

Surgical & IR Workforce Deficiencies: how do we address the decline in PVD Provision

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Peripheral Vascular Disease



How do we prevent Amputation?

The Solution to PVD Provision



Problem Solving:

- Identify
- Define
- Explore
- Action
- Evaluate

Vascular Disease in UK



6,000 Aneurysm Repairs	4,000 Carotid Operations
25,000 Revascularisations	5,000 Major Amputation

Vascular Disease

- 1 in 3 Deaths CVD
- 166,000 Deaths UK
- 100,000 Strokes UK
- 4,000 AAA Screens
- 5 million have PAD
- 3 million Diabetics

Peripheral Arterial Disease (PAD)

- 20% Population Adults >55yrs Europe & North America
- Fontaine Classification (Asymptomatic, Claudication, Rest Pain, Necrosis/Gangrene)
- Stages 3 & 4 significant risk Limb Loss and Death
- UK 500-1000 patients per million significant PAD
- UK PAD 1-2% will require LL Amputation
- UK Diabetes risk Amputation 8-15 fold, 70% die <5yrs

Global Epidemic PAD

Global Epidemic of Type 2 Diabetes Mellitus

USA 2008:
1 per 108,000 Population

Predicted Increase Demand:
• 72% (2030)

UK 2013:
1 per 137,000 Population

Predicted Increase Demand:
• 67% (2029)

France 2011:
1 per 107,000 Population

Predicted Increase Demand:
• 61% (2030)

WORKFORCE

Harkin DW, et al. The vascular surgery workforce: a survey of consultant vascular surgeons in the UK, 2014. *Eur J Vasc Endovasc Surg* 2015 Apr;49(4):448e54. Satiani B, et al. Predicted shortage of Vascular Surgeons in the United States: population and workload analysis. *J Vasc Surg* 2009;50(4):946e52. Berger L, et al. Vascular surgeons in France: an endangered species? *Ann Vasc Surg* 2012 Nov;26(8):1154e9.

Diabetes UK 2012

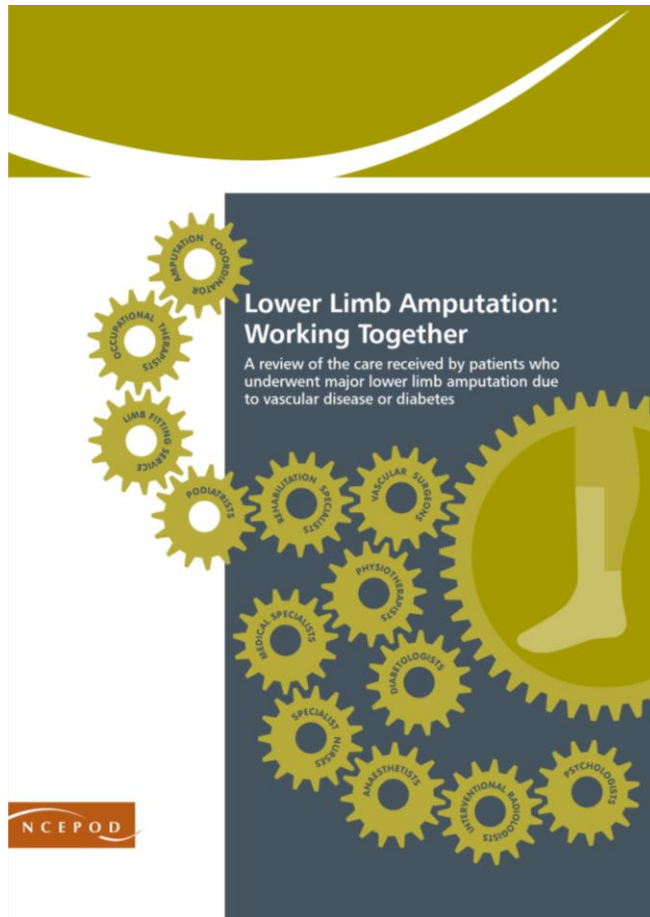


Putting Feet First – Diabetes UK

- 7,000 diabetes related amputations annually in England
- Across England 4-fold variation in the incidence of major amputation
- 80% people die within 5 years of having an amputation
- 50% survive only two years
- Diabetic foot ulcers precede more than 80% of amputations
- Amputations and foot ulcers have a huge impact on QoL

Integrated foot care pathway & DFTs reduce Amputations

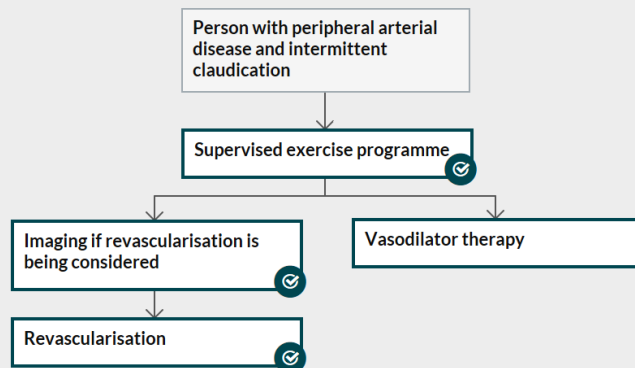
NCEPOD: Amputation 2014



- Over 5000 Amputation England
- Mortality 30-day 12-22%
- Mortality 1yr 38-48%
- **VSGBI QIF Major Amputation 2014**
- Clinical Pathway
- MDT
- Consultant Led (Review <12hrs)
- Elective Surgery
- Diabetes Care & Rehabilitation

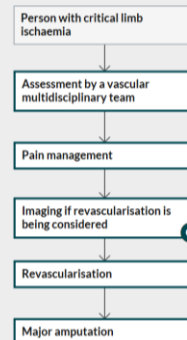
NICE: PAD & CLI

Managing intermittent claudication in people with peripheral arterial disease



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Managing critical limb ischaemia in people with peripheral arterial disease



LLI Evidence: Cochrane Review



Bypass surgery for chronic lower limb ischaemia (Review)

Antoniou GA, Georgiadis GS, Antoniou SA, Makar RR, Smout JD, Torella F

Antoniou GA, Georgiadis GS, Antoniou SA, Makar RR, Smout JD, Torella F.
Bypass surgery for chronic lower limb ischaemia.
Cochrane Database of Systematic Reviews 2017, Issue 4. Art. No.: CD002000.
DOI: 10.1002/14651858.CD002000.pub3.
www.cochranelibrary.com

Bypass surgery for chronic lower limb ischaemia (Review)
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WILEY

LLI Revascularisation Outcome:

- Technical Success
- Complications
- Primary Patency 1 or 4yrs
- Secondary Patency
- Graft or Vessel Occlusion
- Amputation
- Mortality

NO SIGNIFICANT DIFFERENCE

CLI Evidence: Systematic Review

Almasri, Jehad et al: 44 studies that enrolled 8602 patients.

- Outcomes (mortality, amputation, MAE cardiac) similar
- IP GSV graft 1 & 2 yrs (primary: 87%, 78%; secondary: 94%, 87%) **GSV BETTER**
- IP Drug-eluting stents superior bare-metal stents (primary patency: 73% vs 50% at 1 yr) or **SIMPLE BALLOON (66%)**
- IP Prosthetic bypass highest rates of limb loss

Survival, amputation & amputation-free survival at 2 years similar vein bypass vs endovascular

Evidence: BASIL Trial

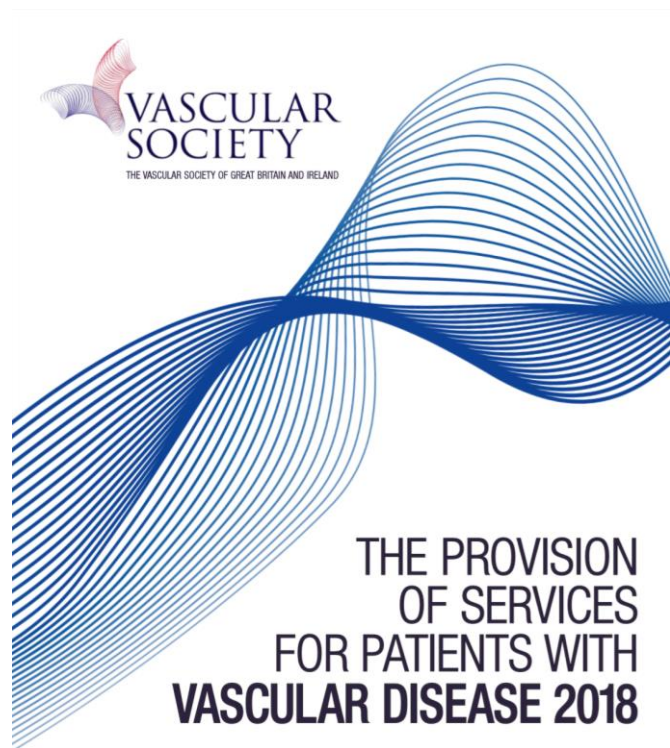
In patients presenting with severe limb ischaemia (infra-inguinal) suitable for surgery and angioplasty:

- Bypass-surgery & balloon-angioplasty-first strategy **broadly similar outcomes Amputation-free survival**
- In the short-term (after 6 months), surgery more expensive vs angioplasty

Await BASIL-2 & BASIL-3

POVS 2018: CLI

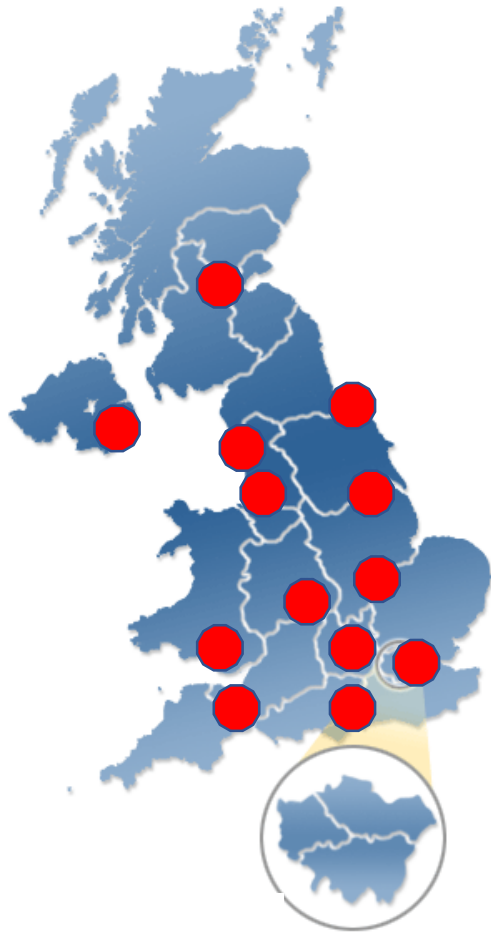
Risk Amputation: 1yr 12%
Mortality: 5yr 50% & 10yr 70%



“Urgent vascular care delivered by integrated vascular networks.”

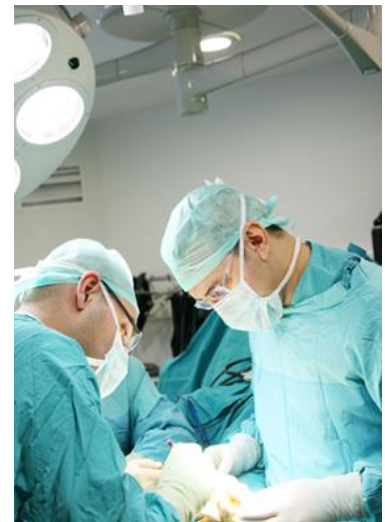
Recommended timelines for admitted pathway for critical limb ischaemia (rest pain and/or tissue loss)			
			% of patients who should achieve this target
Time to admission	< 48 hours from decision to admit/transfer	StAMP ¹⁷	>80%
Consultant review	< 12 hours from urgent admission < 24 hours from elective admission	NHS England NCEPOD ¹⁸	>80%
Investigation for revascularisation	< 48 hours from admission	StAMP	
Primary revascularisation procedure	<5 days		

Specialist Vascular Surgery Training



- **Vascular Surgery** NEW Specialty 2012
- GMC Approved Vascular Curriculum
- SAC Recommended Training Centres
- 15yrs (8 specialty) to train a Surgeon
- Recruitment & Retention
- Workforce Planning

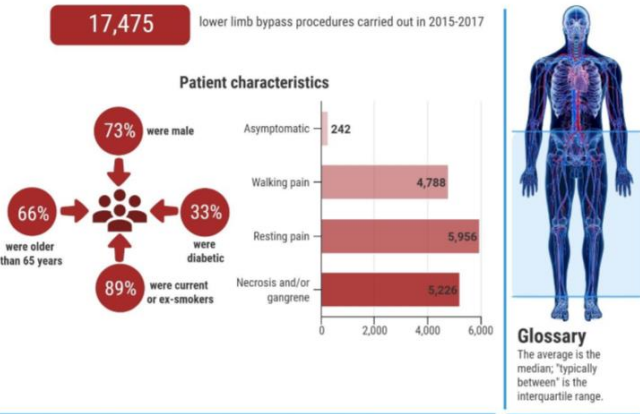
Career in vascular surgery
must be made attractive



Experience: LLI Bypass

Lower limb bypass for peripheral arterial disease to prevent limb loss
Peripheral arterial disease (PAD) is a restriction of the blood flow in the lower limb arteries that can severely affect a patient's quality of life, and risk their limb.

Open surgical (bypass) interventions become options when conservative therapies have proved to be ineffective.



Patient outcomes post bypass

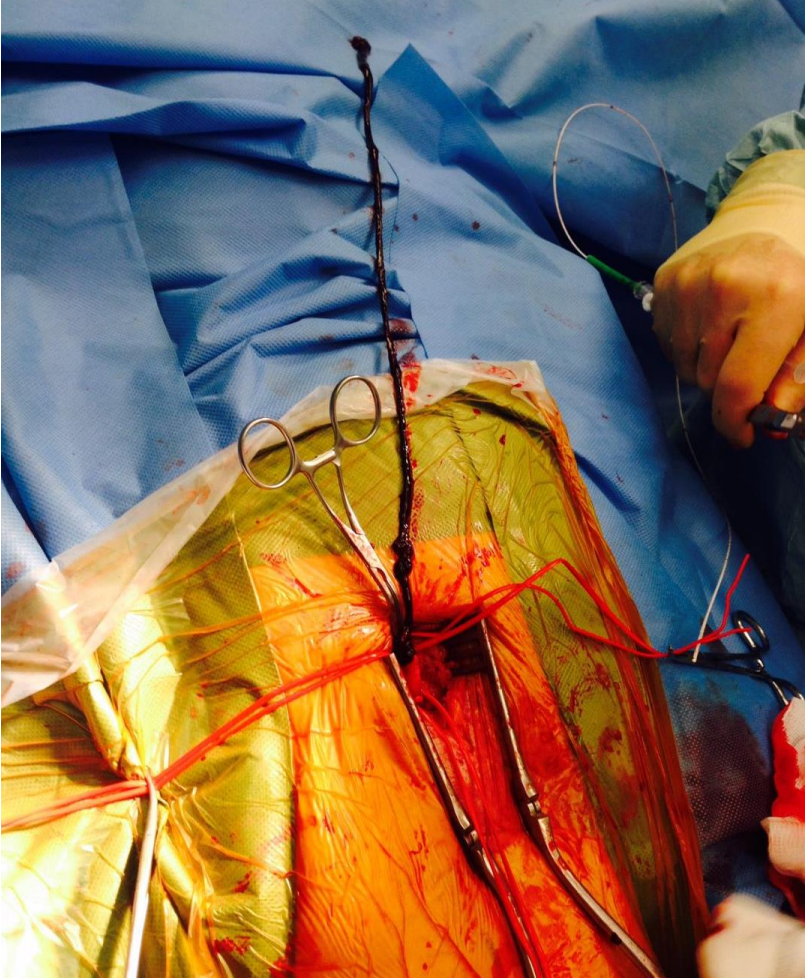


NVR 2017

- 17,475 Bypass 2015-17
- 90% Ascertainment
- 68% CLI
- Elective Mortality 1.2%
- Emergency Mortality 5.2%

	Elective procedures (n=11,103)	%	Emergency procedures (n=6,372)	%
Anaesthetic type				
General	8,224	74.1	5,034	79.0
Regional	1,486	13.4	662	10.4
GA + regional	1,050	9.5	447	7.0
Other	339	3.1	226	3.5
Bypass location				
Femoral – femoral	814	7.3	424	6.7
Femoral – above knee	2,700	24.3	1,060	16.6
Femoral – below knee	1,920	17.3	1,336	21.0
Femoral – tibial	1,262	11.4	1,356	21.3
Other	4,551	41.0	2,243	35.2
Endarterectomy				
Alone	1,035	9.3	363	5.7
Adjunct to bypass	4,477	40.3	2,328	36.5
Graft type				
Autologous	4,589	41.3	3,338	52.4
Vein and prosthetic	335	3.0	283	4.4

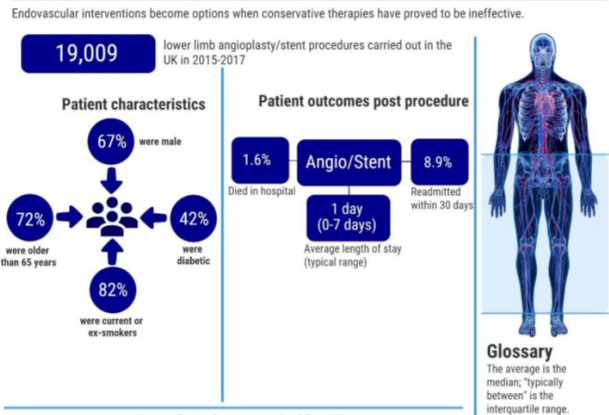
Surgical Techniques



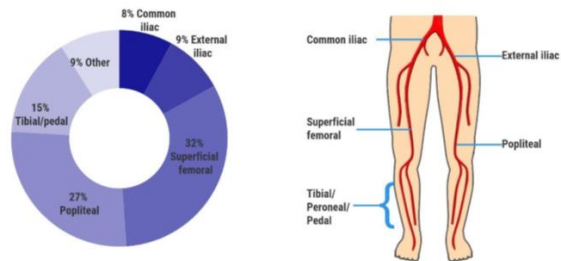
Experience: LLI Endovascular

Lower limb angioplasty/stenting for peripheral arterial disease

Peripheral arterial disease (PAD) is a restriction of the blood flow in the lower limb arteries that can severely affect a patient's quality of life, and risk their limb.

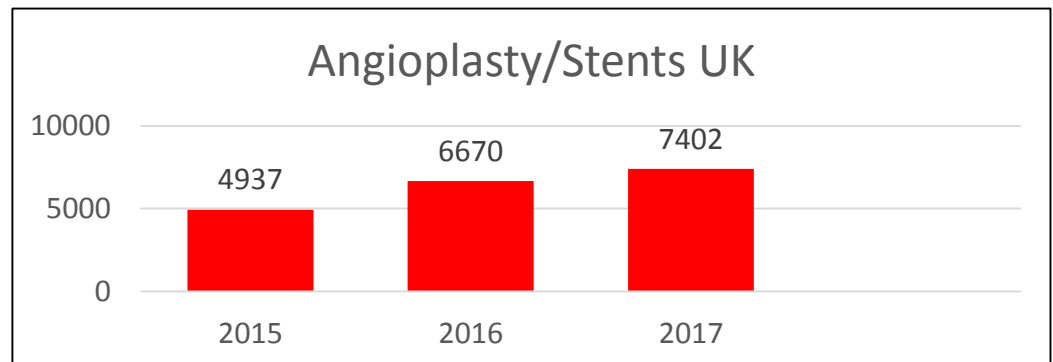


Procedures by anatomical location
Lower limb angioplasty/stent procedures are carried out in various artery locations within the leg. The breakdown of these procedures is shown below



NVR 2017

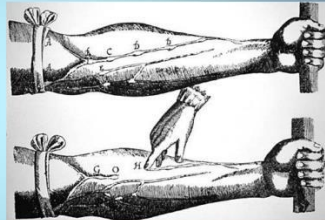
- 19,009 Angioplasty/Stent 2015-17
- **37% Ascertainment (~20,000/yr)**
- 53% CLI
- Elective Mortality 0.4%
- Emergency Mortality 4.8%



Endovascular Interventions

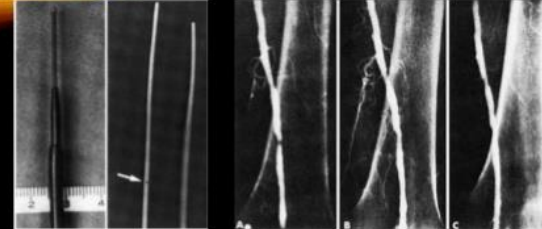
PHYSICIAN

William Harvey

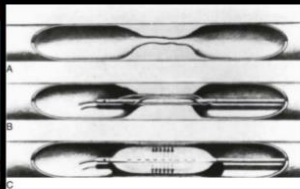


Circulation of the Blood

RADIOLOGIST

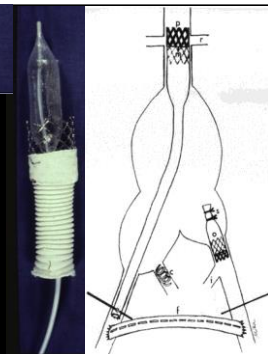


Charles Dotter : Father of Interventional Radiology. Performed first angioplasty using a system of serial dilators in 1964



Andreas Gruentzig - German Cardiologist. Invented the Angioplasty Balloon in 1977

CARDIOLOGIST



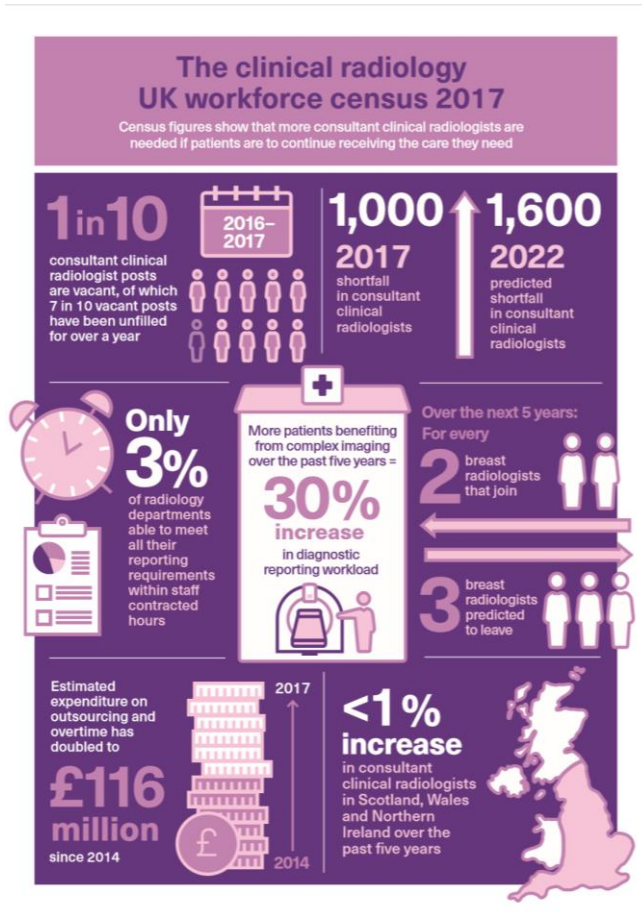
Jaun Parodi: Father of Endovascular Surgery. Performed first EVAR in man in 1991.

SURGEON

Interventional Radiology

Clinical Radiology 2017

- UK 3656 Consultants (+13%)
- 10% Posts unfilled (9% for IR)
- 73% General Radiologist
- 435 (13%) Vascular IR Interest
- NTN/Consultant Ratio **0.28**



UK Demand Diagnostic Imaging
Unmet Need +1004 WTE

UK VS WFS 2018: Scope Practice

Figure 37. Scope of Operations Performed.

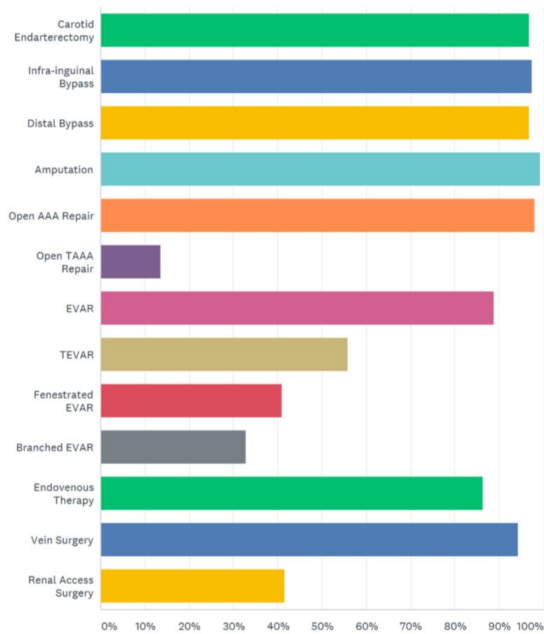


Figure 39. Percentage Surgeons performing Peripheral Angioplasty by Career Stage.

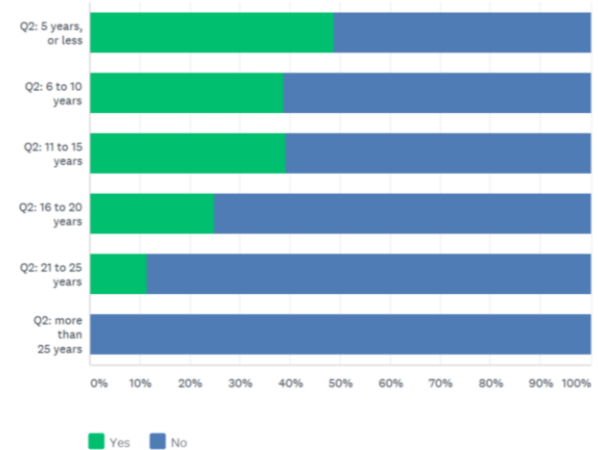
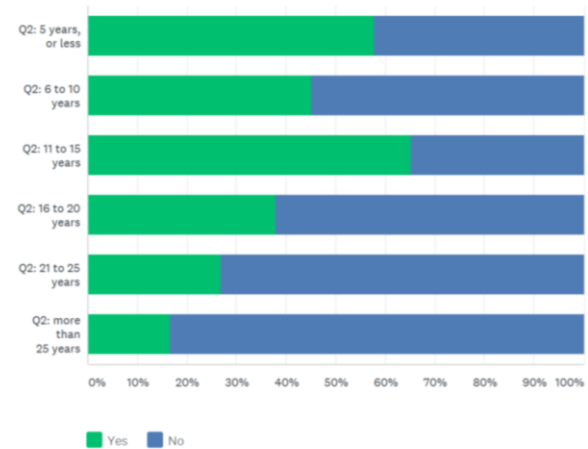


Figure 40. Percentage Surgeons performing complex EVAR.



UK VASCULAR SURGEONS:

- 90% EVAR
- 40% COMPLEX EVAR
- 40% ANGIOPLASTY

UK VS WFS 2018: Endovascular

Figure 23. Specialist vascular surgery training by Career Stage.

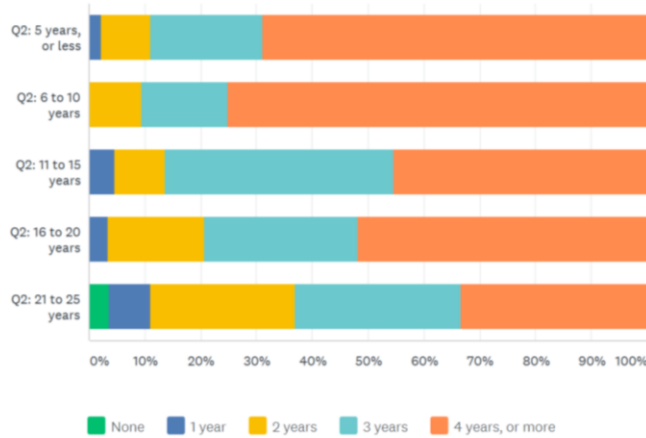


Figure 27. Endovascular Training Fellowships by Location and Career Stage.

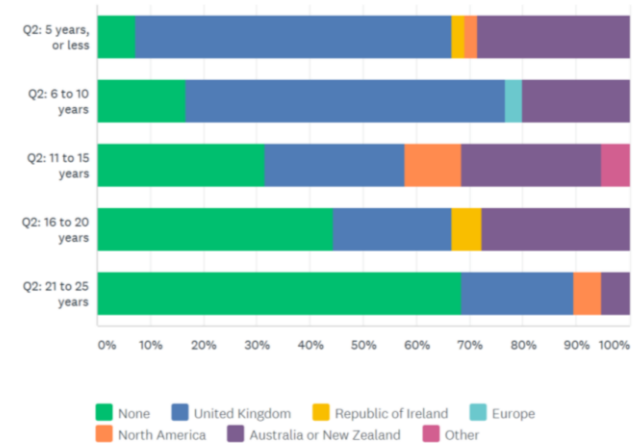
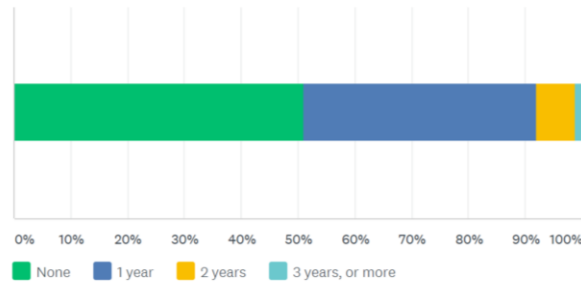


Figure 24. Additional out of programme training in vascular surgery.



**UK VASCULAR SURGEONS
ARE TRAINED & TEACHERS
ENDOVASCULAR THERAPY**

Training Vascular Surgeons

Should Radiology provide training to Vascular Surgeons?



VASCULAR SURGEONS:

- ACCREDITED TRAINERS
- CURRICULUM
- EVAR/FEVAR/TEVAR
- PERIPHERAL ARTERIAL
- PERIPHERAL VENOUS
- POST CCT FELLOWSHIPS

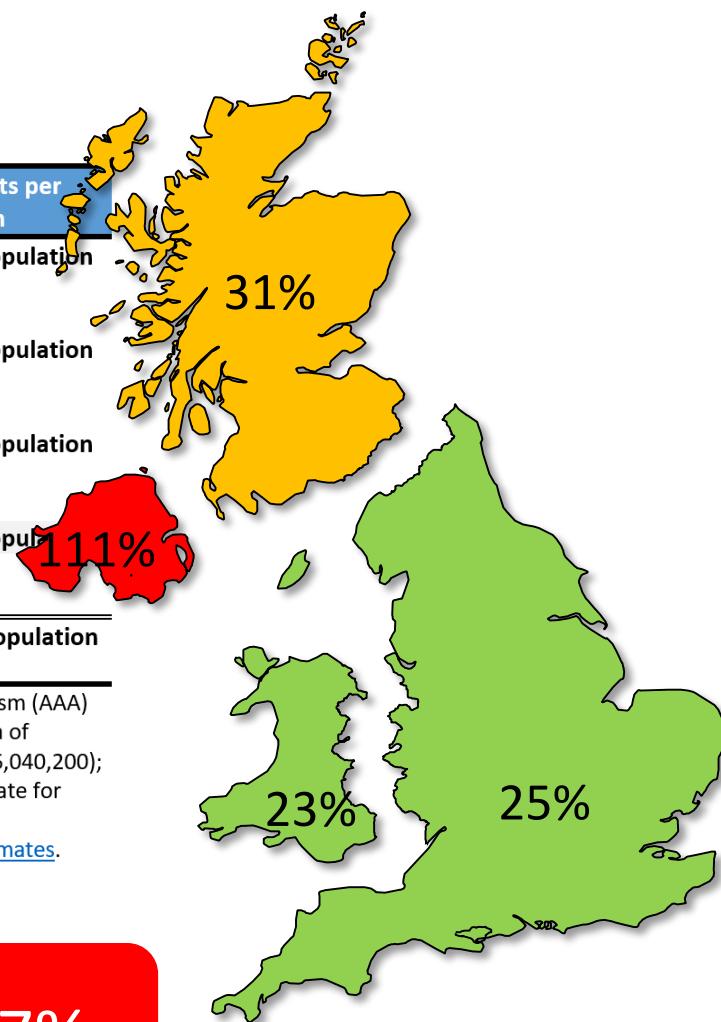
Workforce Change to 1 per 100,000

United Kingdom Vascular Surgery Workforce (Consultants), change needed to achieve recommended target of Vascular Surgeons, 1 per 100,000 Population.

Region	Consultants (2018)	Consultants (Target)	Change (Number)	Change (%)	Target Consultants per capita population
England	445	557	+112	(25%)	1 per 100,000 population
Scotland	42	55	+13	(31%)	1 per 100,000 population
Wales	26	32	+6	(23%)	1 per 100,000 population
Northern Ireland	9	19	+10	(111%)	1 per 100,000 population
United Kingdom	522	663	+141	(27%)	1 per 100,000 population

Source: National Vascular Registry (2017) Vascular Surgeons who perform Abdominal Aortic Aneurysm (AAA) and Provision of Vascular Services (2018) which recommends Vascular Surgeon 1 per 100,000 capita of population. Office National Statistics (ONS) Population mid-year estimate 2018: United Kingdom (66,040,200); England (55,619,400); Scotland (5,424,800); Wales (3,125,200); Northern Ireland (1,870,800). Estimate for Change for Expansion rounded up to next whole consultant surgeon.

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates>.



Increase 522 to 663 (+141) or 27%

Vascular Surgery 2018

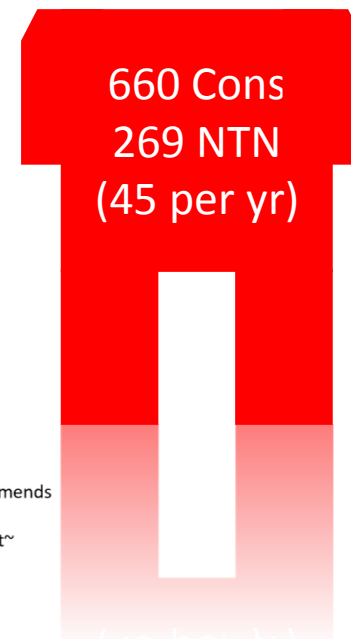
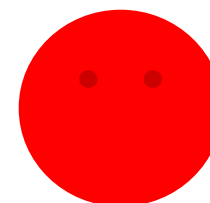
Vascular Surgery
United Kingdom
Workforce Survey
2018

Table 6. United Kingdom Vascular Surgery Workforce (Trainees), by Region to Achieve and Sustain Recommended Consultants per Capita Population (2018).

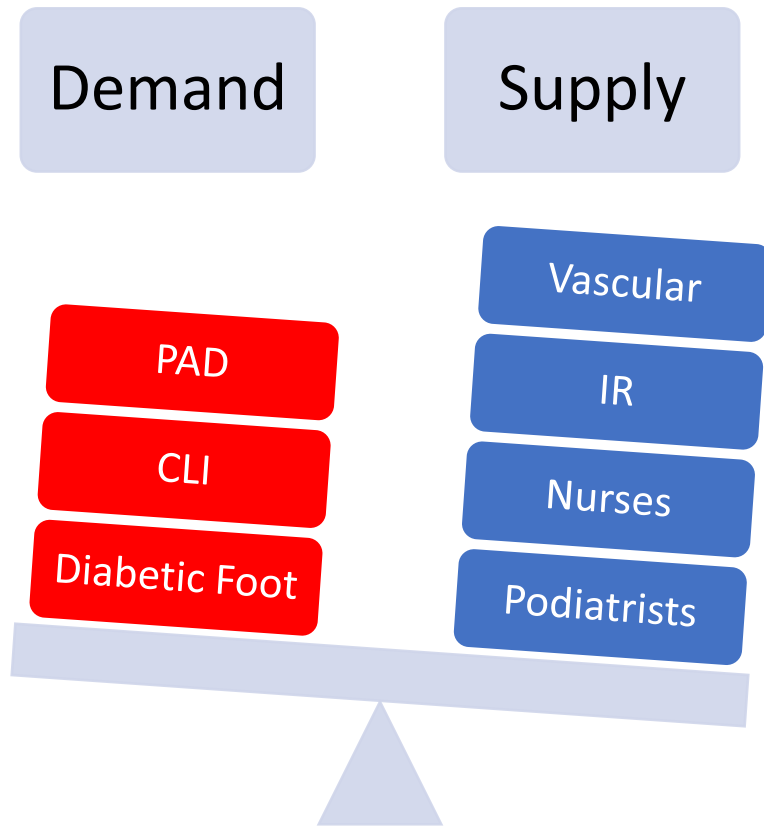
United Kingdom Vascular Surgery Workforce (Trainees), by Region to Achieve and Sustain recommended Consultants per Capita Population (2018).

Region	Population (2018)	Consultants (2018)	Trainees (Ratio 0.4)	If Consultants (1 per 100,000)	NTN (+138) Expansion	NTN (Ratio 0.4) Maintenance	NTN Total
East Midlands	4,771,666	33	13	48 (+15)	+15	19	34
East of England	6,168,432	47	19	62 (+15)	+15	25	40
London	8,825,001	78	31	88 (+10)	+10	35	45
North East	2,644,727	24	10	26 (+2)	+2	10	12
North West	7,258,627	63	25	73 (+10)	+10	29	39
South West	5,559,316	50	20	56 (+6)	+6	22	28
South Central*	-	(20)*	(8)*	(37)*	(+17)*	(15)*	(22)*
South East Coast~	-	(29)~	(12)~	(53)~	(+24)~	(21)~	(45)~
South East (includes*~)	9,080,825*~	49	20	90 (+41)	+41	36	77
West Midlands	5,860,706	53	21	59 (+6)	+6	24	30
Yorkshire & The Humber	5,450,130	48	19	55 (+7)	+7	22	29
England	55,619,400	445	178	556 (+111)	+111	222	333 (+155)
Scotland	5,424,800	42	17	54 (+12)	+12	27	39 (+22)
Wales	3,125,200	26	10	31 (+5)	+5	12	17 (+7)
Northern Ireland	1,870,800	9	4	19 (+10)	+10	8	18 (+14)
United Kingdom	66,040,200	522	209	660 (+138)	+138	269	407 (+198)

Source: National Vascular Registry (2017) Vascular Surgeons who perform Abdominal Aortic Aneurysm (AAA) and Provision of Vascular Services (2018) which recommends Vascular Surgeon 1 per 100,000 capita of population. Office National Statistics (ONS) Population mid-year estimate 2018: United Kingdom (66,040,200); England (55,619,400); Scotland (5,424,800); Wales (3,125,200); Northern Ireland (1,870,800). South East Administrative Region contains South Central* and South East Coast~ Training Regions. South <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates>.



Managing PVD: a Team Approach



- Public Health
- Primary Prevention
- Claudication Clinic
- Supervised Exercise
- Diabetic Foot Team
- “Hot” Foot Clinic
- Vascular Laboratory
- Vascular Imaging

REVASCULARISATION HUB