SOUTH EAST WALES
VASCULAR NETWORK

Programme Business Case

GIG CYMRU NHS WALES

Title	South East Wales Vascular Network Programme Business Case		
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Revision History

Revision Date	Summary of Changes
V.01	First draft – exclusions apply to Hub, Network, finance section of case
V.02	Additions to sections 7,9,10,11.
V.03	Updates to sections: 4,5,6,9, 19
V.04	Additions to section 8 and executive summary
V.05	Changes to exec summary & financial case agreed at programme Board
V.06	Addition - CAV spoke case following approval at BC approval group

Approvals

Name/board/committee title	Date	Version
SEWV Network Programme Board	10/09/21	V.05
CAV UHB Board	30/09/21	
ABUHB Board	13/10/21	
CTM UHB Board	30/09/21	
Powys Teaching Health Board	29/09/21	

Distribution

Name	Date of issue	Version
Steering Committee	16/06/21 & 09/08/21 & 02/09/21	V.01, V.02, V.03
Programme Board	23/06/21 & 11/08/21	V.01 & V.02
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Clinical Advisory Group	21/06/21 & 01/09/21	V.01 & V.03
Operational Group	21/06/21 & 01/09/21	V.01 & V.03

Contents

Abbreviations

AAA	Abdominal Aortic Aneurysm
ABHUB	Aneurin Bevan University Health Board
AC	Arterial Centre
AKA	Above Knee Amputation
ALAS	Artificial Limb and Appliance Service
BEVAR	Branched Endovascular Aneurysm Repair
BKA	Below Knee Amputation
BMS	Biomedical Scientist
CAVUHB	Cardiff and Vale University Health Board
CEA	Carotid Endarterectomy
CEPOD	CEPOD list' commonly denotes a dedicated theatre list for emergency cases (see: NCEPOD)
CHC	Community Health Council
CNS	Clinical Nurse Specialist
CLTI	Chronic Limb-Threatening Ischaemia
CLI	Critical Limb Ishcaemia
CTMUHB	Cwm Taf Morgannwg University Health Board
COTE	Care of the Elderly
COWER	Combined Open with Endovascular Revascularisation
DH	Department of Health
DVT	Deep Vein Thrombosis
EASC	Emergency Ambulance Services Committee
EVAR	Endovascular Aneurysm Repair
FEVAR	Fenestrated Endovascular Aneurysm Repair
GIRFT	Getting It Right First Time
GVI	Gwent Vascular Institute
HEIW	Health Education Institute Wales
HQIP	Healthcare Quality Improvement Partnership
IR	Interventional Radiology
ITU	Intensive Therapy Unit
IVC	Inferior Vena Cava
LOS	Length of Stay
MAC	Major Arterial Centre also referred to as the 'hub'
MAU	Medical Assessment Unit
MDT	Multi-Disciplinary Team
MHRA	Medicines and Healthcare products Regulatory Agency
NCAPOP	National Clinical Audit and Patient Outcomes Programme
NCEPOD	National Confidential Enquiries into Perioperative Deaths
NICE	The National Institute for Health & Care Excellence
NHH	Nevill Hall Hospital
NVR	National Vascular Registry (national audit)
OBC	Outline Business Case

ODN	Operational Delivery Network
PESU	Protected Elective Surgery Unit
POVS	Provision of vascular services (document)
PREM	Patient Reported Experience Measure
PROM	Patient Reported Outcome Measure
PTHB	Powys Teaching Health Board
RCS	The Royal College of Surgeons
RCR	The Royal College of Radiologists
RGH	Royal Glamorgan Hospital
SAU	Surgical Assessment Unit
SEWVN	South East Wales Vascular Network
TIA	Transient Ischaemic Attack
UKAS	United Kingdom Accreditation Service
VS	Vascular Society
VSGBI	The Vascular Society of Great Britain and Ireland
WAAASP	Wales Abdominal Aortic Aneurysm Screening Programme
WAST	Welsh Ambulance Service Trust
WHSSC	Welsh Health Specialised Services Committee
WTD	Working Time Directive
WTE	Whole Time Equivalent
YYF	Ysbyty Ystrad Fawr

1.0 Executive Summary

1.1 Overview

This programme business case seeks approval to redistribute and invest in vascular services across adult pathways of care within the South East Wales region covering four Health Board populations: Aneurin Bevan University Health Board (ABUHB), Cwm Taf Morgannwg University Health Board (CTMUHB), Powys Teaching Health Board (PTHB) and Cardiff and Vale UHB (CAVUHB). The aim is to ensure a unified service which will underpin the creation of a safe, sustainable, equitable service for the population that is in line with the rest of the UK.

The case sets out the challenges currently facing services across the region and describes the model of care underpinned by a network specification and standards of care needed to deliver a fit for purpose, sustainable regional service. It articulates current and predicted demand, the transfer of activity and sets out requirements to support centralisation and meet recognised standards which will deliver a sustainable service for the region and improve patient outcomes.

There has been a multi-professional and multi-disciplinary approach used to formulate this case. All stakeholders have been engaged and there has been a clear steer to ensure that this process has been clinically led with facilitation from managerial teams. Where necessary external bodies have been asked to inform the business case.

1.2 Case for change

Vascular disease accounts for 40 per cent of deaths in the UK and is as common as both cancer and heart disease. Vascular services aim to prevent death from aortic aneurysm, prevent stroke from carotid artery disease and prevent lower limb amputation from peripheral arterial disease and diabetes. The total number of patients likely to need a vascular procedure across South East Wales is approximately 1250 each year and there are a number of factors which indicate that this will increase. These include:

- An ageing population
- An increase in obesity
- An increase in diabetes

It is recognised that services within the South East Wales region are fragile. This is driven by:

- Workforce constraints
- Population needs
- Replicated services across the health system

This picture is reflected across the UK and in order to meet these challenges the Vascular Society of Great Britain and Ireland (VSGBI) and NCEPOD set out recommendations for the way in which services should be organised and delivered, to deliver safe and sustainable care for patients and staff.

The fundamental rationale for the changes set out within this business case are to ensure we create a service that is safe, sustainable and in line with national recommendations and the rest of the UK.

The region is already seeing the impact of fragile services and the consequence of managing these challenges in extremis. Indeed, the risk to patients requiring emergency surgery and interventional radiology was deemed too great to be delivered out of hours by the three individual units in the region and therefore a centralised out of hours emergency service was put in place in 2001 at the University Hospital of Wales.

In September 2020 CTMUHB lost its interventional radiology service. As a result, an urgent temporary change was put into place and patients requiring interventional radiology and vascular surgery transferred to University Hospital of Wales. This led to a change in care model without robust appropriate process, public engagement and financial governance.

Both the Vascular and IR workforce is at risk with a number of staff nearing retirement. In addition to this the workforce is becoming more specialised and there is a shortage nationally. It is highly likely that a system without a centralised model will not attract high quality candidates to the area.

Whilst the two remaining units do not perform poorly, services in their current configuration are not sustainable and do not meet the minimum population recommendations for improved outcomes. Therefore, if this business case is not approved it is highly likely that vascular services will fail to deliver the safe quality of care our population has come to expect.

This case very clearly tries to address these issues through clinical and corporate partnership between the Health Boards within the region. The aim being to protect both patients and staff. Clearly it is important to plan and implement the vascular network before further services start to fail. This is even more important given the impact of the pandemic.

1.3 Proposed Model of Care

The business case sets out a proposal to deliver a model of care in line with national recommendations and the rest of the UK through the implementation of a high volume vascular surgical service at the Major Arterial Centre (the hub) located at the University Hospital of Wales, whilst delivering appropriate local care for assessment and rehabilitation through local non-arterial centres (the spokes).

This will ensure the service meets the national recommendation outlined by GIRFT (2018) and the VSGBI (as set out in POVS) which includes:

- Optimal populations for improved patient outcomes
- Hub and spoke models of care
- Speed of access to expert clinical teams
- Assessment of adequacy of care and outcome measures as captured in the National Vascular Registry.

1.4 Benefits & Outcomes

The delivery of the new model and the investment to the service will ensure:

- A sustainable service that will be able to recruit the appropriate clinical workforce
- Improved patient outcomes through the delivery of a high volume Major Arterial Centre that meet the minimum population recommendations (VSGBI, NCEPOD, GIRFT, WAASP)
- Delivery in line with national standards and the rest of the UK
- Consistent achievement of all outcome measures to target levels (as defined by the VSGBI) see section 19 of the case
- Creation of a more resilient, skilled and sustainable workforce
- A focus on service development across care pathways
- Improved regional working
- Delivery of care in line with Health Board clinical strategies
- Improved opportunities in research and innovation
- Improved opportunities for training and education
- Improved patient experience
- Clear lines of accountability and clinical governance across the network with a core

The above benefits will be reviewed annually as a part of a regular network review and will include measures as set out in the benefits section of the case and includes: staff vacancies and turnover, PROMS and PREMS, performance against national measures, adherence to agreed pathways. A number of these are measured currently, PROMS and PREMS will be rolled out within the first year of the network to provide a baseline from which the service can develop.

The investment in an Operational Delivery Network that puts clinicians and patients at the heart of performance monitoring and service development will ensure the benefits and outcomes set out are monitored and reported, with a key focus on the quality and equity of access to service provision and care in the right place at the right time. The aim of the Network will be to drive clinical performance and evidence the benefits of centralisation through monitoring and review through regular Network Board meetings. It is proposed that whilst an annual review will take place, a 3 and 6-month initial review of the network will take place to ensure early review of activity and operational efficiency.

National measures

Nationally the performance of vascular services are captured and published by the National Vascular Registry (NVR) and reported annually.

CTMUHB do not now deliver vascular services; however, the other two centres achieve satisfactory results.

The National Vascular Registry have confirmed that they will work with the network to produce a pre and post go live report at 6 months.

1.5 Risks

Do nothing service risks

There are several risks that must be considered if this business case is not supported, and the model of care as set out is not delivered. These include:

Sustainability: This risk has already been realised in one of the three units in SE Wales and with a fragile workforce in both Vascular Surgery and Interventional radiology there is an impact on the wider sustainability of local and regional IR services.

Standards: Service in South East Wales will not meet national recommendations set out by the VSGBI. There will also be a failure to meet the requirements by WAAASP commissioners for a unit covering 800 000 patients minimum for screened aneurysms.

Safety: The above two risks impact directly on the ability of the region to deliver to a safe and effective service that maintains acceptable patient outcomes across the three Health Boards.

Equity: Services are not equitable with others in Wales and the wider UK.

Financial: There is already financial risk in relation to CTMUHB transfer of activity to Cardiff without a robust and formal business case being approved**. However, CAVUHB expects that those revenue costs will be recovered effective 1st April 2021 regardless of the final decision on this business case.** CAVUHB have already incurred costs at risk in relation to the development of the Hybrid theatre business case.

Implementation risks

There are a number of risks to the implementation of the proposed model of care. These include:

Workforce: Given that there are a limited number of staff transferring, this puts pressure on CAVUHB. Even with additional recruitment there is a risk to the local population given should staff need to transfer from other specialties to support the hub. This may also lead to additional costs such as agency, and international recruitment.

Engagement and culture: Bringing together of three existing units as a part of a network has already led to strained relationships. It is critical to work together proactively to be open, transparent, and honest when tackling these issues

Impact: Impact of transferring patients to a centralised centre for their surgery means they will potentially be further from home for a small but important period of their care. This is balanced by the need for the best care possible leading to the best option.

Financial: Cost implications of delivering an Operational Delivery Network in line with other services in the UK. Challenges for Health Boards in releasing costs to support the transfer of activity to another provider.

Estate: CAVUHB is under significant pressure presently due to unscheduled demand and COVID-19 demand. This has led to an issue with finding suitable ward space for the centralisation. This is not insurmountable but again does put pressure on the surgical footprint within UHW.

These risks are being monitored as a part of the Programme these are detailed in both the case for change section and section 19 of the case and *Appendix G*.

1.6 Public Engagement

In recognition of the proposed reconfiguration of vascular services across South East Wales, the programme was committed to undertake a comprehensive engagement process with the public and all key stakeholders, consistent with best practice and informed by advice from the Consultation Institute. It has been important to adopt a consistent approach and therefore an engagement group was established with the relevant stakeholders from each Health Board. The plans were developed and agreed between each Health Board and their respective Community Health Councils in line with policy.

Between Friday 19th March and Friday 16th April 2021, the four Health Boards: ABUHB, CTMUHB, PTHB and CAVUHB, ran a public engagement event, describing the rationale and benefits of the proposal.

The events raised a number of queries and concerns which were answered by the clinical and planning teams. These, together with details of plans, processes and all responses were collated into a comprehensive report which was submitted to all constituent CHCs for review and approval.

CHC reviews took place in early May 2021, and a formal agreement was reached to move forward to the implementation stage with a caveat to ensure that a parallel process reviewing thematic issues raised continued through focused engagement.

Details of the engagement process and the outcome from CHCs was subsequently presented to each Health Board meeting, with approval reached in all Boards to proceed.

Engagement with the public and our staff will continue throughout programme delivery and implementation to include the further information on a number of areas which were raised as queries including: transport between sites, access and parking at the hub and facilities and services provided at spoke sites.

1.7 Activity summary

The table below sets out the current and expected activity that has been used as a basis for service planning. This was based on 4 years' worth of data from all three provider health boards and was signed off at Executive Programme Board in March 2021.

Theatres & Interventional Radiology

The combined theatre demand for a typical year for the region is 1082 cases. With a total of 826 cases modelled for the hub. This is a transfer of 595 cases per annum to UHW.

Total cases by provider Health Board:

Health Board	Hub	Spoke	Total Cases
ABUHB	298	74	372
CTMUHW	231	65	296
CAVUHB	297	117	414
Sum of cases	**826**	**256**	**1082**

The below table splits the activity between the 19/20 baseline developed by the network finance group and predicted demand and capacity modelling agreed and benchmarked. It is expected that post COVID the number of patients requiring vascular surgery may well increase. The below table sets out the additional modelled activity for each of the three provider Health Boards.

Provider:	ABUHB	CAVUHB	CTMUHB	Total
C&V Baseline (Hub Activity)		286		286
CTM/AB Baseline Activity Transfer	277		175	452
Additional Activity	21	11	56	**88**
Total Activity	298	297	231	**826**

The following assumptions have been made:

- Activity will be based on cross cover of leave over 50 weeks
- Throughput of 1.4 cases per session in line with current throughput in UHW theatres
- Development of performance indicators and operational measures
- Review dates set at 3,6 and 12 months to assess activity assumptions and theatre efficiency

Capacity for the above demand will be provided through the provision of 6 dedicated all day sessions per week which includes IR. In addition, there will be access to 3 x weekly urgent lists if demand is high. This will ensure we utilise the limited resource effectively. This is less than was currently available regionally but with improved utilisation in line

with UHW current throughput and access to urgent lists it is felt this is an acceptable position for go live. This will be monitored closely in the first 12-18 months.

This plan has been developed in line with the modelling undertaken over a period of 4 years from 2015 to 2019. This has also been tested with clinicians and as part of the peer review and has been benchmarked to ensure it is commensurate with other similar sized units. At request of the Programme Board a review of assumptions made about LOS and theatre throughput was undertaken following snapshot audit over 6 weeks - this changed throughput assumptions from 1-1.2 cases per session to come in line with UHW current throughout of 1.4 cases per session.

Note that activity figures are pre-COVID and allowance will have to be made in short to medium terms planning both in terms of bed use and theatre time with new COVID restrictions in place.

Bed requirements

The below table shows modelled ranges in both hub and spoke beds. These ranges allow for clinical variation and reasonable occupancy levels of 85%-90%. The greater effect of emergencies is reflected within the Cardiff figures. There is significantly more variation in the spoke beds because of the disproportionate effect of longer stays for ongoing rehabilitation.

Total recommended beds for the hub are 35 which is close to 90% variation in terms of variation in bed use.

Health Board	Hub beds	Spoke
ABUHB	12-13 (12)	10
CTMUHB	8-9 (8)	10
CAVUHB	12-17 (15)	10*

*CAVUHB audits have showed consistent reduction in spoke bed days and with an increased therapies provision it is estimated that activity should be managed though 8 beds or less for CAVUHB spoke.

Benchmarking & Peer Review

A benchmarking exercise was undertaken in 2019 with similar Major Arterial Centres/Hubs which shows a variation in provision of beds and theatres but that broadly Cardiff's proposals are in line with similar sized MAC's.

The peer review of the business case supported the number of proposed hub beds as appropriate for the population. There was challenge from both the South West and Wessex Network clinical leads around the number of theatre sessions. Both recommending not to assume and efficiencies in theatres, noting that often an increase in cases as seen as the network develops.

It is therefore essential that an early review is in place to assess the use of CEPOD and the urgent lists available at UHW. The details of the reviews are set out in section 19 of the case.

1.8 Workforce summary

The workforce plan has identified a need to increase the establishment across several professional groups in CAVUHB as the Major Arterial Centre to support the transfer of activity as per demand and capacity modelling. It has also identified the need for several posts that support the creation of the Operational Delivery Network, the development of the network to meet standards/to bring the service in line with other UK vascular services. There are also several posts that will improve the service.

Staff involved in the provision of activity that is transferring to the hub are not subject to formal TUPE transfer arrangements and are free to remain within local Health Board staffing establishments or to express a wish to apply for posts in the hub if desired. Any staff who do take up these posts will be identified and progressed.

Each Health Board has committed to collaborate as part of a network to ensure that staff are developed, educated, and supported to maximise opportunities within the network. As part of the programme there is a network workforce group supporting development of recruitment, training to develop the key skills needed. Where there are existing arrangements to work across sites, staff will be invited to carry on with that arrangement.

The completion of the programme business case is based on the following workforce principles:

- Existing workforce providing vascular care will be identified where possible and included within the case.
- Staffing requirements that are a direct consequence of the creation of the Hub due in line with demand assumptions, and the set-up of a network should legitimately be included within the programme business case.
- Additional staffing bids that are considered to be service developments / enhancements in line with national vascular standards or benchmarking with other network services will be included within the case but clearly identified.
- Additional staffing bids that are independent of the creation of the hub and spoke model will not be included within the programme business case and will be subject to the usual internal service planning and scrutiny processes within the relevant Health Board.

Breakdown of workforce posts

The additional workforce required can be broken down to support 4 core areas: activity, network, standards and service improvement. These are set out in tables below.

Workforce to support activity transfer into the Hub (CAVUHB):

Hub area	WTE required
Ward	38.66
Nurse specialists	2.0
Wound healing	1.0
Pharmacy	1.5
Labs	2.0
Theatres	8.08
Radiology	12.3
Medical	3.47
Therapies	1.78
Total	**70.79**

Workforce aligned to Operational Delivery Network:

Role	Business case section 8	Band	Current WTE	WTE required
Network Clinical Lead	Benchmarking		0	0.2
Network IR lead	POVS *		0	0.1
Network Nursing lead	POVS*	7	0	0.2
Network Manager	Benchmarking	8a	0	1.0
Network Coordinator (administration)	Benchmarking	5	0	1.0
Network Data Coordinator	Peer Review	5	0	1.0 (Fixed term 12 months)
Total			**0**	**3.5**

- Peer review have indicated these posts will be a key element of the next POVS release and a recommendation these are included at the setup of the service

Workforce based in the hub aligned purely to vascular standards/benchmarking with other networks:

Role	Business case section/standard	Band	Current WTE	WTE required
Care of the Elderly Consultant sessions	9.12 aligned to POVS 2018 & Peers		0	0.2
Rehabilitation consultant sessions	Aligned to Peers		0.1 for amputee rehabilitat	0.2

			ion (WHSSC)	
Secretary to Consultants	To support above	4	0	0.2
Podiatry pathfinder	9.14 POVS 2018	8a	0	1.0
Lead therapist (hub rehab coordination)	9.14 Peer Review	7	0	0.7
Vascular trainees to support rota	9.2 POVS 2018 & Peers		0	Sessional payments
Total				**2.3**

Workforce for the provision of acute rehabilitation in the hub to ensure service Improvement in line with rehabilitation standards:

Role	Band	WTE
Dietician	6	0.81
Dietician	4	1.0
Dietetic support worker	3	2.24
Physiotherapist	6	1.12
Rehabilitation assistant	3	1.0
Occupational therapist	6	0.61
Pathway lead Psychologist	8b	1.0
Total		**7.78**

1.9 Financial summary

The centralisation of vascular services for South East Wales is predicated on a service, workforce and financial plan that assumes no additional patient activity (inpatient procedures) is delivered, but for a marginal cost increase a better quality, more sustainable service and better patient outcomes are achieved.

The financial plan has been based upon the agreed demand and capacity modelling approved by the Programme Board, this was based on 4 years work of data with robust clinical and managerial involvement from the health boards and does show an increase from the 2019/20 baseline.

There are both revenue and capital implications for the 3 health boards, including a stepped future revenue cost associated with the opening of the new hybrid theatre.

The following financial analysis is based on service and workforce plans confirmed to date for the 'Hub' element of the service, there remain certain elements to finalise, but they are not expected to be material in value. Not all the 'Spoke' service and workforce plans are finalised by each health board – but indicative values are identified where available, these costs will be the responsibility of the relevant health board, to ensure the system operates effectively for patient care and patient flow.

The table below presents the summary gross cost of the service shift and delivery of the Hub and Spoke model of care:

Revenue Summary of the Planned Centralisation of Vascular Surgery

	ABUHB	CVUHB	CTUHB	TOTAL REGION ACTIVITY	TOTAL REGION COST		TOTAL REGION COST-Recurrent
Baseline Activity (2019/20)	277	286	175	738			
Baseline Cost (2019/20 uplifted to 21/22)	£2,508,067	£3,099,526	£1,482,375		£7,089,969		
Cost of Activity transferring to the Hub							
Expected activity to transfer	298	11	231	826			
Bed Days	£838,090	£279,363	£558,727		£1,676,180		
Theatre Sessions	£741,407	£92,224	£586,898		£1,420,528		
Medical Staffing - Vascular surgeons	£277,205	£10,232	£214,881		£502,318		
Therapies	£113,540	£4,191	£88,013		£205,744		
Clinical Support Costs	£223,365	£8,245	£173,145		£404,755		
IR Support Costs	£57,609	-	£33,771		£91,380		
Betterment/service enhancement identified	£82,003	£81,728	£63,566		£227,297		
National Standards-additional Revenue Costs	£81,330.19	£81,057	£63,044.54		£225,432		
Additional provider costs above 'top down' approach	£25,686	£25,600	£19,911		£71,196		
Provider Cost of Hub Activity Episodes	**£2,440,235**	**£582,640**	**£1,801,956**		**£4,824,831**		£4,824,831
LTA Impact Adjustment	-£8,115	-£63,569	£71,684		£0		
Health Board Impact- Cost of Hub Activity Episodes	**£2,432,120**	**£519,071**	**£1,873,640**		**£4,824,831**		
Intensive Care- Impact of activity transfer	**£70,876**	**-**	**£34,216**		**£105,092**		£105,092
Recurrent Centralisation Costs							
Transport estimate	£44,000	£44,000	£44,000		£132,000		
Network Management	£73,096	£73,096	£73,096		£219,289		
Additional Hybrid theatre cost from 2024							
Additional Maintenance	£7,940	£7,940	£7,940		£23,820		
	£125,036	**£125,036**	**£125,036**		**£375,109**		£375,109
Non Recurrent Centralisation Costs							
Revenue Equipment set up costs	£69,686	£69,686	£69,686		£209,058		
Network Data Manager	£11,333	£11,333	£11,333		£34,000		
Advanced recruitment costs	£45,903	£45,903	£45,903		£137,709		
	£126,922	**£126,922**	**£126,922**		**£380,767**		£0
Additional Cost of Centralisation	**£2,754,955**	**£771,030**	**£2,159,814**		**£5,685,799**		**£5,305,032**

1.10 Planning and Assurance Process

This case has been developed with involvement of all Health Boards and core specialities involved in the care of vascular patients. In preparation for the business case, clinical models have been developed and agreed, demand and capacity modelling undertaken and Hub and Spoke planning templates developed.

The Network Specification, Clinical Models of Care and Clinical Pathways

The clinical model of care was approved following a review of the 2014 clinical options appraisal by the Clinical Advisory Group in early 2021. Several surgical and rehabilitation pathways were then developed following a public engagement process in March 2021.

A Network specification (*Appendix D*) for South East Wales has been developed which is in line with the NHS England service specification, which was published in 2013, the agreed specification is updated to reflect the most recent recommendations and findings of relevant published research, studies, and papers. This specification was approved at Programme Board in May 2021.

This Network specification, the developed models of care and key pathways have also been reviewed by Medical Directors from the three provider Health Boards.

Planning process for Hub and Spokes

Planning templates have been completed by each of the Spokes along with specialty level templates for the key specialties involved in the care of vascular patients within the hub including theatres, ward, radiology, therapies, laboratories. These have been supported with face-to-face meetings at both a spoke and network level within the programme. Benchmarking has been used, where available as well as discussions with other Vascular Networks as a learning opportunity. This has supported the Health Boards to review their current service and supported planning against:

1. The expected change in activity following Network 'go live'.
2. The Network Service Specification & models of care.

Assurance and approval

To provide assurance to the Executive Programme Board that the planning templates case have been internally scrutinised the following were agreed and have taken place:

1. Local Health Board sign off

Completed templates have been reviewed and signed off by the relevant Health Board. By signing, the Board provided assurance that due diligence has been undertaken in completion of the template, and that the revenue implications of the pathways are understood and relate solely to Vascular Services.

In addition to the above, due to the number of supporting services within the Hub, each specialty was asked to complete and submit specialty level planning templates following sign off from their Clinical Board.

2. Peer Review of the business case

Colleagues in Bristol, Brighton and Southampton Vascular Networks have kindly agreed to support a peer review of the business case alongside colleagues from across the South East Wales region in order to provide subject matter expert review and challenge of the case.

3. Programme Scrutiny

Both the Network Steering Committee and Executive Programme Board will provide any further challenge and scrutiny as well as discussions around assurance and risks to delivery of regionalised vascular services.

4. Business Case Approval

Final sign off on business case at Health Boards.

2.0 Introduction and Background

Vascular disease relates to disorders of the arteries, veins and lymphatics. The range of vascular care extends from minor procedures (such as varicose vein surgery) to life saving arterial repairs. The most complex care requires surgery and an inpatient stay in a specialist centre where a wider range of supporting services are available. Vascular interventions are provided by surgeons, interventional radiologists and nurse specialists supported by a wider multidisciplinary team.

Conditions requiring specialised vascular care include: lower limb ischaemia; abdominal aortic aneurysm (AAA); stroke prevention (carotid artery intervention); venous access for haemodialysis; suprarenal and thoraco-abdominal aneurysms; thoracic aortic aneurysms; aortic dissections; mesenteric artery disease; renovascular disease; arterial/graft infections; vascular trauma; upper limb vascular occlusions; vascular malformations and carotid body tumours. The scope of the specialised service includes deep vein reconstruction and thrombolysis for deep vein thrombosis (DVT) but excludes varicose veins and inferior vena cava (IVC) filter insertion.

Collectively, Aneurin Bevan University Health Board, Cardiff and Vale University Health Board, and Cwm Taf Morgannwg University Health Board provide vascular services in South East Wales. The populations affected are Blaenau Gwent, Caerphilly, Monmouthshire, Newport, and Torfaen; Cardiff and the Vale of Glamorgan; Rhondda Cynon Taff and Merthyr Tydfil (Bridgend is part of the South West Wales Network), and South Powys (other parts of Powys served by South West/North Wales Networks as well as networks in England). The total resident population of the Health Boards is approximately 1.5 million.

The total number of patients likely to need a vascular procedure across South East Wales is 1250 each year. In addition, there are currently an estimated 275,000 are living with diabetes in Wales[2] and this prevalence is also increasing. 311,000 people in Wales could have diabetes by 2030[3], with diabetic patients having a worse outcome as evidenced by the increasing rate of lower limb amputation in this group.

The current configuration of services across separate hospital sites are not deemed sustainable for the continued delivery of the quality and safety standards set out by the *Royal College of Surgeons* and the *Vascular Society of Great Britain and Ireland.*

The development of a networked model of care with high volume centres for complex vascular surgery is the first recommendation within the Getting it Right First Time (GIRFT) report for vascular surgery published in 2018. Over the last few years most regions have centralised vascular units to improve clinical outcomes, equity, and efficiency, whilst ensuring service sustainability, attraction and retention of staff and maximising training and education opportunities.

However, despite these national recommendations, concerns about sustainability of services and developments in the rest of the UK and other parts of Wales, the South East

Wales region remains one of a handful of regions in the UK without a formal networked arrangement of care for all vascular services. This, along with the fragility of the wider service sustainability for the future has resulted in our clinical teams considering how this current position can be improved, as well as developing the service to be an exemplar in Wales.

Initial work delivered by the Network Programme:

- Options appraisal and subsequent clinical review of network model and Hub and Spoke designations in 2021.
- Development and agreement of a network specification, including performance measures and targets
- Development of models of care and clinical pathways inclusive of key surgical, rehabilitation and repatriation pathways
- Development, review and agreement of demand and capacity modelling
- Development of understanding of organisational changes to support the new operational structure
- Development of a programme governance structure including an Executive Programme Board
- Delivery of public and staff engagement to test the model and changes to the existing pathways for Vascular patients requiring complex surgery
- Delivery of a peer review of the draft programme business case

3.0 Strategic Case

The development of the vascular network aligns itself with a number of national drivers specific to Wales, as summarised below:

- **A Healthier Wales: Our Plan for Health and Social Care (2018)** The aim of this national strategy is to provide health and social care services in the future that include:
  - Enabling the NHS and social care to deliver sustainable, seamless and person centred pathways of care, use patient safety as a driver to reduce variation, inequity and harm in care delivery and increase quality improvement capacity and capability.
  - When people need help work with them and their loved ones to find out what is best for them and agree how to make those things happen - 'person-centred approach'.
  - Using the latest technology and medicines to help people get better, or to live the best life possible if they are not able to get better.

- **NHS Wales Service Change Plans** – NHS Wales is undergoing a series of changes focusing on the reshaping of acute clinical services, with a view to changing the delivery of some services. This includes centralisation of specialist care (e.g. for patients who sustain cardiac arrests and regain a pulse), with the rationale of delivering improved clinical outcomes and ensure services remain sustainable in the face of challenges in the medical workforce. UHB specific examples include the development of a single acute hospital in Aneurin Bevan University Health Board.

More specifically, there are clear links between the establishment of a Vascular Network and Health Boards' Strategic Goals.

<u>Cardiff and Vale University Health Board</u>

In its *Shaping our Future Wellbeing* Strategy 2015-2025 the Health Board sets out objectives that link directly with the delivery of a regionalised Vascular service including:

- Reduce health inequalities
- Have an emergency care system that provides the right care, in the right place, first time
- Be a great place to work and learn
- Work better together with partners to deliver care and support across care sectors, making best use of our people and technology
- Excel at teaching, research, innovation and improvement and provide an environment where innovation thrives.

Aneurin Bevan University Health Board

In its *Building a Healthier Gwent* Strategy and Annual Plan the Health Board sets out objectives that align closely with the objectives of the Vascular Service proposals, including:

- To address and reduce the impact of health inequality amongst the population of Gwent
- To deliver the right patient care, in the right way, at the right place and by the right person
- To create an integrated research, innovation, improvement and value approach to healthcare provision, bringing shared purpose to think and work in different and more effective ways
- To be an organisation that people choose to work in and where they choose to stay
- To work collectively across Health Boards and Trusts to deliver optimal pathways, such that patients receive great care and continuity regardless of geography

Cwm Taf Morgannwg University Health Board

The Health Board's Vision, Mission and Strategic Objectives align with the establishment of a vascular network and have consistently cited its development as a key priority in the Annual Plan and IMTPs.

Mission Building healthier communities together:

"Vision In every community people begin, live and end life well, feeling involved in their health and care choices"

Strategic Well-being Objectives

- Work with communities and partners to reduce inequality, promote well-being and prevent ill-health. Provide high quality, evidence based, and accessible care.
- Ensure sustainability in all that we do, economically, environmentally and socially.
- Co-create with staff and partners a learning and growing culture.

Powys Teaching Health Board

Powys Teaching Health Board and Powys County Council have a joint ten-year strategy for a Healthy, Caring Powys. The establishment of a vascular network aligns with the local strategy including:

- Early Help and Support: for example, delivery of diagnostic services through spoke services and ensuring appropriate pathways of pre-hospital care.
- Tackling the Big Four: providing a safe and sustainable model of care to reduce the burden of ill health and mortality from circulatory diseases.
- Joined Up Care: working together in a network model, including identifying ways to provide more care closer to home.

- Workforce Futures: ensuring a sustainable workforce, working together to meet the latest standards for quality and outcomes.
- Transforming in Partnership: working together in a network model to provide quality care in Wales.

There is commitment within all Health Board annual plans to the implementation of the SE Wales Vascular Network.

4.0 Case for Change

It should be recognised that vascular patients are already being managed across our healthcare system; therefore, the development of a Vascular Network represents a significant service change, but not a new service development or commissioned service. Thus, the programme has been developed based on strengthening existing clinical services through re-organisation, revised and new pathways and enhancing clinical and operational governance. Furthermore, requirements for additional resources have been considered within the context of enhancing existing services and improving the standard of care for all vascular patients in line with other services across the UK and national standards. This has been clearly articulated in the financial case. Whereas there is some uplift to be expected overall the redesign of service firstly needs to be funded by the full cost of existing services within all Health Boards within the region to ensure that the true additional costs are accurately reflected and understood.

Key investment objectives defined by Welsh Government are referenced throughout this business case with added value that could be delivered. These include:

- **Health gain**: improving patient experience and outcomes.
- **Equity**: where people of highest health needs are targeted first.
- **Clinical and skills sustainability**: reducing service and workforce vulnerabilities and demonstrating solutions that are flexible and robust to a range of future scenarios.
- **Value for money**: demonstrating the least costly way of generating the anticipated benefits.

4.1 Population health and prevalence of vascular disease

Age

Prevalence of vascular disease increases with age. The complexity, outcome and costs of vascular intervention are age-dependant. Between 1998 and 2018, the proportion of the population in Wales aged 65 and over has increased from 17.4 per cent to 20.8 per cent [1]. Although South East Wales most even distribution of ages among the three Welsh regions, this can be partly attributed to the relatively high number of university students living in the area, between 1997 and 2017, the proportion of the population aged 65 and over has increased from 16 per cent to 18 per cent.

This presents a significant challenge to the NHS in Wales in its delivery of services for the future. This factor alone suggests that demand for vascular services and the need for specialist workforce to deliver these services is likely to continue to increase with time.

[1] Summary statistics for Wales, by region: 2020 (gov.wales)

Diabetes

There are currently an estimated 260,000 people with living with diabetes in Wales, and prevalence is increasing. Vascular disease is the major cause of morbidity in diabetes and the risks of disease progression are higher, it is likely that the great increase in the number of patients with diabetes over the next decade will have the biggest impact on vascular services. Many of these patients present as an emergency and are at high risk of amputation.

Obesity

Public Health Wales report that the proportion of children and adults in Wales who are of a healthy weight is reducing. Notably, between 2003 to 2015 there was a 4% increase in levels of obesity among adults in Wales. Currently around 60% of the adult population are overweight or obese with 10,000 more adults becoming obese each year. Startlingly, 1 in 8 children aged 4-5 is obese.[2]

This epidemic is likely to have the biggest impact on the prevalence of diabetes in the next decade and may well cause a dramatic rise. Childhood obesity has also been linked to the development of diabetes and hypertension in later life. These factors contribute to the development of hyperlipidaemia and hypertension, both potent risk factors for vascular disease.

Smoking

Smoking is a major cause of vascular disease and over 80% of vascular patients in Wales are current or ex-smokers. Around 20% of the population over 60 years of age have peripheral arterial disease, with about a quarter of these affected being symptomatic. Approximately 2% of men aged 65 have an enlarged aorta although not all go on to develop a significant aneurysm. The Wales AAA Screening Programme (WAAASP) has been operational since 2012.

Socioeconomic factors

Vascular patients are often from socioeconomically deprived backgrounds. According to the 2019 report detailing Welsh Index of Multiple Deprivation figures South East Wales has some of the least and most deprived areas in Wales, including small areas of deep-rooted deprivation in Blaenau Gwent, Rhondda Cynon Taf, Merthyr Tydfil and Cardiff.[3]

With the development of the network the 4 Health Boards with be able to work more collaboratively to ensure equality and equity of care (as per all three health board values) for vascular patients.

[2] Overweight and Obesity - Public Health Wales (nhs.wales)
[3] Welsh Index of Multiple Deprivation (WIMD) 2019: results report (gov.wales)

4.2 Service Sustainability

As many as 50 percent of patients with vascular disease present urgently or as an emergency, and in the past have often been managed by a general surgeon. However vascular surgery in the UK emerged as a separate specialty in 2013 from its background as a subspecialty of general surgery and is a rapidly advancing field.

As the service becomes more specialised, and the demand is expected to rise, the scale of the workforce challenge is highlighted. A 2014 survey of the UK Vascular Surgeon workforce carried out by the VSGBI reported that "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". The same survey also found that as much as 35% of the consultant vascular workforce intended to retire in the next decade, by 2024. [4]

The same is also true in Interventional Radiology, where a shortage in staff in the UK is putting services at risk. In 2019 the Royal College of Radiologists report that England had a shortfall of 323 Interventional Radiology consultants (a shortfall of 36%) and highlighted that regional variation was leading to inequitable care for patients. [5]

It is accepted practice that Vascular Surgery Services must have a Vascular IR Consultant service. In April 2020 CTMUHB was left without a Vascular Interventional Radiology Consultant. Despite recruitment efforts the posts have remained vacant, this is primarily due to the shortage of Interventional Radiology Consultants nationally. This prompted temporary arrangements to be put in place to support CTMUHB whose vascular service had become unsustainable.

There is a need to urgently develop more sustainable vascular services across South East Wales through reconfiguration. This is the only way to ensure sufficiently large catchment populations prescribed WAASP and recommendations from GIRFT, NCEPOD and VSGBI and tackle fragility of the workforce.

4.3 Patient outcomes

Historically the UK had the highest mortality rates in Western Europe following elective abdominal aortic aneurysm surgery (7.9% UK vs 3.5% Europe, Vascunet 2008) and was among the slowest nations for uptake of new endovascular technology.

Following the introduction of mandatory reporting of vascular surgeon's outcomes to the National Vascular Registry (NVR) which is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP), there has been a significant improvement in outcomes for indexed

[4]Harkin, D. Beard, J.D. Shearman, C.P. Wyatt, M. The Vascular Surgery Workforce: A Survey of Consultant Vascular Surgeons in the UK, 2014 European Journal of Vascular and Endovascular Surgery

[5] Clinical radiology UK workforce census 2019 report (rcr.ac.uk)

vascular procedures. The latest published NVR results for all 3 units in South East Wales *Appendix B.*

The Vascular Society of Great Britain and Ireland (VSGBI) recommend that high quality urgent vascular care should be organised and delivered using integrated vascular networks. Ensuring that local assessment, diagnosis, and rehabilitation of patients in non-arterial centres (spokes) is optimised, whilst also delivering high volume interventions at Major Arterial Centres (hubs). The goal being a service which balances the needs of patient access with the provision of comprehensive safe vascular care and intervention that is, above all sustainable.

Factors that we know influence outcomes:

- Individual surgeons maintaining high volumes of surgery - Surgeons that maintain high volumes of vascular surgery achieve mortality rates 2 - 4% lower than surgeons that perform low volumes of vascular surgery each year. (VSGBI 2009)
- Hospitals performing high volumes of vascular surgery achieve significantly lower mortality than hospitals performing low volumes. (VSGBI 2009)
- Modern surgical techniques - Some vascular procedures can be done using a modern, minimally invasive surgical method called endovascular surgery. Evidence shows that this type of surgery reduces length of hospital stay, reduces the risk of acquiring a hospital infection and most significantly, reduces surgical mortality by around 3% compared to traditional surgical methods

In South East Wales, the volume of cases performed in each individual unit is not in line with the National Vascular Society recommendations of a minimum population of 800,000 (which is also considered necessary for an AAA screening programme). This is based on the number of patients needed to provide a comprehensive emergency service, maintain competence among vascular specialists and nursing staff; the most efficient use of specialist equipment, staff and facilities, and the improvement in patient outcome that is associated with increasing caseload.

Whilst none of the units in South East Wales perform poorly at present there is considerable evidence to show that a different model of care could lead to further improvements in care over time.

<u>High volume centres</u>

Rapid access to diagnostics and interventions forms part of a high-quality service resulting in improved patient outcomes. In other areas of the UK the need for this rapid access has been an important driver for centralisation of surgery onto one hospital site as it requires 24/7 working. Larger units are most likely to provide this service in the medium to long term.

Centralisation should allow for improved facilities for patient care (dedicated vascular wards), investigation (larger radiology units with 24/7 interventional radiology) and treatment (vascular operating theatres and staff, vascular anaesthetists, improved facilities for endovascular management, better critical care).

Performing all complex procedures at central units would ensure all patients have their surgery at a high-volume hospital by an experienced vascular specialist, using the latest technology and techniques

The centralisation of vascular services to large centres offers a number of potential benefits that are unlikely to be achieved through any other model, including:

- High volumes of complex procedures per centre. Evidence for some procedures indicates that the more procedures that are carried out the better the outcomes. For example, significant reductions in peri-operative deaths have been proven to be achieved through the centralised delivery of AAA repair. (Holt PJ, Poloniecki JD, Hinchliffe RJ, Loftus IM, Thompson MM. Model for the reconfiguration of specialised vascular services. The British journal of surgery 2008; 95(12):1469-74). A specialist treatment centre for each vascular screening programme.
- Individual surgeon volumes are more likely to be maintained despite the predicted shift away from open surgical techniques towards endovascular technologies.
- Improvement of the operating environment for vascular specialists, with the increasing availability of theatres that incorporate radiological imaging equipment (hybrid theatres) and dedicated daily vascular operating lists. Working within multi-disciplinary teams has also become common practice [7].
- Centralisation of resources, with the potential to reduce overall costs and improve efficiency.
- Dedicated vascular anaesthetic input.
- Training of junior staff would be facilitated with concentrated high-volume work.
- Potential cost savings in avoidance of duplication of complex equipment both within and external to theatre.
- Provision of comprehensive and sustainable 24/7 vascular radiology services.

All clinical teams agree that services and the care they deliver can be improved by developing and delivering a network model. The benefits are considerable with sustained or indeed improved outcomes, with a richer and wider workforce to draw from, clinical standardisation which can be evidence based, peer reviewed and monitored. However, the key driver for change is to protect the region from local vulnerable services due to workforce constraints and inconsistent clinical practise. The aim is to create a service that can stand up as an exemplar across the UK against the standards set for the care of patients needing vascular interventions.

Screening programmes

A minimum population of 800,000 is considered necessary for an AAA screening programme and is often considered the minimum population required for a centralised vascular service. This is based on the number of patients needed to provide a comprehensive emergency service, maintain competence among vascular specialists and nursing staff; the most efficient use of specialist equipment, staff and facilities, and the improvement in patient outcome that is associated with increasing caseload.

Currently South East Wales provision with three separate smaller units does not meet the minimum population recommendations.

Benefits for Academia and Research

Central units would act as leading centres of research. This would mean greater opportunities for surgeons and specialists who want to pursue a joint career in academia and surgery. It would also help attract junior medical staff who will be the vascular specialists of the future. It is hoped that ongoing research can help define future management and treatment strategies for vascular diseases.

4.4 Evidence for a Hub and Spoke Model of Care

Despite the evidenced benefits that high volume centres can bring there is much evidence for these centres as a part of a wider network that would provide a focus not only on the portion of care within the specialist centre but equally ensure that care across a region is of good quality and is provided wherever possible, closer to home.

In other complex specialities, Hub and Spoke working is well established and well proven to, over time reduce length of stay and improve outcomes [1, 2]. Research into health service models also supports this model of care [3].

The National Vascular Registry performs a periodical organisational audit of vascular units with the most recent being 2018. The 2018 audit shows the organisation of hospital vascular services within the UK continues to evolve. Current advice from the Vascular Society of Great Britain and Ireland (VSGBI) is that major vascular surgery in the UK should be provided by organising vascular services into regional networks, consisting of a Hub hospital providing arterial surgery and complex endovascular interventions, and Spoke hospitals providing venous surgery, diagnostic services, vascular clinics, rehabilitation, and where appropriate, day case angioplasty [VSGBI 2018].

Achieving this network organisation of services has led to a widespread reconfiguration of vascular services within regions. The changes can be illustrated by looking at the number of NHS trusts providing vascular surgery. In 2011, elective repair of infra-renal AAA was performed in 114 NHS trusts. By 2017, 35 of the NHS trusts had stopped performing elective AAA repairs, and in the remaining 79, the number of NHS trusts performing fewer than 30 operations had fallen to 18. There has been a similar change in the number of NHS trusts performing carotid endarterectomy procedures: 120 organisations provided this service in 2011 but this had reduced to 84 in 2017.

4.5 Parity with the rest of Wales and the wider UK

Following recommendations from the VSGBI, GIRFT and NCEPOD, NHS England published a national service specification for vascular services in 2013 setting out standards of care as described within this business case. Since this time English networks with high volume centres have been established. In Wales, both North Wales and South West Wales have centralised

their vascular surgical services onto single sites at Glan Clwyd and Morriston, respectively. Although South East Wales became the first region in Wales in 2019 to have a 24/7 Interventional Radiology on-call based at the UHW and emergency out-of-hours vascular on-call covering South East Wales has existed since 2001 and is also based at the UHW it is still one of the only regions in the UK to not meet the national standards.

5.0 Summary Current Service Provision

Cwm Taf Morgannwg University Health Board

Delivers vascular services for the population of Rhondda Cynon Taff Ely and Merthyr Tydfil. There is also a South West Wales Vascular Network and the residents of the Bridgend care is provided through these arrangements.

The Royal Glamorgan Hospital was historically the site of the Arterial Centre (AC) supported by Prince Charles Hospital, Ysbyty Cwm Cynon and Ysbyty Cwm Rhondda until an urgent temporary service change was put in place in September 2020 with patients now treated in University Hospital of Wales.

Aneurin Bevan University Health Board

Delivers vascular services for the populations of Newport, Blaenau Gwent, Caerphilly, Torfaen, Monmouthshire and parts of Powys.

The Grange University Hospital (GUH) in Llanfrechfa became the site of the Arterial Centre in November 2020, with acute / inpatient services transferring from the Royal Gwent Hospital. The arterial centre is supported by a network of local hospitals, comprising Royal Gwent Hospital, Nevill Hall Hospital, Ysbyty Ystrad Fawr, County Hospital Pontypool, Chepstow Community Hospital, St Woolos Hospital, Ysbyty Aneurin Bevan and Monnow Vale.

ABUHB vascular surgeons and interventional radiologists work jointly with cardiac surgeons, cardiologists and interventional radiologists at UHW to deliver a regional thoracic aortic stenting service. The service is established as a major training centre for Vascular Surgical Trainees in Wales.

Cardiff and Vale University Health Board

Delivers vascular services for the population of Cardiff and Vale of Glamorgan covering a population of over 500,000. The University Hospital of Wales is the Major Arterial Centre and since 2001 the South East Wales Vascular Emergency on-call base. The SE Wales 24/7 Interventional Radiology has been based in UHW since its inception in 2019.

University Hospital of Wales is the Major Trauma Centre and a tertiary specialist centre for several surgical and medical specialties.

UHW is supported by University Hospital Llandough, St Davids Hospital and Barry Community Hospitals.

Services provided by all three Health Board providers

- A vascular team that comprises vascular surgeons, vascular anaesthetists, vascular interventional radiologists, clinical nurse specialists, podiatrists, tissue viability nurses, physiotherapists, occupational therapists, social workers, pharmacists and members of the prosthetics team. The teams are used to working across Health Board boundaries.
- Dedicated vascular beds. There is a provision for inpatient facilities along with day case access for various veins and minor day case surgery. Outpatient clinics are held in each Health Board area. Access to Doppler ultrasound, Computer Tomography (CT) and Magnetic Resonance (MR) Angiography.
- Vascular clinics within their area and weekly interventional radiology clinics in which patients are consented for interventional radiology procedures.
- An interventional radiology suite with high-quality rotational fluoroscopic imaging, in a room which is equipped for a full range of anaesthetics. The rooms can be used for endovascular aneurysm repair, combined vascular surgery and interventional radiography techniques.
- Day Case and Short Stay Facilities for minimally invasive varicose veins procedures are performed under local anaesthetic.
- Operating theatres
- Vascular team access to a critical care unit
- Pathways in place for those patients presenting with critical limb ischaemia (CLI)
- In-hours interventional radiology

Emergency out of hours Vascular provision

A regional approach to out of hours emergency provision for patients in South East Wales commenced in 2001. Since this time between 7:00 hours to 08:00 hours on weekdays, and 24/7 on weekends patients requiring emergency intervention are transferred to University Hospital of Wales. Following assessment a referral is made to the on call vascular surgeon who then decides whether the patient can remain in the admitting hospital, or if they require transfer to the hub. In extremis and the patient is unable to be transferred, then the vascular surgeon will travel to the admitting hospital

The scope of the out of hours service is summarised below:

- Emergency management of abdominal aortic aneurysms
- Traumatic dissection, ruptured peripheral aneurysms
- Haemorrhage arrest (traumatic, intraoperative iatrogenic)
- Acute peripheral and visceral ischaemia
- Venous trauma, and the sequalae of venous thromboembolism
- Emergent management of sepsis related to acute ischaemia, critical limb ischaemia, diabetic related limb sepsis

Exclusions:

- Emergent / urgent treatments which come under the remit of other surgical specialities.
- Acute venous thromboembolism
- Venous access

Out-of-hours interventional radiology is also managed via an on-call rota, meaning that outside of normal working hours, the patients are admitted by the on-call surgical team at UHW and assessed. If emergency interventional radiology input is required, the case is discussed with the vascular surgeon on for the region, who will in turn contact the on-call interventional radiologist.

Tertiary services

Complex endovascular aneurysm repair (Fenestrated Endovascular Aneurysm Repair (FEVAR) and Branched Endovascular Aneurysm Repair (BEVAR)) are referred to the Major Arterial Centre based at Southmead Hospital in Bristol who provide a tertiary service.

Regional MDT

Due to the regional out of hours service that is already provided there is weekly a regional MDT already in place. The MDT meeting includes the vascular surgeons, interventional radiologists, vascular ultra-sonographers, specialist nurses, vascular physiotherapists and trainees and can be access remotely.

National Audit

The outcomes of all patients undergoing arterial surgery or major lower limb amputation in South East Wales are reported to the new National Vascular Registry (NVR).

6.0 Demand and Capacity

In February 2020, the SEW Vascular Steering Group commissioned an analysis of the bed and theatre sessions required to support the development of the network. A key component being the activity transfer to one regional Major Arterial Centre. An analysis of vascular procedures from all three provider Health Boards was undertaken with input from clinicians and mangers across the three health boards to model future clinical pathways and apply broad assumptions. Calculations are based on pre COVID-19 actual activity across all provider Health Boards between 2015 and 2019. The full demand and capacity paper can be found in *Appendix C.*

Following the overarching Network data modelling, further local data analysis was undertaken to support planning. This used several data sources in use at UHW including the local business intelligence system, TheatreMan (the theatre information system) and several specialty specific clinical databases including ICNARC. Additional specific clinical reviews of Vascular Registry data were also used.

A week's audit of ward activity inclusive of LOS undertaken in July 21 by teams at both Cardiff and Vale UHB and Aneurin Bevan UHB and a review of 6 weeks of theatre data from May – June 21.

6.1 Activity assumptions

6.1.1 Surgical cases transferring to the Hub

The combined theatre demand for the region is 1082 cases per annum. With a total of 826 cases modelled for the hub. This is a transfer of 595 cases per annum to UHW.

Total cases by provider Health Board:

Provider	Hub	Spoke	Total Cases
ABUHB	298	74	372
CTMUHW	231	65	296
CAVUHB	297	117	414
Sum of cases	**826**	**256**	**1082**

The below table splits the activity between the 19/20 baseline identified by the network finance group and predicted demand. It is expected that post COVID the number of patients requiring vascular surgery may well increase. The below table sets out the additional modelled activity for each of the three provider Health Boards.

Provider:	ABUHB	CAVUHB	CTMUHB	Total
CAV Baseline (Hub Activity)		286		286
CTM/AB Baseline Activity Transfer	277		175	**452**
Additional Activity	21	11	56	**88**
Total Activity	298	297	231	**826**

The following assumptions have been made:

- Activity will be based on cross cover of leave over 50 weeks
- Throughput of 1.4 cases per session. There is no available benchmarking on theatre efficiency for vascular specifically. Throughput is therefore in line with current throughput in UHW for vascular cases (audit May – July 21 see table below)
- Development of performance indicators and operational measures
- Review dates set at 3,6 and 12 months to test activity assumptions and review theatre usage and efficiency.

Capacity for the above demand will be provided through the provision of 6 dedicated all day sessions per week which includes 1 all day session for IR. In addition, there will be access to 3 x weekly urgent lists if demand is high. This will ensure we utilise the limited resource effectively.

This plan has been developed in line with the modelling undertaken over a period of 4 years from 2015 to 2019. This has also been tested as part of the peer review and has been benchmarked to ensure it is commensurate with other similar sized units. At request of the Programme Board a review of assumptions made about LOS and theatre throughput was undertaken following snapshot audit over 6 weeks. The results of which can be seen in the table below.

Basis	AB Throughput Audit	CAV & CTM Throughput Audit	6 all day sessions per week	8 all day sessions per week	Demand & Capacity Plan
Planned cases			826	826	826
Throughput per session	1.20	1.40	1.38	1.03	1.05
Annual Sessions required	688.33	590.00	600.00	800.00	790
Annual All day Sessions required	344.17	295.00	300.00	400.00	395.00
Weekly (50 weeks) all day sessions required	6.88	5.90	6.00	8.00	7.90

Subsequently following agreement with operational leads and clinical leads throughput assumptions from 1-1.2 cases per session to come in line with UHW current throughout of 1.4 cases per session. It was important to test the findings with the clinical team and the provision has subsequently been supported however, a number of consultant vascular surgeons believe that there should be provision for 8 all day theatres. Therefore, confirmation of access to urgent lists in addition to 6 all day theatre sessions has been

included and it has been agreed that a review will be undertaken at 3, 6 and 12 months to test levels of activity through theatre and efficiencies.

Note that activity figures are pre-COVID and allowance will have to be made in short to medium terms planning both in terms of bed use and theatre time with new COVID restrictions in place.

6.1.2 Regional Bed requirement

The combined bed requirement for the region is 65 in total which includes 35 beds within the hub broken down as follows:

Health Board	Hub	Spoke
ABUHB	12	10
CTMUHB	8	10
CAVUHB	15	8*

*Note that CAVUHB spoke has been agreed at 8 rather than modelled 10-12 due to a therapy led care model.

It is critical to ensure a safe and right sized environment is created to deliver the appropriate clinical care. The overall bed recommendations are based on clear evidence and aligned to other vascular network Major Arterial Centres.

The greater effect of emergencies which have currently shaped the service in Cardiff & Vale has been reflected in the numbers.

The length of stay assumptions are based on both data taken from the demand and capacity review 2015-19 and supported by a 19/20 activity review as a part of the financial case development and a snapshot audit undertaken in July 21 which reflect an average LOS in the hub of 13 days.

It is hoped that as the network develops, and the investment laid out within the programme business case that this will impact positively on the quality of care for vascular patients ensuring that a patients overall LOS will be reduced, and efficiencies realised in the future.

Furthermore, it is envisaged that patients are more likely to be discharged home, as opposed to nursing care, from higher-volume hospitals and less likely to be readmitted as an emergency. It may be possible to offset costs involved in the centralisation of Vascular Services by reducing length as the network develops.

Capacity will be provided through the provision of 35 ward beds on B2 ward in UHW. Currently vascular patients are cared for in one half of B2 ward (19 beds). This requires an expansion and plans have been developed to ensure the release of capacity for go live, this includes the provision for CAVUHB spoke patients in Lakeside Wing rather than B2.

6.1.3 Benchmarking

A benchmarking exercise was undertaken in 2019 with similar Major Arterial Centres/Hubs which shows a variation in provision of beds and theatres. Note this does not include operational detail including: list start times, throughput, length of stay (LOS) etc. as the programme team have been unable to obtain this level of detail.

Centre	Population	Theatres pw	Beds	Notes
Cambridge	1.8m	6 all day	24	
Hull	1.8m	8 all day	30	No hybrid
Imperial/Charing Cross	2m	7 all day	30 + rehab ward	No hybrid
Black Country	1m	5 all day	30 + 4 HDU	
Leicester	2m	10	40	
Southampton	2m	9 all day	35	inc 2 days access to hybrid
Bristol	1.12m	17 sessions, 8.5 (all day)	32	2/17 sessions dedicated for urgent + endovenous day case
Cardiff	1.5m	6 all day	35	Acess to 3 x weekly urgent lists

Cardiff propsals are comparable to similar sized Major Arterial Centres.

Note that where possible specific benchmarking has been undertaken (i.e. Vascular Specialist Nurses were separately benchmarked and this is set out in section 9.3)

6.1.4 Peer Review feedback

The peer review of the business case supported the number of proposed hub beds as appropriate for the population.

There was challenge from both the South West and Wessex Network clinical leads around the number of theatre sessions. Both recommending not to assume and efficiencies in theatres, noting that often an increase in cases as seen as the network develops.

It is therefore essential that an early review is in place to assess the use of CEPOD and the urgent lists available at UHW. The details of the reviews are set out in section 19 of the case.

7.0 Network Clinical Model & Service Specification

The Vascular Society of Great Britain and Ireland (VSGBI) advise vascular services and surgeons on delivering the best possible care for patients presenting with vascular disease. The Provision of Services for Patients with Vascular Disease is produced periodically by the Vascular Society with the most recent iteration being published in 2018. These documents give clear advice on how a vascular network is structured and delivered.

An options appraisal was undertaken locally in 2014 identifying a Hub and Spoke model of care as the preferred option for South East Wales. This appraisal was subsequently reviewed by the Clinical Advisory Group for the Programme. The public engagement process also tested this model including changes to current services and benefits have developed a 'Hub and Spoke' Model of care for delivering the vascular service in South East Wales.

Subsequently, using the recommendations from the VSGBI and the publication of a specification for vascular services by NHS England the Clinical Advisory Group developed a Network specification for South East Wales which was then approved at Programme Board *Appendix D.*

This Network specification, the developed models of care and key pathways have also been reviewed by Medical Directors from the three provider Health Boards.

The specification acts as a base line document setting out the Network Specialised Vascular Service we aim to deliver based on:

- Recommendations
- Standards
- Metrics

Set out by several bodies including:

- VS
- RCS
- RCR
- DH
- NCEPOD
- NICE

The document is based on an NHS England Specification document (specialised-vascular-services-service-specification-adults.pdf(england.nhs.uk)) updated to reflect local context with newer recommendations. It describes the standard vascular pathology managed as three units, but also the tertiary service we aim to deliver going forward. It also describes the reasons why mandatory reporting of individual vascular surgeons was necessary through the NVR and evidence for why vascular services have been centralised nationally and internationally i.e. in order to improve service quality, efficiency and clinical outcomes. It mentions we are the last region in Wales and one of the last in the UK to reorganise vascular services. The document also explains why a unit should have a minimum population of 800,000, but in reality this should be larger.

It goes on to explain vascular surgery became an independent specialty in 2013 and our first cohort of vascular specialist are now emerging into consultant posts.

The document also describes the expected outcomes and specific metrics for indexed procedures, which I hasten to add the three units already achieved but also the importance of staff resilience and economy of scales when we reorganise vascular. It also stipulates the minimum number of procedures that need to perform annually by the specialist and unit.

In aims and objectives we describe the need for the service to improve patient diagnosis and treatment, and ultimately improve mortality and morbidity from vascular disease.

The service models are described and reasons why we chose a Hub & Spoke model and the importance of supporting the spokes, as not to overwhelm the hub. We have clear written arrangements for transfer and repatriation of spoke patients. The document also states explicitly “To avoid any misunderstanding, all arterial surgery will be performed in the hub unless the patient is in extremis”.

The team structure, infrastructure, care pathways are described as well as support for co-located and interdependent services.

7.1 Hub Model of Care

Vascular units have high bed occupancies. The surgery is technically challenging with significant demands on both theatre time and critical care. Readmission rates due to disease progression are significant. Advances in endovascular treatment may offset some of this expense, but many of these procedures are also technically demanding and time consuming and require sophisticated and often expensive facilities and disposables.

Each of our vascular surgeons has knowledge of their own outcomes; this is a key component of clinical governance and is mandatory for the individual surgeon’s revalidation. The National Vascular Registry (NVR) is the focus of data collection with respect to index vascular and endovascular procedures in the UK.

Following redesign of the vascular service in South East Wales all arterial surgery will be performed in the University Hospital of Wales (Hub hospital). The vascular team at that point will comprise ten vascular surgeons, vascular anaesthetists, seven vascular interventional radiologists, four clinical nurse specialists, one surgical care practitioner (with another post out to advert), podiatrists, tissue viability nurses, physiotherapists, occupational therapists, pharmacists and members of the prosthetics team. All the vascular team are required to attend the grand ward-round on Monday morning to review the new and existing in-patients. The lunchtime departmental meeting agrees the patients to be admitted that week and agree the order in which the patients will be listed. The imaging of in-patients requiring intervention are reviewed in the peripheral vascular MDT following on Monday afternoon.

7.1.1 Consultant Vascular Surgeon of the Week

The vascular surgeons are allocated to the consultant of the week (COW) and surgeon of the week (SOW) on a one-in-ten basis. The COW takes all emergency and urgent referrals during the working day (08:00-1700) excluding bank holidays and weekends, while the SOW performs all the urgent / emergent vascular operating. Emergency referrals are made by Consultant Connect or via the hospital switchboard. In-patient referrals are seen in a timely fashion depending on the urgency, out-patients referrals are either seen in a scheduled clinic (virtual / face-to-face) or in the vascular hot-clinic. There is a formal handover from the COW team to the on-call team at 5pm daily.

7.1.2 Pathfinder Podiatrist

The inpatient management of the diabetic foot is of equal importance to outpatient management as patients admitted for an acute diabetic foot condition are particularly vulnerable to poor outcomes, with emergency management often necessary. The length of stay for patients with diabetes can be prolonged, with various factors compounding the difficulty in resolving foot complaints. If investigations, interventions, consultations and care planning are not coordinated during an inpatient stay by appropriately skilled and experienced health professionals, evidence shows that length of stay is extended, re-admission is more likely, and poorer clinical outcomes expected. The inpatient Podiatrist will be highly skilled practitioner aimed to bring together and enhance the performance of the existing specialist team. NICE guidance advocates that an inpatient Podiatrist for acute diabetic foot admissions supports reduced length of stay of diabetic foot admissions, offering timely and appropriate discharge planning, which should in turn, prevent future admissions and unnecessary major amputations.

7.1 3 Urgent / Emergent Vascular Surgery

The COW reviews all referrals and deems which require urgent / emergent surgery, and which can be deferred or referred for other treatments (radiological, supervised exercise programme etc.). Patients requiring surgery are either treated on the main theatre vascular lists or on the CEPOD list, if deemed unable to wait for the scheduled list by the SOW.

7.1.4 Vascular Hot Clinic

Not all referred vascular patients need to be admitted, nor can they always wait for the next available out-patient slot. Referrals to the COW can be made via Consultant Connect, the dedicated handset or the generic email. The COW will determine where outpatient referrals need to be seen i.e., ED, SAU, vascular hot clinic or in a scheduled outpatients clinic. The vascular hot clinic is supported with slots in medical physics for Doppler ultrasound scanning and in radiology with reserved slots for CT/MR angiography.

7.1.5 The Vascular Multidisciplinary Meeting

The multidisciplinary team (MDT) meeting is an essential part of the functionality of the vascular service. This is a key component in delivering quality outcomes. The format of the

MDT takes the form of a single weekly meeting. The MDT meeting includes the vascular surgeons, interventional radiologists, vascular ultra-sonographers, specialist nurses, vascular physiotherapists and trainees. The MDT outcomes are documented live by the MDT coordinator onto the S-drive and then uploaded into the patient's notes electronically via Myrddin, Welsh Clinical Portal and Clinical Work Station.

The meeting is in two parts; 1. regional aortic aneurysm MDT, and 2. Peripheral vascular MDT. The AA MDT is principally concerned with aneurysmal dilatation of the aorto-iliac segment (excluding the ascending aorta), in patients who have reached the recognised thresholds for intervention. The AA MDT also reviews other pathologies of the aorta including: dissection / mural haematoma, inflammatory and mycotic conditions, penetrating ulcers, fistula formation, trauma and the sequaelae of previous interventions. The peripheral vascular MDT reviews all other pathologies pertinent to the vascular surgeon.

7.1.6 Facilities and Infrastructure in the University Hospital of Wales

The Vascular Ward

On Ward B2, UHW there are thirty-six dedicated vascular beds. The nursing care of vascular in-patients requires specialist skills, combining aspects of general surgical nursing, critical care, limb and wound assessment, tissue viability, wound care, rehabilitation, care of the disabled and care of the elderly.

Vascular Radiological Diagnostics

The Vascular Unit has ready access to duplex ultrasound scanning (including in-clinic Doppler scanning) and high-quality CT and MR angiography.

Vascular Outpatient Clinics

Elective vascular clinics occur three times a week in the University Hospital of Wales, on a Monday, Wednesday and Thursday. The vascular hot clinic runs daily but are limited to urgent cases which would otherwise be admitted to hospital. The clinic nurses are able to perform wound dressings and there is access to in-clinic duplex scanning. There is a weekly interventional radiology clinic in which patients are consented for IR procedures.

Day Case and Short Stay Facilities

Minimally invasive varicose veins procedures are performed under local anaesthetic in University Hospital Llandough, as well as the other spoke sites.

Operating Theatres

The Vascular team have access to five all-day operating sessions per week in Main Theatre, UHW as well as a weekly all-day day endovascular list in the radiology department. The vascular theatre stocks specialist grafts, haemostatic agents and embolectomy catheters. There are numerous vascular trays and micro-instrument sets. There is also ready access to cell-salvage.

Interventional Radiology Suite

The interventional radiology suite has high quality rotational fluoroscopic imaging (one of which has biplane imaging capabilities), in two dedicated vascular IR rooms which are

equipped for a full range of anaesthetics. The rooms can be used for EVAR and combined vascular surgery / IR techniques.

Critical Care Unit

A Critical Care facility is essential for the care of patients treated for a vascular emergency, particularly those with a ruptured aortic aneurysm. However, most elective vascular patients are managed in PACU / HDU, rather than ITU.

7.1.7 Out of Normal Working Hours Arrangements

Vascular Surgery

The South East Wales Vascular out of Hours Network was established in 2001. Currently, there are eight vascular surgeons on the rota, with the on-call based in UHW. The service also covers all the other hospitals in South East Wales for patients *in extremis,* or for intraoperative iatrogenic injuries which cannot be transferred.

During normal working hours 08:00 - 17:00 Monday – Fridays (excluding bank holidays), suspected vascular patients in the spoke hospitals are referred to the admitting general surgical on call team and depending on the urgency, the patient is either assessed by the emergency surgeon, or *in extremis* the patient is referred directly to the COW. Suspected vascular patients admitted via the UHW ED / SDEC are initially assessed by the admitting surgical team and then promptly referred to the COW team.

Outside these times the patients are admitted by the on call surgical team and assessed. If emergency vascular surgical input is required the case is discussed with the vascular surgeon on for the region, who can be contacted via the hospital switchboard. For patients *In extremis,* the vascular surgeon will attend the admitting hospital, all other cases requiring vascular surgical treatment will be transferred to the Vascular Hub.

Interventional Radiology

During normal working hours 08:00 - 17:00 Monday – Fridays (excluding bank holidays) vascular related emergencies requiring interventional radiology are referred initially to the vascular surgical team, who will liaise with the consultant interventional radiologist. The Regional Out of Hours Interventional Radiology on call rota was established in February 2019. Outside normal working hours, the patients are admitted by the on call surgical team and assessed. If emergency interventional radiology input is required, the case is discussed with the vascular surgeon on for the region, who will in turn contact the on call interventional radiologist.

Vascular Assessment of the Diabetic Foot

Initial assessment will usually be carried out by a member of the diabetes team (consultant, TVN or specialist podiatrist). This assessment may also be initially carried out by a Podiatrist or nurse working as part of the Foot Protection Team in the community. If there is significant concern, the COW should be contacted. The vascular surgeon will decide if immediate admission is required or be able to arrange review in the next vascular 'hot' clinic. When the diabetic foot team in the spoke hospitals diagnose diabetic foot sepsis with no

arterial compromise, a local referral should be made to the vascular surgeon. This is currently done by sending a referral to the vascular secretary in the respective hospital.

Critical Limb Ischaemia

Patients with critical limb ischaemia (CLI) will present with chronic ischaemic rest pain in the foot or ulceration / gangrene. These patients may present in several different ways and may be admitted under other specialties as in-patients or may be seen in the outpatient clinic or emergency unit.

General surgeons and emergency physicians should have the necessary skills to assess and triage patients presenting with CLI. Patients with severe ischaemia should be discussed with the covering vascular consultant and transfer arranged. Inpatients should be seen and assessed within 48hrs.

Leg ulcers are common in the elderly hospital population. A large proportion will be venous, but some will be arterial or arterio-venous. Severely painful ulcers of the leg, with exposed deeper structures or necrotic tissue and absent pulses should be considered for more urgent management. Although ulcers with these features may not directly meet the criteria for CLI they should be referred to the vascular service using the CLI pathway.

7.1.8 Collaborations with other Medical and Surgical specialties

Due to the global nature of vascular disease, the vascular team share close working relationships with numerous vascular specialties including:

- Diabetology
- Nephrology
- Stroke medicine
- Acute medicine
- Cardiology
- General surgery
- Cardiac surgery
- Plastic surgery

The vascular team has a particularly close working relationship with the diabetology teams and are part of the monthly diabetic foot MDTs.

7.1.9 Recommendations for Urgent Care

Many of the conditions presenting to vascular services are urgent in nature. They fall between requiring immediate treatment as an emergency, but are not elective in the sense that they can safely be added to a waiting list for treatment in turn. The degree of urgency in each case is determined by the responsible consultant using their clinical experience and judgement. There are recommended timeline targets for the delivery of carotid procedures, aortic aneurysm repair and lower limb revascularisation designed to improve patient care and outcomes. The 2018 GIRFT report called for vascular services to be reconfigured for urgent care in order to reduce delays to treatment.

Recommended Timelines:

- Abdominal Aortic Aneurysms should be treated within 8 weeks of diagnostic confirmation, in both screened and unscreened patients
- Carotid endarterectomy for symptomatic patients should be performed within 7 days from referral.
- Critical limb ischaemia (CLI) is recognised as an urgent condition and, depending on the clinical presentation, may require urgent admission.

7.1.10 Audit, Governance & Quality Improvement

Vascular surgeons in the UK are required to submit their figures to the NVR and are then provided with risk-adjusted comparative outcomes for their procedures compared with their peers in the UK. The VSGBI has a standard that all index vascular procedures should be entered on the NVR. Consultants have identified time in their work programme through SPA activity to ensure both adequate data entry into national clinical audit and to quality assure the coding of vascular procedures.

Mortality and Morbidity Meetings

According to RCS Good Surgical Practice all surgeons will regularly attend morbidity and mortality meetings, as a key activity for reviewing the performance of the vascular team and ensuring quality. The Vascular Morbidity and Mortality (Vascular M&M) meeting is therefore a central function in supporting services to achieve and maintain high standards of care. The vascular team conduct monthly M&M meetings, in which all mortalities and relevant morbidities are discussed. There are also opportunities to present outcomes from local and national audits. The vascular team also attend a quarterly aortic aneurysm mortality and morbidity meetings.

Quality Measures

The hub will work to and measure against the agreed Network key quality measures. The vascular team have devised Standard Operating Policies to cover the following areas:

- Pre-operative pre-assessment
- Abdominal aortic aneurysm detection & surveillance
- Venous bypass graft surveillance
- Supervised exercise class

7.2 Non Arterial Centres (Spoke) Models of Care

There is no single model that describes how vascular services should be provided at Non-Arterial Centres, this will be subject to local factors such as geography and pre-existing service configuration, but there are number of key factors that will be common to all. These include:

- Provision of outpatient clinics
- Timely review of inpatient referrals
- Day-case lists and supporting allied specialities such as Diabetic Foot Services.

Speed of access to urgent vascular assessment and investigation will not be dependent on whether a patient enters at the Major Arterial Centre (hub) or Non- Arterial Centre (spoke).

The detailed clinical models for each Health Board are set out in Appendix J. Below are the common standards that all Non-Arterial Centres

Vascular Surgeons

Vascular presence at Non-Arterial Centres will be retained to provide outpatient clinics, perform day case lists, manage ward referrals on inpatients admitted under the care of other specialties, support medical specialties and deal with patient related administration. Each Non-Arterial centre will retain a minimum of two surgeons (this is dependent on size).

Vascular Specialist Nurses (VSN)

Vascular Nurses will remain within the spoke hospitals in order to support consultant colleagues in out-patient clinics, facilitate management of inpatient referrals and act as a link for patients being worked up for inpatient treatment at the Major Arterial Centre. It is anticipated that VSNs will adopt a much more proactive role, acting as the patients advocate and the principle point of liaison between the Major Arterial and Non-Arterial centres.

Emergency provision

All Health Boards have planned systems in place for vascular cover. Emergencies deemed to require admission or urgent assessment will be transferred to the Major Arterial Centre. There will, however, be rare occasions in which it may be necessary for a vascular surgeon to travel to the patient. In all circumstances the call for assistance will be directed to the Major Arterial Centre and the on call vascular surgeon will determine the most appropriate way to manage the case.

Diagnostics

The relevant diagnostic services will continue to be provided at Non-Arterial Centres within the network.

Inpatient referrals

There is already a well described system for making referrals, the aim is that patients are seen within 24hrs whenever possible.

Day case lists
These serve the dual purpose of maintaining a vascular presence as well as treating patients locally and will form the bulk, if not all, of the operating at Non-Arterial sites.

Interventional Radiology
Vascular IR work to continue in Non-arterial centres. These include capacity issues in the Arterial Centre, the commitment to treating patients closer to home and maintenance of non-vascular IR services.

Diabetic Foot Services
Diabetic Foot Services at Non-Arterial Centres, will be fully supported by the vascular team and be headed by diabetologists, with vascular involvement for MDT meetings and combined clinics. Inpatients with diabetic foot disease will remain under the care of diabetolgists, with vascular review provided as required.

Clinics
Outpatient Clinics will form one of the main components of the service at the Non-Arterial centres, enabling patients to be seen closer to home.

Repatriation
If repatriation is deemed the most appropriate course of action for a patient following their stay at Major Arterial Centre then care will be transferred to an appropriate nonvascular specialist e.g. Stroke, Diabetes, Care of Elderly, General Surgery, Orthopaedic Surgery. Earlier repatriation to Non-Arterial Centres ensures Arterial centres are able to accept transfers and improves continuity for outpatient follow-up.

7.3 Network Surgical pathways

A number of key surgical pathways have been developed and agreed through the programme Clinical Advisory Group and approved by the Steering committee. In addition to this, Medical Directors of each provider Health Board have reviewed and signed off the pathways. These can be found in *Appendix E.*

7.4 Rehabilitation

The Vascular Society (POVS 2018) state that 'when planning and organising a new vascular network the full patient pathway including plans for return for rehabilitation needs to be clear'.

Aligned to the programme governance structure a regional vascular rehabilitation and prehabilitation group was established. The group had representation from all the professional groups that will be involved in the rehabilitation pathways. Two regional pathways have been agreed for rehabilitation and repatriation which are included as *Appendix F*.

As region the network is committed that recovery and rehabilitation following major vascular surgery, including lower limb amputation, delivered close to where patients live is key for the success of this network model. Patients will be repatriated to the closest hospital to their home that is able to provide high quality care appropriate to their needs.

The importance of recovery and rehabilitation to the network, and to patients, has been recognised by the development of rehabilitation and repatriation principles below.

Outcomes	Network Provision
1. **Improve patient outcome and experience:** Patient safety, quality of care and experience is at the centre of decisions made. This includes listening to patients' needs and supporting them to go home with good community support. It includes good communication with patients and what to expect from care and what to do at home.	• Therapy led rehabilitation team delivering care to support the outcomes that matter to the patient at home or in the safest environment close to their home. • Timely "step down" of patients from the MAC to rehabilitation when vascular surgical input to their care is no longer essential. • Timely "step down" from the MAC (once clinically appropriate) for patients with diabetes who have ongoing medical needs.
2. Effective communication: Clear 2-way communication between MAC and LHBs coordinators and rehabilitation sites is paramount to the success.	• Agreement between providers over the repatriation of patients who no longer require specialist vascular care to local community hospitals. • Handover documentation will include details of named consultant performing surgery, surgical follow up arrangements, wound care and patient management.
3. **Act as one team with the same values and ethos:** Respect, Listen and trust in the individual specialties for patient safety, quality or care and patient experience.	• Successful recovery and rehabilitation requires the early involvement of local therapists for patients likely to require long-term support • This will be delivered through the network MDT collaboration in hub and spoke sites.
4. **Work in collaboration:** Encourage network thinking with a collaborative approach between the LHBs with close MDTs and regular (daily) board rounds. The Network extends across the Hub, spokes, Community and therapies. Through this network and close collaborative	• Daily ongoing multi-specialty discharge planning from point of admission to the Hub this will ensure robust communication with the spoke clinical teams.

working, patients' clinical status, repatriation and discharge is discussed and confirmed.	
5. **Standardisation across the network:** Clear and standardised procedures and protocols used by the network is standardised documentation across the network. A clear escalation process within LHBs is required.	• Development of a network recovery, rehabilitation and re-ablement (3 R's) policy. • Standard repatriation policy applied across the network. • Standard discharge documentation completed for all hospitals across the network.
6. **Optimal patient pathway:** Patient pathways defined to ensure equity to care across the network and the most efficient care for the patient getting to the right bed, right time. Automatic acceptance in both MAC and LHBs.	• For patients with diabetes, ongoing infection requiring medical management or needing stabilisation and monitoring of diabetes, they may be admitted to their local spoke hospital under the care of a Diabetes consultant. • If the patient is not diabetic and requires medical management of infection, blood monitoring; they can be admitted to their local Spoke hospital under COTE. • Where the patient is medically fit (with or without Diabetes) but is unable to be discharged home e.g. if they need a package of care or physio/ rehab they should be discharged to their local community hospital.
7. **Improved Information access & management:** Use of digital handover to allow transparency and access of information between clinicians and practitioners.	• IT infrastructure to support electronic document transfer between hub and spokes.

7.4.1 Rehabilitation Standards and Performance measures

It is recognised that there is currently an under provision in some areas of the region in relation to rehabilitation when compared with national standards for rehabilitation and workforce, most notable BSRM (British Society of Rehabilitation Medicine).

Through the development of a rehabilitation group for the network workforce standards and more broadly, rehabilitation provision for patients can be assessed.

For go live, the rehabilitation group have agreed a number of measures that will be monitored by the Operational Delivery Network.

These are:

- The timely repatriation of patients from the Hub, within 48 hours. The discharge destination will also be recorded to allow the network to review whether patients have been transferred as close to home as possible
- All patients to be included as a part of a weekly MDT review
- All patients should have a completed rehabilitation prescription on discharge from the hub and this should be provided to the ongoing care provider, GP and patient. This should include a named contact or team who are responsible for the coordination of the patients immediate ongoing care.

8.0 Vascular Network Investment

8.1 Vascular Network team

The Vascular Network management team will be a newly formed team which will be accountable to the SEW Vascular Network Board.

The team will perform a key role in ensuring collaboration and whole patient pathway monitoring of performance and service development. They will ensure that appropriate clinical and corporate governance structures are in place to realise the full benefits of centralising vascular services and will be key in leading and developing services across the adult vascular pathway including oversight of adherence to network specification within the hub and monitoring of both activity and performance indicators and outcomes.
It is important to highlight that this team will not just support the inpatient stay but that it has a key role in ensuring service and flow through the whole pathways, i.e. follow up, repatriation, escalation, across specialties and organisational boundaries.

There is benchmarking to show that having a separate team for the management of the Regionalised Vascular Service is consistent across Wales and England. There is also benchmarking to show similar networks (e.g. Major Trauma, Burns) have a separate network management team to this managing hub and spoke or centre and unit services.

Current

Currently in SEW vascular surgery is managed as a part of General Surgery across all three Health Boards.

Despite a networked arrangement for out of hours emergencies there are no network governance arrangements or clearly identified roles currently allocated in South East Wales which is a national recommendation of the VSGBI.

There are currently sessional payments for surgical clinical leads identified for all three services and it is estimated that at present that 0.3 WTE management time is allocated to local vascular services across the three provider Health Boards.

There are currently existing surgical coordinator roles within CAVUHB 0.6 WTE band 4 & ABUHB 1 WTE band 5.

There are at present no regional clinical leads for vascular surgery including surgical, IR, Anaesthetics or Nursing. The Peer Review noted that the Provision of Vascular Services national standard will shortly contain leadership for all of these areas and strongly recommended these were included within the case.

Proposed

Clinical Lead for the Network
It is proposed that 2 sessions are allocated for Clinical Leadership of the network whilst retaining clinical leads for the Spoke sites and Hub. This is comparable to other vascular networks.

Interventional Radiology Lead - to be added to costing table
1 session allocated for clinical leadership and to ensure links with wider Wales.

Lead Nurse - to be added to costing table
It is proposed that 0.2 WTE band 7 is supported to allow for a nursing lead within the region, this role will be important for ensuring equity in nursing care, education and training across South East Wales and will chair a network nursing group.

Network Manager
It is proposed that a 1WTE band 8a Manager is appointed to a network role. This role will be key in overseeing the development of the network including the development, implementation and monitoring of effective and efficient systems, policies and procedures. Alongside the Clinical Lead, Service Leads, Service Managers and Lead Clinicians. The post holder will ensure that operational, financial, performance, service modernisation and improvement, governance and activity targets are achieved across the Network. This role is set at a lower band than the North Wales Network comparatively (1 WTE 8b) and takes into consideration that this post will be supported by the host organisations Operational Management team and supported by a full-time coordinator role.

Data Coordinator
It is proposed that 1 WTE band 5 data coordinator is appointed on a fixed term 12-month contract in the first instance to ensure the capture and reporting of vascular data across the region as per the agreed Network specification and operational plan.

Coordination & Administrative support
It is proposed that 1 WTE band 5 Network coordinator is appointed to provide support for the coordination of patients between Hub and Spokes and provide support to both the Network Manager, Clinical leads as well as leads within Hub and Spokes. This post will also ensure that all meetings are set and run regularly, that key documentation including risk and issue registers and work plans are kept up to date.

9.0 Major Arterial Centre

9.1 Consultant Surgeons

Data from a survey by the VSGBI in 2009 suggested that one vascular surgeon is needed per 100,000 population, with an equivalent number of interventional radiologists. However, The Vascular Clinical Advisory Group advocates 1 per 125,000 as this equates to a one in eight rota for a site covering 1 million population.

The POVS 2018 document recommends one vascular surgeon per 100,000 population. For SE Wales this requires 12 to 13 WTE surgeons.

Currently there are 10 WTE consultant vascular surgeons in SE Wales with a newly appointed 11th taking up post in December 2021. They participate in an established 1 in 9 out of hours on-call rota.

The ABUHB service has identified the need for an additional consultant post. This is referenced in the finance and ABUHB spoke sections of the case, and will be progressed subject to local ABUHB case scrutiny arrangements.

It is not proposed for go live that additional consultant appointments will be required and the daily timetable is being developed in line with the existing number of consultants.

Elective commitments will be agreed in individual job planning meetings and will be in line with National Consultant Contract in Wales. A full-time contract will have as a minimum 2.5 theatre sessions and 2 out-patient clinics per week.

The vascular surgeons will be allocated to the consultant of the week (COW) on a one-in-eleven basis. The COW will take all emergency and urgent referrals during the working day (08:00-1700) excluding bank holidays and weekends. There be a formal handover from the COW team to the on-call team at 5pm daily.

Each of the vascular surgeons will be allocated to the surgeon of the week (SOW) on a one-in-eleven basis. The SOW will operate on all vascular emergency and urgent cases during the working day (08:00-1700) excluding bank holidays and weekends. The SOW will be expected to work closely with the COW team to ensure a clear management plan for patients requiring urgent / emergent vascular surgery.

9.2 Junior Doctors

Health Education and Improvement Wales (HEIW) via the Wales School of Surgery allocate non-consultant grade trainees to training posts in hospitals across Wales. These include Foundation doctors (FY1 and FY2), Core Surgical Trainees (CT1, CT2 and ISTs) and Speciality Surgical Trainees (vascular ST3-8, but also including general surgical trainees ST3-4). In South East Wales we have FY1, FY2, CT2, general surgical ST3 and vascular ST3-8 rotating through

the vascular units. Other non-training grades are also in non-consultant posts including fellows and clinical research fellows (CRFs). There are currently no Speciality and Associate Specialist (SAS) doctors in vascular posts in South East Wales.

Current

The current allocation of non-consultant grade trainees are as follows:

	AB	CAV	CTM
FY1	3	4ᵖ	0
FY2	0	3ᵖ	0
CT1	0	0	0
CT2	2	1ˡ	0
ST3-8 (vascular)	2	1ǂ	0
ST3-4 (general surgery)	0	1ǂ	0
Fellow (non-training)	0	1	0
Total	7	11	0

CAVUHB
ǂ ST – x2 from ST5 and above on vascular on-call anything junior will be on EGS rota.
ˡ CT – x1 covers EGS on-call, PESU and DSU
ᵖ FY2 - x3 covers EGS on-calls and PESU
ᵖ FY1 – x4 cover EGS on-calls and PESU

*HEIW/ Foundation school insists to maintain the integrity of GS rotas in AB and CTM the CT/FP2/FP1 are to stay in based hospitals.
*agreement STs to re-locate. From August 2021 AB x2 CTM 0 (as part of Cardiff allocation).

Proposed

The Vascular Society (POVS 2018) notes that the provision of junior doctor support out of hours is a particular challenge outside of larger units and is another driver for centralising arterial services within networks.

To provide a 7-day a week working on the vascular unit 365 days a year, there is a requirement for a vascular team. Other comparable vascular units have a vascular team comprising three tiers (consultant, registrar, foundation / core surgical trainee) of on-call for weekend and out-of-hours working i.e. North Bristol NHS Trust this was supported as a part of the peer review of the business case. This structure is long established in other surgical specialties e.g., urology, neurosurgery, paediatric surgery, ENT.

Currently at registrar level (ST) we have been allocated 3 STs and one fellow who cover the weekend and out-of-hours vascular rota. Human Resources have advised that these doctors work a maximum non-resident rota of 1:6 (inclusive), this therefore leaves two unfilled gaps on the rota. We have requested Wales School of Surgery to allocate at least one more vascular ST in future years. Until then, however, for years 2021-22 there is a requirement for funding

to cover the two unfilled gaps on the registrar on-call rota. The rota gaps would be filled by fellows already appointed to research posts working in UHW. Having a fully staffed registrar rota will ensure the vascular surgeon would have a vascular trainee available to assist with complex surgical procedures, in addition to supporting the weekend consultant ward rounds.

Risks

Without a fully staffed middle grade rota there is a risk to patient safety in these complex patients undergoing advanced specialist operations. It is not appropriate to rely on the general surgical registrars as they are already fully tasked managing the general surgery take and because they may lack the necessary skills and experience as they are no longer required to train in vascular surgery.

The junior tier doctors (FY1 to CT2) participate in the general surgical on call in each UHB. Those duties can leave the vascular wards with minimal or no cover at times. This is unsafe. Arrangements need to be made to ensure a minimum safe level of junior doctor staffing on the vascular ward, without destabilising the general surgical on calls.

The issue of registrar cover out of hours is particularly acute. Currently when slots are unfilled on the vascular registrar rota, the general surgical middle grade is expected to cover vascular admissions and surgeries, therefore making them unavailable to manage the emergency general surgical intake, inpatients, and surgeries. The general surgery rota is currently fragile with them frequently borrowing from vascular to cover daytime unfilled slots.

General surgical trainees are no longer required to train in vascular surgery and therefore frequently lack the experience and skills necessary to assess and manage these complex patients.

Without this additional on-call cover the vascular service out of hours becomes unsafe, which would have a detrimental impact on patient care.

9.3 Vascular Nurse Specialists

The Vascular Society of Great Britain and Ireland (VSGBI) endorse the role of the vascular nurse specialist and specialist roles, in both the Major Arterial Centre and non-arterial centre (Spokes) as detailed in POVS (VSGBI 2018). It the 'Top tips form reconfiguration 'produced by the VASGI (2018) the changes to the role of specialist nurses, and the subsequent challenges are acknowledged.

Current

There is a total of 4 WTE Vascular specialist nurses across the three providers in SE Wales. In addition, there are a total of 1.8 Surgical Nurse Practitioners across the three providers in SE Wales.

Current provision is as follows:
2 AB WTE specialist nurses

- VNS x 2 WTE band 7

2 CAV WTE specialist nurses

- SCP x 0.8 WTE band 7
- VNS x 1.0 WTE band 7

2 CTM WTE specialist nurses

- SCP x 1.0 WTE band 7
- VNS x 1.0 WTE band 7

Proposed

Hub services will be supported by Vascular Nurse Practitioners from across the 3 health boards. Primarily covering consultant of the week duties and also spoke responsibilities in their parent health boards. In addition to this, it is also necessary to expand the Vascular Nurse Practitioners to include a weekend service.

It is therefore proposed that 2 WTE additional band 7 Vascular Nurse Practitioners are recruited into the hub to meet the increased demand in activity and complexity. This would create a total of 7.8 WTE band 7 nurses across the network.

Benchmarking

Specific benchmarking has been undertaken with nursing leads within similar networks Inc. WTES and banding and are set out below.

Brighton - 8.6 WTE total for network plus 1 WTE lead nurse:

- Lead VNS 8A 1WTE for the Network
- Band 7 VNS x 8WTE
- Band 6 JVNS x 0.6WTE

Manchester - 11 WTE total band 7 for the network

Bournemouth - 10 WTE total for network:

- Hub: 1 WTE Band 8, 1 WTE Band 7, 2 WTE Band 6.
- Spoke 1: 1 WTE Band 8, 1 WTE Band 6.
- Spoke 2: 2 WTE Band 6. 2 WTE Band 7.

Cambridge - 10 WTE total for the network

- Hub 1 WTE band 7 & 6 WTE band 5.
- Spoke 1: 1 WTE band 7.
- Spoke 2: 2 WTE band 7.

9.4 Vascular Ward

The proposed dedicated vascular ward will be situated on Ward B2 at UHW and provide 35 beds.

This is currently a 19 bedded dedicated vascular unit caring for patients requiring vascular surgery and treatment. The service is supported by 3 Vascular Surgeons, a dedicated Vascular Nurse Specialist and a Surgical Care Practitioner. There are limited Occupational Therapy and Physiotherapy Services.

Currently the split between hub and spoke is 11 and 8 beds respectively. In line with the demand and capacity modelling the below has been developed based on an increase of 24 beds in total for the hub activity.

9.4.1 Nursing

Current

The provision for the current 11 hub beds are as follows:

- Ward Sister Band 7 x 1 WTE
- Ward Deputy Band 6 x 2wte
- Registered Nurses 9.37 WTE
- HCSW 7.46 WTE

Proposed

To reflect increased number of patient admissions, patient pathways and anticipated clinical indications in accordance with Nurse Staffing Levels (Wales) Act 2016: statutory guidance (version 2) : https://gov.wales/sites/default/files/pdf-versions/2021/3/5/1614936011/nurse-staffing-levels-wales-act-2016-statutory-guidance-version-2.pdf#page=1

The proposed staff provision is a determinant of safe staffing levels made in accordance with patient acuity, quality indicators and professional judgement.

Kit and Equipment

The measurement of toe systolic pressure improves the relevance and reliability of diagnosis especially in diabetic patients and allows effective follow up of peripheral arterial disease.

It is proposed that a Toe pressure machine is purchased for use by the vascular team on the ward for the assessment of patients during their stay in the hub.

Machine cost: £2,922.00 including VAT.

9.4.2 Wound Healing

Current

The Wound Healing Service at UHW currently delivers weekly visits to the vascular ward and the team prioritise those patients with either complex amputation sites or requiring wound care for significant pressure areas, larvae therapy and VAC dressings. It is estimated that currently the input to this patient cohort is less than 0.5 WTE per week.

Currently there is not the establishment to support the MDT or Vascular clinics.

Proposed

It is proposed that an additional 0.5 WTE band 6 is supported to increase capacity for the additional proposed activity and acuity, it is expected that there will be in increase in patients with complex amputation sites. The role will be key in enabling the team to; participate in the MDT and be present at weekday daily ward rounds.

It is proposed that 0.5 WTE band 6 is supported to ensure appropriate ward level education, optimisation of care for this cohort of patients in pressure ulcer prevention/treatment and lower limb treatment including compression therapy. Optimising WHS input on the ward would lead to more timely and effective management leading to a reduction in infection and deterioration leading to Stage 3 pressure areas and above, reportable to Welsh Assembly Government.

9.4.3 Pharmacy

The current pharmacy service for the vascular hub at UHW is currently 0.3 band 6 pharmacist, 0.35 band 5 technician and 0.25 band 2 ATO. It is proposed that the following posts are:

- Pharmacist Band 7 x 0.5
- Pharmacist Band 5 x 0.5
- Pharmacy ATO Band 2 x 0.5

The requested increased resource in order to provide the increased centralised service is based upon the expansion and increased activity of the vascular ward with patients requiring the more complex vascular surgery now being undertaken in UHW. The greatest pharmaceutical attention is usually required during the peri-operative period, with many of these patients having diabetes and/or are anticoagulated, and the management of these medications requires careful attention. Currently Pharmacy use B2S as a training ward but as the demand & patient complexity will increase with the expansion of the ward, there will be a need to employ a band 7 pharmacist there instead of utilising a band 6 Pharmacist. Within Surgery this is one of the most complex polypharmacy area and a significant number of their discharges require blister packs – hence the requested additional technical resources.

9.5 Critical Care

The Adult Critical Care Service in Cardiff is the busiest in Wales, caring for around 1500 patients a year. It supports a number of regional tertiary services including neurocritical care, spinal injuries, major trauma, haem-oncology, maxillo-facial, vascular, thoracic and upper gastro-intestinal surgery.

Critical Care currently has 32 staffed Level 3 equivalent beds (on the assumption that WG non-recurrent investment in 2018/19 in 6 beds at UHW becomes recurrent), with 28 at UHW and 4 at UHL. The units provide Secondary Care to Cardiff and Vale patients and Tertiary Care to patients across South Wales.

Centralisation of the service will require uplift of 0.27 beds. The Directorate have confirmed there will be no additional workforce or kit requirements in order to launch the service. This will be reviewed as a part of the post implementation review at 3 and 6 months.

9.6 Theatres

For 'go live' core activity will be provided through 6 all day sessions split as follows:

- 4 all-day sessions within the amber theatre stream including 1 all day session supported
- 1 all-day session within the green theatre stream
- 1 all-day session in the IR department for EVAR.

In addition to the above sessions, if necessary, there will be access to 3 x weekly urgent lists if demand is high, using a 48-hour window as the target access time for urgent cases. This will ensure we utilise the limited resource effectively.

A C-arm image intensifier will be available all times in hours, with an agreed provision for out of hours to ensure availability for fluoroscopy skills as required. The staff to support this have been included within this business case.

The following assumptions have been made:

- Activity will be based on cross cover of leave over 50 weeks
- Throughput is in line with the current service in UHW 1.4 cases per session
- A review at 3, 6 and 12 months will be undertaken to include key quality metrics including access times for urgent surgery. These will be used to inform decisions regarding longer term core vascular theatre capacity

Hybrid Theatre

The Vascular Society recommends at least one endovascular theatre or theatre specification endovascular suite is required, with high quality imaging, advanced applications, and a dedicated X-ray table (compliant with MHRA guidance). At present this is not available at the UHW site and endovascular cases are done within an IR room which

does not meet Theatre operating standards. Therefore, a series of business cases have been developed to deliver a new hybrid theatre at UHW from December 2023 to ensure that Vascular cases can be treated safely in a timely and to meet agreed national standards.

The Overarching Business Case has now been submitted for review at Welsh Governments Infrastructure and Investment Board on the 21st September 2021. The work to develop the Full Business Case has already commenced and is due for submission in December 2021.

Accepting that Capital and Estates timelines for delivery of a new Hybrid Vascular Theatre are not aligned to an Autumn 2021 'go live' of the Vascular Network, an assessment of alternative solutions for operational readiness has been discussed at the Clinical Advisory Group and the procurement of a C-arm image intensifier in Theatres has been supported by both the Network Steering Committee and Programme Board.

Kit and Equipment

Below is an equipment list for both anaesthetic procedures, and the surgical procedures required (including the provision of the c-arm image intensifier) and has been scrutinised to minimise cost as much as possible. It is inevitable as the service develops a Phase 2 financial spend will be necessary as the service grows. It is hopeful this will coincide with the Capital development of the Hybrid Theatres.

Theatre Equipment Requirements

Description	Product Code	Company	UOM	Price Each/Pack	Total Price inc VAT
Phillips monitoring block and leads		Phillips	2	£ 7,500.00	£ 18,000.00
Bair Hugger machine			1	£ 2,750.00	£ 3,300.00
Warming Matress plus control unit		Inspiration healthcare	1	£ 2,052.00	£ 2,462.40
Bean Bag full body			1	£ 360.00	£ 432.00
	Consumables	Werfen	1	£ 25,000.00	£ 30,000.00
					£ 54,194.40

Description	Product Code	Company	UOM	Price Each/Pack	Total Price inc VAT
Major Vascular Set (Tray)		Mercian	3	£ 9,555.50	£ 34,399.80
Peripheral Vascular Set (Tray)		Mercian	3	£ 10,703.25	£ 38,531.70
Vascular Omnitract Set		Integra	5	£ 10,956.73	£ 65,740.38
Ring Tip forceps		Mercian	4	£ 375.00	£ 1,800.00
Headlamp MC6 Chrome		KLS Martin	1	£ 1,594.22	£ 1,913.06
Headlamp Recharging station		KLS Martin	1	£ 255.08	£ 306.10
Headlamp spare battery (pack of 2)		KLS Martin	1	£ 159.43	£ 191.32
Intra Operative Doppler		Huntliegh	1	£ 604.00	£ 724.80
Intra Operative doppler starter pack		Huntliegh	1	£ 885.00	£ 1,062.00
Probes for above		Huntliegh	15	£ 214.67	£ 3,864.00
Lead aprons thyroid protectors			10	£ 284.00	£ 3,408.00
					£ 151,941.16
				Total	**£ 206,135.56**

9.7 Resuscitation service

The Resuscitation Council (UK) Quality Standards recommend one whole-time-equivalent Resuscitation Practitioner (RP) for every 750 members of clinical staff. The total submission for this business case is around 75 staff, a requirement of 0.10WTE is proposed.

9.8 Pain

Current

The service is predominantly nurse led by a team of Clinical Nurse Specialists (CNS). Medically the cover is provided by the duty obstetric anaesthetist in UHW with out of hours and weekend cover being provided by the general on call anaesthetist in UHL. The team is comprised of 8.44 WTE CNSs (x2 WTE Band 6s and 6.44 WTE Band 7s). CNS service provision in UHW is 08.00-08.00 Monday to Friday, 08.00-06.00 Sat and 08:00-08.30 Sun. The majority of complex vascular patients require Pain Service review with subsequent timely management and appropriate intervention. Management includes neuraxial blockade and an available anaesthetist will therefore be sought to facilitate such treatment. Around 10% of the workload within the pain service is for the Vascular hub patients (reviewed pre move of CTM) which equates to approximately 1 WTE and due to their complex needs actually accounts for over 10% in terms of APS time allocation.

Proposed

An additional 1 WTE band 6 pain CNS uplift would be required to meet both the expected uplift in activity and acuity of patient and will allow the Pain Service to attend the MDT ward rounds and vascular morbidity and mortality meetings. They will also be able to support facilitation of appropriate and innovative pain management practices (popliteal nerve blocks, sciatic nerve catheters, epidural analgesia) plus to support governance and safe delivery of high-risk infusions in the ward area.

9.9 Radiology

Interventional Radiology is recognised as a discipline within radiology, although not all Interventional Radiologists work in the vascular field. Vascular surgical specialists work closely with their radiology colleagues.

Interventional radiology for both vascular patients and others was previously covered within the three provider organisations in South East Wales. This was the case until the point that recruitment to vacant posts became a significant challenge, most notably in Cwm Taf Morgannwg UHB.

Currently there are the following establishments of consultants in the three organisations.

CAV - 4 WTE Consultant IRs
AB - 3 WTE Consultant IRs
CTM - 0 WTE Consultant IRs

Cwm Taf Morgannwg UHB have been unsuccessful in filling the vacant posts in their Health board which has resulted in the service provision pre-centralisation to change to accommodate this. All interventional work excluding urology has transferred to Cardiff and Vale University Health Board.

Key issues for interventional radiology model linked to vascular centralisation

With centralisation there are a number of key elements to be considered to ensure that each organisation is appropriately resourced to deliver their element of the model:

1. MDT requirements
2. Cover of EVAR lists
3. Backfill of lists linked to EVAR cover
4. Additional work transferred to the Hub

For the purposes of assessing the change in each organisation this has been broken into three components

1. Unavoidable additional time commitments linked to centralisation
2. Backfill requirements as a result of centralisation
3. Additional work requirement

In Cardiff and Vale Radiology currently have 3 vascular lists over 5 days along with one outpatient clinic for vascular intervention providing a 24 hour on call service for interventional radiology and cardiac radiology which is staffed by radiologists, radiographers and qualified nurses. The team of radiographers are committed to 2 on call systems (cardiology and vascular) with 3 being on call per night.

There is currently no vascular theatre provision within current establishments. Whilst the service has room capacity to deliver vascular centralisation it does not have the workforce Radiology services, along with the rest of the UK experience difficulties in recruiting radiographers and qualified nurses. Training can take up to 6 months to achieve the relevant competences to ensure safe practise.

Current staffing provision at UHW includes:

- 15.4 WTE qualified nurses 3.8 unqualified nurses
- Radiographers 13.6 WTE who also support cardiology services.

Proposal for Consultant Interventional Radiologists

The following tables detail the required changes (sessions) on an annualised basis for each organisation:

Aneurin Bevan Health Board

Unavoidable				**Backfill**			**Additional Work**			
Work	Pre	Post	Change	Pre	Post	Change	Work	Pre	Post	Change
MDT attendance	1.5	3	+1.5	0	1.05	+ 1.05				
MDT Prep	0	0.54	+0.54							
Travel MDT	0	1	+1							
Travel EVAR	0	0.54	+0.54							
Total			3.58			1.05				
Combined Total										4.63

Cardiff and Vale University Health Board

Unavoidable				Backfill			Additional Work			
Work	Pre	Post	Change	Pre	Post	Change	Work	Pre	Post	Change
MDT attendance	2	4	+2	0	1.4	+ 1.4	IR cases	0	2.31	+2.31
MDT Prep	0	0.72	+0.72				Imaging	0	1.5	+1.5
							Clinic/Ward /Admin	0	1.5	+1.5
Total			2.72			1.4				5.31
Combined total										9.43

For the purposes of the business case the additional burden of MDT's and travel is an unavoidable consequence of the centralisation totalling 5.25 consultant sessions. It is recommended that this is included in the business case.

The backfilling arrangements will need to be considered by individual Health Boards through job planning.

As part of the business case there needs to be agreement on the transfer of resources to support the additional workload to be delivered in the Hub. The process for this should be done on a pro-rata basis linked to the number of cases that are predicted for transfer. The total predicted case numbers to transfer on current workloads is 194 cases per annum, with this being split between CTMUHB (114 cases) and ABUHB (80 cases). These cases represent all of the inpatient and emergency angioplasty work. Therefore, of the 5.31 sessions required in the Hub there would need to be a transfer of 3.2 sessions from CTMUHB and 2.11 from ABUHB.

Proposal for Radiographers and Radiology Nursing

To ensure the service is able to support the expansion within the IR suite and the additional interim theatre, supporting the C-arm (image intensifier), whilst the hybrid theatre business cases are developed, the nursing service needs to move to a 4-shift work pattern increasing the hours but still providing a 5-day work pattern with elongated hours. This will reduce the recruitment issues and provide a far more productive workforce in line with the hours worked with the associated service (perioperative directorate). This should also improve communications with the other areas.

9.10 Doppler Service

Current

The service undertakes approximately 2,000 scans a year for vascular surgery. The current vascular hub service is supported by 5.0 WTE Clinical Scientists, and 1.0 WTE currently in training. All have split roles across scientific and a number of clinical services to ensure resilience in each of the areas. The approximate staffing split towards the Clinical Doppler service totals 2.9 WTE. This includes: Band 8d: 0.3/0.4 WTE Band 8b: 0.5 and 0.7 WTE Band 8a: 0.5 WTE Band 7: 0.8 WTE. Work for Vascular Surgery is mainly performed by Band 8 members of staff due to scan and clinical complexity, and in line with the HSS (Higher specialist scientific) training levels. The current service operates on a Monday to Friday basis, with no on-call cover.

Proposed

With the transfer of activity there will be some additional capacity for scanning required, including the availability of ultrasound scanner equipment to meet the centralisation needs. The additional workforce requirement are as follows: 1.0 WTE Band 8a Clinical Scientist and 0.5 WTE Band 2 HCA/Administrative support. 1.0 WTE Band 8a Clinical Scientist is necessary to cover and ensure resilience towards the additional scan requirements, including the urgent and unplanned complex scan demands. The important consideration in the increase in complex cases is that due to scan complexity and ergonomics (for example for portable scans), many scans/sessions require two Band 8 members of staff to perform the scan/session together. The increased clinical workload will need to be supported by a congruent increase in the level of administrative support, and in particular increased HCA support. A 0.5 WTE Band 2 post is therefore required to provide this additional support to the service.

9.11 Laboratories

At present the BTL currently processes over 185 Blood Groups and Antibody Screens daily, using 1 WTE during core hours. Additionally, 30 crossmatches for blood transfusion are also carried out by additional members of the team (averaging 120 units of blood).
There are 4 Biomedical Sciences staff who work on the restocking, cross-matching and blood grouping benches and deal with 10,695 test sets per month. Over the 24/7 period, this work is divided by 4 members of staff in the core hours, 2 between 17:15 and 20:00 and then 1 until 08:00. Each individual WTE member of staff will handle over 2000 tests each during the month in the BTL. The Automated Haematology Laboratory will handle over 65,000 samples per month. The individual WTE BMS will handle over 10,000 samples per month each. The BMS will be expected to work as part of the shift team and are essential for the safe working of the laboratory, ensuring quality of results leaving the department .

The vascular hub service is currently supported by 4 WTE band 5 biomedical scientists.
It is proposed that 1 WTE Band 5 Biomedical scientists is required to take the total to 5.

It was queries during the peer review whether this increase would be enough to meet the predicted demand and therefore, impact on laboratories will be a part of the 3 and 6 months review post implementation.

9.12 Care of the Elderly

There is currently no identified provision for vascular hub patients across the region.

It is a recommendation by the Vascular Society (POVS 2018) that input from elderly care will be central to providing the best care in all units of the network due to a number of associated co-morbidities. Noting that routine daily input from medicine for the care of the elderly should be available to appropriate patients undergoing vascular surgery.

It was strongly recommended by colleagues in other network during peer review that consultant sessions be considered within the hub from go live. Comparatively, mature MAC's such as Bristol have the input of 6 consultant sessions.

It is proposed that the service commence with 2 sessions of a COTE consultant for go live. In order to accommodate this a reduction in proposed rehabilitation consultant sessions has taken place from 4 to 2 for go live. The two consultants will work closely together and as a part of the MDT.

Consultant sessions 2 to be added based on peer review feedback and a reduction from 4 to 2 rehab consultant sessions.

It is proposed that secretarial support of 0.1 WTE is approved to support the additional consultant sessions.

9.13 Rehabilitation Medicine

There is currently 1 session of rehabilitation medicine consultant time allocated to support the artificial limb and appliance service. This is a WHSSC funded session.

It is proposed that 2 rehabilitation medicine consultant sessions support the surgical and therapy teams in assessment and management of any patient requiring specialist rehabilitation input. They will support the interface with the other health boards and ensure that ongoing management of specialist rehabilitation needs are clear and provide a point of specialist advice for the network.

This will be a supportive service with no on call or overnight cover. The support will focus on ward rounds, MDT and family meetings and support for network repatriation. They will work closely with the COTE consultant to provide a blended approach as a part of the MDT.

This investment benchmarks with similar networks including Bristol who have provision for 1 session of rehabilitation consultant time for the MAC, but confirmed they have found these posts hard to recruit to.

It is proposed that secretarial support of 0.1 WTE is approved to support the additional consultant sessions.

9.14 Therapies

It is recognised that there is minimal acute therapy input for vascular patients across the region at present and the current number of WTE therapists is challenging to define across all three units.

Through the development of the case relevant standards have been applied including; British Society of Rehabilitation Medicine, British Association of Chartered Physiotherapists in Amputee Rehabilitation, The Vascular society (POVS 2018) and NICE exemplar of best practice, Calculating Qualified Staffing Requirements for the Physiotherapy Profession in Wales, The British Dietetic Association Safe Staffing Safe Workload Guidance.

The provision for therapies included within this business case has been ratified and scrutinised by the Network rehabilitation group and also peer reviewed as a part of the Network Programme Business Case Peer Review.

For ease, the table below summaries the therapies and breaks down the posts in WTE against vascular standards/network specification, service improvement/rehab standards and activity (this is based on what is current provided for Hub patients at UHW as a baseline where others have not been obtainable).

Service Improvement/other rehab guidance/standards	Band	WTE
Dietician	6	0.81
Dietician	4	1.0
Dietetic support worker	3	2.24
Physiotherapist	6	1.12
Rehabilitation assistant	3	1.0
Occupational therapist	6	0.61
Pathway lead Psychologist	8b	1.0
Total		**7.78**
Vascular standards & network specification		
Podiatry pathfinder	8a	1.0
Lead therapist (hub rehab coordination)	7	0.7
Total		**1.7**
Activity		
Total		**1.78**
Grand Total		**11.26**

The below sections describe provision for all therapies disciplines in detail.

Physiotherapy

The current Physiotherapy service for hub patients at UHW equates to 0.41 WTE and is provided from the wider team of staff supporting surgical patients at UHW.

Vascular patients are prioritised alongside the needs of the wider cohort of surgical patients. Deteriorating patients with acute postoperative respiratory needs, will be prioritised above patients requiring acute rehabilitation.

Patients currently receive Physiotherapy two to three times a week. This is not delivered to the level recommended within "Enhanced Recovery after Surgery" or for patients undergoing amputation the "Clinical Guidelines for the Pre and Post- operative Physiotherapy management of Adults with lower limb amputations" BACPAR 2016.

To meet not only the proposed uplift in activity but also expected acuity it is proposed that 1.89 WTE Band 6 Physiotherapist and 1 WTE band 3 rehabilitation assistant is appointed.

The proposed uplift in staff enables the provision of daily specialist rehabilitation, as identified within SEWVN "Rehabilitation pathway" and the guidelines above. This uplift supports a ratio of 1 WTE band 6/ 15 patients which is recommended for surgical rehabilitation by "Calculating Qualified Staffing Requirements for the Physiotherapy Profession in Wales" Surgical Rehabilitation and 'A consensus approach' produced by: The All-Wales Physiotherapy Managers Committee – Dec 2006.

The rehabilitation assistant will work alongside the Physiotherapist, Occupational Therapist and Nursing staff to encourage and support the integration of rehabilitation into the patient`s daily ward care. This will optimise the patient`s functional independence reducing the dependency on nursing staff.

These complex vascular patients often require two staff during their early rehabilitation to ensure safe therapeutic handling. These staff enable the qualified therapy staff to deliver specialist care to a wider cohort of patients.

Dietetics

Current

The dietetic service has approximately 0.17 WTE band 5 dietitian allocated. This covers the 38 bed B2 ward at present in entirety including any non-vascular surgery patients. Due to the limited resource, the service is currently reactive i.e. patients are identified as requiring intervention by nursing teams. This is often due to a high nutrition risk score, poor appetite post-operatively, issues with gastroparesis post-operatively, wound development, surgical wound healing concerns or issues with co-morbidities e.g. glycaemic control, management of renal diets. The reactive service represent activity against a deterioration in nutrition for these patients at the point of referral. Within our current service prioritisation criteria, we aim to see new referrals with a high nutrition risk score within 72 hours, patients with poor glycaemic control may not be seen during admission but referred onto community services post-discharge. Analysis of activity over the past 12 months indicates an average of 33 contact per month specifically for vascular surgery patients. The remainder of the activity across B2 ward is for other clinical specialities.

Proposed

An uplift to the resources indicated below would support a new model of care and uplift activity in response to both the increased volume and complexity of the centralised service and right size the service to deliver a higher quality nutrition and dietetic service that better meets the needs of the patients by minimising nutritional deteriorations and preventing co-morbidities such as poor wound healing and uncontrolled Blood glucose levels which ultimately increase length of stay.

The centralised Hub service would benefit from a pro-active model. Patients will ideally have been pre-assessed in the relevant vascular spoke. All patients will be reviewed on admission, information from the pre-assessment will be utilised to identify individual patient's risk and necessary intervention. With rates of malnutrition of 60-90% in vascular surgery plus further nutritional need from diabetes, specialist renal diets and micronutrient deficiencies, a blanket referral approach is most appropriate. If patients have not been pre-assessed in the spoke this will occur as soon after admission as practicable.
The Band 4 dietetic resource will take the lead for obtaining handover at the hub from spokes and/or undertaking a thorough pre-assessment for the patient where this has not occurred due to the often-urgent nature of these admissions. The band 4 will provide first

line advice for less complex patients to ensure nutrition is maximised in the post-op period and additionally monitoring and adjusting care for the less complex patients whilst referring more complex patients to the band 6 dietitian allowing more time for them to engage with the MDT through board rounds/ward rounds, shared goal setting and focus on the most nutritionally challenging patients.

The benefits of this model would be:

- Early identification of risk
- Accurate assessment of risk
- Highlighting patients that will require aggressive nutritional support e.g. artificial feeding to see them through the peri-operative period.
- Provides an opportunity to take an anthropometric measurement, for example grip strength, of patients pre-operatively.
- Supports patient preparation for procedure and helps to manage patient expectation post-operatively.

The British Dietetic Association Safe Staffing Safe Workload Guidance has been utilised to calculate the required resource. A safe inpatient caseload is defined as 29 contacts per week is a 'safe' caseload, with more than 33 contacts per week as definitively 'unsafe'. This figure is adjusted by 20% absences, based on a generic caseload and does not reflect the complexity and nutritional challenges of arterial vascular patients i.e. complex wound healing, poorly controlled diabetes, renal disease, frailty. For a 35-36 bed vascular surgery a safe caseload permits less than 1 contact per bed weekly to remain below the 'unsafe' threshold and the service would require more than 1.0wte dietitian. The current 0.3wte band 5 allocated is grossly inadequate for the service need. The expectation is that the majority of these patients would require review 2-3 times during a 5-day period or 70-105 contacts per week.

The required resource of 2.0wte could be skill mixed with band 4 and 6 to maximise efficiencies.

Required resource for 5-day service:
1.3 WTE band 6 Dietitian (incorporating existing 0.3wte)
0.7 WTE band 4 Dietetic Support worker

The unit would benefit from dietetic support workers. These are additional ward-based support worker roles that focus specifically on day to day nutritional care of patients. They liaise with nursing teams, the facilities teams and dietetics to ensure patients receive the most appropriate nutrition and support the nursing team to perform nutritional risk screening, weighing and nutritional monitoring of patients. They will additionally ensure patients receive supplementary nutrition in the form of snacks, milkshakes and fruit to increase nutritional intake, support patient engagement in physical therapy and improve recovery and outcomes.
Evidence from an RCT undertaken in CAV UHB in unscheduled orthopaedic surgery demonstrated that these support worker roles can reduce mortality. Comparisons may be drawn concerning frailty and co-morbidities.

The required resource for a 7-day service aligned to nursing shift patterns is:
2.24 WTE band 3 Dietetic Support Worker.

Occupational Therapy

The current service is only able to provide minimal Occupational Therapy intervention including rehabilitation to patients on B2. The service primarily is able to ensure a safe discharge with requirements for aids and adaptations and wheelchairs a priority. Vascular patients currently have access to 0.7 WTE band 6 Occupational Therapists.

There is specific guidance for vascular rehabilitation including the need for specialist support from Occupational Therapy and Physiotherapy.

In order to meet the activity uplift, it is proposed that an additional 1.8 WTE band 6 therapists are supported to ensure adequate cover over a 5-day period.

It is proposed that a band 7 is recruited to provide leadership for the regional vascular hub. The post will also provide specialist clinical knowledge for the teams across the pathway, to ensure smooth transition between acute and rehab settings and support repatriation to spokes or direct discharge home.

It is proposed that this post supports the service across the regional Hub and CAV spoke sites, it is proposed that the post is therefore split with 0.7 WTE provision for the regional Hub and 0.4 WTE to provide leadership and specialist rehabilitation in the CAV spoke as well as to begin to scope prehab and preoperative input.

This role was supported by the peer review and will also act as the lead coordinator for rehabilitation within the hub and the main point of contact for the spoke lead therapists/coordinators.

Podiatry

There is currently no commissioned inpatient service, all inpatient referrals are responded to regardless of location, the activity on the wards comes from the commissioned community services.

Podiatry currently provide an in-reach service and are dependent on the number of referrals received from the wards. Within the proposed centralisation this type of model would be unsustainable and would have consequences on providing appropriate management of the lower limb foot disease, potentially leading to delays in safe discharge or repatriation.

Management of foot disease during admission requires a Multidisciplinary approach with each specialism having its own role to play, but key to ensuring the person sees the right person at the right time requires orchestrated co-ordination with a Podiatry pathfinder role being highlighted as such an example of best practice. This type of role is often missing and is

of equal importance as that of outpatient management as patients admitted for an acute diabetic foot condition are particularly vulnerable to poor outcomes, with emergency management often necessary leading to long lengths of hospital admission. Evidence shows that if investigations, interventions, consultations and care planning are not coordinated during an inpatient stay by appropriately skilled and experienced health professionals, then length of stay is extended, re-admission is more likely, and poorer clinical outcomes expected including unnecessary major amputations.

The Vascular society (POVS 2018) and NICE exemplar of best practice has identified the role Podiatry has to play by implementing a Podiatry pathfinder. The project, established in the Royal Free Hospital also a Vascular Hub, demonstrates the improvements that can be made in reducing amputations, length of stay, patient outcomes, offing timely and appropriate safe discharges which in turn can prevent future admissions and further surgical interventions.
https://www.nice.org.uk/sharedlearning/ambulatory-acute-foot-service-royal-free-london-nhs-ft
The importance of this type of role was also highlighted at the recent Malvern Diabetic Foot Conference 2021, where both Newcastle Upon Tyne Hospitals (Figure 1) and Oxford (Figure 2) demonstrated how such Podiaty roles can have significant impact on reducing these length of stays and prevent re-admission.

Figure 1. The Malvern Diabetic Foot Conference 2021 - Online Material Access
Nicola Leech - Setting up a foot service in the UK: lessons from the North-East - YouTube

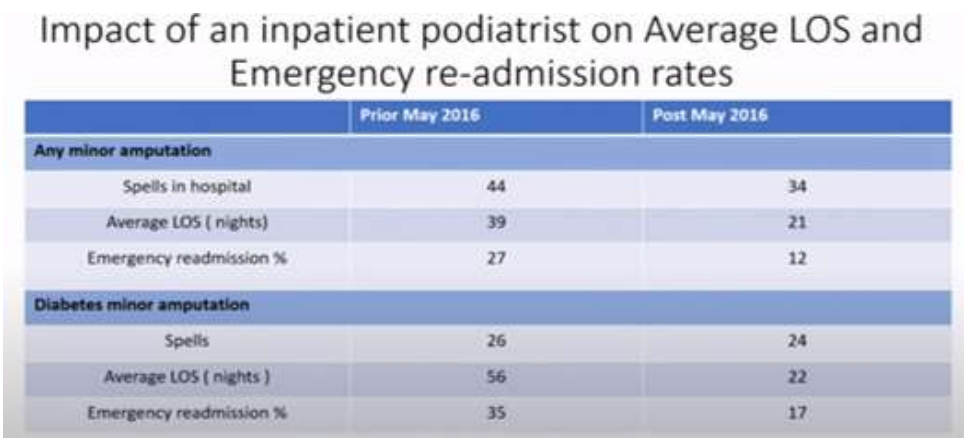


Figure 2. The Malvern Diabetic Foot Conference 2021 - Online Material Access
Jodie Buckingham - The expanding role of the podiatrist - YouTube

MDFT

	No of pts admitted with foot disease	Average length of stay (days)	Total bed days	Cost (assuming £200 per bed day)
July 2016 to June 2017	476	11.5 days	5457 days	£1,091,400
July 2018 to June 2019	194	6.4 days	1250 days	£250,000
Change	280 fewer people admitted	5.1 days shorter LoS	4207 bed days saved	£841,400 saved

1 WTE Band 8a extended scope Podiatry practitioners proposed to work at the front door SAU / MAU and on admission to the hub to support early diagnostics, management planning and referrals. The Podiatrist would be working at an advanced level of decision making, with a clear remit of bringing this MDFT together, to build on and enhance the performance of the existing specialist team. This role would support front door access, diagnostics, early interventions and referrals to meet the recommendations within NICE Guideline NG19. The Podiatrists are very familiar with lower limb diagnostics, carrying out Toe pressures to support use of classification systems such as the WIFI which supports decision making and management planning. The Podiatrist will also be the link between the hub, spokes and into the community, with treatment often starting within the acute setting and further management supported seamlessly into the spokes and on discharge to community settings. Communication will be significantly enhanced across the network between Podiatry, Diabetic foot services and hot clinics, an area that has previously been deficient due to lack of coordination. This post would sit within Podiatry to ensure cover is provided when the post holder is not available.

Risks

The model of hub and spoke is heavily dependent on consistent flow through the system to stop bed blocking and increasing length of stays. It has already been highlighted UHW and in particular ward B2 has had significant prolonged length of stays for patients with Diabetic foot disease. This has also been identified by the new data coming out of the Diabetes Insights of Variation Atlas examining lower limb amputations. Cardiff and Vale UHB length of stay was the highest in Wales in 2018-19, with average length of stay as 49 days (Compared to CTUHB at 20 and ABUHB at 17). By nature of requiring an amputation most would have been due to vascular disease and would have been managed on B2. This raises concerns and demonstrates increased risk on flow through the system validating the urgent need to provide Podiatric support to the hub.

9.17 Psychology

There is currently no Psychology service available to patients within the Vascular Network. There is a WHSSC funded post for patients who have had to have an amputation in SE Wales. This post is part of the multidisciplinary prosthetic rehabilitation service at ALAS.

Over the years attempts have been made to provide in-reach service from ALAS to the Vascular Unit at UHW. This was unsustainable due to low staffing and has not been available for many years. The absence of Psychology is a major gap in the vascular hub multidisciplinary service and along care pathways.

There are clear risks associated with the lack of psychological expertise and a clinically governed psychological care model. This includes: unaddressed psychological morbidity, unachieved behaviour change, and in particular the inappropriate use of medical resources, and a negative impact on medical outcomes.

The relevance of psychological morbidity to vascular disease has been established as a key element of focus for vascular services and initiates. This has led to a "call for action" from vascular professionals to become more engaged in innovative solutions for the identification of mental health aspects of vascular care (Vascular News, 2019). A helpful perspective is taken by Ramirez and Grenon (2018) - examples of where systematic psychological approaches are needed include depression, as well as behavioural factors associated with vascular disease, including tobacco use, physical inactivity, and medical non-adherence (Ramirez et al. 2018). In essence recognising depression and psychological elements as an important risk factor for poor outcomes in patients in Vascular Services is essential to providing the highest quality care. Diabetic foot problems: prevention and management NICE guideline [NG19] Published: 26 August 2015 Last updated: 11 October 2019 The multidisciplinary foot care service should have access to rehabilitation services……, psychological service…. Further evidence and details are available if required

This is an opportunity for biopsychosocial innovation in Vascular services and to align with other medical specialities within the S.E. Wales area and design and deliver a Visible Psychological Care Model for the Vascular Hub. This would include all the psychological factors likely to be relevant operationalising them into a systematic model of delivery. This would include direct patient work, and training and supporting other staff in delivering psychologically-informed care ensuring appropriate clinical governance. Key elements: the relevance of psychological factors to medical outcomes; the identification and treatment of psychological morbidity; design of a signposting and care pathways out of the unit to local services. There is an opportunity to include ward-based staff well-being approaches and reflective processes. There is an opportunity for contributing to research, audit and service improvement utilising the psychologist's research skills.

It is proposed that new post development at 1.0WTE Band 8b Practitioner Psychologist for patients within the Hub working as a part of the multidisciplinary team.

10.0 Spoke services – Aneurin Bevan University Health Board

10.1 Current and Future Service Activity Projections

	Current Service Annual (2019/20) (Pre centralisation)	Future service Annual figures (Post centralisation)	Change +/- Annual figures
Vascular surgery activity	375 arterial cases 100 vv cases	0 arterial cases 100 (VV cases, increasing annually)	-375 arterial cases
Theatre sessions	400 based on 2 sessions per week per surgeon with internal cover over 50 weeks 30 – 40 vv sessions	DC angio procedures to remain in spoke 30 - 40 sessions (vv interventions)	- 400 sessions
Bed days Ward ICU Rehab	5710 (based on June 18 – May 19 local bed day audit)	0 0 0 2700 – 3500 depending on LOS	
Outpatient appointments • Pre op assessment • New • FUP	 456 1521 1417	 458 (based on D&C assumption 2021/22) 1488 (based on D&C assumption 2021/22) 1535 (average of last 4 years attendances)	 +2 -33 +118

10.2 Outpatient Appointments

The change in outpatient activity is due to a number of factors as outlined below:

During the COVID-19 pandemic, interim measures were put in place in order to manage a vulnerable and urgent category of patients to ensure that their ongoing care and needs were being met. To this end, an MDT clinic was established in Cwmbran in conjunction with the Vascular Nurse Specialists, Podiatrists and Tissue Viability teams, as well as Vascular Wound Clinics. A significant proportion of patients who would have previously be seen in a Vascular Consultant Clinic are now being seen in the Vascular MDT clinics, as well as the wound clinics. Furthermore, new clinical pathways and ways of working have been adopted to manage conditions such as intermittent claudication and varicose veins which has led to a reduction in new outpatient demand.

CONSOLIDATION AND SUSTAINABILITY OF THE ANEURIN BEVAN UHB SPOKE SERVICE

In preparing for the establishment of the vascular hub and spoke network model, ABUHB have drawn a distinction between the following workforce implications:-

- Investment required as a direct result of the creation of the revised model, and hence directly relevant to the programme business case.

- Desirable investment to strengthen and develop existing services beyond their current baseline, and which would therefore be subject to local scrutiny and decision making separately from the programme business case

DIRECT WORKFORCE IMPLICATIONS

Consultant Vascular Surgeons

Spoke activities within ABUHB currently require 14.5 sessions per week divided between the 4 consultants; 4.5 DCC sessions are allocated to this work which, after allowing 0.87 sessions for annual and other leave, equates to 3.63 DCC sessions per consultant per week. After centralisation, certain hub duties, including Consultant of the Week, Surgeon of the Week and On Call Consultant, will be protected from annual and study leave. Prior to the creation of the network, this work is backfilled by colleagues as the current ABUHB hub is the Grange University Hospital (GUH). This will not be possible after a move to UHW. This means that the impact of annual, study and other leave will fall disproportionately on the Spoke service. This will amount to 1.3 sessions of spoke activity lost per ABUHB Consultant per week as a direct result of the centralisation model, leaving 3.2 sessions per week available.

A significant amount of Consultant time is currently spent reviewing in-patient ward referrals, for example urgent referrals for carotid surgery. The future pathways (see the spoke model document) involve transferring this work from hub to spoke activity. This has been measured this as 1.4 sessions per week, based on a 2 month sample time. The total requirement for spoke activity will therefore be 15.9 sessions. With 3.2 sessions per consultant available, this requires 5 WTE.

The direct effect of these two changes, disproportionate impact of annual leave and transfer of work from current hub to future spoke duties, is the requirement to increase from 4 to 5 consultants to maintain the spoke services at the current level.

One additional Consultant Vascular Surgeon is therefore required as a direct result of the move to a centralised service with the hub in UHW, Cardiff.

Summary of Consultant job plan calculations

Calculation of distribution of leave between hub and spoke activities.
Assumptions:

1) 11 consultants on equal 11 week rotation
2) 9 DCC contracts, split 50-55% hub, 45-50% spoke
3) CoW, SoW, On Call duties all protected – leave cannot include them
4) 42 productive weeks per year
5) 8 all day operating lists per 11 week cycle; 2 sessions per list.

Per Consultant per 11 weeks:
9 * 11 * 50% = 50 sessions of hub activity per 11 weeks
8 * 2 = 16 sessions of elective operating
50 – 16 = 34 sessions protected from leave – roughly one third of total time.
(9 * 11) – 50 = 49 sessions of spoke activity.
16 + 49 = 65 sessions available for leave, allocated 16:49 hub : spoke
9 * 11 * (10 / 52) = 19.04 DCC sessions leave.
19.04 * (49 / 65) = 14.4 sessions leave from spoke activities per 11 weeks
14.4 / 11= 1.3 DCC sessions per week leave from spoke activity.
Current activity:
Sessions * proportion spoke * allow for leave * number of consultants
9 * 50% * (42 / 52) * 4 = 14.5 sessions spoke activity delivered.

Future activity:
(9 * 50%) - 1.3 sessions for leave = 3.2 spoke sessions available per consultant per week
14.5 / 3.2 = 4.54 Consultants needed to deliver same activity.
Plus 1.4 session of CoW time currently spent on ward referrals and hot clinics, e.g. Carotid referral pathway. This will transfer to spokes.
(14.5 + 1.4) / 3.2 = **4.97 consultants needed**.

Research Fellow
The current ABUHB vascular team includes one research fellow, who undertakes clinical duties for the vascular service and participates in the general surgery out of hours on call rota. No changes to this are proposed as a result of the establishment of the new network.

Consultant Anaesthetists / Interventional Radiologists
Revised rotas for senior anaesthetic and radiology staff are being compiled within Cardiff & Vale UHB to support the additional theatre and IR lists. Final details will be agreed as part of the operational readiness programme planning phase, and will inform the final accompanying programme financial plan.

Specialist Nurses

The current ABUHB vascular team includes 2 WTE specialist nurses and 1 assistant practitioner. The direct implications for these staff will be:-

- Removal of duties associated with acute inpatient care, as this element of the service will transfer to the new vascular hub at UHW in Cardiff.

- Increased requirement for local on-site spoke presence to respond to queries, ward referrals and to provide additional support for clinics and urgent need for pre and postoperative assessment/monitoring of ABUHB patients on ABUHB sites e.g. "the diabetic foot", post minor and major amputation etc.

It is therefore proposed that the capacity released from acute inpatient service duties be redirected to the requirement for increased spoke site presence and liaison as described above. No change is therefore proposed to the current establishment as a result of the establishment of the new network.

Vascular Service Coordinator

The post of service coordinator was established on a pilot basis in 2019 (via the secondment of an existing medical secretary) to ensure a smooth pathway for patients around the service within the new ABUHB Clinical Futures clinical model. This post was quickly embedded as central to the safe and successful running of the spoke service, and will become critical in the new network in liaising closely with the 'hub coordinator' in UHW. They will manage urgent and routine referrals to the service, the investigation and transfer of acute patients to UHW, the step down and regular review of patients transferred out of UHW post-surgery and ensure their ongoing regular review as needed whilst they remain as inpatients and after final discharge. It is therefore proposed that this post now becomes substantive in the new network model.

Administrative / Medical Secretaries

The secondment of one of the two existing medical secretaries into the coordinator role has left the remaining secretary and the typist with an excessive workload. With a reduced consultant presence on the spoke sites in the new network model making communication critical, the current position is not considered safe or sustainable. There is therefore a need to appoint to the vacant secretarial post, with this also providing support to the fifth consultant surgeon described above and improved cross-cover generally within the team.

There are no other changes proposed to the administrative team.

It is intended to establish a vascular service directorate in Cardiff to provide management oversight of all hub activity. Management of the vascular spoke service in the Health Board will continue to be through the General Surgery Directorate and hence to the Scheduled Care Services Division.

Therapy Staff

A variety of therapy services provide support to the vascular service, including physiotherapy, occupational therapy, dietetics and podiatry. Currently there are few therapy staff wholly dedicated to vascular patients, with resource shared with other surgical specialties. Whilst the strengthening of vascular therapy resource is a strategic objective for ABUHB, the spoke rehabilitation model within the new network will essentially operate in a similar way to the existing model, with acute patients now transferring to spoke hospitals for rehabilitation from the hub in UHW instead of from the existing ABUHB hub at GUH. No change is therefore proposed to the current therapy establishment as a result of the establishment of the new network.

Vascular Scientific Staff

The service is currently supported by 3.8WTE vascular scientific staff. No changes are proposed as a result of the new vascular network.

Other Staff Groups

A number of other staff groups provide support to the vascular service, including pharmacy, pathology and HSDU. These staff are not wholly dedicated to vascular patients, with resource shared with other surgical specialties. No changes are proposed to the relevant staffing establishments as a result of the new vascular network.

SUMMARY OF WORKFORCE IMPLICATIONS

	Current Establishment	Proposed Future Establishment	Change
	4 Consultant Surgeons (12 PA)	5 Consultant Surgeons (12 PA)	1 Consultant Surgeon
	1 Research Fellow	1 Research Fellow	No change
	2 Vascular Specialist Nurses 1 Assistant Practitioner	2 Vascular Specialist Nurses 1 Assistant Practitioner	No change
	1 ABUHB Coordinator (pilot)	1 ABUHB coordinator (substantive)	
	1 Secretary 1 Typist	2 Secretaries 1 Typist	1 Secretary
Therapy staff Vascular scientists Pharmacy Pathology HSDU			No change to current establishments

The additional workforce requirements are referenced in the finance section of the case, and will be progressed subject to local ABUHB case scrutiny arrangements.

10.3 Cost Mitigation

The Scheduled Care Division will undertake the following costs mitigations in respect of the additional costs envisaged as a result of the centralisation of inpatient vascular care.

Recharge of Consultant sessions

Where AB consultants are undertaking clinical commitments within the hub at UHW, these will be recharged to C&V UHB as mitigation against the cost of each AB case performed there.

Equipment and Consumables

Some cost mitigation will be achieved through the cessation of local purchasing of higher value vascular equipment and consumables.

Ward Beds / Staff

The removal of acute inpatient vascular care releases an average of eight inpatient beds at GUH. These beds will be redeployed to other surgical specialties, improving patient flow, supporting the Division's recovery programme and reducing the potential requirement for additional capacity provided via premium cost bank and agency workforce.

Theatre Capacity / Staff

The removal of vascular operating activity releases four all-day theatre sessions at GUH. These sessions will not be redeployed initially, with staff redeployed into vacancies within the operating theatre service. Future business cases will be invited and considered for the use of this capacity, subject to identified funding streams.

FUTURE SERVICE REVIEW AND ASSESSMENT / DESIRABLE FUTURE INVESTMENT

The information above reflects the centralised service as planned as on the day of submission of this template in June 2021. The service will be reviewed regularly both before and after implementation of the network, through formal three month, six month and 12 month review workshops. Any significant change to the calculations or assumptions in the business case, and in particular relating to workforce requirements, will be reported back to the Programme / Network Board and Executive Boards.

It remains a strategic objective of ABUHB to strengthen and enhance the capacity and quality of vascular services as envisaged within this programme business case. This will take the form of ongoing review and monitoring of spoke service delivery, with business cases prepared by the relevant service Directorates / Divisions for local scrutiny and prioritisation if / as required. Priorities for this process are likely to include the following:-

- It is recognised that following the establishment of the new network, the unit will retain the same responsibility for covering ABUHB patients at ABUHB spoke hospitals i.e. outpatient assessment, inpatient assessment, varicose vein treatments, staff supervision, staff training, quality assurance, education, hospital management, working with sister specialties and covering emergencies. The establishment of a further additional Consultant Vascular Surgeon should be considered in accordance

with UK best practice recommendations. National guidelines demand one vascular surgeon per 100,000 – 120,000 population (VSGBI: The Provision of Services for Patients with Vascular Disease, 2018 & VSGBI: Vascular Surgery Workforce Survey 2018). At ABUHB this equates to a minimum of 5 – 6 vascular surgeons, compared to 4 as at August 2021.

- Consideration of appointing an additional Vascular Nurse Specialist to ensure optimal care for pre and post-operative patients within the evidence based clinical guidelines spelt out by the VSGBI (VSGBI: The Provision of Services for Patients with Vascular Disease, 2018; VSGBI: A Best Practice Clinical Care Pathway for Peripheral Arterial Disease, 2019). Failure to achieve this in the longer term will bring the risk of increased morbidity and mortality in a frail vulnerable group of elderly patients with multiple co-morbidities.

- Review of current spoke therapy resources and consideration of additional / dedicated appointments in physiotherapy, occupational therapy, dietetics, speech & language therapy and podiatry. It is envisaged that this may be undertaken collaboratively on a network wide basis to ensure future equity of service provision e.g. for the development of pre-habilitation.

11.0 Spoke Services – Cwm Taf Morgannwg University Health Board

11.1 Activity

	Current Service Annual (2019/20) (Pre centralisation)	Future service Annual figures (Post centralisation)	Change +/- Annual figures
Vascular surgery activity	526 Inpatient Admissions		
Theatre sessions	of the 526 Inpatient Admissions, 370 patients had a procedure undertaken in Theatres		
Beddays Ward ICU Rehab	Total 3565 bed days which includes 137 ITU bed days		
Outpatient appointments • Pre op assessment • New • FUP	See table below		

Appointment Status	New Appointments	Follow Appointments	Total Appointments
Attendances	1151	1117	2268
Patient Cancellations	103	153	256
DNAs	106	115	221
Hospital Cancellations	237	302	539
Total Appointments	**1597**	**1687**	**3284**

Uplift in services

NICE guidelines recommend a MDT approach to conservative treatments, pre-habilitation and rehabilitation programmes.

Vascular patient per annum (Rhondda Cynon Taf and Merthyr)

	Number of vascular patients referred to vascular MDT	Number of vascular procedures conducted	Number of patients currently referred for supervised exercise programme	Number of major limb amputations per annum
	+/- 500	355	200	30
Therapies requirement	Attendance at the MDT and overall co-ordination of vascular therapy services	Support secondary prevention. Deliver rehabilitation and facilitate repatriation/discharge	Deliver primary prevention via lifestyle interventions and evidenced based supervised exercise programme	Support secondary prevention. Deliver rehabilitation and facilitate repatriation/discharge

There is a negligible therapy resource dedicated to vascular patients. This resource currently delivers the supervised exercise programme and previously attended some of the multidisciplinary meetings (MDM). Since the vascular service relocated to Cardiff there has been no attendance at the MDM and opportunities for prevention have been missed.
In-patient and domiciliary/community rehabilitation is delivered by generalist therapists usually in the community hospitals or in a person's own home. The capacity of these therapists is very limited and there is little opportunity to offer meaningful rehabilitation. People may only receive therapeutic input onve or twice a week.

CTM therapies therefore recommend enhancing the small vascular physiotherapy service to create a sustainable **CTM Vascular multidisciplinary team (CTM Vascular MDT**) to wrap around the patient wherever they present in the pathway. This service will:

- Attend and engage in the regional MDM
- Actively identify people who would benefit from a conservative lifestyle programme to prevent deterioration or surgery
- To optimise patients for planned surgery where possible
- Co-ordinate services between the hub and spoke hospitals
- In-reach to the hub hospital to facilitate repatriation or discharge home at the earliest opportunity
- Provide expert advice to support core rehabilitation services both in in-patient and home settings.
- Maintain awareness of all vascular patients ensuring their therapeutic needs are met and follow up appointments are coordinated

The CTM Vascular MDT would comprise

- A Clinical Lead: Responsible for delivery and governance of the whole therapies pathway. Ensure participation in the MDT Cardiff.
- Enhanced Physiotherapy to deliver conservative interventions and support rehabilitation
- Enhanced Occupational Therapy to deliver peri-operative pre-assessment and support repatriation & rehabilitation
- Podiatric services to support lifestyle interventions, specific vascular foot management and support wound care pre and post surgery
- Dietetic services to support lifestyle interventions, deliver nutritional optimisation perioperatively and specific nutrition and dietetic interventions during the rehabilitation phase.

	Current Service Annual (2019/20) (Pre centralisation)	Future service Annual figures (Post centralisation)	Change +/- Annual figures	Rationale
Bed days Ward ICU Rehab	Rehabilitation for vascular patients delivered by generalist therapists.	Earlier repatriation of higher risk patients requires increased therapy resource and robust governance arrangements		Vascular specific data not collected for therapies
Therapy Clinical Lead Vascular Services	0	1 WTE Clinical Lead	0.8 WTE 8a £52,012	Responsible for delivery, development and governance of the whole pathway.

				Provide clinical expertise Ensure participation in MDT Cardiff.
Physiotherapy.	0.4 WTE band 6. Delivers supervised exercise programme early in the pathway.	1.0 WTE band 6	0.6 WTE band 6 PT £28,413	To support prehab- and rehabilitation in all settings
Occupational Therapy	0.4 WTE band 6 used to support IP rehabilitation	1.0 WTE band 6	0.6 WTE band 6 OT £28,413	To support pre-assessment and rehabilitation in all settings
Occupational Therapy	0	3 sessions x 52 weeks	Band 7 £16,749	To deliver pre-assessment and facilitate repatriation
Podiatry	Core service only (linked to diabetes and wound care service)	6 sessions x 52 weeks	band 7 £33,499	To support prehabilitation, vascular foot management and wound care
Dietetics	Core service only (linked to diabetes service)	0.2 WTE band 6	0.2 WTE band 6 £9,471	To support prehab- and rehabilitation in all settings and perioperative optimisation
Therapy technicians (includes dietetic requirements	none	Support dietetic interventions; complex rehabilitation; equipment provision; compliance with programmes	1.5 WTE band 4 £44,628	To support all members of the Therapies MDT. Delivering prehab- and rehabilitation in all settings
Admin support And consumables	none	0.5	0.5 band 3 co-ordinator £12,944	Support the MDT, appointments co-ordinations and data collection.

12.0 Spoke Services - Cardiff and Vale University Health Board

Current Service Provision

The Cardiff Regional Vascular Unit prior to September 2020 comprised three consultant vascular surgeons, four consultant vascular interventional radiologists, five vascular anaesthetists, a vascular clinical nurse specialist, surgical care practitioner and a supporting team from occupational therapy, physiotherapy, podiatry, dietetics, and pharmacy.
The vascular service has three all-day vascular operating lists, as well as access to the interventional radiology suite which has high quality rotational fluoroscopic imaging (one of which has biplane imaging capabilities), in two dedicated vascular IR rooms which are equipped for a full range of anaesthetics.

The vascular spoke service is currently provided on B2 at UHW and is combined with the hub service. The resources supporting vascular rehab services are as follows:

Vascular surgeons provide the surgical input to all patients on B2. It is estimated one session of vascular surgeon time currently supports the spoke. Junior doctors support the surgeons on B2.

Nursing
Current provision of nursing on B2 is 1 Registered Nurse Band 5 per shift for 7 patients and 1 Health Care Support Worker (HCSW) per shift based on 1 HCSW to 9 patients. By night the B2 Vascular ward works on 1 RN for 10 patients and 1 HCA for 19 patients.

AHP's
There are currently 0.7 WTE physiotherapist, 0.3 WTE dietitian and 0.7 WTE Occupational therapist supporting the B2 hub. Other therapies do not have a ward based team but provide an in-reach service supporting patients on a referral based need.

Proposed service provision

As an interim solution for the first 6 to 12 months of the network being established, the spoke vascular service for Cardiff and Vale patients will be incorporated within the Lakeside Wing Unit (LSW) on the UHW site led by the care of the elderly team with the relevant clinical support from the vascular team. There will be a plan subsequently developed to create an appropriate rehabilitation service in Llandough Hospital over this time. This interim model has been agreed by the Clinical Board Director for Medicine, the Clinical Board Director for Surgery and the UHB Major Trauma Centre Rehab Lead.

There is an assumption that a maximum of 8 vascular rehab patients will be cared for in the Lakeside Wing (LSW) footprint. This is based on a therapies model reducing the number of beds required from 10-12 to 8. This would change the capacity of LSW from 50 frail elderly un-commissioned beds to 42 frail elderly un-commissioned beds and 8 commissioned vascular rehab beds. The 8 beds would be used for vascular rehab step down patients from B2.

Workforce requirements

Lakeside Wing is currently Un-commissioned capacity, funded through non-recurrent COVID response monies. Lakeside Wing does not have a substantive workforce and the current workforce is provided by temporarily moving staff from Clinical Boards (MCB, SCB & SpCB) and using bank, agency and locum staff to supplement.

Currently, these patients could be cared for through the un-commissioned Medical and Nursing rosters for Lakeside Wing (with the uplift of a HCSW). However, should the final site for these patients be away from Lakeside Wing, then a new, substantive and commissioned Medical and Nursing resource would need to be funded.

Figure in (brackets) are the net increase once staff transfer B2 for nursing and currently support LSW for medical.

Medical

Consultant - Requirement 0.30 WTE (Additional 0 WTE)

Junior Doctor - Requirement 1.00 WTE (Additional 0 WTE)

The current medical workforce within LSW is provided to cover the additional capacity open within MCB. Whilst temporarily located on LSW, the medical team can flex to cover the vascular rehab beds, however, if the LSW additional capacity is removed or when the model is moved to UHL an investment in consultant sessions and junior doctors would be required. This would be a minimum of three consultant sessions and one junior doctor at SHO level.

Nursing

Registered Nurse – Requirement band 5, 5.68 WTE (Additional 0 WTE)

Current registered nursing will be provided by existing Lakeside Wing, which is unfunded and mostly agency nurses. However, there is an additional training requirement for these staff to care for vascular patients. A training plan has been drawn up and is currently being rolled out. It will be essential that this training is completed prior to patients being transferred to the Lakeside wing.

HCSW – Requirement band 2, 5.68 WTE (additional 2.09 WTE)

The HCSW role is vital to the safe care of Vascular Rehab patients. HCSW will be providing patients basic care needs as well as assisting with rehabilitation and activities of daily living. The workload for vascular rehab patients expected to be increased from the other patients on LSW so an uplift is required in order to safely care for these patients in an appropriate environment. An uplift of 5.68 WTE is required for safe staffing.

CNS Diabetes – Requirement band 6, 0.2 WTE (additional 0.2 WTE)
The uplift of 0.2 WTE Diabetic CNS will have huge medical and holistic benefits to the patients. There are a multitude of studies (Lawler et al, 2019; Flanagan et al 2007) that evidence having increased diabetic nurse CNS input into these rehab patients will provide a better outcome, reduced readmission rates and shorter length of stay. This post will not require external recruitment but will need additional hours to be agreed with existing staff.

Discharge Liaison Nurse – Requirement band 5, 0.2 WTE (additional 0.2 WTE)
The uplift of 0.2 WTE DLN will provide vital input from full MDT working for vascular patients and those requiring rehabilitation, and the subsequent benefit in all clinic outcomes, length of stay, mortality, morbidity etc. Their surgical intervention is only the start of their journey and will allow full holistic care, from surgery through to discharge. This will allow for MDT planning and prompt discharge of vascular rehab patients. It will allow for safe planning, safe facilitation and safe selection of the most appropriate place of care for discharge as well as liaison with family members. This post will not require external recruitment but will need additional hours to be agreed with existing staff.

Therapies

Physiotherapist – Requirement band 7, 1.0 WTE (additional 1.0 WTE), Band 6, 1.0 WTE (additional 0.71 WTE)

Physiotherapy will require additional staff to provide rehabilitation to vascular patients within the Cardiff and Vale Spoke beds. The service currently has 0.7 WTE for the vascular ward at UHW. This resource is part of the wider physiotherapy team, delivering acute post-operative care to patients, across a broad range of surgical specialties within the general surgery wards at UHW. The creation of the Vascular Hub will increase the acuity of patients within this ward. Physiotherapy requires an uplift in staffing to provide the appropriate level of postoperative respiratory care and early rehabilitation. This uplift has been identified within the Hub business case. The Physiotherapy service will therefore be unable to transfer this existing resource to the Cardiff and Vale Spoke unit. As a stand-alone unit the Spoke will require a Band 7 Physiotherapist with specialist vascular rehabilitation skills to provide the physiotherapy component of the SEWVN Rehabilitation Pathway. They will provide clinical interventions which will form 70% of their job plan. Safe therapeutic handling during rehabilitation often requires 2 therapists. The Band 6 Physiotherapist will be required to support the delivery of rehabilitation and also provide service continuity. This is key in the short term if the Rehabilitation assistants are not recruited at risk.

The staffing levels proposed (1 WTE: 5 patients) are guided and supported by “Amputee and Prosthetic Rehabilitation -Standards and Guidelines” BSRM –2018 and the “Clinical Guidelines for the Pre and Post-Operative Physiotherapy Management of Adults with Lower Limb Amputations” BACPAR 2016.

The experienced vascular physiotherapists will support the Lakeside nursing staff to develop the specialist handling skills required for vascular patients, whilst they undergo a more formal programme of training and education.

Physiotherapists will provide daily rehabilitation to vascular patients, including those patients have undergone amputation. This will include where appropriate early gait re-education in preparation for a prosthetic limb. Rehabilitation is key to improving clinical outcomes and maximizing functional independence. Physiotherapy interventions which are designed to improve strength, balance and mobility will optimize discharge destinations and may, if patients can be successfully discharged home, reduce the dependency upon community-based services.

Occupational Therapist – Requirement band 6, 1.0 WTE (additional 0.71 WTE) Requirement Band 7, 0.4 WTE (additional 0.4 WTE)

The additional staff are required for the new spoke rehabilitation element of the vascular network with the expectation of providing an improved evidence-based service and to manage the change in the patient pathway including the split of the service from the hub at UHW. The spoke will be a new stand-alone unit and requires the leadership and specialist clinical skills and knowledge provided by a band 7 post, (this post is separated into separate hours across the hub and spoke business cases). Providing a staff ratio of 1WTE:5 patients will enable each patient to receive daily rehabilitation as per the BSRM guidelines. These patients are likely to have complex clinical rehabilitation needs and will also require in depth discharge planning requiring an MDT approach. Therapists will deliver daily direct patient care and rehabilitation, in addition to indirect patient related duties (daily ward rounds, MDMs, supervision, training etc.) A high proportion of these patients will require 2 staff for each treatment session. Comprehensive home assessments may take several hours and require two staff members.

These patients are often complex and any surgery often leads to significant housing needs and arrangements for discharge. As part of the person's holistic care, the Occupational Therapist will support safe discharge with requirements for any aids and adaptation and wheelchairs being a priority with Home Assessment being central to this. They will work with the patient and their family to ensure that the person's functional abilities are improved through rehabilitation as appropriate and will sign post the patient and their family onto relevant services in the community. Not recruiting to these posts will mean that patient's rehabilitation will be delayed with reduced opportunity for intervention required. It is also likely to severely impede patient flow through the service and impact negatively on length of stay.

Dietitian – Requirement band 6, Total 0.7 WTE (additional 0.57 WTE) Requirement Band 4, 0.3 WTE (additional 0.3 WTE)

The dietetic resource required for CAV spoke will deliver a pre-assessment service and support the initial rehabilitation phase and provide secondary prevention care. The resource requirement is 0.7WTE band 6 and 0.3WTE band 4.
The expected benefits of this model would be:

- **Disease prevalence:** Identification of malnutrition through pre-screening to prevent known complications of poor nutrition peri-operatively e.g. infection, wound breakdown. Underweight patients undergoing vascular surgery have higher mortality

rates and this should be corrected ideally pre-operatively. Delivery of secondary prevention advice in the spoke to address vascular risk factors – obesity, diabetes, lipids.

- **Health gain**: Integrated MDT with dietetic presence for care planning ward rounds, board rounds. Smooth transition of care from hub to spoke with suitably resourced service to meet the complex needs of vascular patients.
- **Equity**: Pre-assessment enables the dietetic service to identify those with the highest health needs and support them appropriately through their inpatient journey, e.g. those requiring artificial nutritional support for wound healing or to enable them to engage with physical therapy services and achieve timely outcomes. Early conversations and prompt planning can prevent complications that would extend LOHS.
- **Clinical and skills sustainability**: Appropriate resourcing of service to ensure adequate knowledge and skills set to manage these patients. Registered dietitians who require skills in nutrition support, complex diabetes, renal therapeutic diets and behaviour change achieve this through several years of post-graduate experience.
- **Value for money**: Skill mixing resource to utilise the skills set of the registered staff for more complex patients and bringing in cost-efficiencies with dietetic support workers. Early & accurate identification of nutritional risk, and appropriate nutritional care planning through pre-assessment has been shown to reduce costs in a variety of surgical specialties as part of an enhanced recovery approach.

<u>Rehabilitation</u>

The 0.5WTE band 6 dietitian allocated to the spoke rehabilitation beds will work in collaboration with the patient and MDT to ensure nutritional needs are met adequately to achieve rehabilitation goals. Malnutrition is prevalent in patients undergoing vascular surgery with reported rates of 60-90% and is associated with poorer outcomes. Frailty in this patient group is associated with a 4-fold increased risk of 30-day mortality after major vascular surgery. Adequately nourishing these patients and aggressively managing nutritional problems will support their outcomes holistically.

The 0.5WTE band 6 for the rehabilitation beds will additionally deliver secondary prevention advice or refer onto to appropriate community services to ensure this need is met. Secondary prevention and lifestyle management advice is fundamental and should be incorporated as part of the rehabilitation model. Diet and weight management are key modifiable risk factors, the Vascular Society of Great Britain and Ireland advocate attainment and maintenance of a healthy body weight to help maintain healthy arteries. Dietetic delivery of secondary prevention and weight management education post-operatively should be included in a comprehensive dietetic service model.

<u>Pre-Assessment</u>

The band 6 0.2WTE will be allocated to pre-assessment and the 0.3WTE band 4 will be allocated to pre-assessment.

Pre-assessment should be undertaken to identify risk and permit pre-operative optimisation, ideally 1-2 weeks beforehand. This service will primarily be delivered by band 4 support worker with 0.2WTE band 6 dietetic resource available for the most complex patients e.g.

patients with uncontrolled diabetes on insulin, patients with chronic kidney disease or severe malnutrition.

Potential for existing staff to increase their hours to cover this requirement initially.

Podiatrist – Requirement band 7, 0.5 WTE (additional 0.5 WTE)

The CAV spoke will require 0.5WTE to lead the assessment and management of patients with foot wounds, lower limb amputations or surgical debridement who will be stepped down into the spoke from the hub after vascular intervention. It has been identified within the hub that a high proportion of the current caseload are patients with active diabetic foot disease. The Podiatry service through current resource is only able to support inpatient care as an in-reach service, reliant upon the e-advice and comms system to identify and refer patients that require specialist podiatric intervention. This system often results in delays in timely appropriate assessments and care. The role of the podiatrist within the MDT in the acute setting is essential to facilitate the capacity flow through the hub and spoke. The podiatry team are well placed to direct the ongoing care and support earlier safe discharges from the spoke into the community thus allowing flow throughout the system, ensuring best outcomes for the patients.

The existing inpatient podiatry provision for patients with foot ulceration / peripheral arterial disease requiring Podiatry intervention is not fit for purpose or sustainable. Investment into the new proposed clinical model will demonstrate improvements reducing the number of amputations, length of stay and patient outcomes as identified as best practice by NICE evidence https://www.nice.org.uk/sharedlearning/ambulatory-acute-foot-service-royal-free-london-nhs-ft . Without this role there is a risk the throughput within the spoke will significantly affect the hub. Extended length of stay and delays to discharge and poorer outcome for the patient. The 0.5wte Podiatrist will initiate treatment plans such as topical negative pressure, larvae therapy and pressure redistribution/avoidance prior to discharge to aid rehabilitation and expedite discharge. Without the 0.5wte referral to community Podiatry for an in-reach appointment would be required which on average takes 72 hrs.

Band 7 - Coordination role

Major Trauma has developed a Rehabilitation Coordinator role to coordinate vascular rehabilitation across the whole vascular pathway. Vascular surgery has a robust multi-disciplinary team and it is acknowledged that this specialty differs from Major trauma in size and complexity. It is therefore proposed that the Band 7 Therapy leads will take the responsibility for initial coordination of CAV patient and rehabilitation. They will evaluate and develop the requirement for a similar role within the first year of the Hub and Spoke model for it to be reviewed at 12 months. It is not currently envisaged this would be an additional role as per Major Trauma Service.

Therapy rehab assistants – Requirement band 3 2.0 WTE (additional 2.0 WTE)

Working alongside therapists and nursing staff, rehabilitation assistants encourage and support the integration of rehabilitation into the patient`s daily ward care, optimising the patient`s functional independence and reducing the dependency on nursing staff.

Cost

The cost to care for these vascular rehab patients in eight beds on Lakeside Wing, offset by the assumed resource transfer from B2 spoke beds and medical resource currently on LSW is shown in the table below:

Staff type	Position	Band	B2 staff transfer	LSW Estab required	Net WTE increase	Net investment required - FYE 21/22	Net investment required - FYE 22/23	Comments
			WTE	WTE	WTE	£	£	
Medical	Consultant			0.30	0.30	0	0	No investment required whilst in LSW - existing LSW Medical staffing
	Junior Doctor			1.00	1.00	0	0	No investment required whilst in LSW - existing LSW Medical staffing
Medical Total			**0.00**	**1.30**	**1.30**	**0**	**0**	
Nursing	Registered Nurse	Band 5	-5.68	5.68	0.00	0	0	Assumption that B2 will only release 8/19ths of current budget
	HCSW	Band 2	-3.59	5.68	2.09	26,756	64,215	Assumption that B2 will only release 8/19ths of current budget
	CNS Diabetes	Band 6		0.20	0.20	3,962	9,509	
	Discharge Liaison Nurse	Band 5		0.20	0.20	3,182	7,637	
Nursing Total			**-9.27**	**11.76**	**2.49**	**33,900**	**81,361**	
Therapies	Physiotherapist	Band 7		1.00	1.00	23,356	56,054	
		Band 6	-0.29	1.00	0.71	13,971	33,531	
	Occupational Therapist	Band 6	-0.29	1.00	0.71	13,971	33,531	
		Band 7		0.40	0.40	9,342	22,421	
	Dietician	Band 6	-0.13	0.70	0.57	11,365	27,275	
		Band 4		0.30	0.30	3,733	8,960	
	Podiatrist	Band 7		0.50	0.50	11,678	28,027	
	Therapy Rehab Assistants	Band 3		2.00	2.00	21,661	51,986	
Therapies Total			**-0.72**	**6.90**	**6.18**	**109,077**	**261,785**	
GRAND TOTAL			**-9.99**	**19.96**	**9.97**	**142,977**	**343,145**	

Assumptions

- The vascular rehab patients are currently cared for on B2. The current medical and nursing workforce resource sits within Surgery Clinical Board. The assumption is that this resource (staff and financial) for CAVUHB spoke patients will transfer with the patients upon the move to Lakeside Wing. N.B the medical resources will not transfer in the interim as LSW has temporary medical resource available. The transfer will be required for the final rehabilitation service at UHL.
- The therapies input is based upon a 5-day working model.

13.0 Transport

The critical provider of pre-hospital care and secondary transfers for vascular patients is the Welsh Ambulance Service NHS Trust (WAST), which is commissioned by the Emergency Ambulance Services Committee (EASC*).*

WAST will be a critical enabler in the success of the Regional Vascular Network, providing clinical conveyance in the following phases:

- Responding to emergency / urgent calls from the community, providing any urgent care required at scene and conveying to an emergency department.
- Providing secondary transfers of patients from spoke sites to the major arterial centre / hub at UHW
- Maintaining system flow through the provision of timely discharges from the hub; either taking patients home following acute care or conveying to a spoke site for ongoing medical care and vascular rehabilitation.

An analysis of projected WAST conveyance requirements as a result of the service reconfiguration has been undertaken, with the main additional demand assessed as:

- New requirement for secondary transfers of vascular patients presenting to spoke sites and requiring onward transfer to the hub following clinical assessment
- New requirement (where applicable) for post-treatment transfer of CAVUHB patients from the acute hub at UHW to the spoke site at University Hospital, Llandough
- Some additional journeys or Increased journey length for ABUHB and CTMUHB patients transferred from the acute hub at UHW, either to a spoke site or discharged home

On the basis of the revised activity and associated acuity projections, WAST have prepared a transport plan to provide additional conveyance capacity consistent with timely patient flow around the regional network. The updated financial modelling based on the new activity levels and model has provided a financial implication of £132,000

Initially existing services will provide the transfers and discharges with additional investment to support, in the longer term EASC are planning to develop an All Wales Transfer and Discharge service to enable a timely and quality service for patients specific to the new service requirements of developing models of care such as the Vascular Network.

14.0 Informatics and data

A review of requirement for the transfer of information across the network has been assessed. It is agreed that there are no unmet informatics requirements that would prevent the launch of the network including the centralisation of additional surgery to UHW from CTM UHB or AB UHB.

It has been agreed that there will be a requirement for a transfer of operation notes and associated information between current CAV and AB systems.

It has been agreed that the current process and system used for the sharing of information at the point of repatriation from UHW will remain, although systems and ways of working are likely to develop post launch.

The requirements and processes maps are not yet at a sufficient detail to provide full assurance/cost and continued engagement with the regions informatics departments will need to persist beyond the launch of the network. Therefore, a funding contingency is recommended of £50,000 cost is allocated for 'set up', based on known commercial vendor (Theatreman) integration requirements, potential kit provision and access management to different systems.

However, longer term the lack of integration between systems are undesirable and the network wish to be assured that integration between local and national platforms are prioritised and be delivered within 6 months of go live.

Activity, performance and outcomes data collection

The informatics group have reviewed the requirement for tracking activity post go live and in addition capturing key operational performance inclusive of LOS and time to transfer.

Information will be tracked through a number of platforms which would include, Patient Management System , Clinical Workstation and Theatreman , Data is then pulled through into our Business Intelligence System providing data on:

- Referring HB
- LOS
- Procedure Codes
- Readmission data
- Repatriation timelines

The network data coordinator will be responsible for ensuring accurate data collection and entry into Cardiff and Vale's Patient Management System (PMS), Theatreman, and the National Vascular Registry. The Network manager will have overall responsible for ensuring data quality and this will be reviewed on a monthly basis at the network vascular meeting. The Network manager will also develop a plan for the roll out of PROMS and PREMS with support from the Vascular Clinical Lead during year 1.

15.0 Public Engagement

In recognition of the proposed reconfiguration of an acute surgical service across South East Wales, the vascular service programme was committed to a comprehensive engagement process with the public and all key stakeholders, consistent with best practice and informed by advice from the Consultation Institute. During October 2020, a report was shared with the Vascular Programme Board which outlined a potential approach to engagement and consultation on the proposals for the service. This was supported and a two-stage process of engagement followed by consultation agreed, subject to appropriate engagement with Community Health Council colleagues.

To ensure a consistent approach was adopted across the region, an engagement group was established comprising engagement, communications, workforce, clinical and planning leads from each of the affected Health Boards. Plans for local engagement activity, to be undertaken in line with the overall plan, were agreed between each Health Board and the respective CHC.

Recognising the limitations of undertaking this work during the pandemic, which prevented the use of face-to-face mechanisms for engaging with the public, the Health Boards worked closely with Community Health Councils (CHCs) to develop a blended approach to engagement. This was designed to draw on the learning and mechanisms for reaching people virtually which have evolved over the last year including advice from intermediary Third Sector organisations who have been finding ways to reach different communities.

Between Friday 19th March and Friday 16th April 2021, the four Health Boards, Aneurin Bevan University Health Board, Cwm Taf Morgannwg University Health Board, Cardiff and Vale University Health Board and Powys Teaching Health Board, ran a public engagement on a proposal for the reorganisation of localised vascular services into a 'hub and spoke' model Vascular Network for the South East Wales Region. The key outcomes from the exercise were as follows:-

- 110 people responded to the engagement via an online survey.
- There were 7 virtual public meetings, 1 Third Sector meeting and the proposals were discussed at a range of internal stakeholder meetings.
- Of those who replied via the online survey, 72% agreed with the national evidence and recommendation from the clinical option appraisal that a hub and spoke model would improve vascular services and patient outcomes in South East Wales.

A number of common themes emerged from the feedback received in response to the engagement questions and in other formats including comments made at the public and stakeholder events. These included:

- General support for the network model in principle
- General desire for services to be provided as close to home as practical
- Some queries and concerns regarding capacity and facilities at the hub to accommodate the regional service

- Accessibility and transport
- General suggestions regarding how overall care could be improved
- Queries regarding the nature of the engagement process
- Queries and concerns regarding workforce availability and skills
- Impact on other interdependent services
- Costs and value for money
- Contact and communication between staff, patients, and families

Responses to all of the queries and concerns raised were provided by the clinical and planning teams. These, together with details of plans, processes and all responses were collated into a comprehensive report which was submitted to all constituent CHCs (South Glamorgan, Aneurin Bevan, Cwm Taf and Powys) for review and approval.

CHC reviews took place in early May, and formal agreement was reached to move forward to implementation but with a request for a set period of parallel running focused engagement on the thematic issues raised in the stage 1 engagement period.

Details of the engagement process and the outcome from CHCs was subsequently presented to each Health Board meeting, with approval reached in all Boards to proceed.

16.0 Finance

The centralisation of vascular services for South East Wales is predicated on a service, workforce and financial plan that assumes no additional patient activity (inpatient procedures) is delivered, but for a marginal cost increase a better quality, more sustainable service and better patient outcomes are achieved.

The financial plan has been based upon the agreed demand and capacity requirements approved by the Programme Board, this does provide for some growth from the 2019/20 baseline.

There are both revenue and capital implications for the 3 health boards, including a stepped future revenue cost associated with the opening of the new hybrid theatre.

The following financial analysis is based on service and workforce plans confirmed to date for the 'Hub' element of the service, there remain certain elements to finalise, but they are not expected to be material in value. Not all the 'Spoke' service and workforce plans are finalised by each health board – but indicative values are identified where available, these costs will be the responsibility of the relevant health board, to ensure the system operates effectively for patient care and patient flow.

Summary Financial assessment

Vascular Centralisation Forecast Cost	AB £m	C&V £m	CTM £m	Total £m
Patient Delivery	2.5	0.5	1.9	4.9
Centralisation	0.1	0.1	0.1	0.4
Set up Non recurrent costs	0.1	0.1	0.1	0.4
Total Gross Cost	**2.7**	**0.7**	**2.1**	**5.6**
Potential Mitigation:				
Vascular Surgeons recharge	0.3		0.2	0.5
Theatres & Wards releasable costs	1.1		0.5	1.6
Total Potential Mitigation	**1.4**	**0.0**	**0.7**	**2.1**
Total Net HUB business case cost	**1.3**	**0.7**	**1.4**	**3.5**
Additional Spoke Costs	0.2	0.3	0.3	0.8
System Business Case Costs	**1.5**	**1.0**	**1.7**	**4.3**

Appendix 1 provides the detailed net cost schedule & Appendix 2 provides the 3 year plan.

The details of this summary are described below.

16.1 C&VUHB 'Hub' Revenue Implications

The 'Hub' revenue impact has been calculated on the following basis:

Current CAVUHB costs used to calculate the cost of the planned activity to transfer to the hub, whilst funding the level of dedicated beds and theatre sessions as per the agreed project demand and capacity (D&C) plan.

Costs related to theatre throughput and ward length of stay are based on the agreed D&C plans.

The assumptions include:

- An additional 540 Hub treatment cases to be delivered (total of 826) at C&VUHB (this includes a shift from ABUHB and CTMUHB and a future uplift of 88 cases to match the expected D&C plan (11 C&V, 56 CTM, 21 AB),
- An additional 88.3wte for the Hub (total 158.7wte) - see appendix 2,
- An additional 24 beds (total of 35),
- An additional 116 theatre sessions (total of 600 sessions), plus 2 Cepod theatres available if required,
- Additional Hub 1912.5 vascular surgeon sessions -1,100 shift from AB and 812.5 shift from CTM (Total for Hub 3662 vascular surgeon sessions), and
- Additional 10 interventional radiologist sessions.

Activity Plan assumptions for resource costing, summarised and presented below:

	Hub Activity	Ward Beds	Theatre Sessions
Provider	D&C Plan	D&C Plan	D&C Plan- revised 6 sessions
Aneurin Bevan	298	12 (3,723 days)	205
Cardiff	297	15 (4,654 days)	228
Cwm Taf	231	8 (2,482 days)	167
REGION	**826**	**35 (10,859 days)**	**600**
Inflow (CT and AB)	**529**	**20 (6,205 days)**	**372**
	***+ 11 C&V**		

Uplifted 2019/20 Cardiff costing returns have been used to assess the impact of transferring the activity to the Hub as a benchmark (using a weighted activity approach to the case-mix

costing). This has been adjusted to reflect the 'bottom up' service and workforce costing which has added additional costs due to 'betterment' and additional posts deemed necessary to operate to vascular standards and a larger service. These costs have been developed to include the 2021/22 pay uplift rates.

There are also additional costs identified due to the centralisation of the activity that were not previously incurred:

- New transport requirements to and from the Hub
- Network management costs (recurrent & non-recurrent)
- Future Hybrid theatre costs – net costs to be applied to the tariff

Based on the most up to date information as at the 24th August 2021, the table below presents the summary gross cost of the service shift and centralisation:

Revenue Summary of the Planned Centralisation of Vascular Surgery

	ABUHB	CVUHB	CTUHB	TOTAL REGION ACTIVITY	TOTAL REGION COST		TOTAL REGION COST-Recurrent
Baseline Activity (2019/20)	277	286	175	738			
Baseline Cost (2019/20 uplifted to 21/22)	£2,508,067	£3,099,526	£1,482,375		£7,089,969		
Cost of Activity transferring to the Hub							
Expected activity to transfer	298	11	231	826			
Bed Days	£838,090	£279,363	£558,727		£1,676,180		
Theatre Sessions	£741,407	£92,224	£586,898		£1,420,528		
Medical Staffing - Vascular surgeons	£277,205	£10,232	£214,881		£502,318		
Therapies	£113,540	£1,191	£88,013		£205,744		
Clinical Support Costs	£223,365	£8,245	£173,145		£404,755		
IR Support Costs	£57,609	-	£33,771		£91,380		
Betterment/service enhancement identified	£82,003	£81,728	£63,566		£227,297		
National Standards-additional Revenue Costs	£81,330.19	£81,057	£63,044.54		£225,432		
Additional provider costs above 'top down' approach	£25,686	£25,600	£19,911		£71,196		
Provider Cost of Hub Activity Episodes	**£2,440,235**	**£582,640**	**£1,801,956**		**£4,824,831**		£4,824,831
LTA Impact Adjustment	-£8,115	-£63,569	£71,684		£0		
Health Board Impact-Cost of Hub Activity Episodes	**£2,432,120**	**£519,071**	**£1,873,640**		**£4,824,831**		
Intensive Care- Impact of activity transfer	**£70,876**	-	**£34,216**		**£105,092**		£105,092
Recurrent Centralisation Costs							
Transport estimate	£44,000	£44,000	£44,000		£132,000		
Network Management	£73,096	£73,096	£73,096		£219,289		
Additional Hybrid theatre cost from 2024							
Additional Maintenance	£7,940	£7,940	£7,940		£23,820		
	£125,036	**£125,036**	**£125,036**		**£375,109**		£375,109
Non Recurrent Centralisation Costs							
Revenue Equipment set up costs	£69,686	£69,686	£69,686		£209,058		
Network Data Manager	£11,333	£11,333	£11,333		£34,000		
Advanced recruitment costs	£45,903	£45,903	£45,903		£137,709		
	£126,922	**£126,922**	**£126,922**		**£380,767**		£0
Additional Cost of Centralisation	**£2,754,955**	**£771,030**	**£2,159,814**		**£5,685,799**		**£5,305,032**

Appendix 3 presents the detailed C&VUHB provider investment plan.

The above cost plan has the following points to note:

- High cost consumables/stents are excluded from the above costings and will be recharged on an actual basis to the responsible commissioner health board.
- An additional 10 sessions for Interventional Radiology consultants is included, but is subject to recruitment risks.

- It is agreed that any additional net revenue costs of the Hybrid theatre will need to be included in the tariff in the future.
- Additional network costs and any advanced recruitment costs will be allocated equally across the 3 Health Boards.
- Staff employed in ABUHB and CTMUHB who provide services in the Hub at C&VUHB will be cross-charged at cost to C&VUHB, these are expected to be the vascular surgeons, plus other staff to be confirmed.

Appendix 1 presents a November 2021 to March 2024 3 year financial plan, presenting the recurrent and part year figures in more detail.

Additionality due to Centralisation

The revenue summary table provides analysis of the additional costs of the programme including:

- Betterment £227k
- Meeting National Standards £225k
- Additional C&V operational costs £71k
- Recurrent centralisation & management costs £375k
- The case proposes to deliver an additional 88 treatment cases above current baselines £706k.
- Non-recurrent set up costs £381k

Betterment analysis:

Betterment	Band	wte	£
Dietician	6	0.81	36,182
Dietician	4	1.00	29,392
Dietician	3	2.24	58,607
Physiotherapist	6	1.12	50,320
Rehabilitation Assistant	3	1.00	25,365
Occupational Therapist	6	0.61	27,431
Totals		**6.78**	**£227,297**

Meeting National Standards Analysis:

National Standards-additional Revenue Costs	Band	wte	£
Consultant-Care of the Elderly		0.2	23,999
Medical Secretary	4	0.1	2,768
Consultant-Rehabilitation		0.2	23,999
Medical Secretary	4	0.1	2,768
Pathway Lead Psychologist	8b	1.0	72,569
Podiatrist	8a	1.0	61,318
Ocupational Therapist	7	0.7	38,011
Totals		**3.3**	**£225,432**

Cost Benchmarking

As part of establishing a 'value for money' assessment the following costs per case (excluding high cost stents and ITU) have been assessed as follows:

- Average Baseline costs are £8.7k per case
- Combined future tariff average cost is £9.5k per case
- PBR cost comparators are between £8k and £10k per case

16.2 Spoke Revenue Implications

Each Health Board is responsible for assessing their requirements for the 'spoke' services they will need to establish, to support the system of care for patients requiring vascular treatment and pre and post- operative care and rehabilitation. The estimated net increased costs are presented below:

- C&VUHB

The estimated CAV spoke costs are circa **£340k** full year. This cost is for nursing, therapies and Psychologist staff in a standalone 8 bedded ward. The cost is after consideration of releasable budget from the existing location. This has not yet been approved through the C&VUHB governance process, so remains a risk.

- ABUHB

The estimated costs are circa **£200k** full year, related to additional vascular consultant cover with admin support and replacement backfill for an IR session. This has not yet been approved through the ABUHB governance process, so remains a risk. The service has confirmed the vascular position will not be required for go live.

- CTMUHB

The estimated costs are circa **£250k** full year, related to additional rehabilitation service requirements. This has not yet been approved through the CTMUHB governance process, so remains a risk.

16.3 Potential Revenue Mitigation

Whilst the revenue impact for the region is estimated at £5.7m for the Hub and £0.8m for Spokes, in order to commission the activity and resources as per the agreed D&C plan, there are offsetting factors in the spoke Health Boards to take into account. The Vascular Finance Group has analysed costing return data to ascertain the extent of releasable costs from the current service spending. The group has jointly reviewed this analysis and agreed the releasable elements which may contribute to the affordability of the case and have also

agreed the retained costs for spoke activity in the future and agreed the costs relating to fixed overheads that are not releasable in the short or medium term:

- Opportunity for direct cost release for ABUHB and CTMUHB to release the current costs associated with the service activity transferring into the Hub. Fixed costs and overheads are not considered in the financial assessment within this opportunity potential as they are not considered releasable in the short or medium term.
- Recharge of ABUHB and CTMUHB vascular consultant sessions that will be undertaken in the Hub in the future.
- Reduction of Anaesthetists sessions where activity is no longer performed at spokes.
- Releasable ward costs associated with reduced lengths of patient stays at spokes.
- Releasable theatre costs associated with reduced operations being performed at spokes.
- Draft estimates indicate approximately £1.4m for ABUHB and £0.7m for CTMUHB.

The table below presents the potential mitigation that could be achieved related to a shift in the vascular surgery services to C&VUHB:

Vascular Service	ABUHB	CTMUHB
Releasable costs due to activity transfer to Hub	**£**	**£**
Recharge of Vascular surgeon hub sessions	288,915	213,403
Releasable Aneasthetists costs	123,808	54,896
Releaseable Theatre costs (including IR)	429,334	176,250
Releasable Ward/Bed costs	596,848	301,619
Total Potential Mitigation	**1,438,905**	**746,168**

The above costs will only be releasable by health boards with positive action, the recharge of surgeons has been agreed and is presented in green, the other potential releasable resources will require health boards to consider their options and are presented in amber, but can provide resources to fund the vascular centralisation investment requirements as a direct result of the shift in these services to C&VUHB.

The assessment of current costs incurred, using costing return analysis, has been confirmed by the Vascular Finance Group and includes the releasable elements, the costs retained to maintain pathway work in Spokes and the un-releasable residual fixed costs (premises, capital charges, infrastructure, overheads) previously deployed to support local vascular services, presented below:

HB Baseline	ABUHB	CTM
	£m	£m
Releasable	1.4	0.7
Retained	0.4	0.3
Fixed Unreleasable	0.7	0.4
Total	2.5	1.4

The recurrent net C&VUHB commissioner 'additionality' investment for the HUB of £3.1m is described in the following table:

Breakdown of Vascular Recurrent Investment Plan	£k	£k
Additional Gross Cost of centralisation in C&V Hub	5,305	
Mitigation Opportunity (AB & CTM Risk)	-2,185	
Potential Net Cost impact		**3,120**
Represented by:		
Additional 88 Cases	706	
Betterment/service enhancement	284	
Additional provider costs for standards	225	
Centralisation Costs	375	
Additional Bed requirement (D&C) >LOS = 3 beds above current practice	280	
Additional theatre requirement (D&C) = 14 sessions above current practice	41	
AICU stepped investment	105	
Additional C&V service costs to provide HUB services not transferred:		
Radiography	303	
Estates & Facilities	238	
Ward and other core services	206	
Pharmacy, Pathology, Vascular and Wound specialists	357	
Additional Hub Step investment per agreed service model & D&C plans		**3,120**

16.4 Capital Requirements

In order to ensure that UHW complies with the recommendations made by the VSGBI and GIRFT a series of capital business cases are being developed, alongside a programme of work for Major Trauma services, to deliver a new hybrid theatre at UHW from December 2023. This will deliver a dedicated operating space to ensure that Vascular cases can be treated safely in a timely and to meet agreed national standards.

Accepting that Capital and Estates timelines for delivery of a new Hybrid Vascular Theatre are not aligned to an Autumn 2021 'go live' of the Vascular Network, an assessment of alternative solutions for operational readiness has been discussed at the Clinical Advisory Group and the procurement of a C-arm image intensifier in Theatres has been supported by both the Network Steering Committee and Programme Board.

Along with this agreement, other Capital equipment costs have been identified, and together these are detailed in the table below. The project assumption is that the 3 Health Boards will split the cost equally and provide for these in local discretionary Capital spend plans (noting that allocation adjustments to C&VUHB will be required).

Capital Summary of the Centralisation of Vascular Surgery - Hub

	£'000
Centralisation Capital Equipment Costs	
C-Arm - Ziehm Vision RFD 3131 CMOS 25 kW	162
Rotem machine for IR	21
Reciprocating Saw (RECON)	15
Capital Cost of Centralisation	**198**

Health Board Share	
Health Board	**£'000**
Cardiff and Vale UHB	66
Cwm Taff Morganwg UHB	66
Aneurin Bevan UHB	66
	198

16.5 Hybrid Theatre costs

Expenditure	**£,000**
Vascular Hybrid & MTC Theatre - full capital cost	33,500

It is estimated that 50% of the capital cost will be assigned to the vascular hybrid theatre.

The Overarching Business Case identified additional annual revenue costs for both Theatres of £1.034m, which are summarised in the table below: -

Expenditure	**£'000**
Equipment Maintenance Facilities Costs	800 234
Total	**1,034**

The equipment maintenance costs are at this stage an estimate and predominantly relate to the Radiological equipment that will be integrated into these Theatres.

In terms of usage one Theatre will support Major Trauma, whilst the other Theatre will support Vascular and as such an equal share of the revenue costs is considered appropriate as set out below: -

Service	**£'000**
Major Trauma Vascular Network	517 517
Total	**1,034**

For planning purposes, the 50% share of associated Vascular Network revenue costs for this OBC are shared across the Network based upon the Vascular Network Demand and Capacity plan Theatre session requirement. The estimated impact by Health Board is summarised in the table below: -

Health Board	Theatre Sessions	OBC Revenue £'000
Cardiff and Vale Aneurin Bevan Cwm Taf Morgannwg	6.0 5.4 4.4	196 177 144
Total	**15.8**	**517**

Timescales for submission of the case are:

- March 2021 –Overarching Business Case – submitted awaiting approval at Welsh Government Infrastructure Board Sept 21
- December 2021–Full Business Case
- December 2023 - Construction completion
- April 2024 - Commissioning and handover

16.6 Commissioning - Funds Flow Arrangements

The proposed 'commissioning' mechanism will be a contract based on a specific set of vascular tariff rates for the vascular activity delivered. C&VUHB as the Hub provider will charge other health boards for the activity delivered and ABUHB and CTMUHB will in turn recharge for the costs of the staff and services that ABUHB and CTMUHB deliver at the HUB (ie. surgeon sessions etc..). This is a tried and tested method.

The tariff will be based on the costs identified in this case divided by the activity expected to be delivered as per the project D&C plan. There will be a mechanism established to adjust for over or under delivery which fairly compensates for costs incurred or avoided to ensure the service is sustainable.

The table below presents the new Vascular Hub tariff and the marginal rates proposed for variation to planned activity.

Elective/Emergency	Procedure Category	Category Code	Derived Casemix Tariff	Marginal Price
Elective	Carotid	B	£4,951	£2,229
Elective	Evar AAA	C	£4,906	£1,820
Elective	Illiac and Femoral Artery	A	£6,644	£2,557
Elective	Open AAA	D	£9,759	£3,927
Elective	Amputations	X	£7,824	£2,146
Elective	Amputations	DF	£3,739	£1,215
Elective	Other Artery	F	£1,597	£373
Elective	Subclavian Artery	G	£1,481	£294
Emergency	Carotid	B	£3,558	£1,137
Emergency	Evar AAA	C	£5,066	£1,520
Emergency	Illiac and Femoral Artery	A	£11,425	£2,850
Emergency	Open AAA	D	£8,492	£3,836
Emergency	Amputations	X	£13,867	£3,681
Emergency	Amputations	DF	£8,038	£2,140
Emergency	Other Artery	F	£3,483	£1,050
Emergency	Subclavian Artery	G	£3,106	£1,318
Casemix tariff is indicative value based on the costing return weighting of the derived average tariff				
Marginal Price has been supplied by the provider based on costing return intelligence				

Historically commissioned Long Term Agreement (LTA) finance and activity levels have been adjusted to ensure a cost neutral revised baseline is achieved, while enabling a consistently priced Vascular tariff to be applied for all vascular activity delivered by the hub to all commissioners. Appendix 4 presents the cost neutral commissioner rebased analysis.

Centralisation, Network team costs and any advanced recruitment will be funded equally as a fixed cost by each health board (1/3rds).

Intensive Care bed days are not included in the costing of the procedure episode and these will be recharged by the provider at the marginal cost of delivery through the existing contract mechanisms.

High-cost consumables such as stents are also not included in the episode cost and will be recharged by the Hub provider to commissioner health boards. The revenue impact of this should be neutral as there will be an offset cost in the current provider (now spoke).

16.7 First 12 months of implementation

Given the uncertainty with the service assumptions, the proposed approach is to financially operate the first 12 months of implementation at actual cost. This will ensure all Health Boards costs are reflective of the actual centralisation project costs and cost shares are applied based on a responsible commissioner basis for equity.

As part of the project's 3, 6 and 12 month comprehensive reviews, the comparison of actual service delivery and performance and how that is impacting financial costs will be considered against the tariff mechanism proposed.

This intelligence will then be used to confirm the future tariff going live from the following financial year, expected to be 2023/24 on the basis of October 2021 implementation.

16.8 Information Recording/Reporting

It will be imperative that patient activity data capture systems are established to support corporate and clinical governance and performance and financial reporting, including data feeds into the proposed patient outcome capture system and vascular registry.

Finance Appendix 1

Revenue Summary of the Planned Centralisation of Vascular Surgery

		ABUHB	CVUHB	CTUHB	TOTAL REGION ACTIVITY	TOTAL REGION COST
Baseline Activity (2019/20)		277	286	175	738	
Baseline Cost (2019/20 uplifted to 21/22)		£2,508,067	£3,099,526	£1,482,375		£7,089,969
Cost of Activity transferring to the Hub						
Expected activity to transfer		298	11	231	826	
Bed Days		£838,090	£279,363	£558,727		£1,676,180
Theatre Sessions		£741,407	£92,224	£586,898		£1,420,528
Medical Staffing - Vascular surgeons	to be recharged by employer	£277,205	£10,232	£214,881		£502,318
Therapies		£113,540	£4,191	£88,013		£205,744
Clinical Support Costs		£223,365	£8,245	£173,145		£404,755
IR Support Costs		£57,609	-	£33,771		£91,380
Betterment/service enhancement identified		£82,003	£81,728	£63,566		£227,297
National Standards-additional Revenue Costs	£0	£81,330	£81,057	£63,045		£225,432
Additional provider costs above 'top down' approach	apportion over 826 cases	£25,686	£25,600	£19,911		£71,196
Provider Cost of Hub Activity Episodes		**£2,440,235**	**£582,640**	**£1,801,956**		**£4,824,831**
LTA Impact Adjustment		-£8,115	-£63,569	£71,684		£0
Health Board Impact-Cost of Hub Activity Episodes		**£2,432,120**	**£519,071**	**£1,873,640**		**£4,824,831**
Intensive Care- Impact of activity transfer		**£70,876**	**-**	**£34,216**		**£105,092**
Recurrent Centralisation Costs						
Transport estimate		£44,000	£44,000	£44,000		£132,000
Network Management		£73,096	£73,096	£73,096		£219,289
Additional Hybrid theatre cost from 2024						
Additional Maintenance		£7,940	£7,940	£7,940		£23,820
		£125,036	£125,036	£125,036		£375,109
Non Recurrent Centralisation Costs						
Revenue Equipment set up costs		£69,686	£69,686	£69,686		£209,058
Network Data Manager		£11,333	£11,333	£11,333		£34,000
Advanced recruitment costs		£45,903	£45,903	£45,903		£137,709
		£126,922	£126,922	£126,922		£380,767
Additional Cost of Centralisation		**£2,754,955**	**£771,030**	**£2,159,814**		**£5,685,799**
Agreed recharge of consultant surgeon hub sessions		-£288,915		-£213,403		-£502,318
Net Additional Cost of Centralisation		**£2,466,040**	**£771,030**	**£1,946,411**		**£5,183,481**
Further Mitigation Opportunities						
Release of costs for beds currently used for Hub activity		-£596,848		-£301,619		
Release/recharge of anaesthetist (est)		-£123,808		-£54,896		
Release of costs for theatre sessions currently used for Hub activity		-£429,334		-£176,250		
Mitigtaion Opportunity		-£1,149,990		-£532,765		**-£1,682,754**
Net Potential Additional Cost		**£1,316,050**	**£771,030**	**£1,413,646**		**£3,500,726**

Finance Appendix 2

Revenue Summary of the Planned Centralisation of Vascular Surgery

	PYE				Year 1				Year 2			
	Nov 21- Mar 22				Apr 22-Mar 23				Apr 23-Mar 24			
	ABUHB	CVUHB	CTUHB	TOTAL	ABUHB	CVUHB	CTUHB	TOTAL	ABUHB	CVUHB	CTUHB	TOTAL
Baseline Activity (2019/20)												
Baseline Cost (2019/20 uplifted to 21/22)												
Cost of Activity transferring to the Hub												
Expected activity to transfer												
Bed Days	£340,204	£116,401	£232,803	£698,408	£838,090	£279,363	£558,727	£1,676,180	£838,090	£279,363	£558,727	£1,676,180
Theatre Sessions	£308,919	£38,427	£244,541	£591,887	£741,407	£92,224	£586,898	£1,420,528	£741,407	£92,224	£586,898	£1,420,528
Medical Staffing - Vascular surgeons	£115,502	£4,264	£89,534	£209,299	£277,205	£10,232	£214,881	£502,318	£277,205	£10,232	£214,881	£502,318
Therapies	£47,309	£1,746	£36,672	£85,727	£113,540	£4,191	£88,013	£205,744	£113,540	£4,191	£88,013	£205,744
Clinical Support Costs	£93,069	£3,435	£72,144	£168,648	£223,365	£8,245	£173,145	£404,755	£223,365	£8,245	£173,145	£404,755
IR Support Costs	£24,004	£0	£14,071	£38,075	£57,609	£0	£33,771	£91,380	£57,609	£0	£33,771	£91,380
Betterment/service enhancement identified	£34,168	£34,053	£26,486	£94,707	£82,003	£81,728	£63,566	£227,297	£82,003	£81,728	£63,566	£227,297
National Standards-additional Revenue Costs	£33,888	£33,774	£26,269	£93,930	£81,330	£81,057	£63,045	£225,432	£81,330	£81,057	£63,045	£225,432
Additional provider costs above 'top down' approach	£10,702	£10,666	£8,296	£29,665	£25,686	£25,600	£19,911	£71,196	£25,686	£25,600	£19,911	£71,196
Provider Cost of Hub Activity Episodes	**£1,016,765**	**£242,767**	**£750,815**	**£2,010,346**	**£2,440,235**	**£582,640**	**£1,801,956**	**£4,824,831**	**£2,440,235**	**£582,640**	**£1,801,956**	**£4,824,831**
LTA Impact Adjustment	-£3,381	-£26,487	£29,868	£0	-£8,115	-£63,569	£71,684	£0	-£8,115	-£63,569	£71,684	£0
Health Board Impact- Cost of Hub Activity Episodes												
Intensive Care- Impact of activity transfer	**£29,531.67**	**£0**	**£14,257**	**£43,788**	£70,876	£0	£34,216	**£105,092**	£70,876	£0	£34,216	**£105,092**
Recurrent Centralisation Costs												
Transport estimate	£18,333	£18,333	£18,333	£55,000	£44,000	£44,000	£44,000	£132,000	£44,000	£44,000	£44,000	£132,000
Network Management	£30,457	£30,457	£30,457	£91,371	£73,096	£73,096	£73,096	£219,289	£73,096	£73,096	£73,096	£219,289
Additional Hybrid theatre cost from 2024	-	-	-	-	£0	£0	£0	-	£0	£0	£0	-
Additional Maintenance	£3,308	£3,308	£3,308	£9,925	£7,940	£7,940	£7,940	£23,820	£7,940	£7,940	£7,940	£23,820
	£52,099	**£52,099**	**£52,099**	**£156,296**	**£125,036**	**£125,036**	**£125,036**	**£375,109**	**£125,036**	**£125,036**	**£125,036**	**£375,109**
Non Recurrent Centralisation Costs												
Revenue Equipment set up costs	£69,686	£69,686	£69,686	£209,058				£0				£0
Network Data Manager	£4,722	£4,722	£4,722	£14,167	£6,611.11	£6,611.11	£6,611.11	£19,833				£0
Advanced recruitment costs	£46,903	£46,903	£45,903	£137,709				£0				£0
	£120,311	**£120,311**	**£120,311**	**£360,933**	**£6,611**	**£6,611**	**£6,611**	**£19,833**	**£0**	**£0**	**£0**	**£0**
Additional Cost of Centralisation	**£1,215,325**	**£388,689**	**£967,349**	**£2,571,363**	**£2,634,644**	**£650,718**	**£2,039,503**	**£5,324,865**	**£2,628,033**	**£644,107**	**£2,032,892**	**£5,305,032**

Finance Appendix 3

Cardiff And Vale UHB additional revenue costs to deliver Activity Transfer					
Based on 6AD theatre sessions					
Based on 24 additional beds (CAV 4, CTM 8, AB 12)					
Revised post CAV BCAG 19th August					
2021/22 Payscales AVPOS					
HUB - Revenue Cost - Staff	**Band**	**Current WTE (CAV Hub only)**	**Total requirement WTE (to support Network HUB)**	**Additional Requirement for Hub - WTE**	**CAV Hub Additional Activity Cost Full Year**
Medical					
Consultant	Consultant	3.5	7.33	3.83	502,319
Medical Secretary	4	1.5	2.00	0.50	14,696
Consultant Anaesthetists	Consultant	1.23	2.70	1.47	180,481
Medical Total		**6.23**	**12.03**	**5.80**	**697,495**
Ward - Additional 24 beds		11 beds	35 beds	24 beds	
Ward Sister	7	1	1.00	-	-
Registered Nurse band 5	5	7.8	29.30	21.50	837,467
Ward duputy	6	2	4.00	2.00	88,331
HCSW	2	4.94	19.90	14.96	457,185
Patient environment co-ordinator Band 3 (was Band 2)	3	0.8	1.00	0.20	7,268
Ward Total		**16.54**	**55.2**	**38.66**	**1,390,251**
Vascular Nurse Specialist					
Specialist Nurse - Vascular Nurse Practitioner band/Surgical Care Practitioner 7	7	1.8	3.80	2.00	108,602
Vascular Nurse Specialist Total		**1.8**	**3.80**	**2.00**	**108,602**
Wound Healing					
Wound Healing Nurse	7	1	1.00	-	-
Wound Healing Nurse	6	1.56	2.56	1.00	44,816
Wound Healing Total		**2.56**	**3.56**	**1.00**	**44,816**
Pharmacy					
Pharmacist Band 7	7	0.5	1.00	0.50	27,150
Pharmacy Tech band 5	5	0.5	1.00	0.50	18,057
Pharmacy ATO Band 2	2	0	0.50	0.50	11,940
Pharmacy Total		**1**	**2.50**	**1.50**	**57,147**
Theatres					
Theatre Assistants	2	1.3	2.78	1.48	32,932
Theatre Porters	2	0.75	1.25	0.50	12,141
Band 6 pain specialist nurse (Pain)	6	0.84	1.84	1.00	48,776
Band 7 Resus Practitioner	7	0	0.10	0.10	5,582
HSDU band 2	2	1	2.00	1.00	24,280
Clinical Leader Theatres	7	0	1.00	1.00	57,506
Band 6 (1 Anaesthetics, 1 Scrub)	6	2.45	4.45	2.00	97,550
Theatre Practitioners Band 5	5	1.44	2.44	1.00	51,406
Theatres Total		**7.78**	**15.86**	**8.08**	**330,173**
Laboratory					
Biomedical Scientist Band 5	5	4	5.00	1.00	36,113
Specimen Reception MLA band 2	2	0	1.00	1.00	23,881
Laboratory Total		**4**	**6.00**	**2.00**	**59,994**

Radiology					
Radiographers band 6	6	4	6.40	2.40	129,070
Radiographers Band 5 (mon to fri 7.5 hours with standby ocfh	5	0	1.50	1.50	54,170
Radiology Porters band 2	2	0	2.40	2.40	57,314
Consultant IR	Consultant	4	5.00	1.00	124,066
Radiology Admin - medical secretary	4		0.50	0.50	29,392
Band 8a lead nurse radiology - this is an uplift from a band 7 to an 8A	8a	1	1.00	-	7,425
Band 6 radiology nurse	6	11.4	15.40	4.00	179,264
Band 5 radiology nurse	5	5	5.00	-	-
Band 3 radiology HCSW	3	3	4.00	1.00	26,164
Radiology Total		**28.4**	**41.20**	**12.80**	**606,866**
Medical Physics					
Medical Physics Clinical Scientists 8a	8a	1	2.00	1.00	61,318
Medical Physics Total		**1**	**2.00**	**1.00**	**61,318**
Therapies - Dietetics					
Dietitian Band 6	6	0.17	1.30	1.13	50,477
Dietitian support worker pre-op assessment and optimisation Band 4	4	0	1.00	1.00	29,392
Dietetic Support Worker Band 3 (ward based)	3	0	2.24	2.24	58,607
Therapies - Dietetics Total		**0.17**	**4.54**	**4.37**	**138,476**
Therapies - Physiotherapy					
Physiotherapist Band 6	6	0.41	2.30	1.89	84,915
Rehabilitation Assistant Band 3	3	0	1.00	1.00	25,365
Therapies - Physiotherapy Total		**0.41**	**3.30**	**2.89**	**110,280**
Therapies - Podiatry					
Podiatrist 8a	8a	0	1.00	1.00	61,318
Therapies - Podiatry Total		**0**	**1.00**	**1.00**	**61,318**
Therapies - Occupational Therapy					
Occupational Therapist Band 7	7	0	0.70	0.70	38,011
Occupational Therapist Band 6	6	0.41	1.80	1.39	62,507
Occupational Therapist Band 5	5	0	-	-	-
Therapies - Occupational Therapy Total		**0.41**	**2.5**	**2.09**	**100,517.30**
Rehabilitation Consultants					
Consultant	Cons	0.1	0.30	0.20	23,999
Medical secretary	4	0	0.10	0.10	2,768
Rehabilitation Consultants Total		**0.1**	**0.4**	**0.3**	**26,767**
COTE Consultants					
Consultant	Cons	0	0.20	0.20	23,999
Medical secretary	4	0	0.10	0.10	2,768
COTE Consultants Total		**0**	**0.3**	**0.3**	**26,767**
Psychologist					
Pathway Lead Psychologist	8b	0	1.00	1.00	72,569
Psychologist Total		**0**	**1.00**	**1.00**	**72,569**
Total Staff Cost		**70.39**	**155.19**	**84.80**	**3,893,357**
Critical care cost					**105,092**

Non Staff Costs					
Ward					267,226
Theatre					395,692
Laboratory					25,000
Therapies					5,000
Rehab					600
Estates and Facilities					237,956
Wound Healing dressings					TBC
Blood Producsts					TBC
Total Non Staff cost					**931,474**
Centralisation Cost - Network Management team					
Clinical Lead session	Consultant	0	0.20	0.20	23,999
Clinical Lead session - IR	Consultant	0	0.10	0.10	12,000
Vascular Surgical Trainees (Registrar or STR) OOH Cover only					70,000
Netowrk Clinical Lead Nurse	7	0	0.20	0.20	10,860
Network Manager	8a	0	1.00	1.00	61,318
Network Coordinator	5	0	1.00	1.00	36,113
Network Data Manager	5	0	1.00	1.00	34,000
Total Network Management team		**0**	**3.50**	**3.50**	**248,289**
Centralisation Costs - Recurrent					
Ongoing maintenance costs associated with Capital requirements					23,820
Transport estimate					132,000
Network Team - Non Pay					5,000
Informatics					-
Total Centralisation costs - Recurrent					**160,820**
Centralisation Costs - Non Recurrent					
Theatre equipment (Revenue)					206,136
Ward Equipment - TOE machine					2,922
Total Centralisation costs - Non Recurrent					**209,058**
Total Hub Cost for Additional Activity		**70.39**	**158.69**	**88.30**	**5,548,090**
Advance Recruitment					137,709
Total Cost for HuB					**5,685,799**

Finance Appendix 4

Health Board Impact of Centralisation

	AB	C&V	CTM	Powys	Swansea Bay	TOTAL
Commissioner Cost	£2,472,216	£535,109	£1,769,389	£32,077	£16,039	£4,824,831
LTA Adjustment for transferred activity	-£40,096	-£16,039	£104,250	-£32,077	-£16,039	-
Health Board Impact	**£2,432,120**	**£519,071**	**£1,873,640**	**£0**	**£0**	**£4,824,831**
AICU	£70,876	£0	£34,216	-	-	£105,092
Recurrent Centralisation Costs	£125,036	£125,036	£125,036	-	-	£375,109
Non Recurrent Centralisation Costs	£126,922	£126,922	£126,922	-	-	£380,767
Health Board Impact	**£2,754,955**	**£771,030**	**£2,159,814**	**£0**	**£0**	**£5,685,799**
note - before mitigation						
Provider Impact	**£2,440,235**	**£582,640**	**£1,801,956**	-	-	**£4,824,831**
AICU	£70,876	£0	£34,216	-	-	£105,092
Recurrent Centralisation Costs	£125,036	£125,036	£125,036	-	-	£375,109
Non Recurrent Centralisation Costs	£126,922	£126,922	£126,922	-	-	£380,767
Provider Impact	**£2,763,070**	**£834,599**	**£2,088,130**	-	-	**£5,685,799**
Difference between HB and Provider Impact	-£8,115	-£63,569	£71,684			£0

17.0 Impact on other services and Interdependencies

Given the range of services already in situ on the University Hospital Wales site, its position as a specialist and tertiary provider, and the co-dependencies between them and the vascular service, particularly major trauma, interventional cardiology and cardio-thoracic surgery, its ideally placed to the be Major Arterial Centre. All spokes sites have consultant led A&E and a general surgery emergency service and will need to maintain a service that fully recognises the interdependencies with key clinical services.

17.1 Interventional Radiology

Interventional radiology plays a central role in the delivery of safe and effective patient focussed care that aligns with the strategic objectives of Health Boards and the wider NHS. Many surgical procedures have been replaced or enhanced by the provision of IR services. The number and complexity of procedures continues to increase as the majority of hospital specialties, both medical and surgical, are dependent on the provision of IR to run their services.

The precarious position of this service within South Wales is illustrated by the current position with only CAVUHB and ABUHB able to offer a service. The collapse of IR in Cwm Taf Morgannwg in the past 12 months has led to wholesale transfer of the provision of its IR services to UHW. Swansea Bay, the largest UHB west of Cardiff, is only able to offer a limited service necessitating transfers of patients from west Wales to UHW for IR treatments. Local arrangements for the delivery of this service differ in each Health Board. With the expectation of CTMUHB there will be day case procedures taking place in spoke sites due to interventional radiology consultant presence, however there will be no inpatient vascular interventional radiology undertaken on the spoke sites.

The number of WTE consultant radiologists, even in South East Wales, is not commensurate with the workload and lags behind England in terms of numbers per head of population. This position is compounded by the age profile of current incumbents which will mean further unfilled posts due to retirements in the near future. Recruitment is challenging as there are insufficient numbers of trained IRs. This is compounded in Wales by the acknowledged difficulties in attracting medical staff into the region. Indeed, recent advertisements from CAV and AB for consultant IRs have either only attracted single local candidates or none at all. Future recruitment of IRs will be key to the continued provision of services in South Wales. In this competitive environment posts that are not attractive will fail to appoint. Candidates will want to be part of larger units that are able to offer support, varied case mix and workable rotas compatible with a healthy work/life balance. Vascular centralisation in South East Wales helps to provide this environment

17.2 Stroke Services

Patients who receive vascular services may have had a stroke and are at risk of having further strokes. Stroke pathways are in place for each Health Board and these will recognise the interdependency with Vascular services. Clinicians will foster good working relationships and step down pathways recognise the need for input from Stroke physicians and stroke rehabilitation.

17.3 Diabetic Services

Vascular disease is the major cause of morbidity in diabetes and the risks of disease progression are higher, with an epidemic of diabetic foot disease expected in the next decade. Diabetics pathways are in place for each Health Board and clinical parameters that identify the requirement for intervention by Diabetic physicians. A pre-operative optimisation pathways are in place those with diabetes undergoing elective surgery with Hba1c > 69 mmol/mol, and this will be utilised to reduce the length of stay for patients with diabetes.

17.4 Podiatry

This is a key service supporting the foot wound and rehabilitation pathway. All Health Boards have undertaken a joint pathway review to ensure seamless care between podiatry and vascular services. This includes the need for ongoing treatment through community podiatry services.

17.5 Care of the Elderly

The typical age of Vascular patients means that symptoms can often present in the elderly and patients will require input from Vascular consultants.

17.6 Rehabilitation medicine

Seamless repatriation of patients following rehabilitation care pathways particularly for post amputation care will be vital to the success of the network.

17.7 Limb Fitting Service

The vascular service must ensure its patients have access to a local limb fitting service, which meets the standards set by The British Society of Rehabilitation Medicine. This service is commissioned through Welsh Health Specialised Services and provided for the South East Wales Region from UHW.

18.0 Outcome and performance measures

The following section describes outcomes and measures as agreed in the Network service specification. The tables within this section outline the various measures and the targets (where identified) as well as the baseline in all 3 units (again where collected).

18.1 Key Quality measures

A number of key quality measures were agreed as a part of the South East Wales Network specification. These are aligned with NHS England Vascular service specification and by mirroring these it will allow the South East Wales Vascular Network to assess its performance against other networks across the UK and highlight areas for improvement.

The measures include known complications such as stroke following carotid intervention as well as standards set by the National Aortic Aneurysm Screening Programme. In the majority of cases the measures are captured in the National Vascular Registry, which is a clinical audit that vascular specialists use to monitor their practice.

The NVR measures currently collects information on five vascular surgical procedures:

- Repair of abdominal aortic aneurysm (AAA)
- Carotid endarterectomy
- Lower limb angioplasty
- Lower limb bypass
- Lower limb amputation

The NVR publishes a report annually which provides a comparative analysis on the 5 key procedures. A full report for SE Wales units for 2019 can be found in *Appendix B.* The NVR have agreed to support the development of the SEW Vascular Network with a pre and post go live report.

The below table sets out the current measures, targets that are set nationally in NHS England and are a part of the agreed measures for the SEW Vascular Network. Where available, the 2019 baseline performance for the three vascular units is provided. It is anticipated that nationally these agreed measures is likely to change in the next 12 months and the data capture likely to evolve. The SEW Vascular Network will work closely with the Vascular Society and the NVR to ensure alignment line with UK peers and the QIF. Performance against the national measures will form part of the annual review of the service.

Abdominal Aortic Aneurysm

Metric	Agency	Definition	Target	Acceptable	2019 NVR data		
					ABUHB	CAVUHB	CTMUHB
Mortality	NVR	Unit overall elective AA in hospital mortality	≤3.5%	<6%	1.6	5.6 (includes complex cases)	1.8
Length of stay	NVR	LOS for elective AA repair	<7d	<10d	9	9 (includes complex cases)	9
Number of AA repairs per arterial centre	NVR	Number of AAA repairs (total – elective and emergency	>60	>50	44	40 (21 Standard + 19 Complex)	15
Time to treatment	WAAASP	% of subjects with AAA ≥ 5.5cm deemed fit for intervention operated on by vascular specialist within eight weeks (56 days)	≥80%	≥60%	67 days	68 days	111 days

Carotid Intervention

Metric	Agency	Definition	Target	Acceptable	2019 NVR data		
					ABUHB	CAVUHB	CTMUHB
Stroke rate	NVR*	Stroke rate 30 days after surgery	<2%	<3%	3.4%	0	1.4%
Mortality	NVR	Death rate 30 days after surgery	<1%	<2%	Not recorded on NVR		
Referral	National Stroke Strategy	Delay from symptom to treatment for suitable patients (by 2013)	<7 days	<14 days	12 days	8 days	8 days

Peripheral Arterial Disease – Lower Limb Bypass (PAD)

Metric	Agency	Definition	Target	Acceptable	2019 NVR data		
					ABUHB	CAVUHB	CTMUHB
Mortality	NVR	Death 30 days after surgery	<5%	<10%	2.2%	3.2%	1%
Amputation free survival	NVR	Amputation free survival 1 year post surgery	<5%	<10%	Not currently recorded on NVR, captured locally at present. Confirmed as 0% for all Units		

Lower Limb Amputation

Metric	Agency	Definition	Target	Acceptable	2019 NVR data		
					ABUHB	CAVUHB	CTMUHB
Mortality	NVR	In hospital mortality	5%	≤15%	5.4%	3.8%	4.0%
Procedure	VSGBI QIF*	Patients should undergo surgery on daytime lists (between 0800 and 2000)	90%	75%	Not currently reported by NVR. Report to be provided prior to go live.		
Procedure	VSGBI QIF	Ration of below to above knee amputation in unit	>1	1			
Outcome	VSGBI	QIF Rate of amputation revision to higher level	<10%	<12%			

N.B. To be confirmed by CAG as additional measures sept 21

Amputation: Time from decision to operate to surgery, divided up for those managed as IP (target 48hrs) and OP (no explicit target)
Chronic Limb Threatening Ischemia: Time from referral to treatment, divided up for those managed as IP (target 5/7) and OP (target 2/52)
Readmission rates

18.2 Network measures

In addition to the national measures there are a number of agreed measures for the network to monitor, these include measure that have been developed by the programme groups for rehabilitation, the clinical advisory group and the network operational group. All of the below measures have been agreed for review after 3 & 6 months of go live. A review frequency is then suggested below.

Metric	Agency	Target if applicable	Review frequency
NVR data completeness	NVR	100%	Annually
Time to transfer to Hub	Network repatriation database	48hrs (unless urgent <24hrs) or emergency - (acute limb ischaemia, severe diabetic foot sepsis or ruptured AAA - immediate)	Monthly
Time to transfer to spoke	Network repatriation database	<48 hours	Monthly
Discharge location – distance from usual place of residence	Network repatriation database	None	Monthly
Length of stay Hub	CAV local database	No published target	Monthly
Length of stay Spokes	CAV/AB/CTM local database	No published target	Monthly
Hub theatre measures to include: No of DOSA cases CEPOD usage Urgent list usage Scheduled list usage Time to theatre all lists Late starts Early finishes Cancellations * % of cases with a vascular team	CAV Local database	Current to be used as baseline	Monthly
Time from referral to imaging	CAV local database	Current to be used as baseline	Monthly
Rehabilitation passport completed upon discharge	CAV local database	100%	Quarterly
All patients to be included in the weekly hub MDT review for rehabilitation	CAV local database	100%	Quarterly

*inc cancellations due to existing comorbidities which may highlight pre assessment issues

18.3 Patient reported outcome measures

Currently Patient Reported Outcome Measures (PROMS) and Patient Reported Experience Measures (PREMS) are not collected for patients undergoing vascular surgery in the region.

There are no national PROMS/PREMS for Vascular outside of varicose veins. Therefore, it is the intention of the Network to develop this and roll out a validated PROMS and PREMS measurement within the first 6 months of the network to provide a baseline. This will allow the service to measure value in relation to outcomes and experience. It is suggested that a target completion rate is benchmarked with similar networks.

19.0 Benefits

Throughout the life of the programme a number of benefits have been captured for both patients and staff and have been categorised and presented in the table below. Key benefits are as follows:

- Continued improved patient outcomes through the delivery of a high volume Major Arterial Centre that meet the minimum population recommendations. None of the 3 provider units currently meet the minimum requirement. Individual surgeon volumes are more likely to be maintained
- The release of capacity within current provider Health Boards
- sustainable specialist workforce; consultant surgeons, IR consultants, specialist nurses and the wider multi disciplinary team.
- Improved research and innovation opportunities
- Improved training and educational opportunities
- Improved attraction and retention of staff
- Clear lines of accountability and clinical governance across the network that puts clinicians and patients at the heart of performance monitoring and service development

Objective	Group	Benefits	Measures
Sustainability	Patients	• Improved services to meet current and future patients' needs • Maintains higher standards of care and therefore outcomes	• Mortality, Stroke Rate, Time to treatment (NVR) • LOS (hub and spoke)
	Staff	• Ability to recruit to more attractive and sustainable rotas in specialised services – *essential for sustainable consultant and middle grade rotas in vascular surgery and interventional radiology.* • Standardisation of operational policies and protocols • Improving training • Recruitment & Retention • Staff morale • Education and learning opportunities	• Vacancy rates • Turnover • Education take up • Staff satisfaction survey
Improving Quality and Safety of Services	Patients	• Enhancing prevention & rehabilitation • Improving mortality and morbidity • Reduced clinical incidents • Improving functional outcomes • Higher patient satisfaction • Improved data collection to continuously improve service delivery	• Activity • Mortality (NVR) • Discharge to home • PROMS/PREMS • Data completeness and quality (NVR)
	Staff	• Maintain continuity of services	• As above for sustainability

		• Improvements in health and safety (reduced incidents) • Improved staff satisfaction • Improved staff recruitment and retention	
Optimising Access	Patients	• Providing appropriate services as close to patients' homes as possible (assessment and rehabilitation in spokes) • Network coordination to improve flow • Equity of service provision	• Time to transfer to spoke • LOS in hub & spokes • Access times for AAA and other planned activity (NVR)
	Staff	• Development of integrated teams to optimise clinical capacity	As above
Effective use of Resources	Patients	• Focussing the utilisation of high cost equipment and facilities in single, specialised surgical hub • Improved care and faster recovery allowing faster return to economic productivity • Reduced length of stay	• Clear understanding of total costings to deliver vascular in region pre and post centralization • LOS • NVR & PROMS Outcomes • Efficiencies (Theatre utilisation and LOS)
	Staff	• Coordinated network and dedicated hub reduces delays and cancellations & maximises use of specialised staff	

20.0 Management Case

The management case sets out the “achievability” of the programme. Its purpose, therefore, is to build on the preceding chapters by setting out in more detail the actions required to ensure the successful delivery of the network against the agreed investment objectives and timeline. To achieve this, it sets out the programme management arrangements and implementation plan.

This chapter also sets out the current programme management arrangements, handover arrangements to the Operational Network and post programme assurance and evaluation.

Finally, it describes the arrangements for benefits realisations and risk management over the programme timeline in detail.

20.1 Programme Management arrangements

Cardiff and Vale has hosted the programme working in close collaboration with all Health Board partners, this includes which includes programme planning, public engagement and preparation for delivery. It is anticipated that at the point at which the network becomes operational, a collaboration between Health Boards will continue.

In order to successfully deliver this service change, it has taken the following approach in the organisation and management of the programme:

- The programme has adopted the general principles of PRINCE-2 methodology in managing the activities and outputs of the programme and will meet the requirements of the WHC (2006): 001; Capital Investment Manual; NHS and Treasury Guidance; and any subsequent guidance, which may be issued during the programme’s lifespan.
- The programme has sought to benefit from experience and best practice from other NHS programmes.
- Specialist professional advisers were employed for those activities where the necessary skills and experience are not otherwise available within the programme.

The above approach will continue to be utilised as the programme progresses. In managing the programme, the aims are to:

- Deliver the programme on time and to budget.
- Ensure effective and proactive lines of accountability and responsibility for the programme deliverables.
- Establish stakeholder involvement at all stages.

20.2 Programme Structure and Reporting

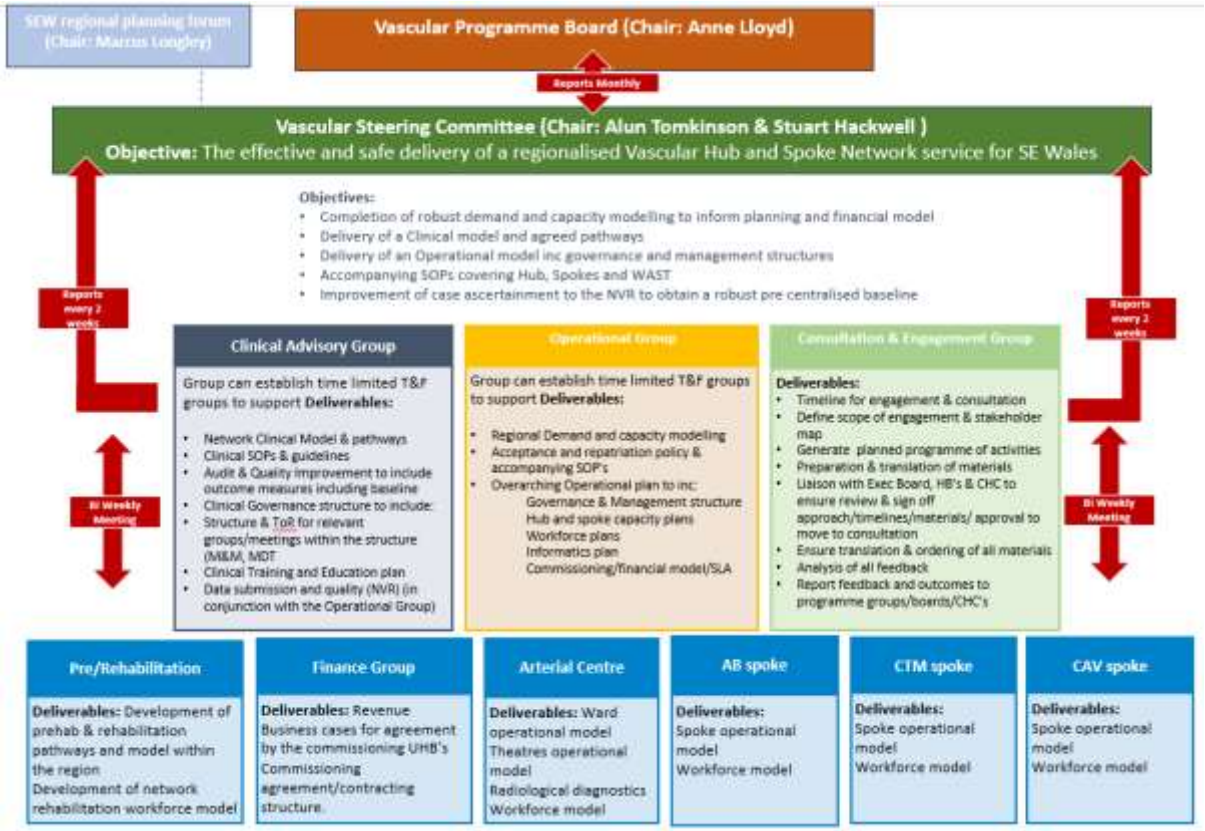
20.2.1 Vascular Executive Programme Board

The Executive Programme Board was established in 2019 and meets at least bi monthly with additional meetings when required. The chair of the programme board is Ann Lloyd, Chair, Aneurin Bevan University Health Board. The Programme Board is made up of Executive and senior clinical and managerial representation from all provider Health Boards.

Terms of reference for all programme groups, committee and board and full list of membership for the network board are in Appendix F.

In summary, the network board is responsible for the following agree the overall project approach, expected outcomes, operational and clinical models and finance model. It will also oversee and receive reports from readiness assessments for the network inclusive of hub, spokes and network structures and processes ahead of implementation.

The figure below illustrates the governance arrangements of the programme:



20.2.2 Steering Committee

The Steering Committee oversees the delivery of the programme including approval of the overall programme approach, clinical & operational models and finance model as well as provide oversight of the Network Clinical Advisory and Operational groups as well as the programme risk register and controls.

More specifically they:

- Oversee the programme arrangements and ensure they are fit for purpose
- Oversee the timely delivery of the programme of work and associated deliverables within the required timeframe and to the required quality
- Ensure that risks are identified and managed escalating to the SW Joint Planning forum and Executive Board as appropriate
- Ensure the delivery of an effective engagement and consultation with the public and staff
- Ensure effective communication is maintained (both within and outside of the LHBs).
- Receive regular reports on progress from Engagement, Operational and Clinical Groups and any of the working groups as appropriate.
- Effectively link with WAST as pre-hospital providers

The steering committee has provided oversight of the development of the programme business case.

20.2.3 Network Groups

A number of programme groups have been created led by respective network leads. The groups draw upon the experience of clinicians and managers from across the regions and chairs are nominated leads from across the three provider Health Boards.

There is representation from both Powys Teaching Health Board and the Welsh Ambulance Service Trust on the groups where appropriate.

20.3 Principles of Organisational Governance

20.3.1 Overview of proposed structure

The organisational governance structure must ensure clear lines of accountability and responsibility across the pathway in order to achieve the best possible outcomes and experience for patients.

The arrangements must create an environment in which all components of governance are delivered openly and transparently. In addition, all providers must contribute equally and positively to the governance activities of the network. Whilst some aspects of the organisational governance arrangement are clear, others present a level of complexity,

which will challenge the effectiveness of the network to deliver as a whole and across the vascular pathway.

It is proposed that an Operational Delivery Network (ODN) is established upon go live of the Network hosted by an agreed organisation, underpinned by a Memorandum of Understanding.

The term 'ODN' was developed in NHS England in 2012, to reflect the shift in the function of some clinical networks to focus on coordinating patient pathways between providers over a wide area to ensure access to specialist resources and expertise.

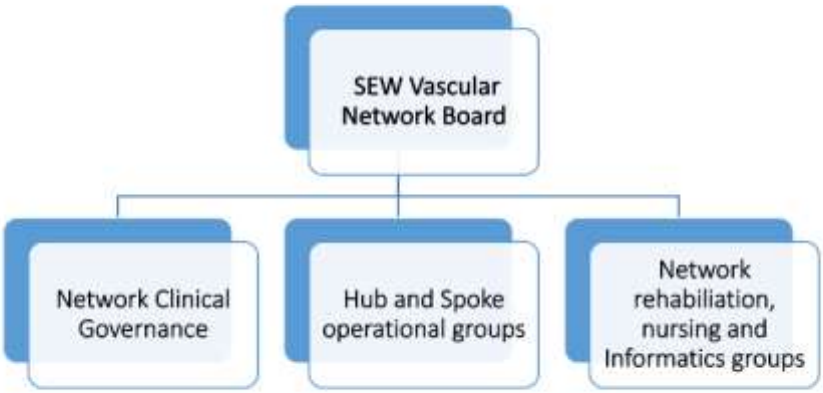
In NHS England, provider organisations host ODNs to ensure optimal delivery of the service specification. The ODN represents a collaboration between all providers commissioned to deliver clinical services.

Any of the provider organisations within the network could host the Network. It is often the Specialist Centre (Major Trauma Centre, Major Arterial or Burn Centres for example) however, this is not always the case. The Major Trauma Network is South Wales is Hosted by Swansea Bay UHB, a Trauma Unit with Specialist Services.

The role of the ODN 'host' is to enable, oversee and performance manage the formal establishment of the ODN by way of establishing a facilitative, supportive framework to ensure clear lines of responsibility and reporting arrangements to provide assurance.

The host provider has a dual role as host and as a member of the ODN internal governance processes. The host is not accountable for the compliance of other ODN member organisations, accountability for this rests with the ODN Board.

Proposed Operational Delivery Network governance structure:



As the network moves from its planning phase to implementation and operational delivery the programme board will become the SEW Vascular Network board, with a review of its membership given its change of function to operational delivery. The SEW Vascular ODN will to be accountable to the organisations represented on its Board.

It is proposed that the chair for the SEW Vascular Network Board will come from outside the Hub (i.e. CAVUHB).

The Network board will have a role in both operational delivery and overseeing the continuation of the programme, as its development will continue over many years. It is proposed that an independent chair is appointed.

Feeding into the Network board will be number of groups responsible for overseeing the clinical & operational delivery of the network as well as developments in services and pathways.

In relation to Clinical Governance, whilst the primary responsibility for clinical governance and accountability remains that of each individual Health Board. It is acknowledged that there are numerous lessons and outcomes that should be shared and utilised for reporting. A clinical governance group for the network would allow clinical teams to come together regularly to share best practice.

It is proposed that the current Hub and Spoke groups will transition into local Operational groups. A nominated LHB executive or Clinical Board/Locality Group/Divisional Lead should chair.

There will be several elements of the network that will require further focus and development beyond launch, it is recommended that both the Rehabilitation and Informatics groups remain as discreet groups to support delivery in the first year.

20.3.2 Network management team

The SEW Vascular management team will be accountable to the Network Board. The team will be hosted by the host organisation of the ODN where clinical operational line management support will be provided.

The management team will consist of the following:

- Network Clinical Lead
- Network IR Lead
- Network Nursing lead
- Network Manager
- Network Coordinator
- Network Data Coordinator

It is proposed that lead roles remain within Hub and Spokes to ensure the effective management of these services. It is proposed that the substantive contracts for these posts remain LHB's. These roles include:

- Spoke Clinical and Managerial leads
- Hub Clinical and Managerial lead
- Vascular Nurses
- Vascular Coordinators

Providers:

- WAST
- Hub – UHW, CAVUHB.
- Spokes, local hospitals and community-based rehabilitation – CAVUHB, ABUHB, CTUHB.

Providers will be responsible to the Network Board. However, clinical and managerial accountability will be held within each organisation's structure.

20.3.3 Challenges with the proposed structure

There are a number of key challenges for the Network in relation to the above organisational structure that the Executive Programme board will need resolve before it transitions into an Operational Network Board. Several hypothetical scenarios that could arise shown below help to illustrate the challenges and the role of the Network board within the proposed organisational structure:

1. Delay in transfer of care

Delayed discharges of care to one or more Spokes. Several patients at the Hub have been waiting in excess of two weeks for transfer from the time of completion of specialist care. This is causing considerable pressure on beds for new patients at the Hub. Despite the presence of a repatriation policy agreed by all LHBs, patient flow is becoming an increasing problem. The Network Manager and Clinical Lead discusses the issue with the Chief Operating Officer in the Spoke/s and learns that there are no appropriate beds available and as such, the hospital is no longer unable to accept patients back. In the proposed structure, the Network is unable to resolve the issue and the problem continues, with a detrimental impact on patients and their families.

2. NVR data Quality and completeness
3. Community rehab and ongoing care

The above scenarios, hypothetical and not exhaustive, represent a sample of issues that are likely to arise, with an impact on the effectiveness of the network and on vascular patients. They provide a compelling case for optimising organisational structure from the outset.

The following issues have been identified throughout the development of the programme and through discussions with other Networks:

- Complex commissioning arrangements with multiple bodies involved, leading to fragmented accountability and difficulty in (a) visualising the entire patient pathway, (b) maintaining 'operational delivery'.
- Sub-optimal effectiveness of the SEW Vascular Network Board if acting solely in a facilitative/advisory capacity in relation to clinical and operational governance issues.
- The design must recognise the lack of incentivisation and internal market forces in NHS Wales. If incentivisation and internal market forces are not utilised as part of the establishment of the network, other mechanisms will need to be explored to ensure accountability across the pathway.

20.3.4 Network Review Process

It is proposed that an annual review of the network and its component parts is undertaken for the following reasons:

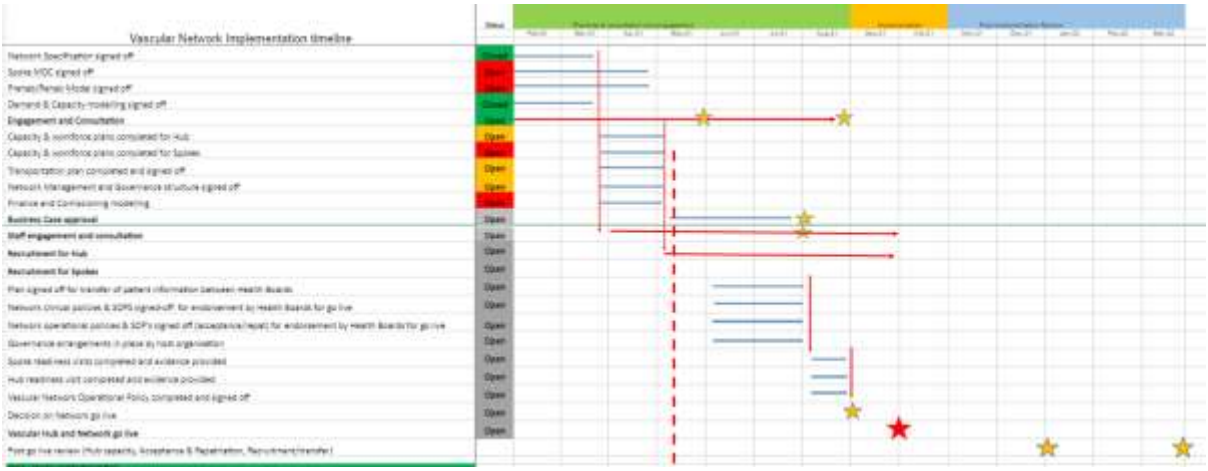
- Driver for service development and quality improvement.
- A focus on coordination within and across organisations, following the patient pathway.
- Clinically led with user and carer involvement from the outset.

The first review of the Hub, Spokes and WAST as pre hospital provider is expected to be undertaken at the end of year 1, with a full report provided to the Network Board to include providers and commissioners. Further reviews should be guided by the results of the first.

An intermediate review should take place in the first three months to ensure that there are no urgent operational issues that are having an adverse effect on the network.

20.4 Implementation plan

Following agreement of the indicative timeline, the network board set out a critical path in relation to the development of the programme business case and associated LHB business case information alongside an implementation milestones. A snapshot is shown below and includes a readiness assessment of all elements of the network in Mid-September 2021 with an estimated 'go live' date for the network as 31st October 2021.



Whilst this is an ambitious timeline, the programme board recognises the importance of moving forward with the establishment of the network given that many years have elapsed since discussions related to its development had begun.

In relation to the network working groups, detailed implementation plans are being developed, in keeping with the above timeline. As the programme moves into the next phase of implementation, the programme team will work closely with all LHB programme teams to develop implementation plans as part of the assurance process before the network is operational. This will also help the network board understand the cumulative risk and undertake a collaborative approach to mitigating this.

20.5 Critical enablers for go live & Programme assurance of readiness

Network - Management and governance structures, policies inc repatriation policy

Transport- Availability of additional clinical conveyance capacity as agreed with WAST

Spokes - Clear communication and protocol for repatriation into local hospitals and community services. Clear arrangements for local assessment for the assessment of vascular patients presenting in an acute basis and appropriate transfer to the hub on that basis.

Hub - Appropriate operational capacity delivered inc.: workforce, kit, equipment, and footprint delivered. Effective operational clinical policies delivered and effective job plans agreed

Informatics - Effective transfer of and timely access to patient information inc. operation notes in all parts of the region. Confirmed process and systems for the collection of activity & performance data.

The SEW Vascular Network currently planned to go live operationally at the end of October 2021. LHB services are currently finalising the requirements of their own spoke services. The final decision to 'go live' will require any operational risks to be identified and mitigated as a pre-requisite and confirmed by the SEWVN Implementation Board.

There are three key elements to providing robust assurance so that the service can launch. These are:

- Programme Business Case – as a blueprint for implementation and a record of the decision making process and governance (planning diligence).
- Network/Hub and Spoke state of readiness for launch and testing of any contingency arrangements
- Finalisation of Network Operational Policy and associated SOP's.

Based on the outputs of these elements, the network board will report to Health Boards, to seek the authority to go live.

20.6 Post implementation review

Operational Service reviews

The Programme Board has agreed that a post implementation review should take place at both 3 and 6 months after 'go live'. This is to assess the operational impact of the service against the predicted activity and demand and capacity modelling and to ensure operational effectiveness of the systems. The measures for the 3 and 6 month reviews were discussed and agreed at the programme Clinical Advisory and Operational Groups and will include the following:

3 & 6 months - initial service reviews:

- Activity (inc case mix within activity) analysed by commissioner (inc of bed days and theatre session usage). CEPOD usage
- Analysis of actual costs incurred (on a quarterly basis) based on the parameters we used for the business case and activity usage triangulation
- Time to theatre from decision time to getting into theatre
- LOS (across the pathway, broken down hub and spokes)
- Delays in transfer for treatment into hub and back out to spoke (as per agreed policy)
- Patient discharge destination and impact on WAST assumptions

12 months full service review:

It is proposed that a full review of the Network takes place at 12 months. To include:

- A review visit and assessment of ODN, Hub, Spokes.
- Assessment against Network agreed performance indicators as per the Network specification (NVR measured performance against other services).

20.7 Post Programme Assurance and Evaluation

The outline arrangements for post implementation review (PIR) and project evaluation review (PER) have been established in accordance with best practice and are as follows.

Post-project evaluation is a mandatory requirement for all NHS bodies who are undertaking a project of this scope and scale.

A thorough and robust post-project evaluation (PPE) should be undertaken at key stages in the process to ensure that positive lessons can be learnt from the programme that will be of value for wider system learning. The lessons learnt will be of benefit to:

- LHB's in using this knowledge for future projects.
- LHBs, pre-hospital services and commissioners – to inform their approaches to regional programmes.
- The NHS more widely – to test whether the approaches used in this programme have been effective.

PPE also sets in place a framework within which the agreed benefits can be tested to identify which benefits have been achieved and which have not.

- NHS guidance on PPE has been published and the key stages, which are applicable for this programme, are:
- Evaluation of the various processes put in place during implementation.
- Evaluation of the project in use shortly after the development is operational.
- Evaluation of the project once the developments are well established.

It is proposed that the network team draw up detailed plans for evaluation at each of these stages in consultation with its key stakeholders.

20.8 Risk Management Plan

Programme risks are managed through each Programme Executive Board where an updated risk register is presented. As the programme transitions towards go live, the processes of testing business continuity and the business case assurance process.

Programme risks with mitigations are outlined in *Appendix G* which describes in detail all current programme risks and status.

20.8.1 Future Risk Profile and Plan

There are a number of sources of risk identification as a consequences of the activities of programme planning for implementation. Once the service has a way forward for financial sign off, a number of key activities will follow the submission of the case to Health Board Boards. These are:

Risk plan to manage non delivery or underachievement of benefits realisation plan
It is imperative that the benefits undergo a full risk assessment. That risk assessment will then be signed off by network board and shared with commissioners and will be formally logged as a handover document to the Network.

Risks emerging from readiness assessments
Network, Hub and Spoke readiness is essential to the maintenance of effective patient flow and achievement of benefits and improved outcomes. Executive Programme Board will receive a report on the escalation of additional risks identified through the assessments.

20.9 Communication/Stakeholder Engagement Plan

A comprehensive communication/ stakeholder engagement plan was developed as part of the planning for engagement indicating key stakeholder groups. This will now be developed to reflect how this will be managed both during the implementation and operational phases of the programme. Integral to the plan is the responsibility for LHBs to ensure that local stakeholders e.g. CHCs are kept informed of developments and progress.

Approval

Decision	**Date**

Signature: _____ Date:

Appendix A: Breakdown of SEW Vascular Workforce

Table 1.Total vascular workforce for the South East Wales region

Job title	AB Staff in post where able to identify	CAV Staff in post where able to identify	CTM Staff in post where able to identify	TOTAL SIP across Network	Recruitment requirements
Medical	**WTE**	**WTE**	**WTE**	**WTE**	**WTE**
Consultant Anaesthetists	1.04	1.23	0.1	2.37	1.47
Consultant IR Radiographers	0.4	4	0	4.4	1
Secretary to Consultant IR	0	0	0	0	0.5
COTE Consultant	0	0	0	0	0.2
Secretary to COTE consultant	0	0	0	0	0.1
Rehabilitation Consultant	0	0.1	0	0.1	0.2
Rehabilitation secretary	0	0	0	0	0.1
Vascular Consultant	4	3.5	2	9.5	0
Medical secretary to Vascular Consultant	0	1.5	0	1.5	0.5
Vascular Surgical Trainees (Registrar or STR)					0
TOTALS	*5.44*	*10.33*	*2.1*	*17.87*	*4.07*
Ward Staff					
Ward Sister Band 7	0	1	1	2	0
Deputy Ward Manager Band 6	0	2	1	3	2
Staff Nurses band 5	5.2	7.8	10.37	23.37	21.5
Health Care Support Workers Band 3	5.3	4.94	8.53	18.77	14.96
Patient environment co-ordinator Band 3	0	0.8	0	0.8	0.2
TOTALS	*10.5*	*16.54*	*20.9*	*47.94*	*38.66*
Vascular Nurse Specialist					
Specialist Nurse - Vascular Nurse Practitioner band 7	2	1	1	4	2
Specialist Nurse - Surgical Care Practitioner band 7	0	0.8	1	1.8	0
TOTALS	*2*	*1.8*	*2*	*5.8*	*2*
Wound Healing Service					
Wound Healing Nurse Band 6	0	1.56		1.56	1
Wound Healing Nurse Band 7	0	1		1	0
TOTALS	*0*	*2.56*	*0*	*2.56*	*1*
Pharmacy					
Pharmacist Band 7	0.25	0.3		0.55	0.5

Pharmacy ATO Band 2	0.01	0.25		0.26	0.5
Pharmacy Tech band 5	0.1	0.35		0.45	0.5
TOTALS	*0.36*	*0.9*	*0*	*1.26*	*1.5*
Theatres					
Clinical Leader Theatres	0	0	0	0	1
HSDU band 2	0	0	1	1	1
Theatre Assistants	0	1.3	0	1.3	1.48
Theatre Porters	0	0	0	0	0.5
Theatre Practitioners band 5	1.2	1.44	1.08	3.72	1
Resus Practitioner Band 7	0	0	0	0	0.1
Theatre Practitioners Band 6	2.7	2.45	0.36	5.51	2
Specialist Nurse Band 6 pain	0	1.84	0	1.84	1
TOTALS	*3.9*	*7.03*	*2.44*	*13.37*	*8.08*
Labs					
Biomedical Scientist Band 5	0	4	0	4	1
Specimen Reception MLA band 2	0	0	0	0	1
TOTALS	*0*	*4*	*0*	*4*	*2*
Radiology					
Radiographers Band 5 C Arm	0	0	0	0	1.5
Radiographers Band 6	0	4	0	4	2.4
Radiology Band 3 HCSW	0	3	0	3	1
Radiology Lead Nurse Band 8a - uplift from a band 7 to an 8A	0	1	0	1	0
Radiology Nurse Band 5	0	5	0	5	0
Radiology Nurse Band 6	0	11.4	0	11.4	4
Radiology Porters band 2	0	0	0	0	2.4
Medical Physics Clinical Scientists 8a Dopler	0	1	0	1	1
TOTALS	*0*	*25.4*	*0*	*25.4*	*12.3*
Therapies					
Dietetic Support Worker Band 3 (ward based)	0	0	0	0	2.24
Dietitian Band 6	0	0.17	0	0.17	1.13
Dietitian support worker pre-op assessment and optimisation Band 4	0	0	0	0	1
Occupational Therapist Band 7	0	0	0	0	0.7
Occupational Therapist Band 6	1	0.7	0.5	2.2	1.39
Physiotherapist Band 6	0.1	0.7	0.5	1.3	1.89
Physiotherapy Rehabilitation Assistant Band 3	0.1	0	0	0.1	1
Podiatrist 8a	0	0	0	0	1
TOTALS	*1.2*	*1.57*	*1*	*3.77*	*10.35*

Psychology					
Pathway Lead Psychologist Band 8b	0	0	0	0	1
TOTALS	*0*	*0*	*0*	*0*	*1*
Network Posts					
Consultant Clinical Lead	0	0	0	0	0.2
Network Manager 8A	0	0	0	0	1
Network Co-Ordinator B5	0	0	0	0	1
Network Data Manager B5	0	0	0	0	1
Consultant IR Lead	0	0	0	0	0.1
Nursing Lead	0	0	0	0	0.2
TOTALS	*0*	*0*	*0*	*0*	*3.5*
TOTAL		**70.13**		**121.97**	**84.46**

Table 2. Workforce related to hub activity transfer only

Job title	**AB Staff in post where able to identify**	**CAV Staff in post where able to identify**	**CTM Staff in post where able to identify**	**TOTAL SIP across Network**	**Recruitment requirements**
Medical	**WTE**	**WTE**	**WTE**	**WTE**	**WTE**
Consultant Anaesthetists	1.04	1.23	0.1	2.37	1.47
Consultant IR Radiographers	0.4	4	0	4.4	1
Secretary to Consultant IR	0	0	0	0	0.5
Vascular Consultant	4	3.5	2	9.5	0
Medical secretary to Vascular Consultant	0	1.5	0	1.5	0.5
Vascular Surgical Trainees (Registrar or STR)					0
TOTALS	*5.44*	*10.23*	*2.1*	*17.77*	*3.47*
Ward Staff					
Ward Sister Band 7	0	1	1	2	0
Deputy Ward Manager Band 6	0	2	1	3	2
Staff Nurses band 5	5.2	7.8	10.37	23.37	21.5
Health Care Support Workers Band 3	5.3	4.94	8.53	18.77	14.96

Patient environment co-ordinator Band 3	0	0.8	0	0.8	0.2
TOTALS	*10.5*	*16.54*	*20.9*	*47.94*	*38.66*
Vascular Nurse Specialist					
Specialist Nurse - Vascular Nurse Practitioner band 7	2	1	1	4	2
Specialist Nurse - Surgical Care Practitioner band 7	0	0.8	1	1.8	0
TOTALS	*2*	*1.8*	*2*	*5.8*	*2*
Wound Healing Service					
Wound Healing Nurse Band 6	0	1.56		1.56	1
Wound Healing Nurse Band 7	0	1		1	0
TOTALS	*0*	*2.56*	*0*	*2.56*	*1*
Pharmacy					
Pharmacist Band 7	0.25	0.3		0.55	0.5
Pharmacy ATO Band 2	0.01	0.25		0.26	0.5
Pharmacy Tech band 5	0.1	0.35		0.45	0.5
TOTALS	*0.36*	*0.9*	*0*	*1.26*	*1.5*
Theatres					
Clinical Leader Theatres	0	0	0	0	1
HSDU band 2	0	0	1	1	1
Theatre Assistants	0	1.3	0	1.3	1.48
Theatre Porters	0	0	0	0	0.5
Theatre Practitioners band 5	1.2	1.44	1.08	3.72	1
Resus Practitioner Band 7	0	0	0	0	0.1
Theatre Practitioners Band 6	2.7	2.45	0.36	5.51	2
Specialist Nurse Band 6 pain	0	1.84	0	1.84	1
TOTALS	*3.9*	*7.03*	*2.44*	*13.37*	*8.08*
Labs					
Biomedical Scientist Band 5	0	4	0	4	1
Specimen Reception MLA band 2	0	0	0	0	1
TOTALS	*0*	*4*	*0*	*4*	*2*
Radiology					
Radiographers Band 5 C Arm	0	0	0	0	1.5
Radiographers Band 6	0	4	0	4	2.4
Radiology Band 3 HCSW	0	3	0	3	1
Radiology Lead Nurse Band 8a - uplift from a band 7 to an 8A	0	1	0	1	0
Radiology Nurse Band 5	0	5	0	5	0
Radiology Nurse Band 6	0	11.4	0	11.4	4
Radiology Porters band 2	0	0	0	0	2.4
Medical Physics Clinical Scientists 8a Dopler	0	1	0	1	1

TOTALS	*0*	*25.4*	*0*	*25.4*	*12.3*
Therapies					
Occupational Therapist Band 6	1	0.7	0	1.7	0.78
Dietician band 6					0.32
Physiotherapist Band 6	0.1	0.7	0.5	1.3	0.77
TOTALS	*1.1*	*1.4*	*0.5*	*3*	*1.87*
TOTAL				**118.1**	**70.88**

Table 3. Workforce associated with Network set up

Job title	**Recruitment requirements**
Network Posts	**WTE**
Consultant Clinical Lead	0.2
Network Manager 8A	1
Network Co-Ordinator B5	1
Network Data Manager B5	1
Consultant IR Lead	0.1
Nursing Lead	0.2
TOTALS	**3.5**

Table 4. Workforce associated with Service Improvement

Job title	**AB Staff in post where able to identify**	**CAV Staff in post where able to identify**	**CTM Staff in post where able to identify**	**TOTAL across Network**	**Recruitment requirements**
Dietetic Support Worker Band 3 (ward based)	0	0	0	0	2.24
Dietitian Band 6	0	0.17	0	0.17	0.81
Dietitian support worker Band 4	0	0	0	0	1
Occupational Therapist Band 6	1	0.7	0	1.7	0.61
Physiotherapist Band 6	0.1	0.7	0	0.8	1.12
Physiotherapy Rehab Assistant Band 3	0.1	0	0	0.1	1
TOTALS	**1.2**	**1.57**	**0**	**2.77**	**6.78**

Table 5. Workforce associated with delivery of National Standards/in line with other UK networks

Job title	AB Staff in post where able to identify	CAV Staff in post where able to identify	CTM Staff in post where able to identify	TOTAL SIP across Network	Recruitment requirements
COTE Consultant	0	0	0	0	0.2
Secretary to COTE consultant	0	0	0	0	0.1
Rehabilitation Consultant	0	0.1	0	0.1	0.2
Rehabilitation secretary	0	0	0	0	0.1
Occupational Therapist Band 7	0	0	0	0	0.7
Podiatrist 8a	0	0	0	0	1
Pathway Lead Psychologist Band 8b	0	0	0	0	1
TOTALS	**0**	**0.1**	**0**	**0.1**	**3.3**

Appendix B: SEW Data analysis from: National Vascular Registry November 2020 Annual Report.

Abdominal Aortic Aneurysms (AAA)

69 UK Vascular units performing AAA repair
•median assessment to repair typically 50 - 90 days
•84.8% were discussed at MDT meetings
•90.5% had preoperative CT/MR angiography
•94.7% underwent a formal anaesthetic review
•83.2% had documented formal fitness assessment tests.
In 2019, the in-hospital postoperative mortality was 2.3% after open repair and 0.4% after EVAR. Between 2017-19, the risk-adjusted in-hospital mortality rates for all NHS vascular units were within the expected range of the national average (1.4% for 2017-19).

AAA Resource Utilisation

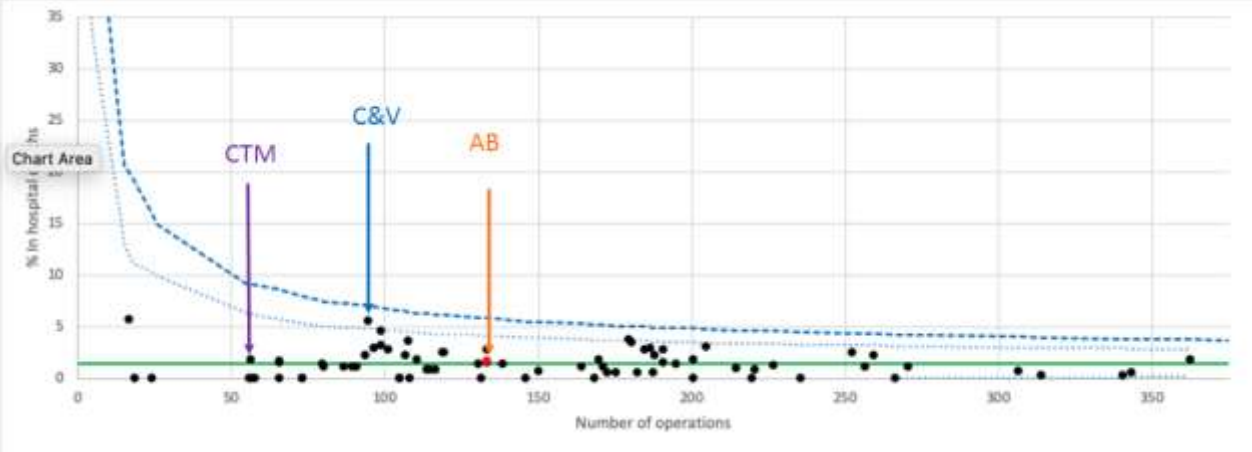
	AB	C&V	CTM	National
Open LoS (days)	9 (6– 15)	9 (8 – 16)	9 (7 – 11)	7 (6-10)
EVAR LoS (days)	1 (1 – 1)	3 (3 – 5)	2 (2 – 4)	2 (1-3)

Case Ascertainment

	AB	C&V	CTM
Elective AAA 2019	44	21	15
Ruptured AAA 2017 – 2019	21	20	13

Full data submission
Incomplete data submission

AAA Outcomes – 30 day mortality



Carotid Endarterectomy (CEA)

• In 2019, the NVR received details of 4,141 CEAs. The number of CEA has decreased markedly since 2011 when nearly 6,000 procedures were performed.
• NICE NG128 - the delay from symptom to carotid surgery is recommended to be within 14 days to reduce the risk of patients developing a stroke.
• Nationally 1.9% of patients died and/or had a stroke within 30 days (95% CI 1.7-2.2)

CEA Resource Utilisation

	AB	CAV	CTM	National
Op within 7 days of referral	58%	xxx	73%	51%
LoS (days)	1 (1 – 4)	7 (4 – 8)	2 (2 – 3)	2 (2 - 5)

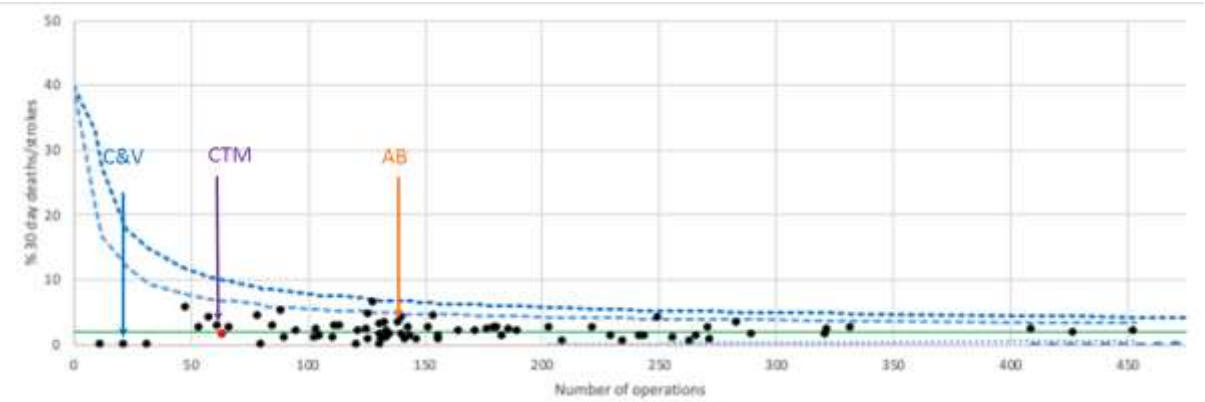
Case Ascertainment

	AB	C&V	CTM
CEAs 2019	49	4	22

Full data submission
Low data submission†

† PEDW 2018 CAVUHB submitted 17 CEAs

CEA Outcomes – 30 Day stroke or death



Lower Limb Interventions for Peripheral Arterial Disease

- 2017 - 19, 18,090 bypass procedures performed in the UK.
- 55.9% were admitted with chronic limb-threatening ischaemia (CLTI).
- Patients admitted non-electively with CLTI should have a revascularisation procedure within five days.

Bypass Resource Utilisation

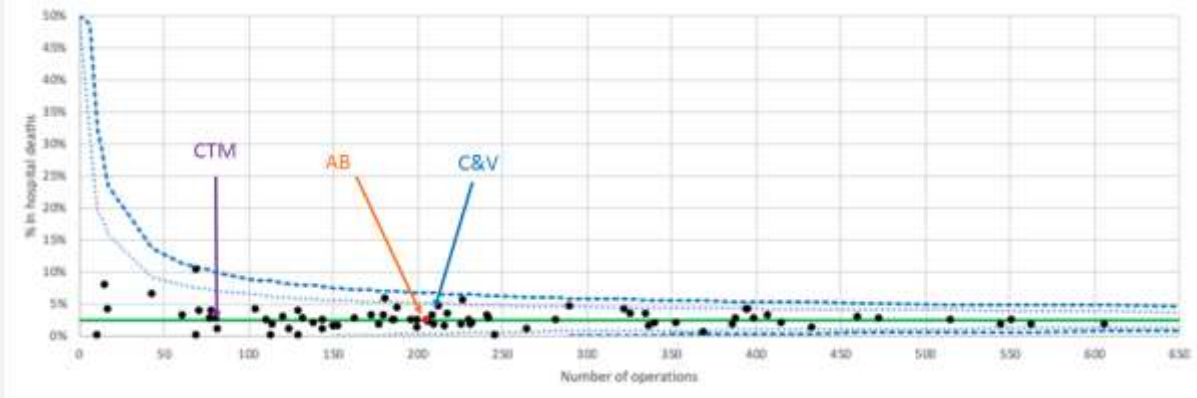
	AB	C&V	CTM	National
Bypass LoS (days)	9 (6– 15)	9 (5 – 19)	9 (4 – 16)	7 (4-15)
CLTI wait (days)	5 (2 – 7)	7 (4 – 9)	7 (4 – 9)	6 (2 - 9)
CLTI % treated in 5 days	55%	29%	35%	50%

Case Ascertainment

	AB	C&V	CTM
Bypasses 2017 – 2019	206	209	82

Full data submission
Incomplete data submission

Bypass Outcomes – in hospital mortality



Major Lower Limb Amputation

•All patients undergoing elective major lower limb amputation should be admitted in a timely fashion.
•Major amputations should be undertaken on a planned operating list during normal working hours.
•Vascular units should aim to have an above knee amputation (AKA): below knee amputation (BKA) ratio below one.

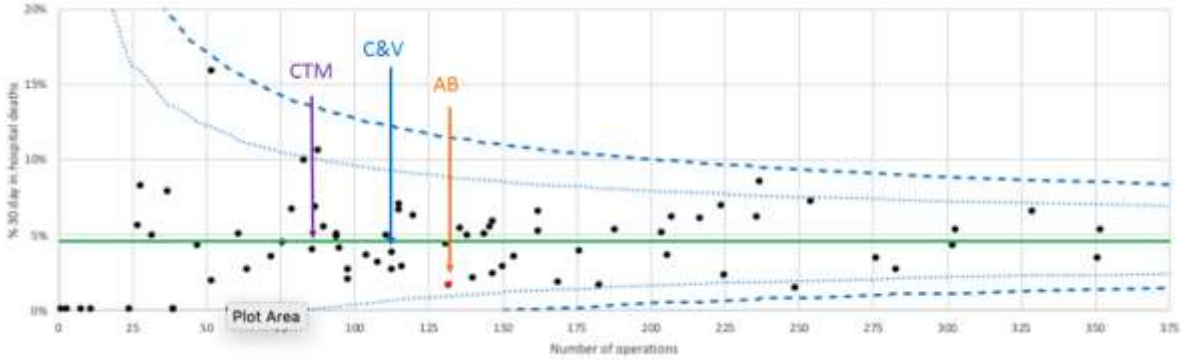
Amputation Resource Utilisation

	AB	C&V	CTM	National
Assessment to Op (days)	8 (4– 28)	10 (4 – 25)	37 (19 – 117)	7 (3 - 18)
LoS (days)	29 (16 – 48)	40 (23 – 77)	27 (14 – 43)	23 (13 - 39)
AKA : BKA ratio	0.78	0.74	0.62	0.93
% Consultant in theatre	92%	99%	100%	80%

Case Ascertainment

	AB	C&V	CTM
Major Amputations 2017 – 2019	132	113	86

Amputation Outcomes – in hospital mortality



Appendix C: SEWVN Demand and Capacity Modelling

South East Wales Vascular Centralisation Demand and Capacity Modelling Recommendations for bed days and theatre sessions September 2020

Introduction

Following the input of clinicians and managers across the three health Boards, realistic modelling has been carried out based on actual activity for a period of over four years. During that time there has been a clear reduction in bed use, without any reduction in activity. Whilst this has been taken account of in the recommendations, an allowance for risk and variation to ensure that sufficient beds are allocated to the new Regional Centre.
An estimate of theatre sessions is possible at this point but will be confirmed, allowing the additional TU/PACU requirements to be calculated.

1 Methodology

The following calculations are based actual activity from 2015 to November 2019 for Aneurin Bevan, Cardiff and Vale, Cwm Taf Morgannwg University Health Boards. All admissions and theatre cases associated with identified vascular consultants and for identified vascular procedures were included to reduce general surgery activity down into specifically vascular activity.

The split between hub and spoke activity was based on a division of activity agreed by consultants and updated to make all in-patient amputations hub activity. The identified vascular activity was further split into clinical relevant groups to enable further analysis. Information on how procedures were identified is included as Appendix One.

In terms of bed calculations, theatre cases which related to a single admission were combined to produce a single length of stay, which was then split between hub and spoke, where there was a realistic possibility that such patients might be repatriated to their host health board during their stay. The proportionate split was different for different groups of procedures, but only represents an average as opposed to a prediction for individual patients, recognising the fact that very unwell patients would not be transferred at risk.

The overall prediction of bed numbers is based on actual variation and not theoretical percentages. It therefore takes all of the activity relating to the cohort and seeks to ensure that the bed complement will be sufficient to accommodate the variation in activity. The necessary bed complement is however based on the total bed use across health board areas – combining peaks and troughs for individual health boards would produce more variation (and a higher bed complement) than happens in practice when all activity is brought together in one place.

Two areas have been identified for further sensitivity analysis

- Average hub/spoke split for revascularisation
- Average hub/spoke split for major amputations

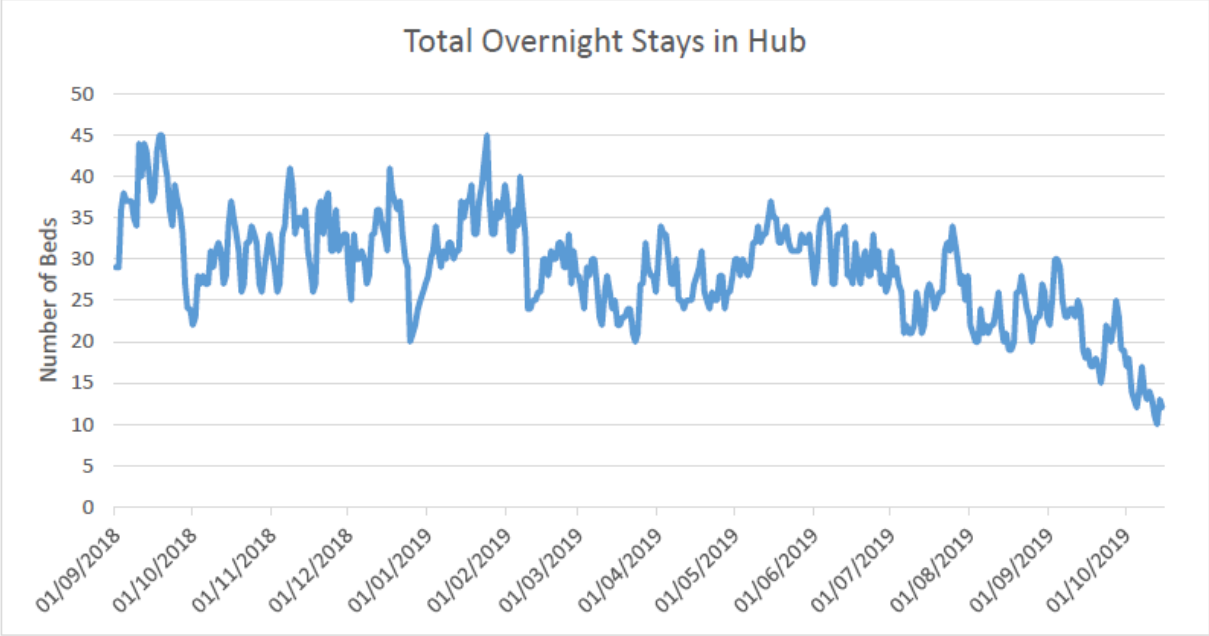
It is expected that this will make slightly increase the number of hub beds, as it will not affect all stays for patients in this category.

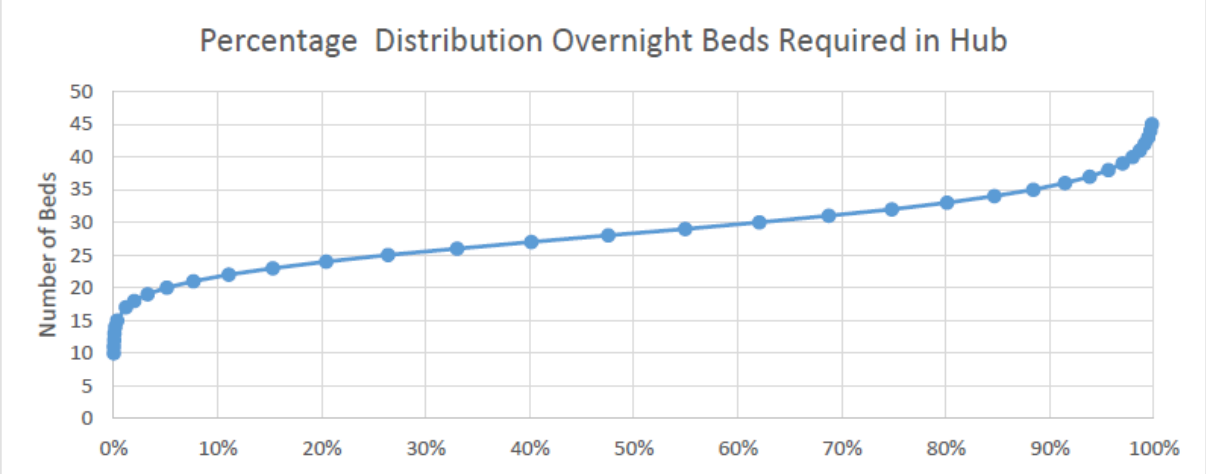
Theatre cases have been analysed by the agreed clinically relevant groups, and an initial calculation of theatre sessions, based on historical theatre allocations at UHW. More detailed analysis involving actual average theatre time for these groups will be undertaken, which will be more accurate and inform the CEPOD/allocated theatre split.

All figures are pre-COVID and allowance will have to be made in short to medium terms planning both in terms of bed use and theatre time with new COVID restrictions in place. This may necessitate planning for separate elective stream beds and longer theatre sessions.

2 Bed Compliment

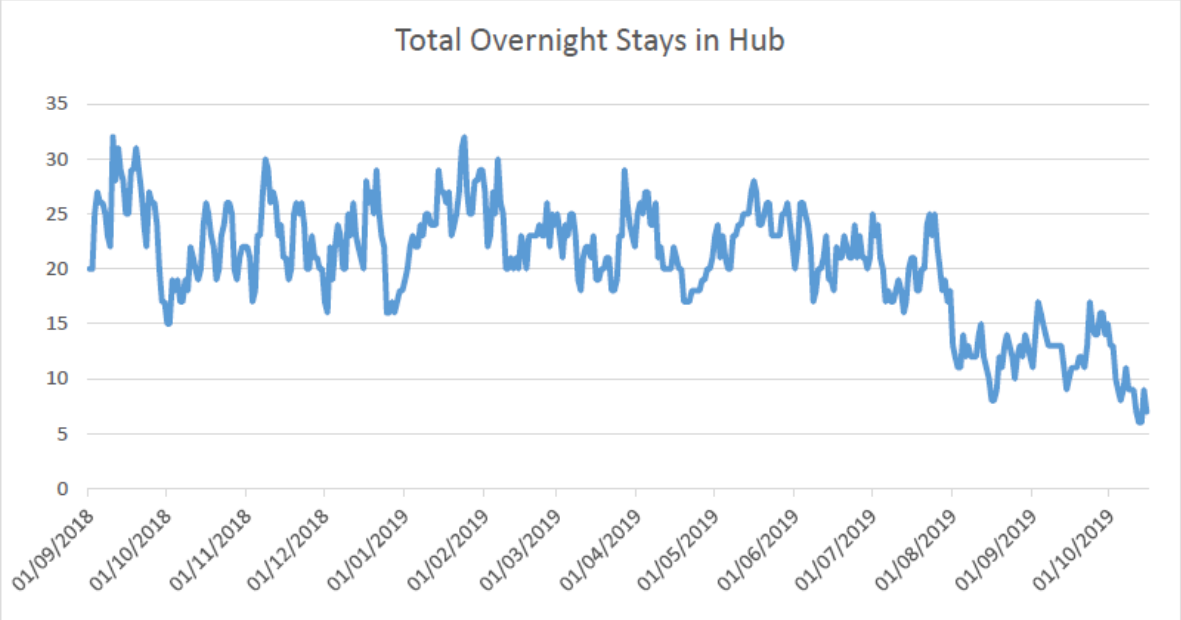
2.1 Aneurin Bevan, Cardiff and Vale, and Cwm Taf Health Boards Hub requirement

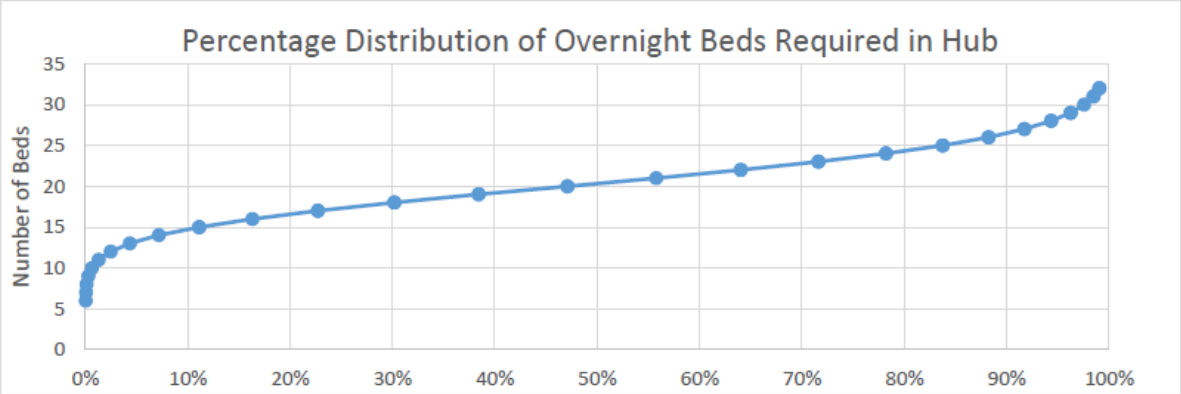




The bed requirement for the combine hub is shown above. There is a clear reduction in beds used from the beginning of 2019, mainly associated with CAVUHB and CTUHB, which may relate to pathway management and ward processes. 35 beds is close to 90 percentile in terms of variation in bed use, but this total is almost 100 percentile for the later period. 35 is therefore regarded as a very low risk bed compliment, with the possibility that with effective processes actual use could be lower. It is also comparable with other Regional Centres.

2.2 Cardiff and Vale, and Cwm Taf Health Boards Hub requirement





When only CAVUHB and CTUHB are considered once a combined total of 25 beds covers almost 100 percent of the bed use in the later period.

Because moving to a two health board centre will take place first it is recommended that 20 beds are set up immediately rising to 25 beds if required as COVID becomes less of an issue for the admission of patients. Given the potential delay in presentation of some patients with chronic conditions it may be that 25 beds are required earlier. It should be borne in mind that only CAVUHB and CTUHB have seen significant reductions in bed use in the most recent period, with CAVUHB requirements reducing consistently to around 20-22 (12 hub on B2 and 10 spoke on B2 and 2-3 patients elsewhere for rehab) from August 2019. A longer term of 20 in total for the CAVUHB/CTUHB hub is realistic.

2.3 Health Board contributions to hub

The following is based on each health board's individual hub requirements.

Aneurin Bevan 12-13 beds
Cardiff and Vale 12-17 beds
Cwm Taf Health Board 8-9 beds

These do not total to the overall figures above as a result of how the peaks and troughs combine and issues with rounding. The greater effect of emergencies is reflected in the figures for Cardiff and Vale, who are already managing this variation in their bed base.

Recommended hub beds (ABUHB) 12
Recommended hub beds (CTUHB) 8

The overall bed recommendations are for providing and safe clinical service, which accommodates variation. In terms of resource use however these totals would have to be monitored closely for financial purposes based on a baseline of activity for health board of origin (not yet calculated as figures are based on where care currently takes place, with some CTUHB and ABUHB patients already treated in Cardiff)

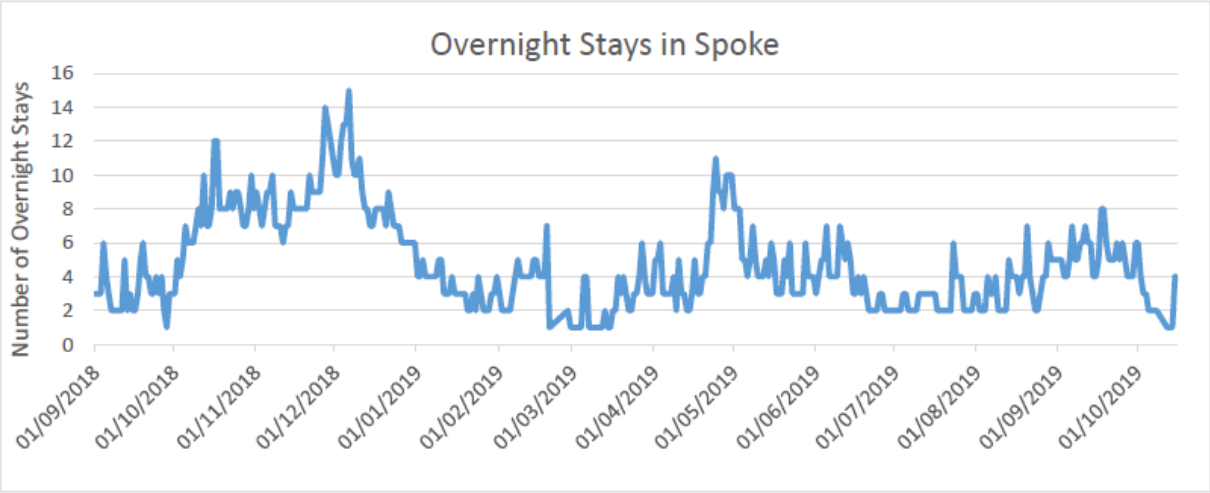
2.4 Spoke bed requirements

Spoke bed requirements are significantly more variable than hub bed requirements as a result of the disproportionate effect of longer stay patients with complex rehabilitation and re-ablement needs.

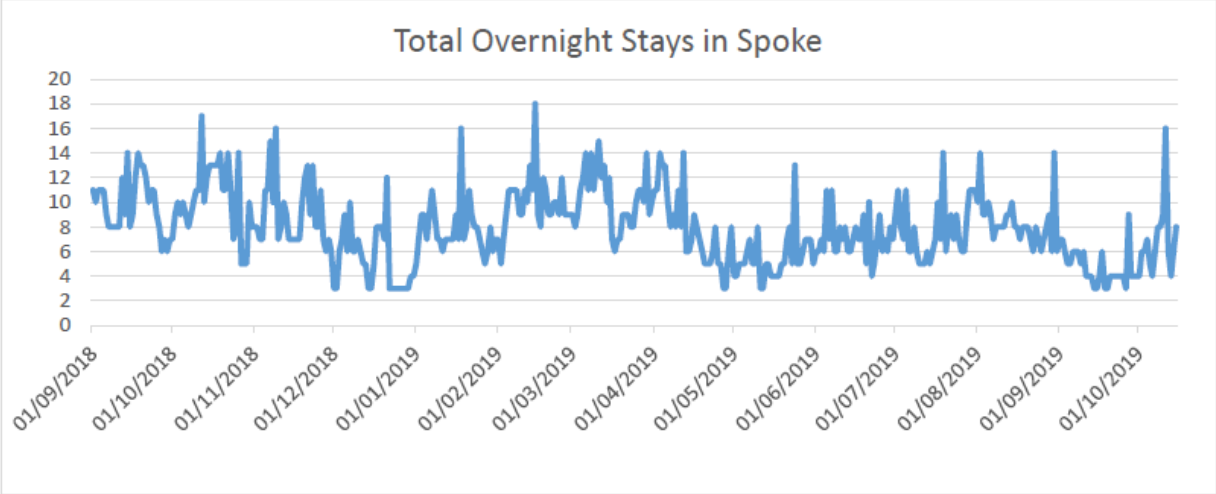
Interestingly the spoke bed requirements for all three health boards to reach over 90 percentile in terms of variation are similar. As the calculations are based on splitting episodes, these do not reflect current bed use, rather how patient pathways are managed, access to community support, or differences in patient needs for rehabilitation.

Recommended spoke beds (ABUHB) 10
Recommended spoke beds (CAVUHB) 10-12
Recommended spoke beds (CTUHB) 10

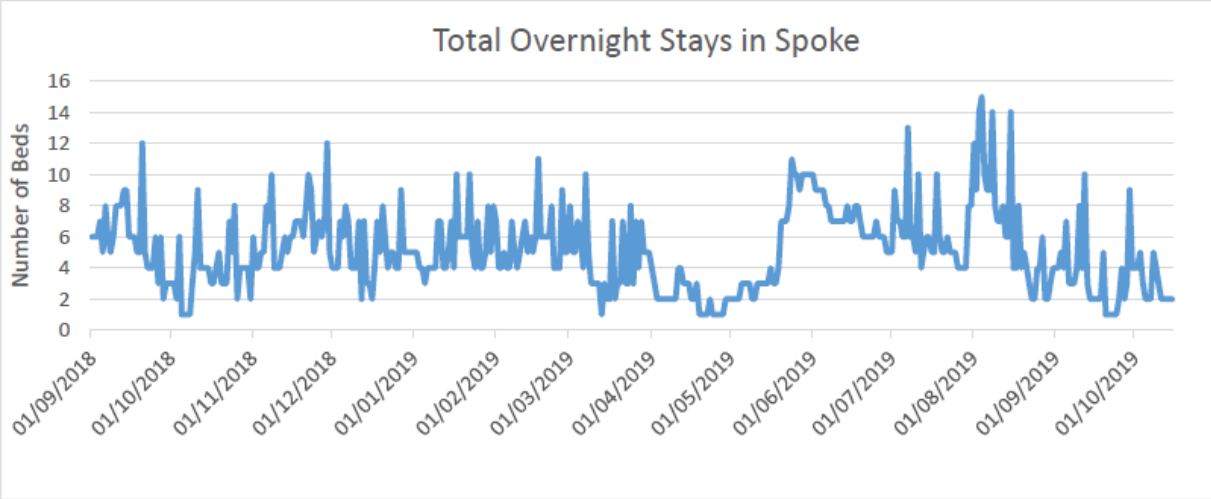
Aneurin Bevan UHB



Cardiff and Vale UHB



Cwm Taf UHB



3 Theatre Use

Theatre cases have been analysed according to the clinical categories in Appendix One.
As a guide the Clinical activity delivered by Cardiff and Vales Health Board was carried out in 6 sessions a week, without leave cover with some CEPOD theatre use, but many same or next day cases carried out on scheduled lists. A more detailed analysis will be carried out using actual time in theatre (with the caveat that this may have changed permanently as a result of COVID).

The tables below show a typical year for each health board (four full years data is available).

The figures shown are for individual visits to theatres and are based on the primary recorded procedure. Sum of procedures total includes non-vascular procedures.

Actual theatre use will be significantly lower than the estimates because a Vascular Centre would fully utilise every session by running a leave cover rota for theatres.

3.1 Aneurin Bevan UHB Theatre Use

2019		Hub	Spoke	Grand Total
Sum of No of Procs		366	261	765
Sum of A	Iliac and Femoral Artery	100	62	162
Sum of B	Carotid	29	0	29
Sum of C	EVAR AAA	29	0	29
Sum of D	Open AAA	17	0	17
Sum of E	Operations on Vena Cava	3	0	3
Sum of G	Subclavian Artery	5	0	5
Sum of X	Major Amputations	45	0	45
Sum of DF	Amputations	42	0	42
Sum of other Artery	Other Artery	19	0	19
Sum of Other Artery/Spoke	Subclavian Artery	9	12	21
		298	**74**	**372**

Estimated theatre sessions 5.4 sessions per week without leave cover
(Only for illustration – based on CAVUHB usage, not actual time in theatre)

3.2 Cardiff and Vale UHB Theatre Use

2018		Hub	Spoke	Grand Total
Sum of No of Procs		332	440	1191
Sum of A	Iliac and Femoral Artery	97	81	178
Sum of B	Carotid	17	0	17
Sum of C	EVAR AAA	24	0	24
Sum of D	Open AAA	37	0	37

Sum of E	Operations on Vena Cava	3	0	3
Sum of G	Subclavian Artery	9	0	9
Sum of X	Major Amputations	46	0	46
Sum of DF	Amputations	37	0	37
Sum of other Artery	Other Artery	19	0	19
Sum of Other Artery/Spoke	Subclavian Artery	8	36	44
		297	**117**	**414**

Theatre sessions 6 sessions a week without leave cover (plus some CEPOD)
(Only for illustration – based on actual theatre allocation, and therefore historical throughput)

3.3 Cwm Taf UHB Theatre Use

2018		**hub**	**Spoke**	**Grand Total**
Sum of No of Procs		249	410	722
Sum of A	Iliac and Femoral Artery	44	59	103
Sum of B	Carotid	16	0	16
Sum of C	EVAR AAA	17	0	17
Sum of D	Open AAA	18	0	18
Sum of E	Operations on Vena Cava	2	0	2
Sum of G	Subclavian Artery	4	0	4
Sum of X	Major Amputations	38	0	38
Sum of DF	Amputations	51	0	51
Sum of other Artery	Other Artery	38	0	38
Sum of Other Artery/Spoke	Subclavian Artery	3	6	9
		231	**65**	**296**

Estimated theatre sessions 4.4 sessions per week without leave cover
(Only for illustration – based on CAVUHB usage, not actual time in theatre)

3.4 Combined Health Board Activity

	hub	Spoke	Grand Total
	826	256	1082

Appendix One
Clinical categories for procedures and episodes

OPCS Procedure Block		OPCS Code	OPCS Description	Elective - HUB	Emergency - HUB	Elective - SPOKE	Emergency - SPOKE	Exclude	Procedure Category	Category Code
L16-L28	Aorta	L16	Extra-Anatomic Bypass Of Aorta	✔	✔				Open AAA	D
		L18	Emergency Replacement Of Aneurysmal Segment Of Aorta	✔	✔				Open AAA	D
		L19	Other Replacement Of Aneurysmal Segment Of Aorta	✔	✔				Open AAA	D
		L20	Other Emergency Bypass Of Segment Of Aorta	✔	✔				Open AAA	D
		L21	Other Bypass Of Segment Of Aorta	✔	✔				Open AAA	D
		L22	Attention To Prosthesis Of Aorta	✔	✔				Open AAA	D
		L23	Plastic Repair Of Aorta	✔	✔				Open AAA	D
		L24	Other Open Operations On Aorta	✔	✔				Open AAA	D
		L26	Transluminal Operations On Aorta	✔	✔				EVAR AAA	C
		L27	Transl.Insertion Of Stent Graft For Aneurysmal Smt Aort	✔	✔				EVAR AAA	C
		L28	Transluminal Operations On Aneurysmal Segment Of Aorta	✔	✔				EVAR AAA	C
L29-L39	Carotid cerebral and subclavian arteries	L29	Reconstruction Of Carotid Artery	✔	✔				Carotid	B
		L30	Other Open Operations On Carotid Artery	✔	✔				Carotid	B
		L31	Transluminal Operations On Carotid Artery	✔	✔				Carotid	B
		L33	Operations On Aneurysm Of Cerebral Artery					✔	Exclude	Exclude
		L34	Other Open Operations On Cerebral Artery					✔	Exclude	Exclude
		L35	Transluminal Operations On Cerebral Artery					✔	Exclude	Exclude

OPCS Procedure Block		OPCS Code	OPCS Description	Elective - HUB	Emergency - HUB	Elective - SPOKE	Emergency - SPOKE	Exclude	Procedure Category	Category Code
		L37	Reconstruction Of Subclavian Artery	✔	✔				Subclavian Artery	G
		L38	Other Open Operations On Subclavian Artery	✔	✔				Subclavian Artery	G
		L39	Transluminal Operations On Subclavian Artery	✔	✔				Subclavian Artery	G
L41-L47	Abdominal branches of aorta	L41	Reconstruction Of Renal Artery	✔	✔				Other Artery	F
		L42	Other Open Operations On Renal Artery	✔	✔				Other Artery	F
		L43	Transluminal Operations On Renal Artery			✔	✔		Spoke	Spoke
		L45	Reconstruction Of Other Visceral Branch Of Abdominal Ao	✔	✔				Open AAA	D
		L46	Other Open Ops On Other Visceral Branch/Abdominal Aorta	✔	✔				Open AAA	D
		L47	Transluminal Ops On Other Visceral Branch/Abdominal Aor	✔	✔				EVAR AAA	C
L48-L63	Iliac and femoral arteries	L48	Emergency Replacement Of Aneurysmal Iliac Artery	✔	✔				Iliac and Femoral Artery	A
		L49	Other Replacement Of Aneurysmal Iliac Artery	✔	✔				Iliac and Femoral Artery	A
		L50	Other Emergency Bypass Of Iliac Artery	✔	✔				Iliac and Femoral Artery	A
		L51	Other Bypass Of Iliac Artery	✔	✔				Iliac and Femoral Artery	A
		L52	Reconstruction Of Iliac Artery	✔	✔				Iliac and Femoral Artery	A
		L53	Other Open Operations On Iliac Artery	✔	✔				Iliac and Femoral Artery	A
		L54	Transluminal Operations On Iliac Artery		✔	✔			Iliac and Femoral Artery /Spoke	A
		L56	Emergency Replacement Of Aneurysmal Femoral Artery	✔	✔				Iliac and Femoral Artery	A

OPCS Procedure Block		OPCS Code	OPCS Description	Elective - HUB	Emergency - HUB	Elective - SPOKE	Emergency - SPOKE	Exclude	Procedure Category	Category Code
		L57	Other Replacement Of Aneurysmal Femoral Artery	✔	✔				Iliac and Femoral Artery	A
		L58	Other Emergency Bypass Of Femoral Artery	✔	✔				Iliac and Femoral Artery	A
		L59	Other Bypass Of Femoral Artery	✔	✔				Iliac and Femoral Artery	A
		L60	Reconstruction Of Femoral Artery	✔	✔				Iliac and Femoral Artery	A
		L62	Other Open Operations On Femoral Artery	✔	✔				Iliac and Femoral Artery	A
		L63	Transluminal Operations On Femoral Artery		✔	✔			Iliac and Femoral Artery /Spoke	A
L65-L72	Other arteries	L65	Revision Of Reconstruction Of Artery	✔	✔				Other Artery	F
		L66	Other Therapeutic Transluminal Operations On Artery		✔	✔			Other Artery/Spoke	F
		L67	Excision Of Other Artery			✔	✔		Spoke	Spoke
		L68	Repair Of Other Artery	✔	✔				Other Artery	F
		L69	Operations On Major Systemic To Pulmonary Collateral Ar					✔	Exclude	Exclude
		L70	Other Open Operations On Other Artery	✔	✔				Other Artery	F
		L71	Therapeutic Transluminal Operations On Other Artery		✔	✔			Other Artery/Spoke	F
		L72	Diagnostic Transluminal Operations On Other Artery		✔	✔			Other Artery/Spoke	F
L73-L99	Veins and other blood vessels	L73	Mechanical Embolic Protection Of Blood Vessel			✔	✔		Spoke	Spoke
		L74	Arteriovenous Shunt					✔	Exclude	Exclude
		L75	Other Arteriovenous Operations					✔	Exclude	Exclude

OPCS Procedure Block	OPCS Code	OPCS Description	Elective - HUB	Emergency - HUB	Elective - SPOKE	Emergency - SPOKE	Exclude	Procedure Category	Category Code
	L76	Endovascular Placement Of Stent			✔	✔		Spoke	Spoke
	L77	Connection Of Vena Cava Or Branch Of Vena Cava					✔	Exclude	Exclude
	L79	Other Operations On Vena Cava	✔			✔		Operations on Vena Cava/Spoke	E
	L80	Operations On Individual Pulmonary Veins					✔	Exclude	Exclude
	L81	Other Bypass Operations On Vein					✔	Exclude	Exclude
	L82	Repair Of Valve Of Vein					✔	Exclude	Exclude
	L83	Other Operations For Venous Insufficiency			✔	✔		Spoke	Spoke
	L84	Combined Operations On Varicose Vein Of Leg			✔	✔		Spoke	Spoke
	L85	Ligation Of Varicose Vein Of Leg			✔	✔		Spoke	Spoke
	L86	Injection Into Varicose Vein Of Leg			✔	✔		Spoke	Spoke
	L87	Other Operations On Varicose Vein Of Leg			✔	✔		Spoke	Spoke
	L88	Transluminal Operations On Varicose Vein Of Leg			✔	✔		Spoke	Spoke
	L89	Other Endovascular Placement Of Stent			✔	✔		Spoke	Spoke
	L90	Open Removal Of Thrombus From Vein	✔	✔				Operations on Vena Cava	E
	L91	Other Vein Related Operations			✔	✔		Spoke	Spoke
	L92	Unblocking Of Access Catheter					✔	Exclude	Exclude
	L93	Other Open Operations On Vein			✔	✔		Spoke	Spoke
	L94	Therapeutic Transluminal Operations On Vein			✔	✔		Spoke	Spoke
	L95	Diagnostic Transluminal Operations On Vein			✔	✔		Spoke	Spoke
	L96	Percutaneous Removal Of Thrombus From Vein			✔	✔		Spoke	Spoke
	L97	Other Operations On Blood Vessel			✔	✔		Spoke	Spoke
	L98	Operations On Microvascular Vessel					✔	Exclude	Exclude

OPCS Procedure Block		OPCS Code	OPCS Description	Elective - HUB	Emergency - HUB	Elective - SPOKE	Emergency - SPOKE	Exclude	Procedure Category	Category Code
		L99	Other Therapeutic Transluminal Operations/Vein			✔	✔		Spoke	Spoke
T76-T83	Muscle	T76	TRANSPLANTATION OF MUSCLE					✔	Exclude	Exclude
		T77	Excision Of Muscle					✔	Exclude	Exclude
		T79	Repair of Muscle					✔	Exclude	Exclude
		T80	Release Of Contracture Of Muscle					✔	Exclude	Exclude
		T81	Biopsy of Muscle					✔	Exclude	Exclude
		T83	Other Operations On Muscle					✔	Exclude	Exclude
X01-X27	Operations covering multiple systems	X01	REPLANTATION OF UPPER LIMB					✔	Exclude	Exclude
		X02	REPLANTATION OF LOWER LIMB					✔	Exclude	Exclude
		X03	REPLANTATION OF OTHER ORGAN					✔	Exclude	Exclude
		X04	TRANSPLANTATION BETWEEN SYSTEMS					✔	Exclude	Exclude
		X05	IMPLANTATION OF PROSTHESIS FOR LIMB					✔	Exclude	Exclude
		X07	AMPUTATION OF ARM	✔	✔				Amputation	X
		X08	Amputation Of Hand	✔	✔				Amputation	X
		X09	Amputation Of Leg	✔	✔				Amputation	X
		X10	Amputation Of Foot	✔	✔				Amputation	DF
		X11	Amputation Of Toe	✔	✔				Amputation	DF
		X12	Operations On Amputation Stump	✔	✔				Amputation	X
		X14	CLEARANCE OF PELVIS					✔	Exclude	Exclude
		X15	OPERATIONS FOR SEXUAL TRANSFORMATION					✔	Exclude	Exclude
		X17	SEPARATION OF CONJOINED TWINS					✔	Exclude	Exclude
		X19	CORRECTION OF CONGENITAL DEFORMITY OF SHOULDER OR UPPER					✔	Exclude	Exclude
		X20	CORRECTION OF CONGENITAL DEFORMITY OF FOREARM					✔	Exclude	Exclude
		X21	CORRECTION OF CONGENITAL DEFORMITY OF HAND					✔	Exclude	Exclude
		X22	CORRECTION OF CONGENITAL DEFORMITY OF HIP					✔	Exclude	Exclude
		X23	CORRECTION OF CONGENITAL DEFORMITY OF LEG					✔	Exclude	Exclude
		X24	PRIMARY CORRECTION OF CONGENITAL DEFORMITY OF FOOT					✔	Exclude	Exclude
		X25	OTHER CORRECTION OF CONGENITAL DEFORMITY OF FOOT					✔	Exclude	Exclude
		X27	CORRECTION OF MINOR CONGENITAL DEFORMITY OF FOOT					✔	Exclude	Exclude
		Total Count		28	46	26	22	34		

Analysis logic

How the data has been analysed
a. All spoke patients to be counted as spoke beds (CAV to also have spoke and hub beds)
b. All Hub patients with stays of up to seven days to be counted as Hub days
c. Category A (Ischaemic limb revascularisation) – first seven days to be Hub, then 50% or remaining time to be Hub and 50% to be spoke (recognising that longer lengths of stay indicate patients requiring further recuperation and rehabilitation)
d. Category B (Carotid) – all bed days to be in Hub
e. Category C (EVAR) – all bed days to be in Hub
f. Category D (AAAs) – all bed days to be in Hub
g. Category E (Vena Cava) – all bed days to be in Hub
h. Category F (catch all for other operations) – no strict rule so assume all days in hub initially
i. Category G (Subclavian artery) – all bed days to be in the hub
j. All in-patient amputations X07-X12 are Hub patients whether emergency or elective
k. All amputations are categorised as "X" except amputation of foot and toe which should be classified as "DF" Diabetic Foot (this is of course a generalisation)
l. Category X (major amputations) – first seven days in the Hub then the remaining days in a spoke bed
m. Category DB (minor amputations/diabetic feet) – first seven days to be Hub, then 2/3 of remaining time to be Hub and 1/3 to be spoke (recognising that longer lengths of stay indicate patients requiring further recuperation and rehabilitation).

For ease and due to file size the following appendices are collated as attachments.

Appendix D: SEWVN Service Specification

Appendix E: SEWVN Surgical Pathways

Appendix F: SEWVN Rehabilitation Pathways

Appendix G: SEWVN Programme Terms of Reference

Appendix H: SEWVN Programme Risk Register

Appendix I: SEWVN Business Case Peer Review

Appendix J: SEWVN Non Arterial Centre (Spoke) Models of Care