce Intelligence (<http://www.cwfi.org.uk>) are working in conjunction with the Royal Colleges, Specialty Associations and the National Health Service to plan for the future needs of the health service so that we can implement systems now to ensure we have the workforce needed for service provision. Workforce plans are the foundation on which resource management activities such as recruitment, selection, orientation, training, and retention are built. There are many factors which may impact of the shape of our vascular surgery service in the future and the workforce needed to provide it, these include: reconfiguration of services; advances in healthcare practice; financial and political decisions. Planning must recognise the uncertainty of the future but using good intelligence, robust estimates can be made.

Vascular Surgery became a new specialty in 2012 and represents one of the smaller physician specialty workforces, yet we treat a disease that is the number one killer in the UK and affects the fastest growing segment of the nation's population, atherosclerosis in the elderly. Vascular Services have evolved to incorporate the management of a vast array of conditions affecting the body's vascular system to include the arteries, veins, and lymphatics. Like the complex network of blood vessels throughout the body, so too there are many complex interactions between vascular surgeons and other specialists managing some of the most common and morbid conditions that affect our population such as stroke, heart disease, diabetes, trauma, and cancer. Thus, as we anticipate the changing demographics and treatable disease patterns over the next 40 years, **it seems inevitable that our specialty will be in short supply at a time when demand for our services is growing rapidly.**

Before we can determine plans for the future we must have a clear understanding of the present situation. This paper discusses the current evidence, including that obtained from a survey of the UK vascular surgery workforce in 2013, and presents a strategy for the future.

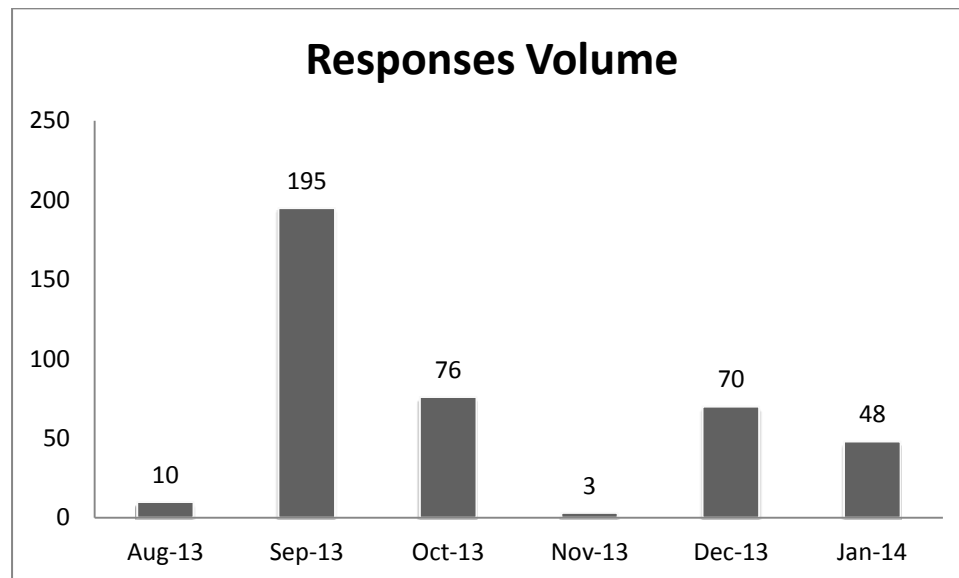
2. Methodology

The Vascular Surgery UK Workforce Survey was conducted on behalf of the membership of our Specialty Association, the Vascular Society of Great Britain & Ireland and in conjunction with the Specialty Advisory Committee (SAC) for Vascular Surgery of the Joint Committee for Surgical Training (JCST).

2.1 Questionnaire

The Vascular Surgery United Kingdom Workforce was designed using a common web-survey platform (SurveyMonkey®) and contained 86 questions covering the following domains: Personal Characteristics (Q1-6); Job Characteristics (Q7-38); Vascular Surgery Practice (Q39-52); Hospital Resources (Q53-68); Professional Activities (Q69-77); Work-life Balance (Q78-86), **Appendix 1**. All Ordinary-Members of the Vascular Society GB&I, our specialty association, who were based within the UK were invited to participate in the survey. Invitations from the Vascular Society GB&I were sent to the registered email address of 450 Ordinary Members in September 2013, and reminders were sent in December 2013 and January 2014. As of January 2014 we had received 402 completed surveys, of which 352 (88%) were completed by Consultant Vascular Surgeons currently practicing in the United Kingdom, and this represented our cohort for analysis.

Figure 1: Survey Response Volume Chronologically.



We analysed completed surveys from 352 Consultant Vascular Surgeons in the United Kingdom. Assuming a UK population circa 63 million^{5,6} this would equate to a ratio of 1 Vascular Surgeon per 179,000 population or only 5 Vascular Surgeons per million population.

We cannot assume that all practicing Vascular Surgeons in the UK are members of the Vascular Society nor can we assume that all practicing members have completed the survey. Therefore, other sources of information must be considered. The National Vascular Registry “2013 Report on Surgical Outcomes Consultant-level Statistics”⁷ records that 458 surgeons in UK were conducting AAA repair and a slightly smaller number (429) were listed as doing CEA. With a UK population circa 63 million, this suggests that currently the ratio of vascular surgeons to capita population is between 1 per 137,000 population and 1 per 147,000 population. The Vascular Society recommends a minimum of 1 vascular surgeon per 150,000 population. For large tertiary centres this ratio may need to increase to 1 per 100,000, due to added complexity of case load².

We looked at the survey responses volume by UK Nation, to consider the ratio of consultant vascular surgeons, per capita population, across the United Kingdom. The Office for National Statistics gives the population for the Nations of the United Kingdom as of mid-2010 to be as follows: Scotland, 5.3 million; Wales, 3 million; Northern Ireland, 1.8 million; England, 52.6 million⁶. To determine whether there are sufficient numbers of Consultant Vascular Surgeons to deliver a safe level of Vascular Surgery Service across the respective UK Nations, we carried out weighted-capitation transformation based on assumed ideal numbers of consultant vascular surgeons’ per capita population, as follows: 1 per 150,000 as POVS (minimum number); 1 per 137,000 as number registered by NVR (surgeons in UK conducting AAA repair); 1 per 100,000 as POVS (number for tertiary centres). That would suggest that in the United Kingdom we need between 418 and 627 Vascular Surgeons. Based on these predictions the number of vascular surgeons needed in for each of the UK Nations and the UK Total are shown in **Table 1**.

Table 1: Estimation of Vascular Surgeons per Capita Population by UK Region.

Weighted Capitation	Scotland	Wales	Northern Ireland	England	Greater London	TOTAL
1 per 150,000	35	20	12	351	55	418
1 per 137,000*	39	22	13	384	61	458
1 per 100,000	53	30	18	526	83	627

Based on available data, if we accept the minimum numbers to deliver a safe service, there would appear to be significant under-provision of Consultant Vascular Surgeons in Scotland, Wales, and Northern Ireland. Whilst current numbers in England may provide for a

minimum service at present, there would appear to be relative under-provision in the Greater London Region. However, these assumptions must be interpreted with caution as they do not take into account other factors which may influence the burden of cardiovascular disease such as population age, lifestyle, and socio-economic deprivation.

The population of the UK is projected to increase by 4.9 million over the next 10 years from 62.3 million at mid-2010 to 67.2 million at mid-2020, an annual average rate of growth of 0.8 per cent. It is projected that the UK population will be 73.2 million at mid-2035, a total increase of 10.9 million over the next 25 years⁵.

To accommodate predicted population expansion over the next 10 years we may need an additional 36 Consultant Vascular Surgeons, to maintain the current level of service.

2.2 Vascular Surgeons and Vascular Services in other Countries

In developed countries, both the number and complexity of vascular surgery procedures per capita population is increasing year-on-year. In the United States in 2008, it was reported that there were 2783 board certified Vascular Surgeons for a population circa 300 million, giving them an estimated ratio of Vascular Surgeons per capita population of approximately 1 per 108,000 population⁹. In the United States the Healthcare Cost and Utilisation Project Nationwide Inpatient Sample demonstrates a net increase in vascular surgery procedures of 5% (490 to 515 procedures per 100,000 capita) in the per capita rate for all adults. Based on the assumption that trends in age-specific rates remain constant, they have predicted inpatient vascular surgery workload to increase (compared to 2008) by 18% by 2015, 34% by 2020, and 72% by 2030⁹. France, a close European Neighbour, by comparison to the UK has a similar population size, demographic, and socio-economic status. In France in 2011 it was reported that there were 611 active vascular surgeons for a population of circa 65 million, giving them an estimated ratio of Vascular Surgeon per capita population of approximately 1 per 107,000 population¹⁰. They too recognised a substantial increase in vascular surgery procedures per capita population and predict a 61% increase in major vascular surgery interventions by the year 2030. Combined with the effect of an increasing and increasingly aged population, they predicted they would need a 30% (circa 183) increase in numbers of vascular surgeons. Both studies recognise a dramatic increase in vascular workload and recommend that vascular surgery training process would need to adapt to ensure an adequate number of trained vascular surgeons are available to provide quality vascular care in the future. Obviously there are significant differences between the healthcare systems in these comparator countries, which make direct comparison difficult, but despite their obvious concerns both countries have significantly greater numbers of vascular surgeons per capita population than the United Kingdom.

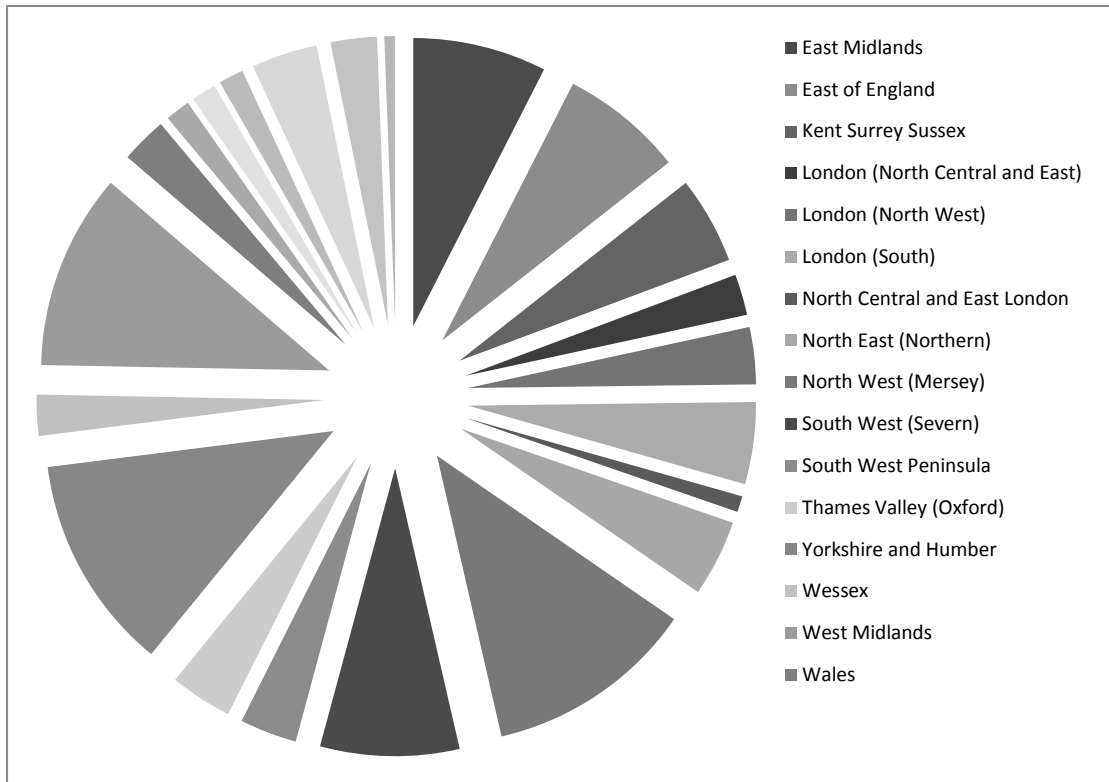
To provide a similar level of service to comparator countries such as the United States or France we may need an additional 136 vascular surgeons in the United Kingdom.

Geographical Distribution

We analysed completed surveys by each Postgraduate Deanery in the UK so that our results reflect both Regional and National practice in Vascular Surgery in the East Midlands, East of England, Kent Surrey & Sussex, London (North Central, North West, South, Central and East), North East (Northern), North West (Mersey), South East (Severn), South West (Penninsula), Thames Valley (Oxford), Yorkshire & Humber, Wessex, West Midlands, Wales, Scotland (East, North, South East, West), and Northern Ireland. Consultant Vascular Surgeons report from 95 NHS Trusts across the length and breadth of the UK, **Figure 1**.

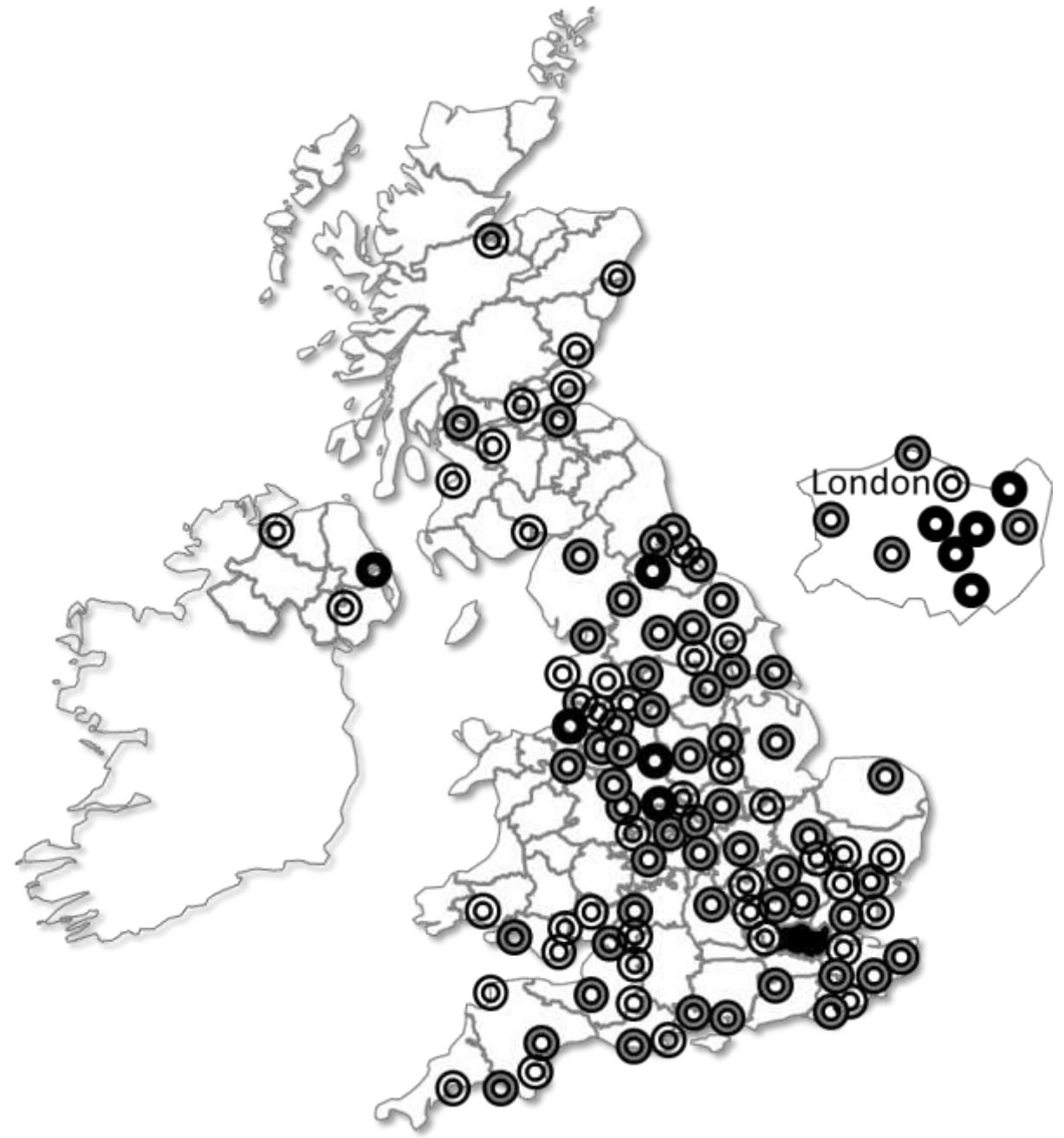
The National Vascular Registry “2013 Report on Surgical Outcomes Consultant-level Statistics”⁷ records 111 NHS Trusts in the UK as registered to perform major vascular surgery (Aneurysm Repair) in 2012. We received returns from Consultant Vascular Surgeons working in 95/111 (86%) NHS Trusts. There has been significant and ongoing reorganization of vascular surgery services in the United Kingdom since 2012 and many NHS Trusts who had traditionally provided inpatient vascular surgery services, in particular small teams of 3 or less or single-handed consultant surgeons, no longer provide inpatient vascular surgery. This has led in many regions to the creation of clinical networks with inpatient vascular surgery services being provided in central “hub” hospitals by large teams (8, or more) and outreach outpatient and day-case services being provided in the regional “spoke” hospitals by vascular surgeons from the hub on a regular basis. However, there is significant regional variation in the speed with which this is occurring, often due to the competing interests of the Trusts involved.




Figure 1: Distribution Vascular Surgeons by Postgraduate Deanery of the United Kingdom.



The Vascular Society of GB&I is the Professional Association which represents Vascular Surgeons working in the British Isles. Since 2008 Vascular Surgeons have been expected to register with the National Vascular Database (now renamed the National Vascular Registry - NVR) and submit outcomes activity and outcomes data for the major index vascular surgery procedures they perform. The Vascular Society has written to individual surgeons and the Chief Executive of all NHS Trusts in the United Kingdom to ensure they are aware that this is considered an essential component of clinical governance and professional behavior. Therefore we can expect that any Vascular Surgeon currently practising in the United Kingdom will be registered with the NVR.

Figure 2: Geographical Distribution of Vascular Surgery Services in UK.

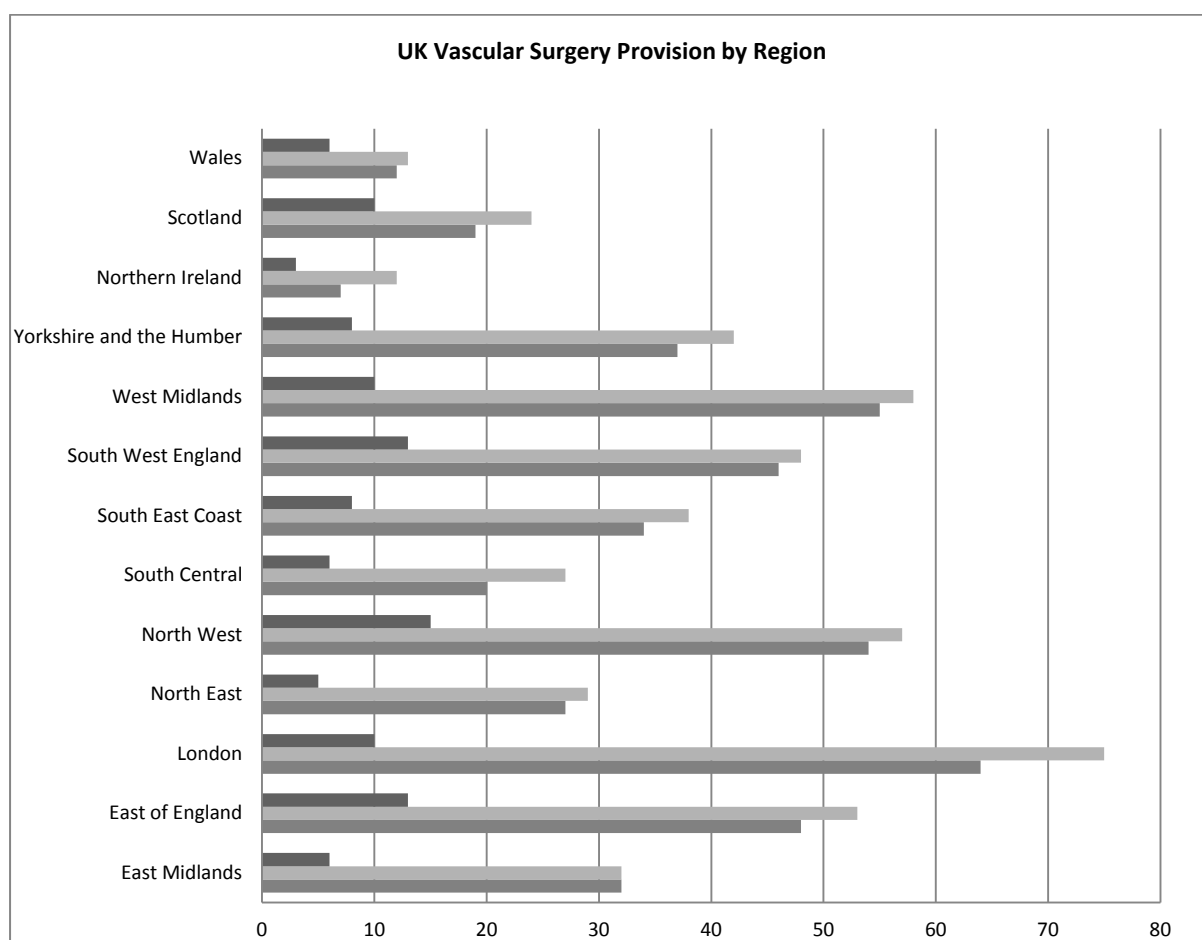


NHS Trust number of vascular surgeons: 3, or less , 4 to 7 , 8, or more 

Data derived from NVR⁷ and reflects practice in 2012 with the regional number of Surgeons(Surgeons performing AAA), and NHS Trusts with registered vascular surgeons.*

There is significant regional variation in the distribution of inpatient vascular services across the UK. In part this variation can be explained by population density with greatest density of population associated with the greatest number of vascular surgeons and NHS Trusts with registered vascular surgeons.

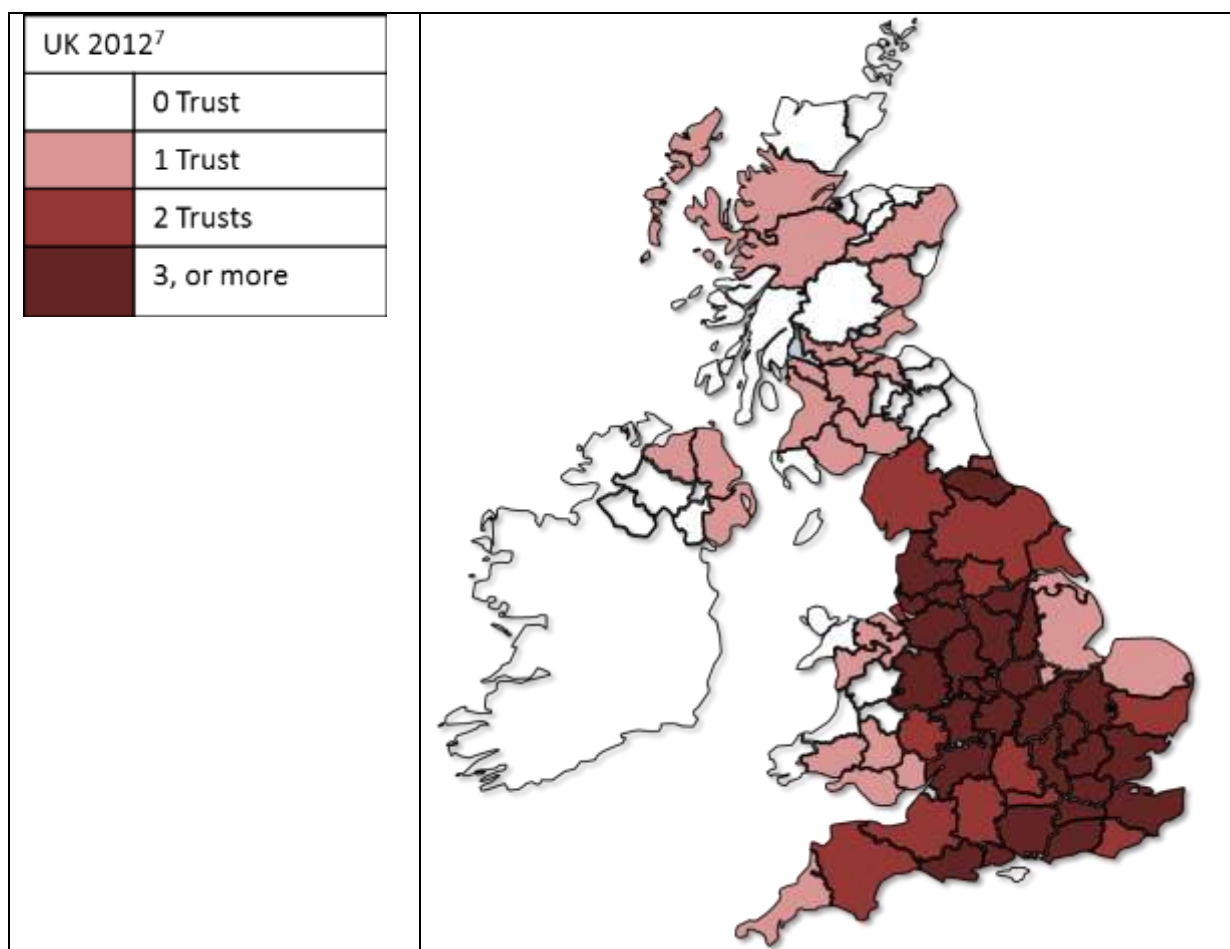
Figure 3: UK Vascular Surgery Service Provision of Surgeons and Trusts per Region.



Data derived from NVR⁷ and reflects practice in 2012 with the regional number of Surgeons, Surgeons(Surgeons performing AAA), and NHS Trusts with registered vascular surgeons.*

As expected the greatest numbers are seen in London, the West Midlands, and the North West. There is significant variation between regions in the number of NHS Trusts with registered vascular surgeons. It is also clear that in some regions there are a large number of relatively small teams (3, or less) of vascular surgeons working in separate NHS Trusts in quite close geographical proximity to each other. This is most acute in the East of England, North West, South Central, South West, and all of the home-nations (Scotland, Wales, and Northern Ireland). The POVS document has advised reconfiguration of vascular services to a smaller number of NHS Trusts with larger teams (6, or greater) of vascular surgeons.

Figure 4: Geographical Density of NHS Trusts with registered Vascular Surgeons in UK.



Data derived from NVR⁷ and reflects practice in 2012 with the regional relative density of NHS Trusts with registered vascular surgeons.

The Vascular Society of Great Britain & Ireland made recommendations on service re-configuration in *The Provision of Vascular Services 2012*². There is evidence of re-configuration of inpatient Vascular Surgery Services across the United Kingdom with specialist Vascular Surgeons within regions joining together to provide emergency duty rotas and clinical networks, and a move towards a smaller number of higher-volume centres providing inpatient Vascular Surgery Services.

3. Consultant Vascular Surgeon Workforce

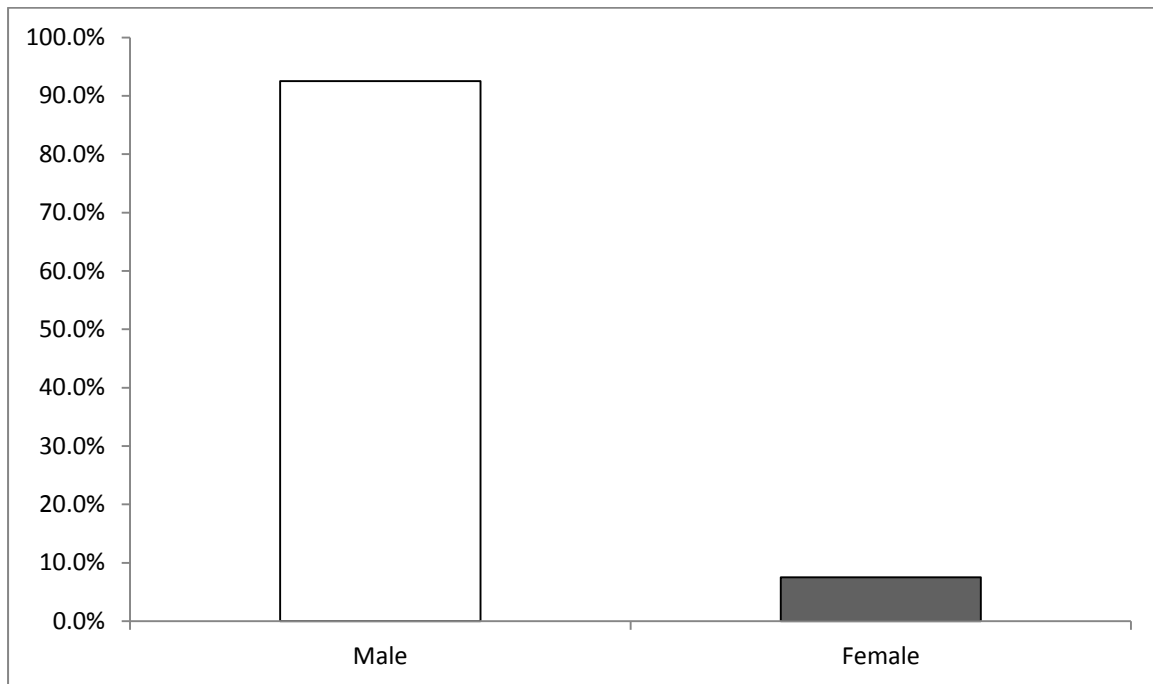
3.1 Human Characteristics

It is clear that both the gender distribution and work-patterns in Vascular Surgery are destined to change radically over the next 10-years.

Gender

Currently in the UK the Consultant Vascular Surgeon Workforce is composed of 92% men and only 8% women. This gender imbalance is not unique to vascular surgery, but seen across a range of surgical specialties and indeed to a lesser degree in the total NHS Consultant Workforce.

Figure 5: Vascular Surgeons' Gender.

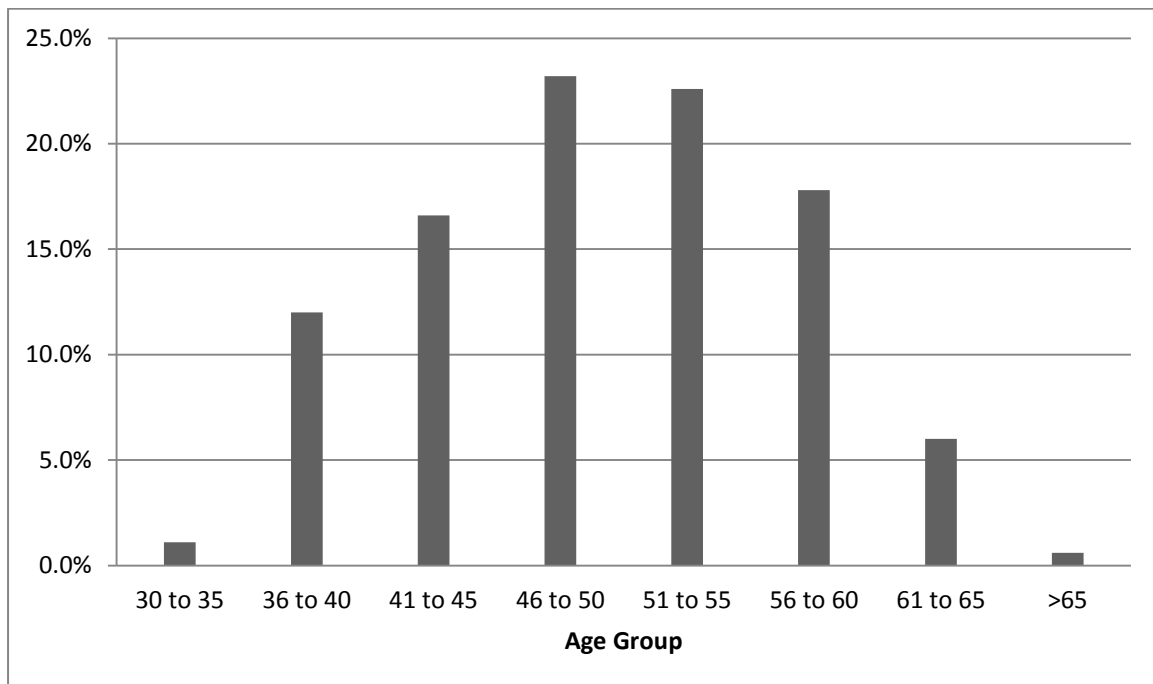


In 2013, after competitive National Selection, the first intake of Specialist Training Registrars (StR) to the new 6-year Specialty Training Programme for Vascular Surgery were composed of 45% Male and 55% Female. It is known that the gender balance, male to female, in both Undergraduate Medical education and in Postgraduate Core Surgical Training has been consistently close to parity (50:50) in recent years. Therefore, pending analysis of subsequent appointments it would appear a rapid re-balancing of the vascular surgical workforce is underway.

Age

The current Vascular Surgery Workforce has a normal age-distribution. The majority of the workforce in mid-career between the ages of 41 and 55 years (62.4%), but up to one-fifth are above the age of 55 (Aged 56-65 years, 23.8%).

Figure 6: Vascular Surgeons Age.



At least 24% (circa 110 Surgeons) of our Consultant Vascular Surgeon Workforce will retire within the next 10-years, and this number could be considerably higher. Indeed, when we asked Consultant how likely they were to retire in the next 10-years, 35% (circa 160 Surgeons) responded that they were extremely likely to retire, and as many as 44% (circa 202 Surgeons) responded that they were very or extremely likely to retire. Many Vascular Surgeons consider the current numbers of vascular surgeons nationally to be inadequate, and with predicted expansion in population and demand for vascular surgery services this could create a “perfect storm” in respect to lack of provision of vascular surgery services in the United Kingdom.

To accommodate workforce retirements over the next 10 years we may need to replace a minimum of 110, but perhaps as many as 202, Consultant Vascular Surgeons, to maintain the current level of service.

Effect of Gender on Workforce

It is clear from our survey that the gender-imbalance that currently exists in our workforce should change to become more reflective of the population we serve. With this change in the workforce we need to plan for an increase in part-time working, career-breaks (including entitled maternity leave), and to create a more family-friendly work pattern.

In our survey, there is some evidence of a gender effect in respect to *past* training; that is training as a General Surgeon with Vascular Surgery Sub-specialisation, although results must be treated with caution as overall numbers of female surgeons in the workforce are

currently low (only 8%). During training Female Surgeons were less likely to have Out-of-Program Experience (OOPE), (28% Female vs 43% Male, $p < 0.05$), and Female Surgeons who had OOPE were much less likely to Train outside of the United Kingdom (6% Female vs 38% Male, $p < 0.001$). One possible factor, which has been reported in other careers, is the perceived detrimental effect of relocation in another region or more acutely another country on Family-life, Partners, and Children. Current and future trainees will have the benefit of the new Specialist Training Programme for Vascular Surgery, with comprehensive high-quality training in all aspects of the new Vascular Surgery Curriculum within the United Kingdom.

In our survey, there is some evidence of a gender effect in respect to Consultant Job Characteristics, although again these results must be treated with caution as overall numbers of female surgeons in the workforce are currently low (only 8%). In respect to the balance between full-time and part-time working, we see that Female Surgeons are more likely to work part-time, (16% Female vs 7% Male, $p < 0.05$). As we move towards gender re-balancing of the workforce, we can predict that there will be an increase in part-time working and this in turn will require an increase in the overall numbers of Consultant Vascular Surgeons to provide the current level of service. In the future, with a gender balanced (50:50) workforce, we could assume that of the total workforce at least 11.5% will work part-time.

To facilitate anticipated changes to part-time working as a result of gender re-balancing of the workforce, we may require an additional 53 Consultant Vascular Surgeons, to maintain the current level of service.

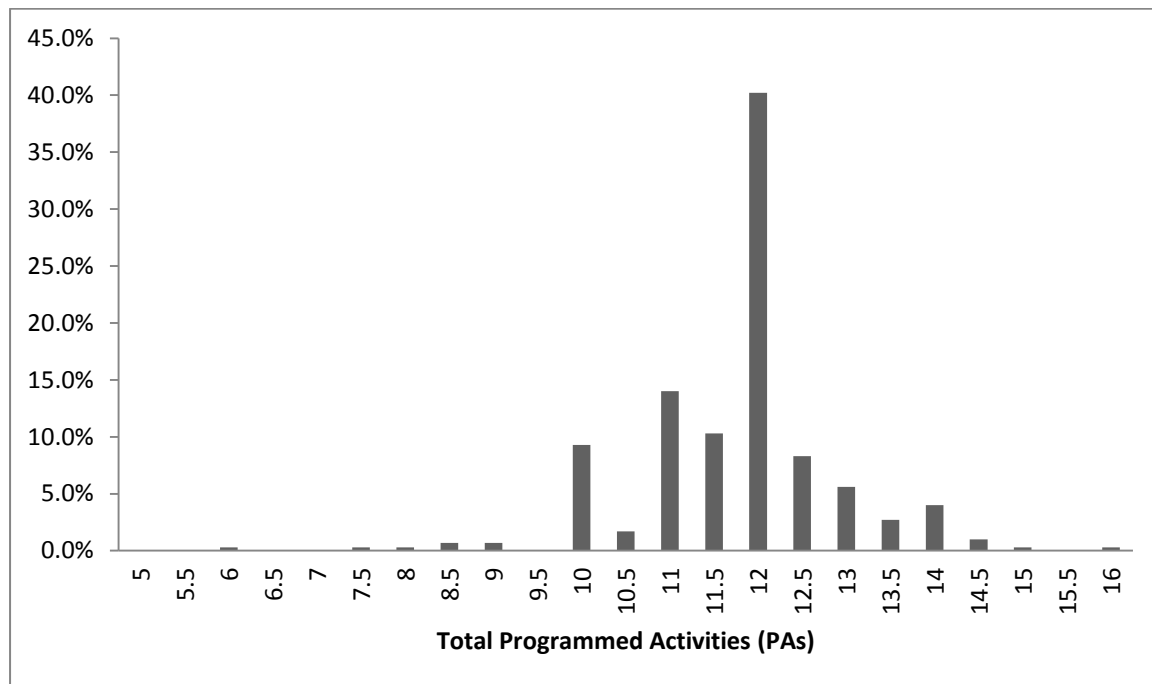
3.2 Job Characteristics

Respondents described themselves as Vascular Surgeons (74%) or General and Vascular Surgeons (26%); no participating surgeon identified themselves as a General Surgeon. The vast majority (77%) of overall respondents indicated that more than 75% of their job involved Vascular Surgery.

Job-plans and Hours Worked

Overall, the vast majority (92.7%) indicated that they currently worked full-time. The average number of total Programmed Activities (PA) worked was 12 (range 6 to 16) PAs, with the vast majority (88%) working more than the recommended standard 10 PA Consultant Contract.

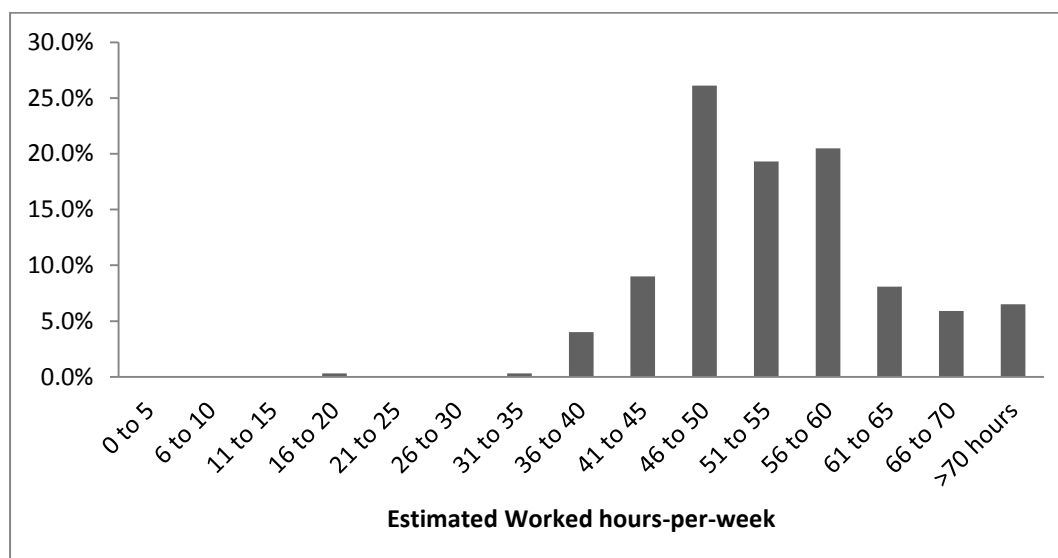
Figure 7: Vascular Surgeons Total programmed Activities.



Both the NHS Employers and Professional Associations have indicated that they would aspire to bring current job-plans down to 10 or below Programmed Activities (PA), a level which is considered safe and sustainable. The total PA allocation is distributed between Direct Clinical Care (DCC) and Supporting Professional Activity (SPA), those activities required to ensure a doctor maintains Good Medical Practice and to support Appraisal and Revalidation. In our survey, the average SPA allocation is already below 1.5 SPAs, which is considered by the British Medical Association (BMA) the minimum necessary for satisfactory appraisal and revalidation; as such, any future reductions would need to come from DCC with obvious effects on clinical activity. Currently, to reduce the entire workforce from an average 12 PA Job-plan (circa 5,496 PAs), to an average 10 PA Job-plan (circa 4,580 PAs), would leave a shortfall of circa 916 PA of work no longer delivered. This would represent approximately 92 Whole-Time Equivalent (WTE) in respect to the workforce. Obviously, some additional efficiency may reduce PAs without resort to new-job creation, but this workload cannot wholly be replaced with efficiency alone.

Not only are Vascular Surgeons contracted to work an excessive amount of hours, the majority of vascular surgeons estimate they work hours which are well in excess of their contracted hours and also in excess of what is considered safe and sustainable. The majority (60.3%) of Vascular Surgeons estimated they worked more than 50 hours per week, and more than one-fifth (20.5%) work more than 60 hours per week.

Figure 8: Vascular Surgeons Estimated Worked hours-per-week.



The Consultant Workforce is currently non-compliant with the European Working Time Directive (EWTD). Furthermore, the levels of hours and PAs worked are not considered safe or sustainable by NHS Employers and Professional Associations. Although emergency cover for vascular surgical emergencies already exists at nights and weekends, compensatory rest periods following emergency duty (which are supposed to be mandatory) are rarely timetabled. This risks both consultant and patient safety.

To bring current Job-plans into line with advice from Employers, Professional Associations, and EWTD, we may need an additional 92 Consultant Vascular Surgeons (or equivalent), to maintain the current level of service.

7-Day Working

NHS England's National Medical Director Sir Bruce Keogh has recently set out a plan to drive seven day services across the NHS over the next three years, starting with urgent care services and supporting diagnostics. This was prompted by evidence that, compared to the standard working week (Monday-Friday) on weekend days (Saturday and Sunday), there was a significant detrimental effect in respect to mortality rates, patient experience, the length of hospital stays and readmission rates⁸. Vascular Surgery, due to its complex caseload and emergency workload, has for many years been a consultant lead and delivered service. When vascular surgery emergencies require procedural and surgical intervention it is clear from our publically reported outcomes on NVR that in the vast majority of cases a Consultant Vascular Surgeon is present whether the case is in standard hours, at night, or on the weekend. Whilst as a profession this is a source of pride we recognise that we need to address all factors which may improve outcomes for our patients.

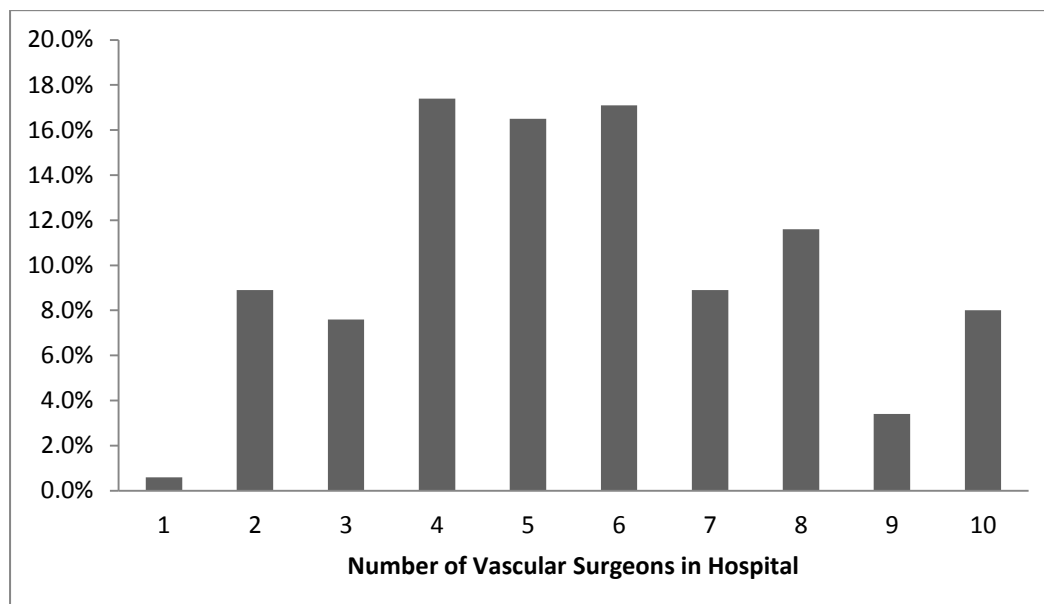
In our survey, a majority (>50%) of consultant vascular surgeons indicated that they would be willing to carry out scheduled theatre sessions at weekends if appropriately job-planned. However, it is clear that a move to scheduled working at the weekend will have detrimental effects on the standard working week unless workforce numbers are expanded. To provide additional scheduled day-time work (0800 to 1700 hours) on Saturday and Sunday, in premium time (circa 6 PAs) as currently contracted, would require an additional 2,748 PAs worked nationally.

To facilitate complete 7-day Working may require the equivalent of an additional 275 Consultant Vascular Surgeons, to deliver this increased level of service.

Vascular Surgery Teams

When providing vascular surgery services, the size and skill mix within the team has a critical effect not only on work-patterns and on-call rotas, but also on patient outcomes. The effect of team volume on outcome in respect to major vascular surgery interventions is now clear, and without question, established, within the large higher volume teams producing better outcomes for the majority of their patients who undergo complex vascular surgery procedures¹¹.

Figure 9: Vascular Surgeons Number in Hospital (Team).



The average team was composed of between 5 and 6 (range 2 to 10) Vascular Surgeons. At least half (82.9%) declare they are working in a team of 4, or more, and more than one-fifth (23%) working in a large team of 8 or more Vascular Surgeons. However, there are still a significant minority (17.1%) of Vascular Surgeons working in teams of 3, or less.

It is clear that Small Teams (3, or less) are unable to provide a comprehensive vascular surgery service within their Hospital Trust, as compared to either a Medium Team (4 to 7) or a large Team (8 or more). These differences are perhaps most acute in respect to the 24/7 provision of a CePOD Emergency Theatre, access to Vascular Imaging, and availability of Interventional Radiology cover, **Table 2**.

Table 2: Effect of Team Size on Level of Vascular Surgery Service.

Factor		Teams			p-value
Question	Response	Small	Medium	Large	
Q8	>75% Vascular Surgery Job	73.2	78.2	78.4	NS
Q30	24/7 Vascular Surgery Cover	50*	95.8	100	0.05
Q31	On-call for Vascular Surgery only	60.4*	87	83.6	0.05
Q53	Specialist Vascular Surgery Beds	44.4*	90	94.5	0.01
Q59	24/7 CePOD Theatre	78.2*	89.9	97.3	0.05
Q61	24/7 Vascular Imaging (CT/MRI)	83.3*	96.8	95.9	0.05
Q65	24/7 Interventional Radiology	20.4*	70.7	75.7	0.01

Data represents Question (Q) responses by team size. Teams (number vascular surgeons in hospital): Small (3, or less), Medium (4 to 7), Large (8, or more).

The Vascular Society of Great Britain and Ireland considers that providing an inpatient and emergency vascular surgery service with less than 6 consultants is not considered sustainable or safe. In the future, this minimum number may need to increase to 10 or more.

Dual Consultant Operating

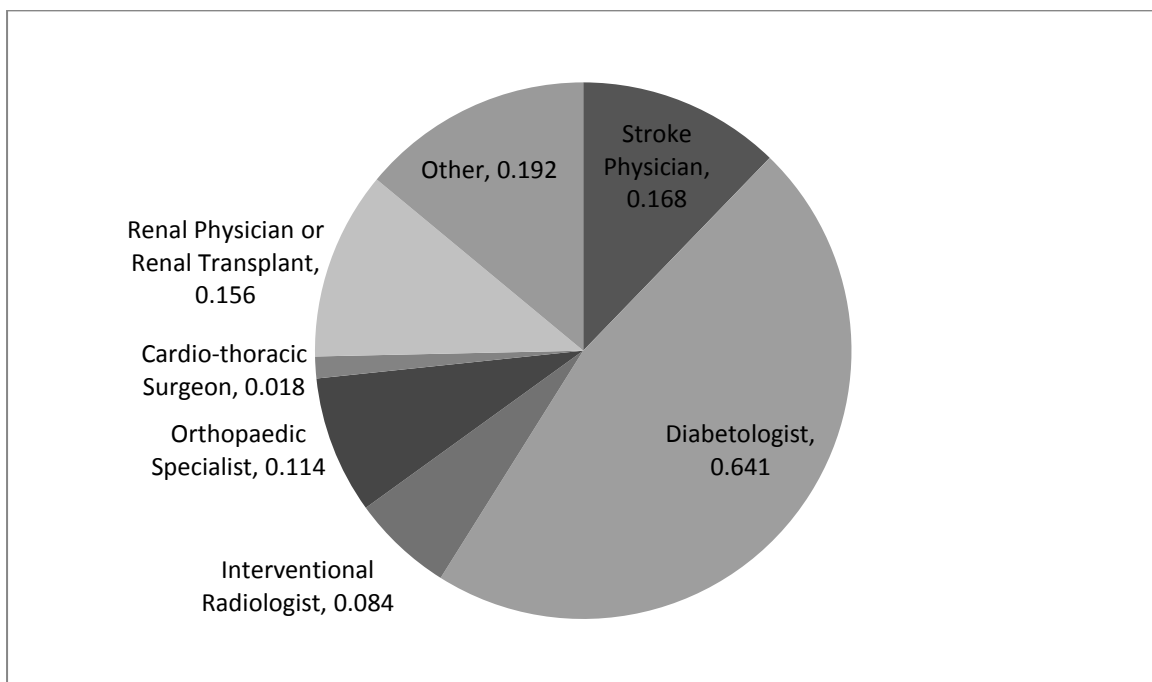
Dual Consultant operating is becoming increasingly common for major vascular procedures. One-third of Consultant Vascular Surgeons report that they operate frequently with another consultant, and a significant minority (10%) operate very frequently with another consultant. Historically, an operating surgical team would consist of a minimum of a Consultant, a Higher Specialist Trainee (Registrar), and a Core Surgical Trainee. It is now rare for an operating surgical team lead by a Consultant to have the luxury of more than one Trainee and frequently there are none. This change has been driven by several factors. First, changes to surgical training mean that there has been an overall reduction in surgical trainees nationally. Second, there has been an overall reduction in hours worked per individual trainee in order to achieve compliance with the European Working Time Directive (EWTD). Lastly, the financial pressure on NHS Trusts has led to an under-recruitment of non-training grade and locum doctors. However, many major arterial procedures often require a three-person operating team due to the complexity of many of the operations.

The other factor which has increased dual-consultant working is the increase in complexity of vascular surgical procedures, in particular complex or revision open surgery and complex endovascular surgery. Dual-operating is likely to increase further and to facilitate this it is likely that some inpatient vascular surgery services will relocate to larger centres with larger teams.

In a typical week, the majority work in more than one Hospital (72.35%), and more than one-fifth (21.2%) work in 3 or more Hospitals. The average number of Theatre Sessions per week was 2.5, with a clear majority working either 2 (41.7%) or 3 (40.5%) sessions per week. The average number of Day Procedure Sessions (Vein Surgery, Endovenous Therapy, Renal Access Surgery) per week was 0.8 sessions, with a clear majority (63.5%) working 1 session per week. The average number of Endovascular/Angio Sessions per week was 0.27 sessions, with a clear majority (78.1%) with nil sessions per week. Based on the opinion of 352 consultant vascular surgeons currently working in the United Kingdom, the majority (64.7%) of surgeons report that the optimal number of surgery sessions needed to maintain their technical skills would be 3, or more sessions per week.

The average number of Outpatient Clinic Sessions per week was 2 sessions, with the clear majority (61.4%) working 2 sessions per week. Many Surgeons report that they conduct Multi-disciplinary Team (MDT) outpatient sessions with allied medical specialists, the commonest being Diabetologists (64.1%) and Stroke Physicians (16.8%). This scheduled and more importantly unscheduled support for other specialties and allied healthcare professionals (such as podiatrists) is often not fully reflected in job-plans and will continue to create an upward pressure on workload for vascular surgery.

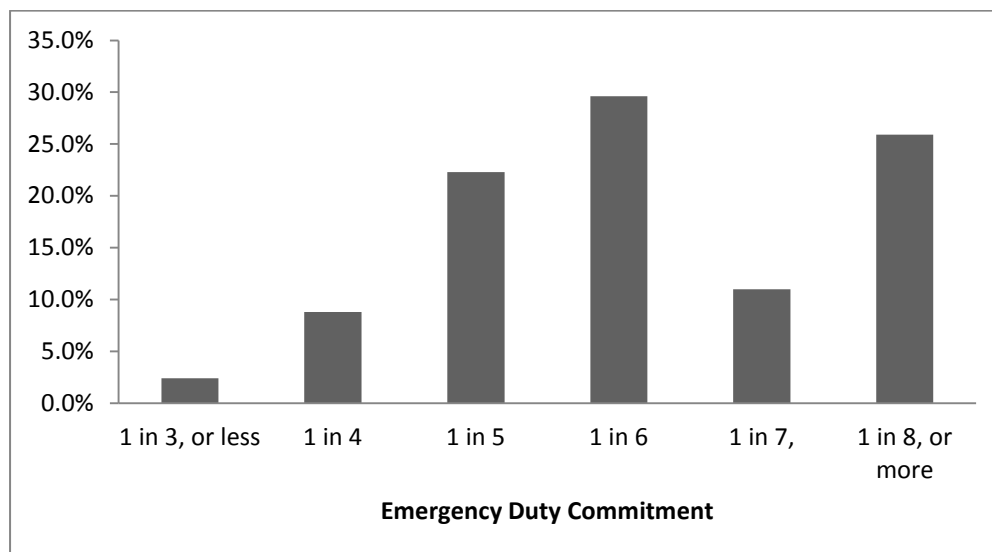
Figure 10: Vascular Surgeons Multi-disciplinary Team Clinics.



Job-plan and Emergency Duty Rotas

A majority (65.42%) of Vascular Surgeons are now on an emergency duty rota which is either 1 in 6, or less frequent. The commonest on-call rota is 1 in 6 (29.17%), with a significant minority (25.42%) working a less frequent rota of 1 in 8, or less. However, more than one-third (34.58%) continue to work a more frequent emergency duty rota of 1 in 5, or more. More than one-in-ten (11.66%) Vascular Surgeons provide emergency cover more frequently than is considered safe or healthy by working a 1 in 4, or worse.

Figure 11: Vascular Surgeons Emergency Duty Commitment.



The vast majority (81.70%) of Consultant Vascular Surgeons provide emergency duty cover for Vascular Surgery Emergencies only. Whilst a significant minority (16.60%) continue to provide cover for Vascular & General Surgery Emergencies, only a few (1.70%) remain on a separate General Surgery Emergency rota.

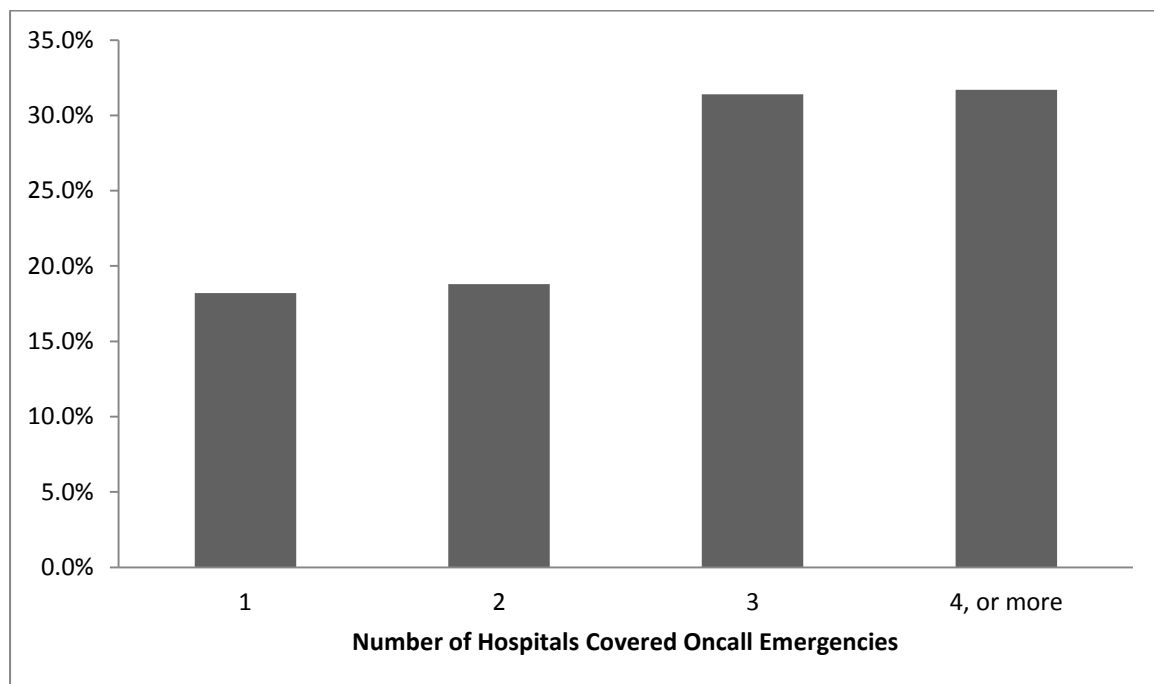
A narrow majority (58.82%) of Consultants report that when on duty for emergencies, they are free from elective commitments during the day, but a worryingly large proportion (41.18%) are not. Many larger Centres have sufficient manpower to provide cross-cover for elective sessions such that the Surgeon on duty is free and unhindered to respond to emergencies. An increasing number of large units are designating an Emergency Surgeon (of the day or week) to triage urgent referrals and provide Emergency Care. However, it is rare for the Emergency Surgeon to have timetabled hours of rest (which are supposed to be mandatory).

Given the importance of endovascular surgery to our elective and emergency practice, it is of significant concern that a large minority (36.6%) Vascular Surgeons report that they do not have access to interventional radiology services 24-hours-per-day. Re-organisation of inpatient and emergency vascular services to large volume centres, which in general are more likely to have 24/7 interventional radiology support, may improve emergency cover

over the medium term. It will also be important for suitably trained vascular surgeons to both develop skills and gain access to endovascular practice out-of-hours to ensure patients get the right procedure at the right time. Existing consultants will need time to attain new skills in a rapidly developing field. Endovascular training has been incorporated into the training programme for specialty trainees, but existing consultants will require additional training time to acquire the requisite endovascular skills.

The majority of Vascular Surgeons provide emergency cover for more than one hospital when on-call, with nearly one-third (31.7%) providing cover to 4, or more, Hospitals.

Figure 12: Number of Hospitals Covered when On-call for Vascular Emergencies.



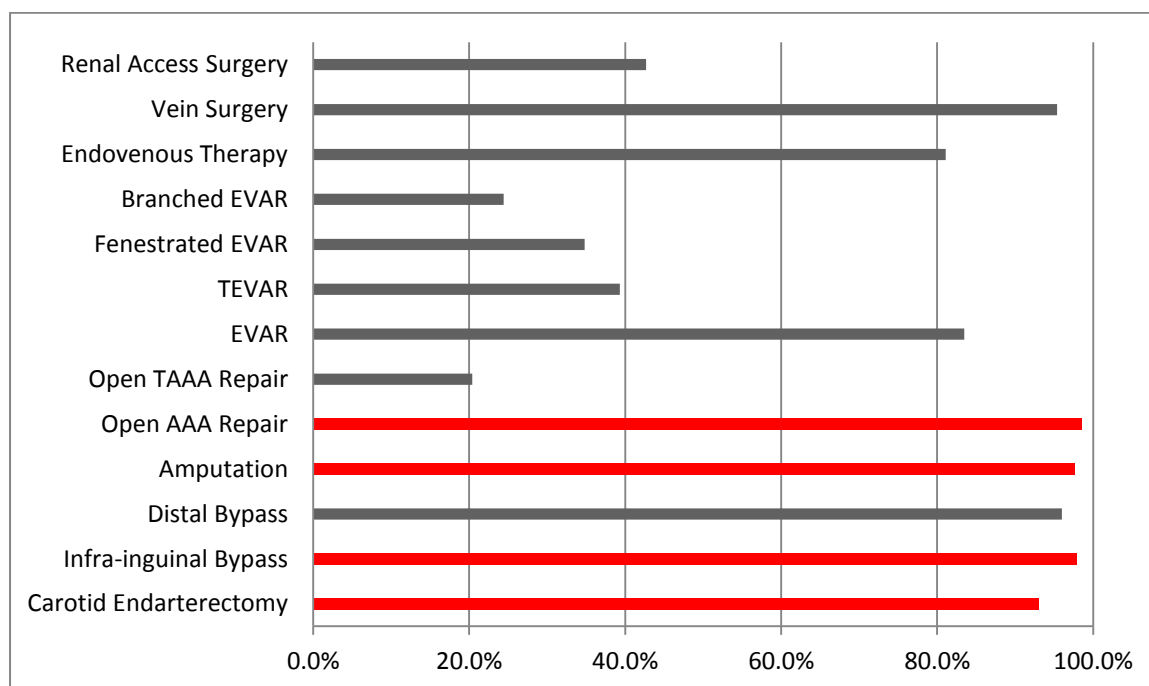
Whilst the vast majority of vascular surgeons report that they are healthy, there are considerable physical demands from an acute surgical specialty like vascular surgery. These demands perhaps are most acute when on-call for vascular emergencies yet it is clear that currently the vast majority of vascular surgeons in the United Kingdom continue to provide emergency on-call services up-to and until retirement, with only a small minority (5.9%) of services allowing consultant to leave the on-call rota above the age of 60 years-of-age. When questioned, the clear majority (73.4%) of vascular surgeons feel it is inappropriate to be on-duty for vascular surgery emergencies above the age of 60 years. At present it is essential that practicing consultant vascular surgeons maintain their competence and capability to provide for the demands of both their elective and emergency workload. However, there is also a duty of care which employers and indeed our professional associations must recognise in consideration of what is a safe and sustainable work pattern for surgeons in the later part of their career.

At present it is clear that pragmatic regional solutions for emergency vascular surgery cover often involve several small teams of Vascular Surgeons contributing to a joint on-call rota. However the safety and sustainability of this model may be questionable going forward particularly if inpatient vascular emergencies are delivered at multiple sites within a region. Further true centralisation to hub sites is required in the future.

3.3 Scope of Vascular Surgery Practice

The vast majority (over 90%) of Consultant Vascular Surgeons perform the major index Vascular Surgery procedures, the outcomes of which are recorded by the National Vascular Registry⁷.

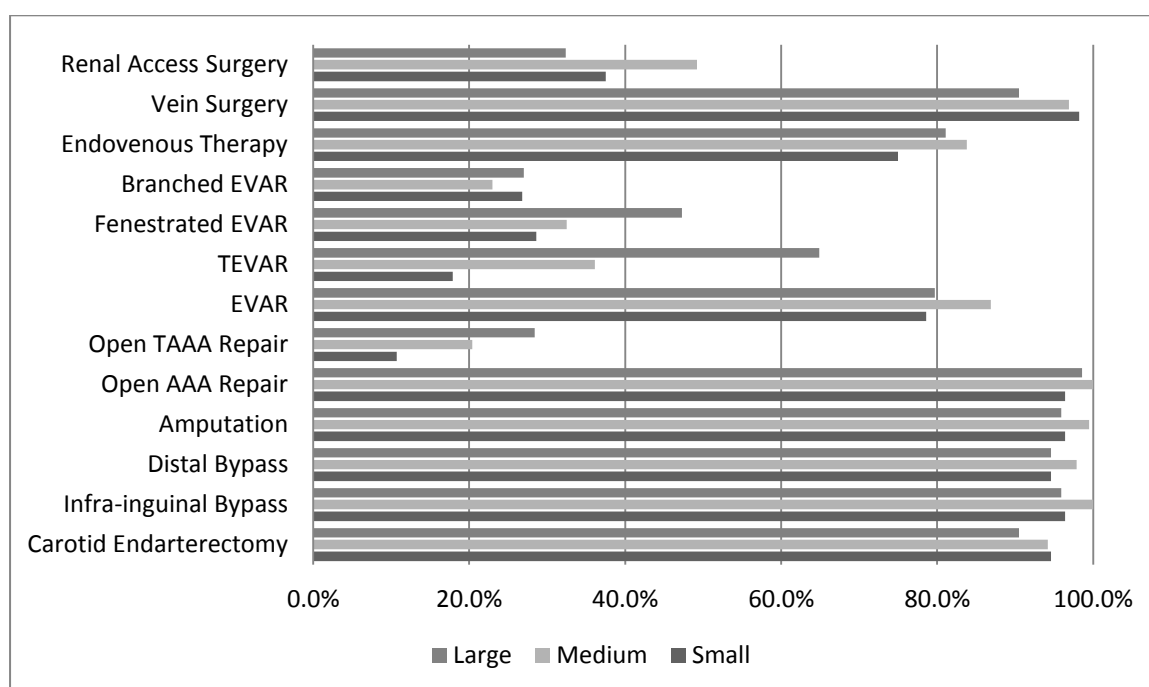
Figure 13: Operations Performed by Vascular Surgeons.



National Vascular Registry (NVR)⁷ Index Procedures highlighted in Red.

The vast majority (over 90%) perform the following procedures: Open AAA Repair (98.5%); Infra-inguinal Bypass (97.9%); Amputation (97.6%); Distal Bypass (96.0%); Vein Surgery (95.4%); Carotid Endarterectomy (93.0%). As such the vast majority of Consultant Vascular Surgeons could be considered Vascular Surgery *Generalists*, equipped to manage an unselected Vascular Surgery Emergency intake.

Figure 14: Effect of Team Size on Operations Performed.



Vascular Surgeons working in Small Teams (3 or less) are less likely to conduct complex vascular surgery as compared to those working in either a Medium Team (4 to 7) or a large Team (8 or more). These differences are perhaps most acute in respect to the Open Thoraco-abdominal Aortic Aneurysm (TAAA) Repair, Thoracic Endovascular Aneurysm Repair (TEVAR), and complex Endovascular Repair (fenestrated EVAR). It is likely that complex vascular surgery procedures will be carried out in fewer more specialised and perhaps larger units in the future.

Endovascular Surgery is increasing year-on-year in respect to the number and range of procedures and it is reassuring to see that over four-fifths (83.5%) of our Vascular Surgeons now perform standard Endovascular Abdominal Aortic Aneurysm Repair (EVAR). However, a minority (less than 50%) of Vascular Surgeons perform more complex Endovascular Aortic Therapy such as: Thoracic Endovascular Aneurysm Repair (39.3%); Fenestrated Endovascular Abdominal Aortic Aneurysm Repair (34.8%); Branched Endovascular Abdominal Aortic Aneurysm Repair (24.4%). A minority, of only one-fifth (20.76%) of Vascular Surgeons, perform a *weekly* Endovascular/Angiography Session. Furthermore, only one-third (30.7%) of Vascular Surgeons perform peripheral angioplasty.

Whilst Endovascular Surgery is firmly established amongst our members, it is clear that it will take time for the full transition to an Endovascular *Specialist*. Whilst many transferrable endovascular skills can be obtained from the common practice of EVAR, for some appropriately trained vascular surgeons there would be benefit in future to train and perform in endovascular procedures outside of the aortic bed. An even smaller number

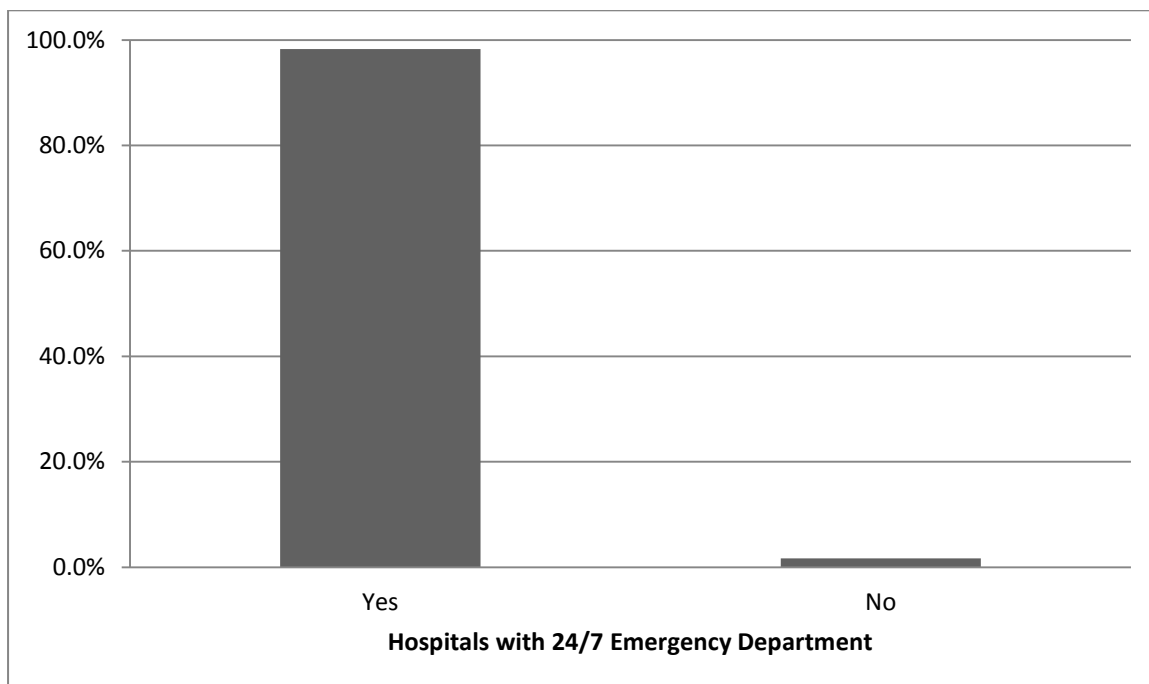
perform complex Open Thoraco-abdominal Aortic Surgery (20.4%). Complex Endovascular and Open Vascular Surgery requires' very significant resources in respect to equipment and skilled personnel. This combined with the volume-outcome effect and the proactive commissioning of these complex services would suggest these interventions in future will be carried out at a relatively small number of super-specialist Vascular Surgery units across the UK. This may in the future produce Vascular Surgery *Specialists* in a range of sub-specialty areas such as Endovascular Surgery, Open Thoraco-abdominal Aortic Surgery, and Venous Therapy.

A minority (42.7%) of Vascular Surgeons currently perform renal access surgery (arterio-venous fistula) for the growing number of patients who need long term haemodialysis for renal failure. Chronic Kidney Disease (CKD) is affecting an increasing number of patients and is likely to increase in prevalence due to the increase in Diabetes Mellitus and an aging population. Vascular Surgeons have many transferable skills which would make them well suited to renal access surgery and an increasing proportion of vascular surgery time will be needed to manage these patients. In response to this requirement, training in vascular access is an essential requirement of the new Vascular Surgical Curriculum.

3.4 Hospital Environment & Resources

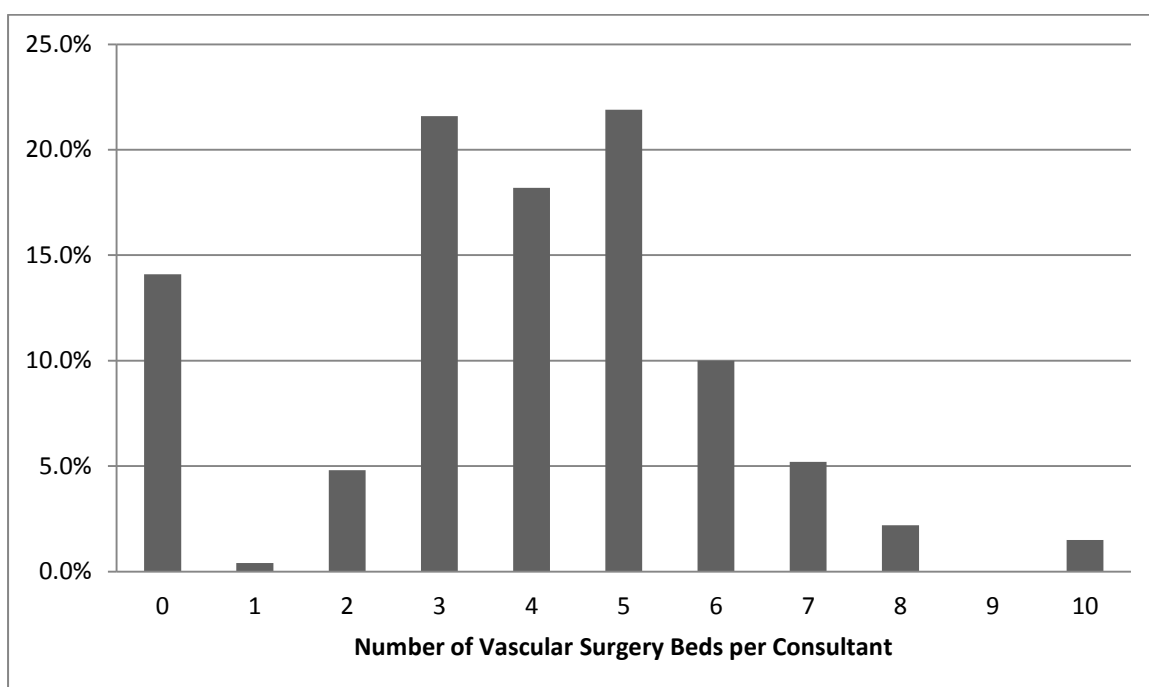
The vast majority (over 90%) of Consultant Vascular Surgeons work in Acute NHS Hospital Trusts, many of which are also regional or National Centers for more specialised care, or attached as Teaching Centers to University Medical Schools. These large Acute NHS Hospital Trusts, many of which are also Foundation Trusts, allow their Vascular Surgery teams access 24 hours-a-day and 7 days-a-week (24/7) to facilities necessary to assess, diagnose, and treat Vascular Surgery emergencies, such as: 24/7 Emergency Department (98.2%); 24/7 Intensive Care Unit (99.4%); 24/7 Emergency Theatre (89.4%); 24/7 Vascular Cross-sectional Radiological Imaging (94.1%).

Figure 15: Hospitals hosting a Vascular Surgery Service with 24/7 Emergency Department.



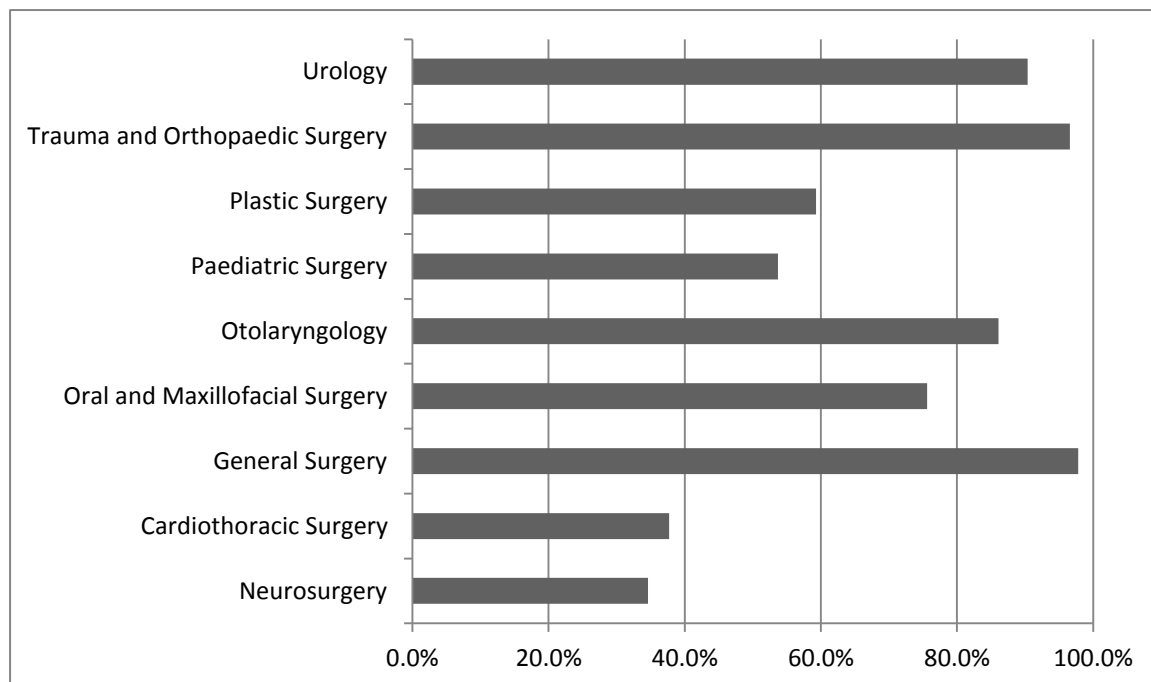
The clear majority (85.9%) of Vascular Surgeons report that they have specialist vascular surgery beds in their hospital. The majority (61.7%) of vascular surgeons have between 3 and 5 specialist vascular surgery beds per consultant.

Figure 16: Number of Specialist Vascular Surgery Beds per Consultant Vascular Surgeon.



Many Consultant Vascular Surgeons are working in an Acute Hospital also designated as a Level 1 Trauma Centre (48.0%), and as such also have to provide emergency support for Vascular Trauma. These large Acute NHS Hospital Trusts where Vascular Surgery Services are located are often tertiary referral and treatment centers for many other surgical specialties and other acute services, such as trauma, cardiac, renal and acute stroke

Figure 17: Surgical Specialties co-located with Vascular Surgery Services.



On the basis of this survey, the following surgical specialties are represented: General Surgery (97.8%); Trauma and Orthopaedic (T&O) Surgery (96.6%); Urology (90.4%); Otolaryngology (86.1%); Oral and Maxillofacial Surgery (75.6%); Plastic Surgery (59.3%); Paediatric Surgery (53.5%); Cardiothoracic Surgery (37.7%); Neurosurgery (34.6%). Vascular Surgeons provide significant support to these other surgical specialties for complex cases planned as part of a multi-disciplinary team and for unplanned support for surgical bleeding. The vast majority of vascular surgery services are currently co-located with general and T&O surgery, as part of the emergency surgical provision for an Acute NHS Trust. However, it is clear that there are many examples of safe and effective delivery of sub-specialty surgical services without co-location of vascular surgery services on the same hospital site.

Re-configuration of Vascular Surgery Services in the UK

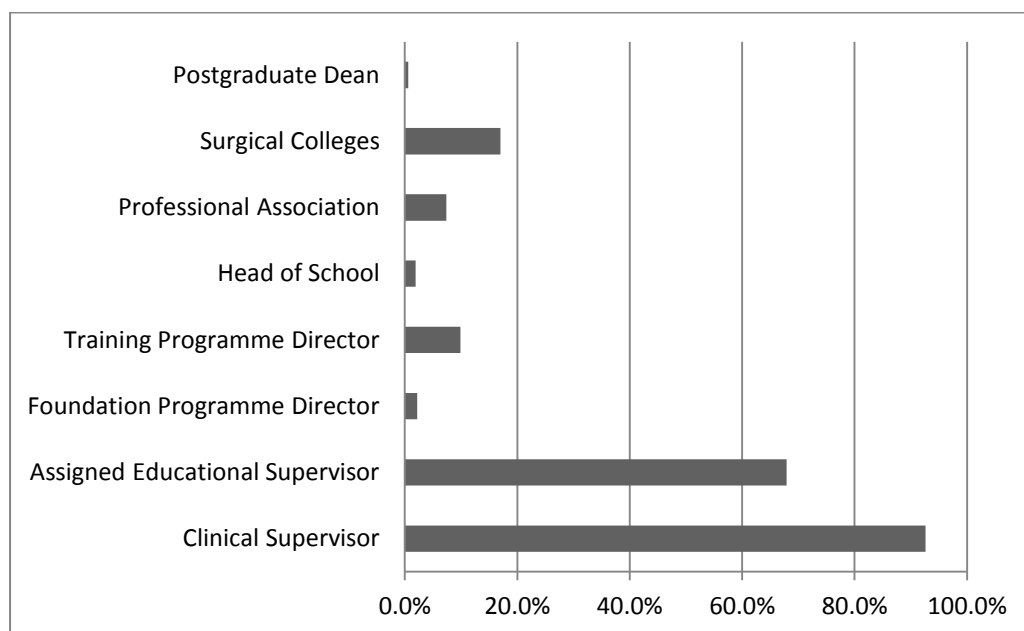
The Vascular Society of Great Britain & Ireland made recommendation on service re-configuration in The Provision of Vascular Services 2012². There is substantive evidence that clinicians, clinical managers, and commissioning groups across the United Kingdom are engaged in a process of re-configuration of Vascular Surgical Services. Currently, if fully implemented these changes are likely to result in the re-configuration of emergency and inpatient Vascular Surgical Services to a smaller number of Vascular Surgery Centres,

perhaps only 50, located in large Acute NHS Hospital Trusts across the United Kingdom. These Centres will provide for the needs of between 0.9 million and 1.26 million (or greater) population. It is also likely that a smaller number of these Centres, perhaps between 10 and 20, will become *super-Specialist* Tertiary Referral Centres for complex Open and Endovascular Surgery. These will provide for the needs of between 3.15 million and 6.3 million (or greater) population. To provide safe and sustainable 24/7 elective and emergency Vascular Surgery Services within these units, we should expect a significant expansion of current specialist Consultant Vascular Surgeons. Historically in the United Kingdom the majority of Surgical Emergencies, including Trauma, have been managed by General Surgeons. Many General Surgeons are no-longer equipped to manage Vascular Surgery Emergencies due to changes in their training curriculum, skill-set, and experience. Therefore, the majority of these units will have between 8 and 10 Consultant Vascular Surgeons to provide safe and sustainable 24/7 emergency cover. Consultant Vascular Surgeons who are equipped as *Generalist* Vascular Surgeons, and able to manage an un-selected emergency Vascular Surgery workload, are needed to provide safe and sustainable 24/7 emergency cover for vascular surgery services in the United Kingdom.

3.4 Professional Activities

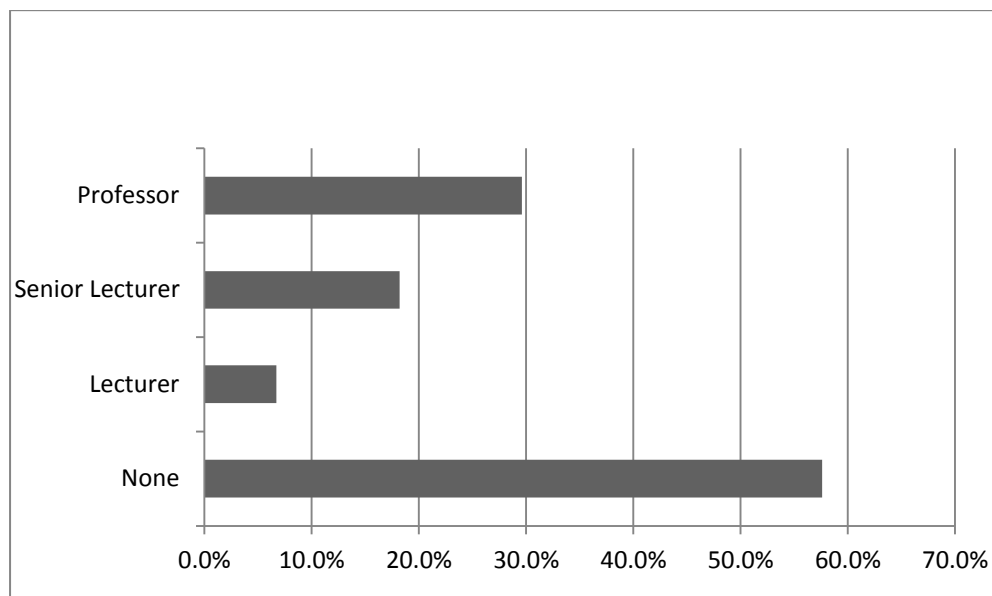
The vast majority of Vascular Surgeons are actively involved with training and often combine their clinical practice with significant professional roles in clinical management or training. The GMC's plans for recognition of Trainers will require more time in many consultant vascular surgeons' job plans for clinical and educational supervision.

Figure 18: Vascular Surgeons other Professional Activities.



It is also of note that, despite the massive changes to Academic Medicine and the role of clinical and non-clinical research in training in recent years, there are still a significant minority of vascular services who are actively involved in academic research.

Figure 19: Percentage of Vascular Surgery Units with formal Academic Roles.



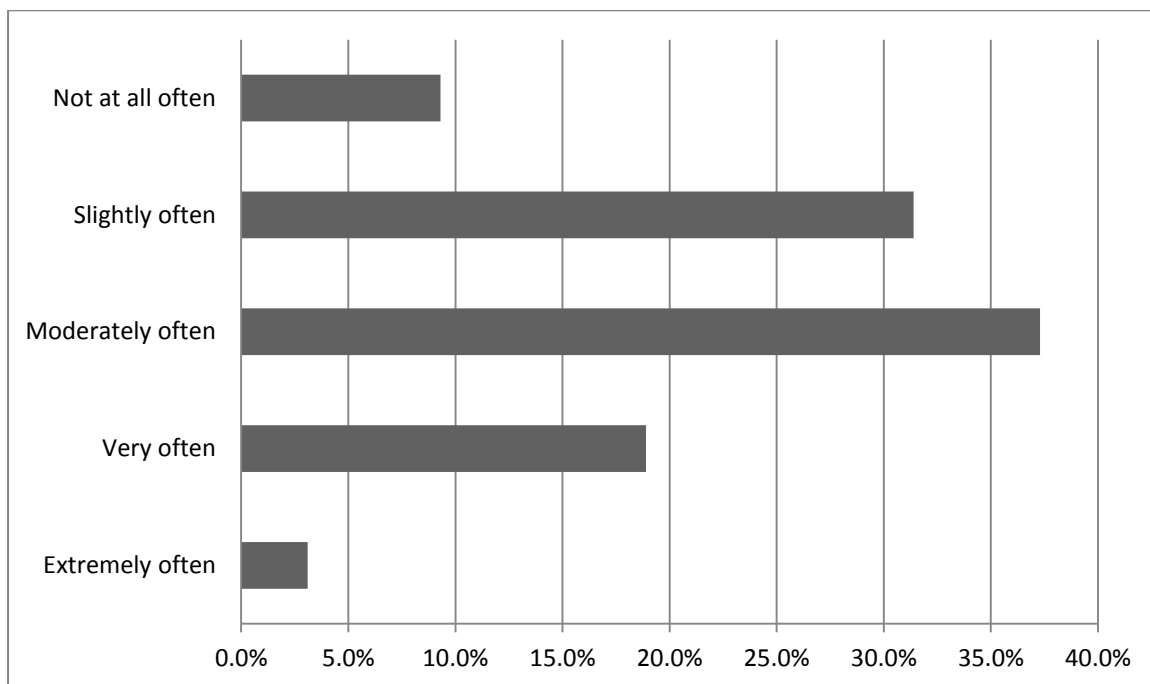
It is important that we continue to support this historical area of strength within our specialty to ensure we continue to provide innovation and best evidence-based practice in Vascular Surgery.

3.5 Work-Life Balance

The vast majority (84.97%) of Vascular Surgeons like their job, with a majority (50.21%) reporting they “like (their job) a great deal”. The clear majority (69.23%) are also satisfied with their job, with over one-fifth (21.79%) reporting that they are “extremely satisfied”. Our Vascular Surgery Workforce also would appear to be in good physical health with a clear majority (72.22%) reporting they are “very” or “extremely” healthy.

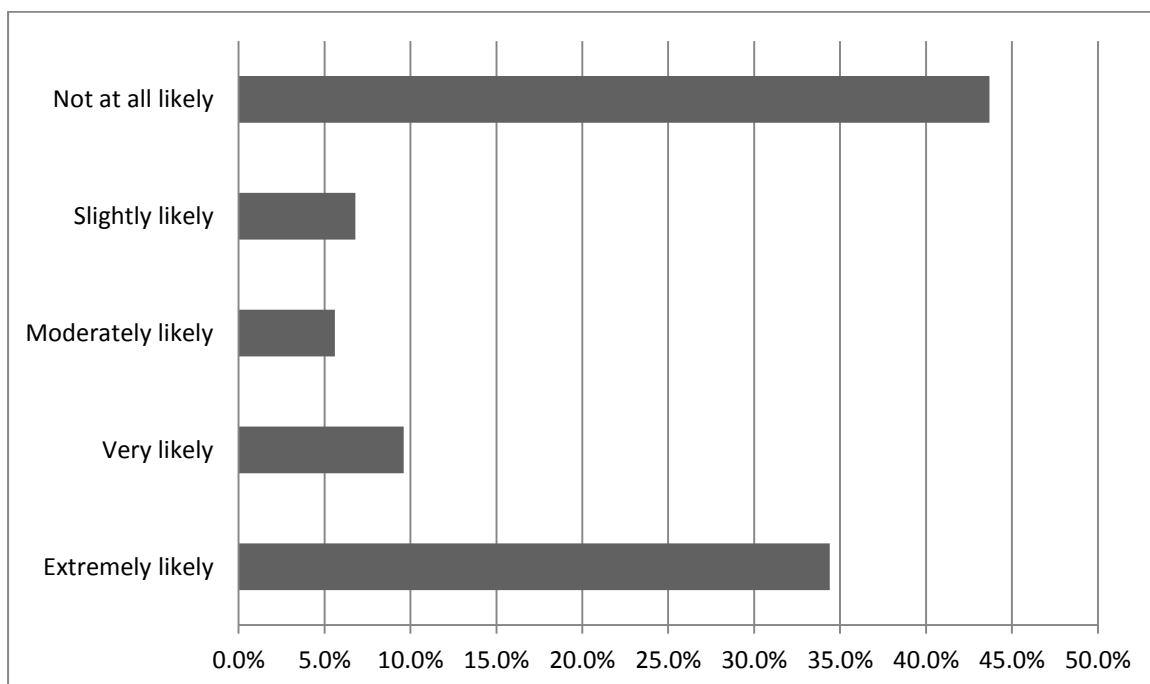
However, the mental health of our Workforce, who deal with a demanding acute surgical specialty with significant emergency workload, may not be quite as secure with a clear majority who feel “stressed at work” on a weekly basis, and more than one-fifth (22.0%) feeling stressed at work “very” or “extremely” often, on a weekly basis.

Figure 20: Percentage of Vascular Surgeons Experiencing Occupational Stress.



111 Consultant Vascular Surgeons have indicated that they plan to retire in the next 10 years, which represents 35% of the Vascular Surgery Workforce. The majority (88.57%) cited their reason for retirement was “Tired of the NHS”.

Figure 21: Percentage of Vascular Surgeons Planning to Retire within 10 years.



Therefore, over the next 10-years with we can expect well over half of our workforce to retire and be replaced by a new-generation of Vascular Surgeons trained as Vascular and Endovascular Surgical Specialists. This new-generation will approach gender-parity and will expect to work in a flexible modern workplace. This will radically transform the scope and practice of Vascular Surgery in the United Kingdom. However, unless the number of trainees is quickly increased, there is likely to be a lack of available replacements.

4. Training the Future Workforce

The New Specialty of Vascular Surgery

Vascular Surgery was established as a new surgical Specialty by Act of Parliament in 2012. The extensive Scope of Vascular Surgery Practice is outlined in our approved curriculum⁴. The Vascular Society has made recommendations on the standards for Specialist Training in Vascular Surgery³. The new Specialty Advisory Committee (SAC) for Vascular Surgery Training, on behalf of the Joint (Surgical Colleges) Committee for Surgical Training (JCST), was established to provide expert advice to the General Medical Council (GMC) and Postgraduate Training Deaneries on the Vascular Surgery Curriculum content and delivery. The new generation of Vascular Surgeons will need to have a range of new skills consummate with the scope of modern vascular surgery practice to encompass vascular imaging, medicine, open surgery, and endovascular therapy.

Vascular Surgery Training

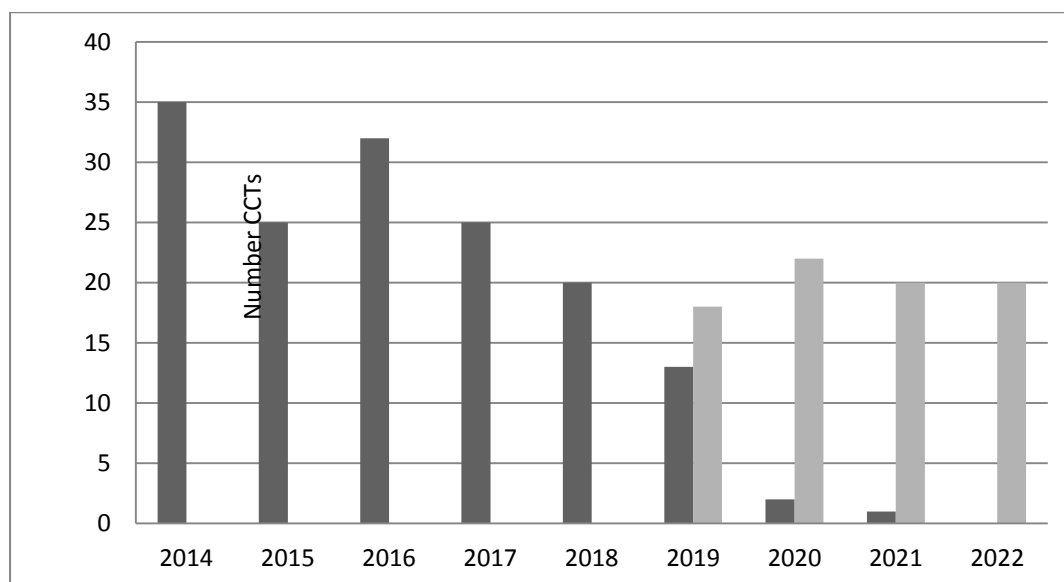
In 2013, the General Medical Council (GMC) approved 14 Training Programmes across the United Kingdom. Vascular Surgery was allotted 20 National Training Numbers (NTN) per year. The 273 applicants for Vascular Surgery went through a National Selection process and 20 were selected. The current specialist training programme for vascular surgery is 6 years. However, it takes a minimum of 10 years from point of graduation from medical school to train a consultant vascular surgeon (2 years foundation training, 2 years core surgery training, and 6 years specialist vascular surgery training). Historically, specialty training for a large minority would have been extended further by the addition of Out-of-Program-Experience (OOPE) in a specialist center in the United Kingdom or Internationally for 1 or 2 years. Based on our survey, over 40% of current consultant Vascular Surgeons have received at least 1 year of additional OOPE. Of Surgeons who obtained OOPE, the majority (58%) trained outside of the United Kingdom. However, new specialist training programmes for vascular surgery are designed to deliver high-quality training commensurate with the requirements of the vascular surgery curriculum and are eligible for a certificate of completion of training and appointment as a Consultant Vascular Surgeon within the United Kingdom.

Currently in the UK, the Consultant Vascular Surgeon Workforce is composed of 92% Male and only 8% Female. This gender imbalance is seen across a range of surgical specialties and indeed to a lesser degree in the total NHS Consultant Workforce, an imbalance which must be addressed. In 2013 after competitive National Selection the first intake of Specialist Training Registrars (StR) to the new 6-year Specialty Training Programme for Vascular Surgery were composed of 45% Male and 55% Female. It is known that the gender balance in both Undergraduate Medical education and in Postgraduate Core Surgical Training has

been consistently close to parity (50:50) in recent years. Therefore, pending analysis of subsequent appointments it would appear a rapid re-balancing of the vascular surgical workforce is underway. With this change in the workforce we need to plan for an increase in part-time working, career-breaks (including entitled maternity leave), and to create a more family-friendly work pattern.

Historically, Vascular Surgeons were trained as General Surgeons with a sub-specialty interest in Vascular Surgery. These General (Vascular) Surgery trainees continue their training towards the award of a Certificate of Completion of Training (CCT) in General (Vascular) Surgery. The new intake of specialist Vascular Surgery trainees, commencing in 2013, will first be eligible for CCT in Vascular Surgery in 2019. Both legacy General (Vascular) NTN and specialist Vascular NTN trainees, on award of CCT, are eligible for appointment as a Consultant Vascular Surgeon. The numbers of legacy trainees will reduce, as current and future trainees enter the new specialist programme for vascular surgery training, **Figure 22**.

Figure 22: Expected Number of CCT in General (Vascular) and Vascular Surgery.



Data derived from Vascular Surgery SAC survey 2013

To accommodate expected retirements (+110), population expansion (+36), changes in workforce in respect to gender rebalance and part-time working (+53), and compliance with EWTD (+92) we may need to train and appoint as many as 291 new Consultant Vascular Surgeons in the United Kingdom over the next 10 years to maintain the *status quo* in respect to the current level of service. To provide a complete 7-day service for vascular surgery we may also need an additional 275 Consultant Vascular Surgeons. If we are to meet the minimum projections of future demand we may need to increase NTNs in Vascular Surgery significantly from the current allocation of 20 per annum. The actual number of NTNs required could be much higher if there is a surge in early retirement as suggested by our survey.

Future Workforce

On the basis of the survey results outlined in this document, we can provide a future estimate of the numbers of Consultant Vascular Surgeons needed to deliver a safe level of Vascular Surgery Service in the UK. Estimates are based on assumed ideal numbers of consultant vascular surgeons' per capita population, as follows: 1 per 150,000 as POVS (minimum number); 1 per 137,000* as number registered by NVR (surgeons in UK conducting AAA repair); 1 per 100,000 as POVS (number for tertiary centres). Based on these predictions the number of vascular surgeons needed in for UK, are shown, **Table 3**.

Table 3: Estimation of Numbers of Vascular Surgeons needed per Capita Population in UK.

Weighted Capitation	Baseline	Population Expansion (+ 36)	Gender Re-balance (+53)	10PA Contract (+92)	7-day Working (+275)
1 per 150,000	418	454	507	599	874
1 per 137,000	458	494	547	639	914
1 per 100,000	627	663	716	808	1083

Whilst the level of service provision will ultimately be based on governmental healthcare policy in this area, it is undoubtedly clear that we need to plan for a significant expansion in the Consultant Vascular Surgeon Workforce over the short- and medium-term. We will need to train and appoint sufficient numbers of new Consultant Vascular Surgeons in the United Kingdom over the next 10 years to maintain the *status quo*. To achieve this we urgently need an increase in National Training Numbers allocated to Vascular Surgery.

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Appendix I

2013 Survey Questions

Personal Characteristics

1. What is the job title for your current position?
2. How long have you been in your current position? (round up to the nearest whole number)
3. Are you male or female?
4. What is your age?
5. In which postgraduate medical education deanery of the United Kingdom do you work?
6. What NHS Hospital(s) do you carry out inpatient arterial work in?

Job Characteristics

7. Which of the following best describes your job function?
8. What percentage of your job involves vascular surgery?
9. During specialist registrar training how long did you spend in recognised specialist vascular training unit?
10. Did you receive Out of Programme Experience (OOPE) in Vascular Surgery?
11. If you obtained Out of Programme Experience (OOPE), where did you train?
12. Did you completed an Endovascular Training Fellowship (please specify)?
13. If you obtained Endovascular Training, where did you train?
14. How many consultant vascular surgeons are there in your Hospital?
15. How many UNFILLED consultant vascular surgeon posts are there in your hospital?
16. If you have unfilled posts, please state reason post is unfilled?
17. Is your job full-time or part-time?
18. In your job-plan how many programmed activities (PA) involve direct clinical care (DCC)?
19. In your job-plan how many programmed activities (PA) are for supporting professional activities (SPA)?
20. In your job-plan how many TOTAL programmed activities (PA)?
21. What is the average number of hours you work per week?
22. In a typical week, how many Theatre Sessions do you have?
23. In a typical week, how many Day Procedure Sessions do you have?
24. In a typical week, how many Endovascular/Angio Sessions do you have?
25. To maintain your surgical skills how many surgery sessions per week would be optimal?
26. In the past 12 months, how frequently did you operate with a second consultant?
27. In a typical week, how many Outpatient Clinics do you have?
28. What joint outpatient clinics with other specialists do you do? (Select all that apply)
29. In a typical week, in how many hospitals do you work?
30. Does your hospital provide 24/7 cover for Vascular Surgery?
31. What type of surgery do you cover when oncall for emergencies?
32. When oncall are you free from daytime elective commitments?
33. What is your oncall committment?
34. How many hospitals do you cover when oncall?
35. Do you allow surgeons to leave the oncall rota at a certain age, if so please specify?
36. Above what age do you feel it would be inappropriate to be oncall for vascular surgery emergencies?
37. Do you do scheduled theatre sessions at weekends?
38. Would you do scheduled theatre sessions at weekends, if it were appropriately jobplanned?

Vascular Surgery Practice

39. Do you perform Carotid Endarterectomy?
40. Do you perform infra-inguinal bypass surgery?
41. Do you perform amputations?
42. Do you perform Open Abdominal Aortic Surgery?
43. Do you perform Open Thoracic Aortic Surgery?
44. Do you perform Endovascular Aneurysm Repair (EVAR)?
45. Do you perform Fenestrated or Branched EVAR?
46. Do you perform TEVAR?
47. Do you perform peripheral angioplasty?
48. Do you perform Open Vein Surgery?
49. Do you perform Endovenous Therapy?
50. Do you perform Duplex Ultrasound (for endovenous therapy)?
51. Do you perform renal access surgery?
52. Which of these operations do you perform (Select all that apply)?

Hospital Resources

53. Do you have specialist vascular surgery beds?
54. How many specialist vascular surgical beds do you have in your hospital?
55. How many specialist vascular surgical beds do you have per consultant in your hospital?
56. Does your hospital have 24/7 Emergency Department?
57. Does your hospital have a Level 1 Trauma Centre?
58. Do you have access 24/7 to an Intensive Care Unit?
59. Do you have access to a 24/7 CEPOD Emergency Theatre in your hospital?
60. Do you have access to 24/7 Hybrid Interventional Suite with fixed imaging equipment?
61. Do you have access to 24/7 Vascular Imaging (CTA or MRA) in your hospital?
62. Do you have access (daytime, monday to friday) to a vascular laboratory for vascular ultrasound imaging?
63. Do you have access (out of hours, weekend) to a vascular laboratory for vascular ultrasound imaging?
64. If you do EVAR, where do you perform the majority of your cases?
65. Do you have access to 24/7 Interventional Radiology cover in your hospital?
66. How many Interventional Radiologist are in your hospital?
67. Is your hospital a National AAA Screening Programme recognised treatment centre?
68. Which surgical specialties do you have in your hospital? (Select all that apply)

Professional Activities

69. What is your job role?
70. What educational roles do you have?
71. What roles do you have as an Examiner?
72. Is there a consultant vascular surgeon in your hospital who has an official university academic appointment, please specify?
73. Do you attend a weekly Multi-disciplinary Team Meeting?
74. Do you attend a monthly audit meeting to included Morbidity and Mortality data?
75. Do you submit your outcomes data to the National Vascular Registry (NVR)?
76. Has your hospital been approved by the GMC and Vascular Surgery SAC for new Specialist Registrar Training in Vascular Surgery?
77. Do your surgical trainees receive training on procedural skills simulators (arterial/venous/endovascular) before treating patients?

Work-life Balance

78. How physically healthy are you?

79. Are you satisfied with your job, neither satisfied nor dissatisfied with it, or dissatisfied with it?

80. In a typical week, how often do you feel stressed at work?

81. Do you like your job, neither like nor dislike it, or dislike it?

82. How useful is it in your opinion to have a mentor?

83. How likely are you to drop your vascular surgery commitments and continue as a general surgeon?

84. How likely are you to retire in the next ten years?

85. If you plan to retire in the next 10 years, please indicate how soon you plan to retire?

86. If you plan to retire, please state your reason for leaving?