Template Version 2 – Emergency vascular care

1. Context

7 Day services programme

The Government's Mandate to the NHS for 2016/17 sets a priority deliverable to:
"Roll out 4 priority clinical standards in all relevant specialties to 25% of the population in 2016/17; by 2020 roll out 7 day hospital services to 100% of the population (with progress also made on the other six standards identified by the NHS Services, Seven Days a Week Forum), so that patients receive the same standards of care in hospitals, seven days a week."

NHS Services, Seven Days a Week Forum - Summary of Initial Findings, December 2013

The 4 priority clinical standards are:

- **Standard 2 - Time to consultant review**
  All emergency admissions must be seen and have a thorough clinical assessment by a suitable consultant as soon as possible but at the latest within 14 hours of admission to hospital. Although the December 2013 document stipulated that the standard was to be measured 'from time of arrival' this has now been changed to reflect the original source document for this standard (Royal College of Physicians acute care toolkit number 4).
- **Standard 5 - Access to diagnostics**
  Hospital inpatients must have scheduled seven-day access to diagnostic services such as x-ray, ultrasound, computerised tomography (CT), magnetic resonance imaging (MRI), echocardiography, endoscopy, bronchoscopy and pathology. Consultant-directed diagnostic tests and their reporting will be available seven days a week:
  - within 1 hour for critical patients;
  - within 12 hours for urgent patients; and
  - within 24 hours for non-urgent patients
- **Standard 6 - Access to consultant-directed interventions**
  Hospital inpatients must have timely 24 hour access, seven days a week, to consultant-directed interventions that meet the relevant specialty guidelines, either on-site or through formally agreed networked arrangements with clear protocols, such as:
  - critical care;
  - interventional radiology;
  - interventional endoscopy; and
  - emergency general surgery.
- **Standard 8 - On-going review in high dependency areas**
  All patients on the AMU, SAU, ICU and other high dependency areas must be seen and reviewed by a consultant twice daily, including all acutely ill patients directly transferred, or others who deteriorate. To maximise continuity of care consultants should be working multiple day blocks. Once transferred from the acute area of the hospital to a general ward patients should be reviewed during a consultant-delivered ward round at least once every 24 hours, seven days a week, unless it has been determined that this would not affect the patient's care pathway.

NHS England and NHS Improvement have joint responsibility for delivery, working with other organisations, to achieve this. To achieve the ambition of 25% of the population having access to 7 day hospital services by March 2017, a number of trusts have been identified to be early implementers. They are being supported to achieve the four priority clinical standards from the Sustainable Improvement Team. In response to clinical feedback, NHS Improvement has clarified the guidance on the four priority clinical standards for providers completing the self-assessment survey.

Seven-day services: clarification of the four priority clinical standards

Urgent and Emergency Care Review and the 5 urgent network specialist services

The U&EC Review aims to ensure that by 1st November 2017, 100% of five urgent network specialist services provide urgent care that meets the 4 prioritised 7DS clinical standards. These services are: major heart attack centres, paediatric intensive care units, major trauma centres, hyperacute stroke units and vascular surgery centres. The 23 U&EC Networks will have a key role in ensuring the services progress towards said achievement, and will be supported by the 4 regional U&EC PMOs.

2. Service-specific context

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. This is also the minimum number needed for the most efficient use of specialist equipment, staff and facilities, and the improvement in patient outcome that is associated with increasing caseload.

Over the last few years there have been changes in the structure of vascular services which will start to influence and improve service quality, efficiency and clinical outcomes. However more restructuring will be required to deliver high quality services on an equitable basis.

The Vascular Society of Great Britain and Ireland (VSGBI) and National Confidential Enquiry into Patient Outcome and Death (NCEPOD) guidance on the provision of emergency and elective vascular surgery services states that the best outcomes are achieved in specialist vascular units with dedicated vascular teams available 24 hours a day, seven days a week. This includes interventional radiology as part of the vascular team and the British Society of Interventional Radiology has published guidance on the provision of interventional radiology which is linked to this document. The VSGBI recommends fewer and higher volume units. The ongoing vascular surgery reconfiguration and the Quality Improvement (QIP) Programme led by the VSGBI has led to a reduction in elective infra-renal aortic aneurysm operative mortality of 8% in 2008 to 1.5% in 2014[i].

The evidence also supports minimum numbers of elective procedures that vascular units should undertake and links surgeon elective volume with outcome. The Vascular Society reported outcomes after elective infra-renal AAA repair in 2012 as part of its quality improvement programme. Analysis of unit volume in quartiles from the low volume units (10 cases per year) through to the high volume units (150 repairs per year) showed a consistent reduction in mortality across the quartiles from 4.4% to 1.9%[ii].

3. Guidance

3.1 NHS England Guidance including specialised commissioning

Service Specification for Specialised Vascular Services (Adults)

The service specification for specialised vascular services is comprehensive, relevant parts of the document for emergency vascular interventions have been included below:

Vascular Networks
All Trusts that provide a vascular service must belong to a vascular provider network.
The network arrangements must be clearly documented and have clearly articulated governance arrangements. As well as the weekly multi-disciplinary team meetings there will be regular business meetings to ensure an inclusive and coherent approach to audit, education and training.

To avoid any misunderstanding, it is envisaged that all arterial surgery will be provided at a vascular centre, with the facilities outlined below. In-patient arterial surgery and vascular interventional radiology will be available 24/7 within the arterial centre with a vascular on call rota for vascular emergencies covered by on site vascular surgeons and vascular interventional radiologists to ensure immediate access for emergency procedures and post-operative care. In practice that means a vascular medical team of a minimum of 6 vascular surgeons and 6 vascular interventional radiologists will be needed to ensure a comprehensive out of hours emergency cover.

Each surgeon will need to have an appropriate arterial workload (e.g. in the region of 10 AAA emergency and elective procedures per surgeon per year and commensurate numbers of lower limb and carotid procedures), which will necessitate an appropriate catchment area to generate sufficient case volume. A minimum population as of 800,000 as quoted in Section 2 service-specific context would be appropriate but for a world class service a larger catchment area will be required.

A 24/7 vascular interventional radiology rota may need to be organised on a network wide basis to ensure that interventional radiology services for other specialties, in local hospitals, are not destabilised. All participants in the rota must have the appropriate skills and competencies to undertake the full range of vascular interventional radiological procedures. Emergency access to vascular interventional radiology must be within 1 hour from initial consultation to intervention.

Each vascular network will have a formalised description of where inpatient, day case and outpatient services are provided in the network. Local protocols will be agreed to provide high quality specialist care at any non-arterial hospitals in the network. Clear written arrangements will exist for cover of inpatients and the transfer of emergencies out of hours. Formal arrangements will also exist to enable vascular-specialists working predominately at a ‘spoke’ hospital to support out-patient clinics, ward work and non arterial surgery on appropriate sites across the network.

The provider network will nominate a lead vascular clinician and a lead manager with responsibility for ensuring and maintaining implementation of the standards set out in this service specification and locally agreed policies/protocols. All patients with vascular disease or vascular complications cared for outside of the main arterial centre must have access to the same high quality of care and the same opportunities/choices of care as those patients who are in the arterial centre hospitals. The vascular service will provide a diagnostic and treatment service through a multidisciplinary team model.

Specialist Vascular Team
Patients with vascular disorders will be cared for by specialist vascular teams. These teams will include vascular surgeons, consultant anaesthetists, interventional vascular radiologists, vascular scientists, nurses, radiographers, physiotherapists, occupational therapists and rehabilitation specialists.

The vascular multidisciplinary team will be hosted by the arterial centre. Clinicians providing emergency care will be part of the vascular services multi-disciplinary team and be delivering both in and out of hours care in the network arterial centre.

Care of patients will be managed through regular multi-disciplinary team meetings which will occur at least once a week. The membership requirements for the multi-disciplinary team meeting will include a range of clinical disciplines and be formalised. The documentation will include statements on minimum levels of attendance for individuals and quoracy. It is expected that all clinicians will attend multi-disciplinary team meeting on a regular basis.

Emergency procedures will be reviewed at the next multi-disciplinary team meeting.
Discussion at the multi-disciplinary team meeting will precede elective vascular procedures being undertaken, although protocols will be developed to ensure that urgent cases are not delayed inappropriately. The specialist vascular team will also support the care of patients under the management of other specialties.

Infrastructure/Facilities

With regard to the whole vascular service across the network there will be access to the following:

- Vascular Laboratory – the vascular laboratory service will be available for the diagnosis and assessment of arterial and venous disease. (Service availability does not necessarily have to be within the confines of a vascular laboratory).
- Vascular Ward – patients with vascular disease will have access to dedicated vascular beds. There will be sufficient dedicated beds to accommodate the routine elective work and emergency admissions. Beds will be staffed by an appropriate skill mix of nurses who have been trained in the care of vascular patients. Doppler investigation will be available on the ward.
- Interventional radiology suite with access to nursing staff who have been trained in vascular procedures. .(RCR Standards BFCR(08)13)
- Operating Theatres – a 24 hour NCEPOD emergency theatre will be accessible at all times to undertake emergency vascular procedures.
- Operating theatres – facilities for endovascular aneurysm repair should be available with facilities as described by the Joint Working Group to produce guidance on delivering an Endovascular Aneurysm Repair Service
- Anaesthesia – elective vascular services will have dedicated vascular anaesthetic input into elective services, from anaesthetists experienced in dealing with the vascular patient and with a special interest in this area.
- Intensive Treatment Unit (ITU) and High Dependency Unit (HDU) – Facilities with full renal support must be available on-site to support the vascular service. Bookable HDU/ITU with sufficient beds will be available for elective patients.
- 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.

Care Pathways
The following care pathways will be documented by each vascular network:

- Management of acute rupture of AAA
- Investigation and management of unruptured AAA
- Investigation and management of carotid disease (link to stroke care pathway)
- Management of acute limb ischaemia
- Management of vascular access for renal patients, if undertaken by vascular specialists
- Management of vascular injury (including iatrogenic complications)

Highly Specialised Interventions
Some interventions/treatment are complex, rare or require other specialist input such as cardiothoracic surgeons e.g. thoraco-abdominal aneurysms. These procedures will only be carried out in arterial centres with the required skills and clinical linkages.
There needs to be a close relation between vascular services and cardiology/cardiac surgery services and whilst colocation is desirable it is not essential.

Interdependencies with other services
Vascular services link to a range of other clinical specialties and services:

Co-located services
- Intensive care
- Interventional vascular radiology

Interdependent services
- Stroke imaging, intervention and vascular opinion on stroke management
- Limb salvage surgery
- Diabetes specialist hospital services and diabetic community services
- Renal inpatient units
- Interventional cardiology
- Cardiac surgery
- Thoracic surgery
- Major trauma centres and trauma units

Related services
- Rehabilitation services
- Limb fitting service

Relevant networks and screening programmes include:-
- Cardiac/Stroke networks
- Renal networks
- Critical Care networks
- Trauma networks
- AAA screening programme

3.2 National Guidance i.e. NICE

Of note - there is a clinical guideline committee under the umbrella of NICE, currently working on "AAA management and diagnosis" - with a working publication date of May 2018.

3.3 National Clinical Guidance e.g. Royal Colleges and Specialist Associations

Vascular Society – Provision of services for patients with vascular disease (2015)

This document sets out the principles by which a 24/7 high quality, consultant led vascular service might best deliver optimal patient care. The document is intended to assist those responsible for the provision and resourcing of health care, as well as for commissioners of the service. The background highlights the main conditions presenting to the vascular service and the issues involved in their management. Further sections outline the personnel involved in the vascular service, the facilities required, organisation of networks, training and governance.

The current Vascular Society recommendation is that high quality vascular care in the UK is best delivered with vascular networks. The details of how vascular networks should operate to optimise local assessment, diagnosis and rehabilitation of patients in non-arterial centres - whilst also delivering high volume interventions at arterial centres is described. The goal is a service which balances the needs of patient access with the provision of comprehensive, safe vascular care and intervention.

RCoA – Guidance on the provision of vascular anaesthesia services (2016)
This document covers guidance on the provision of elective and emergency vascular anaesthesia service

- Major vascular surgery includes a significant urgent and emergency workload. The ability to provide emergency cover means that facilities and expertise should be available 24 hours per day. Staffing and resources should also be planned and funded to allow for unpredictable changes in service requirements for urgent vascular procedures.
- Aortic surgery carries high risks of morbidity and mortality, which are greater after emergency than elective procedures. Patients undergoing open aortic surgery require post-operative level 2 or level 3 critical care on-site. These facilities must be available for all patients undergoing major vascular surgery and availability must be confirmed before elective surgery is contemplated.
- Anaesthesia for all patients undergoing major vascular surgery should be provided by a consultant experienced in vascular anaesthesia.
- There is evidence that outcome after major arterial surgery is related to the caseload of both surgeons and anaesthetists. It has been suggested that individual anaesthetists should not be caring for very small numbers of patients undergoing major elective and emergency aortic or carotid surgery. Anaesthetic departments should review the allocation of vascular cases to ensure optimal concentration of experience and expertise.
- Anaesthetists undertaking major vascular surgical cases should be supported by adequately trained assistants who work regularly in the vascular theatres.
- Vascular anaesthetists should have some managerial responsibility and should be involved in planning decisions that affect the delivery of vascular services.
- Anaesthetists should be fully involved in decision-making for patients undergoing major vascular surgery. This includes access to facilities for adequate pre-operative assessment. Ideally, this should be within the setting of a formal pre-operative assessment clinic, which should be adequately staffed and supported and have allocated sessional programmed activities
- Provision should be made for those who may cover vascular emergencies, but do not have regular sessions in vascular anaesthesia, to spend time in a supernumerary capacity with a consultant anaesthetist who has a regular vascular commitment.
- Units undertaking major vascular anaesthesia should nominate a named lead clinician to assist dialogue and relationships with vascular surgeons, radiologists and other appropriate specialists. Departments should facilitate joint audit and management meetings between these parties.
- Multidisciplinary team decision-making should be undertaken, to allow planned, appropriate management of all high-risk cases. Where regional or national guidance exists, this should be followed.
- Patients undergoing major vascular surgery should have access to a multidisciplinary, acute pain management service.
- Facilities should be available to conserve blood (for example, cell salvage or acute normovolaemic haemodilution) and be supported by the facilities to manage major haemorrhage.
- Local guidelines should ensure the appropriate administration of blood and coagulation products immediately if required.

Further intelligence from the RCoA is included below:

- HDU and ICU are already 24/7, as is emergency anaesthetics cover and the sections on preoperative assessment, multidisciplinary team working are sensible.
- The guidance does not recommend a dedicated consultant vascular anaesthetics on call rota and the RCoA are comfortable with this, as even in the high volume centres we are not sure the workload would justify it.
- Management of vascular emergencies should presently fall within the core skill-set of the consultant anaesthetist covering a general emergency workload. It may be this will change as more emergency endovascular AAA repairs are carried out remotely.
- No separate rota for vascular anaesthesia means it is imperative that vascular anaesthetists (and management) within any given department provide the necessary in house Continued Professional Development (CPD) for those without regular vascular practice. Anaesthetists in arterial centres now attend patients with increasingly complex vascular emergencies (dissections, trauma and perhaps bespoke EVAR for symptomatic AAA etc.). This is an increasingly important issue.

RCR - Standards for providing a seven-day acute care diagnostic radiology service (2015)

This document aims to highlight the standards that should be taken into account when designing such a service, and it is hoped that it will help in making a business case for the necessary increases in human and financial resources. It contains 14 key recommendations which are expanded upon within the document:

1. Safe radiological staffing is required to deliver satisfactory patient outcomes.
2. Clinicians treating acutely and critically ill patients should have access to a radiologist when their skill is likely to aid diagnosis and/or provide therapeutic intervention.
3. Rostering arrangements for the delivery of acute care diagnostic radiology services should ensure adequate rest is possible before and after each shift. Ad hoc on call arrangements, for example, for intervention, are inappropriate and should be replaced by more formal arrangements. To ensure patient safety it is important that radiologists are not fatigued and always have 11 hours of continuous rest in a 24 hours period, in line with the requirements of the UK Working Time Regulations.
4. Radiologists reporting from home and teleradiologists reporting outsourced imagine for acute patients should have workflow efficient access to previous imaging, reports, electronic patient records, multiplanar processing facilities and voice recognition reporting.
5. Robust information infrastructures should be in place to support image and report sharing.
6. Radiologists reporting acute imaging should be supported by secretarial or clerical staff to facilitate the communication between radiologists and the referring doctors. This particularly applies to critical, significant or unexpected report communication.
7. There should be clarity from the provider about what acute care services are provided on site on a 24 hour basis and referral protocols should be agreed.
8. Radiology information systems and picture archiving and communication systems support should be available seven days a week.
9. To provide effective acute care diagnostic radiology series, it should be delivered as part of a provider's delivery of all seven-day acute care services and not as an isolation service
10. IT system should enable efficient electronic feedback to all radiologists involved in emergency imaging or intervention, to benefit patients and facilitate learning
11. All radiologists reporting imaging of acutely ill patient or intervening on them should have well-defined efficient telephone communication systems that permit urgent discussion with clinicians who have overall responsibility for such patients

12. Health provider and commissioners that sign up to providing seven-day acute care diagnostic radiology services must ensure that such services are adequately staffed and resourced to provide a sustainable high-quality service, protect the health and wellbeing of staff and to ensure that patient safety is not compromised
13. When any aspect of acute radiology services cannot be provided on a 24 hour basis, this should be formally reported and placed on the provider's risk register. Business cases for alternatives for providing acute radiology services should be urgently developed and discussed with the provider's management.
14. Large networks of radiologists may facilitate sustainable acute seven-day rotas.

RCR Statement

For Standard 5, 'Improved Access to Diagnostics', we believe that a timely provisional report is required in critical and urgent patients. Consultant delivered report within 1 hour would be optimal but is completely unachievable with present staff and budget restraints. For critical patients a Registrar-delivered provisional report within 1 hour of the CT being performed followed by Consultant approval of a report within 24 hours is the current realistic guideline.

RCR & British Society of Interventional Radiology - Provision of interventional radiology services (2013)

This document demonstrates the range of services offered by interventional radiologists and sets out the core requirements for the provisions of an Interventional Radiology (IR) service both in district general hospitals and tertiary or teaching hospitals, advising on how services may be set up collaboratively within regions to offer the highest quality of care to all patients, both in and out of hours. This highlights that access to robust 24/7 interventional radiology should be a priority for all acute hospitals and reconfigurations to individual series should ensure that continuity of access to IR services, particularly for emergency care is maintained.

The number of interventional radiologists within a unit is clearly a key factor in determining the approach to developing a safe and sustainable rota. The following guidance should be applied:

- Services with fewer than four interventional radiologists should liaise with neighbouring units to develop a model of care that will permit robust IR rotas
- Services with between 4-6 interventional radiologists may be able to provide an independent on-call rota depending on the intensity of activity. Most services in this range should consider networking with neighbouring units to ensure a more robust long-term service.
- Services consisting of six or more interventional radiologists will usually be able to provide a robust 24/7 services with is compliant within the EWTD. For populations greater than one million, a 1:8 rota may be more sustainable.

4. Relevant data and intelligence including national audits

Vascular Services Quality Improvement Programme

5. Key areas of required attention

Radiology:

1. Key issue is lack of Reporting Radiologists across the UK. This workforce census from 2014 covers the demands, staff shortages, effects of outsourcing and financial shortfalls in Radiology Services. Most useful summary here:

https://www.rcr.ac.uk/sites/default/files/publication/bfcr153_census_20082015.pdf
https://www.rcr.ac.uk/sites/default/files/RCR_Clinical_Radiology_response_to_Dalton_Review.pdf

2. Outsourced reporting has become a necessity in many NHS Trusts because of inadequate Consultant Radiologist staffing which means that Consultants cannot have time off the following day after a busy night on call. NHS Consultant Radiologists also deliver outsourced reporting. Outsourcing is costly. The RCR 2014 workforce census projected that, for the period 1 April 2013 to 31 March 2014, total expenditure on radiology outsourcing across the UK was equivalent to the annual salary of 680 to 689 NHS consultants (point five of the 2014 pay scale for England).
   More here:
   https://www.rcr.ac.uk/clinical-radiology/service-delivery/sustainable-future-diagnostic-radiology/network-solutions
3. Consistent increase in demand for all imaging (approximate 13% increase in investigations per annum). The current workload is already not being covered. 88% of Departments cannot meet their existing reporting requirements in 2013-14.
4. For emergency vascular services, many of these services do not meet the above standards. There are issues around the ability to deliver interventional radiology on a 24/7 basis and many sites operate with derogations from the specialised commissioning specification. Further work is required from regional teams to support these services. In many cases, reorganisations in which the number of centres decrease and services are centralised are planned to address these issues.
5. In those centres that are also major trauma centres both a vascular surgeon and vascular interventional radiology consultant must be available to be onsite in 30minutes. This is less than the 1hour target contained in this guidance. In order to meet clinical guidance for both rotas will need to be arranged at a network level and patients may need to be transferred. Further reconfiguration will require commissioner-driven change to promote increased capacity (theatre lists, ITU, OPD, beds etc.) at the hubs of the vascular networks.

Comment [CH1]: Are the derogations clinically acceptable though?

References

[i] RCSE, VSGBI, HQIP. The National Vascular Registry 2015 Annual Report; http://www.hqip.org.uk/public/cms/253/625/24/316/2015-Nov-11-National%20Vascular%20Registry-annual%20report%202015.pdf?realName=0nnt0I.pdf

[ii] VSGBI. Outcomes after elective repair of Infrarenal Aortic Aneurysms. 2012; http://www.vascularsociety.org.uk/wp-content/uploads/2012/11/VSGBI-Mortality-Report.pdf