

# **NATIONAL ABDOMINAL AORTIC ANEURYSM QUALITY IMPROVEMENT PROGRAMME**

## **INTERIM REPORT**

Prepared on behalf of the  
Vascular Society of Great Britain and Ireland

by

The Abdominal Aortic Aneurysm Quality Improvement  
Programme Team

**JUNE 2011**

# **NATIONAL ABDOMINAL AORTIC ANEURYSM QUALITY IMPROVEMENT PROGRAMME (AAAQIP) INTERIM REPORT 2011**

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## **The Abdominal Aortic Aneurysm Quality Improvement Programme**

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# NATIONAL ABDOMINAL AORTIC ANEURYSM QUALITY IMPROVEMENT PROGRAMME (AAAQIP) INTERIM REPORT 2011

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## Glossary

A&R	Audit & Research
AAA	Abdominal Aortic Aneurysm
AMP	Amputation
BSIR	British Society for Interventional Radiology
C Diff	Clostridium Difficile
CCF	Congestive Cardiac Failure
EVAR	Endovascular Aneurysm Repair (a graft placed under X ray guidance, usually via the groin arteries)
GAS	Glasgow Aneurysm Score
GMC	General Medical Council
HES	Hospital Episode Statistics
IHD	Ischaemic Heart Disease
IIB	Infrainguinal Bypass Surgery
IPOC	Integrated Pathway of Care
IT	Information Technology
MI	Myocardial Infarction
MRSA	Methicillin Resistant Staphylococcus Aureus
n	Number
NAAASP	National Abdominal Aortic Aneurysm Screening Programme
NHS	National Health Service
NVD	National Vascular Database
ONS	Office of National Statistics
OPCS	Office of Population Census Surveys
OR	Open Aneurysm Repair (the traditional open surgical approach)
PCT	Primary Care Trust
PEDW	Patient Episode Database for Wales
POSSUM	Physiological & operative severity score for the enumeration of mortality & morbidity
PROMs	Patient Reported Outcome Measures
PUO	Pyrexia of unknown origin
Resp	Respiratory
SD	Standard Deviation
SpR	Specialist Registrar
SMR01	Scottish Morbidity Record
VASGBI	Vascular Anaesthesia Society of Great Britain & Ireland
VBHOM	Vascular Biochemistry and Haematology Outcomes Model
VSGBI	Vascular Society of Great Britain & Ireland

## FOREWORD

The Vascular Society's quality improvement programme grew out of recognition that the outcomes for abdominal aortic aneurysm (AAA) surgery in the UK were not as good as the Society believed they should be. Evidence came from a variety of sources, The National Confidential Enquiry into Peri-operative Deaths, The National Intensive Care audit (ICNARC) and the 2008 Vascunet report comparing AAA outcomes from vascular registries in a selection of European countries. With recognition came the clear understanding that the solution to improving patient care lay with vascular surgeons. The Quality Improvement Framework (ratified by the society in 2009) provided the springboard for action. This became a practical reality when, with our partner organisations, we obtained a quality improvement programme grant from The Health Foundation.

We have seen the appointment of a dedicated team, the development of a clear project plan and now a rolling implementation of the programme with willing support from Vascular Society members and their clinical colleagues throughout the United Kingdom. Our purpose is to introduce clear standards for clinicians to measure their service against and to improve the consistency of assessment and interventions for patients with AAA. We also wish to see better communication with our patients, involving them in the critical decisions that they need to make to obtain the best care that they can.

This report details our plans and maps out progress to date. It provides a framework on which we can build a better service, yet work remains to be done. We need to build partnerships between clinicians and with our patients to deliver the improvements that we aspire to. There is evidence of improvement in outcomes with the latest Vascunet report showing falling mortality following AAA repair. Please use this document to drive improvements in your local services and help to demonstrate that in the UK vascular specialists are providing a high quality service to our patients.

**Peter Lamont**



President

The Vascular Society of Great Britain and Ireland

## EXECUTIVE SUMMARY

The Abdominal Aortic Aneurysm Quality Improvement Programme (AAQIP) was initiated after the U.K was found to have a high outlying mortality rate for aortic aneurysm surgery at 7.9%, compared to the rest of Europe at 3.5%, [Vascunet 2008]. The Vascular Society was successful in obtaining a grant of £380,000 from the Health Foundation to run the programme nationally and achieve the aim of reducing elective AAA mortality in the U.K to 3.5% by 2013. The programme has rolled out involving joint collaboration from the VASGBI and BSIR with relevant Cardiac and Stroke Networks and patient involvement. The key findings and recommendations to date are captured below with a view to engaging those involved in the care of patients with aortic aneurysm in the remaining year of the programme.

## Key Recommendations

### *Volume-outcome*

- There is evidence that larger volume centres achieve better outcomes following AAA repair with reduced length of stay and improved survival after complications [Holt et al. 2007]. The Vascular Society recommends that centres undertaking AAA repair should perform a minimum of 100 elective interventions (Endovascular repair (EVAR) or Open surgical Repair (OR)) in a 3 year period.
- Units undertaking smaller numbers should seek to link with adjacent centres and form a single in-patient intervention centre for major vascular surgery that meets the volume requirement for safety.
- Where such mergers are made, a vascular service must be maintained on other sites to ensure local provision of out-patient and day-care services. There should be equity of access to vascular specialist care for all patients served by an intervention centre, irrespective of their site of presentation.
- Centres must have the ability to offer both OR and EVAR to be a designated arterial centre.

### *Pre-assessment*

- There is good evidence that standardising medical practice improves patient safety [Muluk et al. 1997].
- Patients with AAA requiring intervention are best managed using a care pathway that includes the key components of the Vascular Society's Quality Improvement Framework (2009).
- All patients being considered for intervention should have formal imaging of their AAA by CT angiography unless medically contra-indicated.
- Multi Disciplinary Teams (MDT) improve decision making and patient progress along care pathways in cancer [Junor et al. 1994]. It is recommended that vascular services use MDTs for decision making about patient suitability for elective AAA considered for intervention. All patients with an AAA of diameter 5.5cm or above should be reviewed by the MDT even if not proceeding to intervention.
- The National Abdominal Aortic Aneurysm Screening Programme (NAAASP) has set a deadline of 8 weeks from referral to treatment for all large AAA (over 5.5cm in men). It is recommended that all large AAA, in patients safe for intervention, however detected should be treated with in 8 weeks from referral.

### *Facilities*

- Centres providing care for patients with AAA should have on site 24/7 availability of vascular surgeons and interventional radiologists with appropriate vascular skills.
- Hospitals should comply with MHRA recommendations regarding facilities for endovascular repair of AAA [MHRA 2010].

- Patients should have access to critical care facilities when required.
- Patients should be cared for on specialist vascular wards, by clinical teams skilled in the care of patients with vascular disease.

### ***Team Composition***

- Patients requiring intervention for AAA should be managed by a vascular anaesthetist.
- Clinical teams should ensure that they have appropriate skill mixes to provide both open and endovascular interventions for patients under their care.

### ***Patient Information***

- Patients should be given consistent advice about the risks of interventions in an unbiased way, to allow them to make an informed choice about their preferred intervention. Such advice should include information on both short and long term outcomes of all interventions.
- Patients should be given written information to support the verbal advice that they are given.
- Vascular teams should include specialist nurses who can support patients and give advice about pre and post-operative care. Patients being discharged from hospital should have a telephone number to phone for advice in the early post-operative period.
- Telephone contact with patients after discharge is encouraged as part of routine clinical care.

### ***Clinical Audit***

- Centres undertaking interventions for AAA must enter all cases into national clinical audit via the National Vascular database (NVD) in real time (target within 2 weeks of patient discharge or death).
- Vascular units should have policies in place to validate data entry and coding of activity. This should be supported by regular meetings.
- NHS Trusts should facilitate regular coding reviews (at least monthly) to improve the quality of audit and HES data returns.
- Vascular services should seek feedback from their patients (PROMS) to provide quality assurance of their service.



# 1. INTRODUCTION

## 1.1 Origins of the National AAA Quality Improvement Programme

Between 4% and 8% of older men are affected by an abdominal aortic aneurysm (AAA), and every year in England and Wales about 7000 men die from a ruptured AAA [Vascunet 2008, Jimenez and Wilson 2005]. Most AAAs do not produce symptoms. They can rupture without warning, causing sudden death or collapse of the patient. Ruptured AAA carries a mortality of about 75%. There has been sustained interest in preventing rupture by screening and detecting AAA. Clinical trials have demonstrated that screening and intervening to treat larger AAA reduces aneurysm related mortality [Ashton et al., 2002; Lindholt et al., 2006]. This evidence has led to the introduction of a national abdominal aortic aneurysm screening programme (NAAASP) to identify and treat at risk aneurysms prior to rupture [NAAASP 2011].

Aneurysms detected by screening may be treated by either open surgery (OR) to replace the aneurysmal segment or by endovascular repair (EVAR) undertaken by insertion of a stent graft. Both operations carry a risk of death. For a screening programme to be effective it is necessary to reduce the associated peri-operative mortality to a minimum. In 2008 the mortality rate associated with elective AAA repair was reported by Vascunet (a collaboration of European Vascular registries) at about 7.5% in the U.K. This rate compared unfavourably with other European countries which reported mortality rates in the order of 3 to 4% [Vascunet 2008]. Other sources of information from the Intensive Care Society and the Vascular Anaesthesia Society presented similar mortality outcomes for elective AAA repair in the UK [Bayley et al. 2001].

The data gave rise to significant concern within the UK vascular community and resulted in the publication of a national quality improvement framework for improving the results of elective AAA repair [AAQIF 2009]. The Vascular Society's Audit and Quality Improvement Committee was tasked with delivering a quality improvement programme to reduce mortality following elective repair of AAA in the UK which incorporates the QIF. Funding was sought from the Health Foundation and a grant of £380,000 was awarded for this work at the end of 2009. The grant application included members of the VSGBI, VASGBI, BSIR and Circulation Foundation as well as lay and patient representatives.

The Health Foundation funds projects through a scheme called "Closing the Gap". Closing the Gap aims to improve the quality of care delivered to patients by bridging the gap between known best practice and the routine delivery of care. The AAQIP concentrates on assisting all centres in the adoption of processes and protocols which have been shown to reduce mortality. The Vascular Society has a central role in encouraging improvements in patient care. The Society recognises that patient safety can be improved by enhancing the consistency of care delivery and improving national clinical audit.

This report is an account of the first year of a national quality improvement programme. It is intended to share the learning and disseminate examples of best practice to help clinicians, managers, NHS Trusts and commissioning bodies deliver high quality care to patients throughout the UK. It contains within it a pathway of care that maps to the quality improvement framework. This is underpinned by an evidence base and feedback from consultation with patients, clinicians and cardiovascular networks involved in providing care.

## 1.2 Aims of the AAA QIP

1. To reduce the elective mortality for infrarenal AAA repair in the UK to 3.5% by 2013.
2. Increase data contribution onto the National Vascular Database (NVD) from 65%-90% by April 2012. To encourage convergence of Hospital Episode Statistics (HES) and NVD data by improving both clinical audit data entry and clinician involvement in coding.
3. Standardise the management of patients' through the AAA care pathway in regions throughout the U.K.
4. Use best practice protocols for AAA surgery based on previous Randomised Controlled Trials (EVAR trials).
5. Target change in centres with high mortality and deviation from agreed protocols driving best practice.

6. Engage and collaborate with patients to improve informed consent, communication throughout the care pathway and patient satisfaction.
7. Measure unanticipated consequences and adverse events as a result of implementing the programme.

### 1.3 Organisation of the Programme

The project is run on behalf of the Vascular Society's Quality Improvement and Audit Committee from a central office in Southmead Hospital, Bristol with regular communication with the VSGBI offices in London. Our implementation team lead project interventions at a regional level through regional action plans (R.A.Ps) including all clinicians involved in the care of patients with aortic aneurysms.

#### Central Project Team

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Roxanne Potgieter, Project Manager

Helen Hindley, Acute Kidney Injury Audit Manager  
Julia McCleary, Research Administrator

#### Core Team

Peter Lamont, President VSGBI  
Mike Wyatt, Secretary VSGBI  
Sara Baker, Director NVD  
Peter Barker, Patient Representative

Jonathan Earnshaw, NAAASP Director  
Simon Parvin, Treasurer VSGBI  
Tim Lees, ex Chair Audit and QI committee

#### Regional Implementation Team Leads

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N. Ireland: Paul Blair, Bernard Lee  
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Yorkshire: Julian Scott, Sewa Singh, Jonathan Beard, Jon Hossain  
W. Midlands: Colette Marshall, Ross Naylor  
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South East: Mark Tyrrell, David Gerrard  
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Wales: Susan Hill, Louis Fligelstone

#### Patient Group Leads

Bristol: Roxanne Potgieter  
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Leeds: Julian Scott, Anne Johnson  
Manchester: Vince Smyth, David Murray  
Cardiff: Kate Rowlands, Susan Hill  
Aberdeen: Paul Bachoo, Julie Brittenden  
London: George Peach

#### Stakeholders

- National Abdominal Aortic Aneurysm Screening Programme (& Scotland) (NAAASP)
- British Society of Interventional Radiology (BSIR)
- Vascular Anaesthetic Society of GB & Ireland (VASGBI)
- Society for Vascular Nursing (SVN)
- Cardio-Vascular/ Cardiac and Stroke Networks
- Commissioners

### 1.4 Availability of the report in the public domain

This report will be circulated to all vascular surgeons, Governance Leads, Trust Chief Executive Officers, Medical Directors and stakeholder groups. Recipients are strongly encouraged to share the report with relevant members of their teams.

## 1.5 Definitions

- **Vascular Society of Great Britain and Ireland (VSGBI):** The VSGBI is a registered charity founded to relieve sickness and to preserve, promote and protect the health of the public by advancing excellence and innovation in vascular health, through education, audit and research. The VSGBI represents and provides professional support for over 600 members and focuses on non cardiac vascular disease, including disease of the peripheral arteries, veins and lymphatic. <http://www.vascularsociety.org.uk/>
- **Index Vascular procedures:** Index Vascular procedures include Infra-inguinal Bypass Surgery, Limb Amputations, Carotid Endarterectomy and Abdominal Aortic Aneurysm Repair. These procedures form a substantial part of the vascular training curriculum and the core workload of a practising vascular surgeon.
- **National Vascular Database (NVD):** The NVD, is a web based data entry system that aims to collect data on all index vascular procedures. It is housed in a secure NHS server. Data can be entered in real time by users.
- The NVD is funded largely by subscription from the membership and its sister organisations (BSIR and VASGBI). In addition it receives funding through HQIP for the carotid intervention audit. The VSGBI supports clinicians to enter 100% of cases onto the NVD. <https://www.nvdonline.nhs.uk/> The NVD is also linked to the National AAA screening programme database so that screened patients can be tracked from their invitation to attend screening through to outcome following intervention.
- **Hospital Episode Statistics (HES):** HES is the national statistical data warehouse for England of the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. National data is also accessed from the Celtic nations and is referred to using the following terms; SMR01 (Scotland), PEDW (Wales) and DHSSPSNI (Northern Ireland). In this report, the term *HES* is used generically to describe data that are collected by these national agencies.

## 2. SUMMARY OF KEY COMPONENTS IN THE QUALITY IMPROVEMENT PROGRAMME

### 2.1 Framework for Improving the Results of Elective AAA Repair (2009)

After consultation with the membership in March 2009, the Council of the Vascular Society published the framework for improving the results of elective AAA repair which maps to standards set by NAAASP. This provides clear, unambiguous and reliable standards to identify the necessary steps in the care pathway to provide optimal patient care. As part of the QIP we have produced best practice protocols mapped to these standards to help vascular clinicians who may need to introduce changes to their vascular practice.

### 2.2 Data Communication and Measurement

The importance of collecting complete and up to date clinical data is repeatedly emphasised in order to track variation in outcomes and identify areas for improvement. The AAAQIP aims to drive up data contribution onto the National Vascular Database (NVD). We provide quarterly reports to NHS Trusts comparing their Hospital Episode Statistics (HES) and NVD data for all AAA and carotid cases. Our aim is to drive greater scrutiny of coding and accuracy of data capture. We wish to encourage:

- Clinicians within NHS Trusts to address data discrepancies with information governance departments and resolve them locally.
- Improved data entry, with a focus on accuracy of recording of clinical activity.

### 2.3 Best Practice Protocols & Quality Improvement Interventions

Reducing harm to patients can be achieved by reducing variation in care delivery [Nolan 2000]. We aim to improve standardisation of care delivery by introducing best practice protocols. We have taken the standards described in the QIP as well as developing an assessment tool based on the EVAR 1 trial. These have been brought together in care bundles to allow measurement of the consistency of care delivery.

We describe processes and standards for pre-operative risk assessment and advocate the introduction of a formal MDT to improve the consistency and safety of pre-operative decision making. The introduction of a patient pathway allows all team members and patients to monitor the progress of in hospital care against pre-defined standards. A key component of the pathway is to make communication with patients more consistent.

## 2.4 Regional Action Plans

We found that it is not possible to deliver a national QI programme centrally, so we have taken a regional approach. We help local teams run multi-disciplinary days for those involved in the care of patients with aortic aneurysm. These plans involve all team members from clinicians and managers to cardio-vascular networks and commissioners. The days are used to inform teams about data entry levels, and to provide background information about quality improvement. Teams are encouraged to develop local implementation plans and test these using recognised QI methodologies. Learning is shared across regional groups and between hospitals in differing regions tackling similar clinical issues. Learning is facilitated both through the QIP team and directly between clinical teams. At this stage we are beginning to re-visit regions to find out about progress and to help maintain enthusiasm and drive for quality improvement. Some examples of learning resulting from these days are included in this report. We intend all teams to produce formal written summaries of their QI activity for the final report (Spring 2012).

## 2.5 Patient Engagement

Patients, carers and the wider public have a significant role to play in implementing our QI framework. They are involved at all levels of the project, helping to design improvements in communication and care delivery. Their personal experiences of the patient pathway provide a strong narrative to emphasise the importance of clinical quality improvement to clinicians. We have built a network of patient groups around the U.K to explore patient experiences and to identify areas for improvement. The early outputs from this group work have resulted in significant development of written information for patients both pre-operatively and following AAA repair. The patients groups are also involved in helping to develop Patient Reported Outcome Measures (PROMs) for assessment of the quality of care.

# 3. FRAMEWORK FOR IMPROVING THE RESULTS OF ELECTIVE AAA REPAIR (2009)

The quality improvement framework is a document outlining some of the key features of a high quality vascular service. It can be found in the Vascular Society's website at:

<http://www.vascularsociety.org.uk/library/quality-improvement.html>. The key components centre around pre-operative care, the conduct of surgery, ensuring that surgery is undertaken with the correct equipment and finally, high quality audit to demonstrate safety. One or two of the key points have been updated and modified to take account of newer evidence for high quality care.

## 3.1 Pre-operative Care

- This should involve formal risk assessment and correction of adverse clinical features to reduce the risk of intervention.
  - It is the belief of clinicians involved in care delivery that this is best done as a team, formally involving anaesthetists and other specialities in pre-hospital care. This facet of the framework is designed to ensure that risks are minimised and that cardio-respiratory risk factors are not overlooked. Drugs to control blood pressure and the use of statins reduce risk in patients undergoing major surgery and should be used widely. We believe that re-organisation of care delivery needs a formal MDT process to underpin it.
  - We have defined the MDT. This is a process of decision making shared by a minimum of a vascular surgeon, vascular interventional radiologist and vascular anaesthetist. The ideal is a single meeting with sharing of knowledge about the patient to allow optimal decision making. Some centres cannot provide this at present and an acceptable alternative is formal assessment by surgeons, radiologists and anaesthetists documented in a single place (see website for examples of forms for this purpose <http://www.aaqip.com/aaqip/QI-MDT-assessment.html>). There should be a written record of the decisions about intervention and the personnel involved.

- Patients should be formally involved in decision making about their care. This means that they should be offered a choice as to whether to proceed to intervention. Those wishing to proceed and suitable for either OR or EVAR, should be offered a choice of intervention.
- Patients should be given information about both short term and longer term outcomes of both OR and EVAR to enable them to make an informed choice about treatment.

### 3.2 Team Operative Care

#### **Expertise**

The VSGBI, VASGBI and BSIR are agreed that patients with AAA should only be treated by clinicians competent to deliver their care. This means that surgeons, anaesthetists and radiologists should have a regular vascular specialist practice. They should be supported by nursing and radiography teams conversant with both open and endovascular repair. Patients should be nursed on a ward with specialist vascular nursing skills in accordance with the standards in The Provision of Services for Patients with Vascular Disease 2009 (<http://www.vascularsociety.org.uk/library/vascular-society-publications.html>). A revised version of this document is planned for 2011 and the new standards should be adopted once available.

#### **3.3 Facilities**

Units should have appropriate equipment both for open and endovascular repair. This needs to include an appropriate sterile environment for surgery (EVAR and OR) [MHRA 2010]. Other requirements are for blood salvage and auto-re-transfusion equipment. Vascular units must have rapid access to blood products (standard: within one hour). There must be an on-site intensive care unit with capability to provide ventilatory and renal support.

#### **3.4 Organisation of the Service**

It is important that units have an adequate volume to demonstrate that they are providing safe care. There is now good evidence that outcomes are better in higher volume centres [Holt et al. 2007]. The VSGBI recommends that centres providing care should be undertaking a minimum of 100 elective AAA cases in any 3 year period. The centres providing care must have a 24/7 vascular surgical on-call and interventional radiology on call rota. No quality improvement programme can be delivered without adequate data to provide evidence of change. It is a requirement that all centres undertaking AAA repair should submit all their cases to national audit through the NVD. This is also a requirement for participation in the national AAA screening programme.

## **4. DATA COMMUNICATION:**

### **NATIONAL VASCULAR DATABASE REPORT**

The National Vascular Database (NVD) is a voluntary database run by the Vascular Society used to collect data on patients undergoing major vascular index procedures. These are Abdominal Aortic Aneurysms (AAA), Infrainguinal Bypass (IIB), Amputation (AMP) and Carotid Endarterectomies (+ stents). It is a web based system provided by Dr Foster Intelligence, housed on a secure NHS server allowing real time data entry.

It offers online analysis with real time reporting of numbers and mortality by hospital and individual surgeon. It allows vascular specialists to compare their performance for key procedures against national standards. The NVD also permits the reporting of case mix and complication rates. As well as this, the NVD forms the data collection tool for several National Audits including the Carotid Interventions Audit (CIA) and the Acute Kidney Injury (AKI) Audit. Participation in national clinical audit is an important component of clinical governance.

The dataset is proposed to be used as a tool for re-validation of surgeons in the future. It will also be able to provide information to commissioning bodies about delivery of care and to inform healthcare professionals about the standard of care provided to patients' with vascular disease.



Analysis into the NVD data has been undertaken and key outputs are shown below.

## 4.1 Growth of the NVD

### Cases per procedure

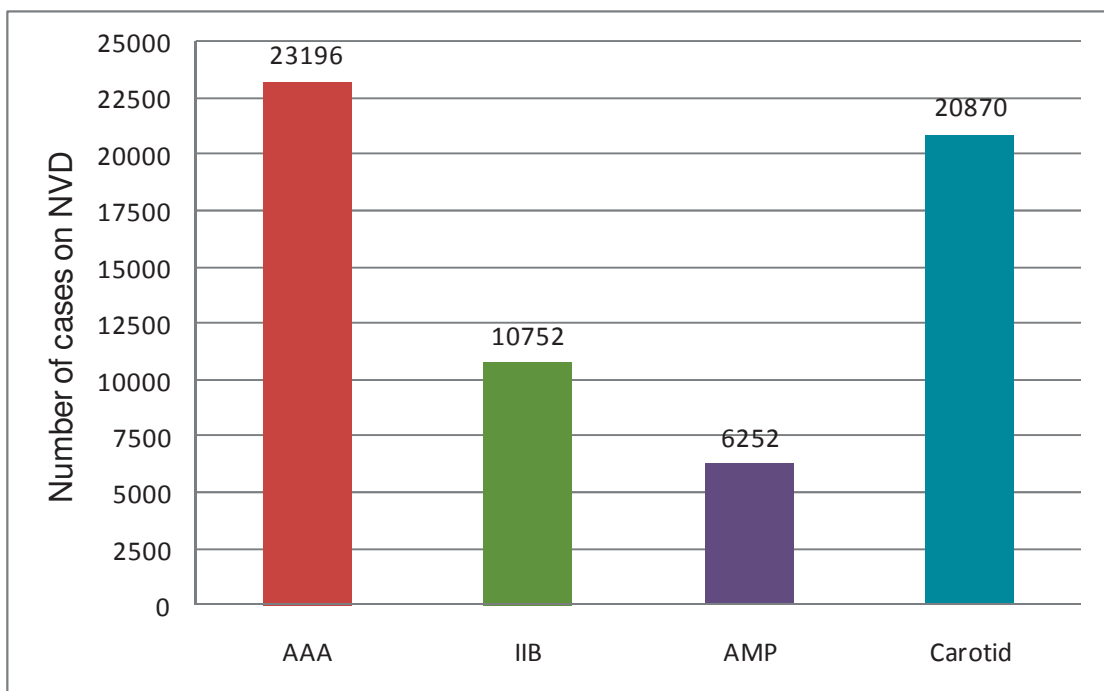


Figure 1: Total number of cases in the NVD by procedure (May 2011).

### Growth of cases per procedure

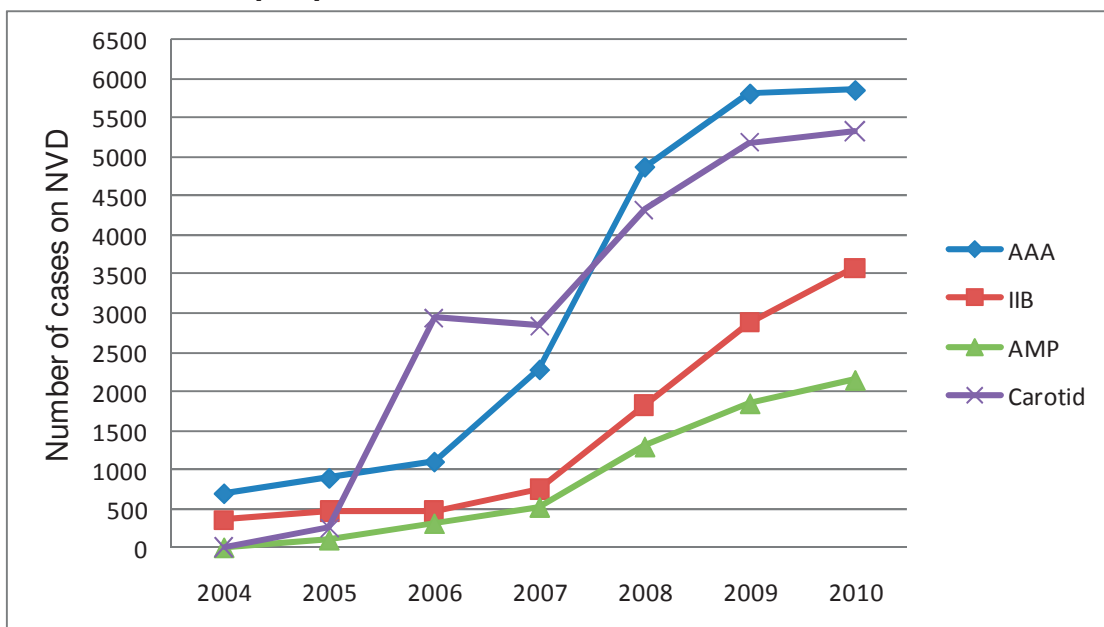
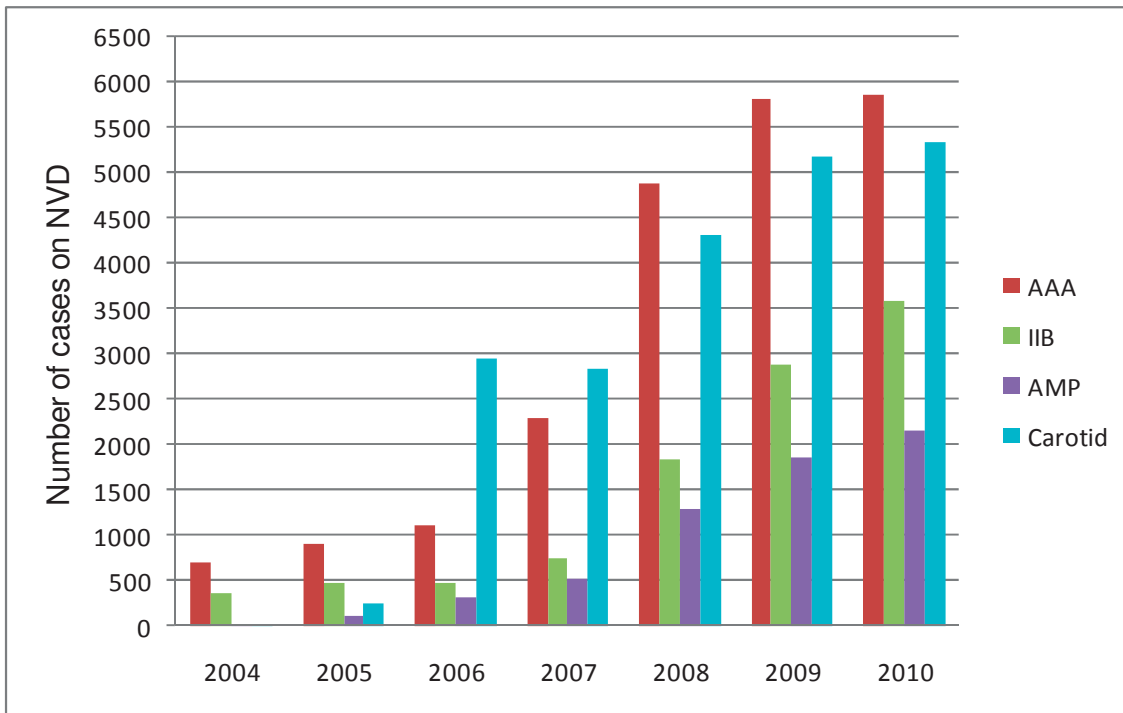


Figure 2: Number of cases recorded on the NVD for each index vascular procedure (2004-2010).



**Figure 3:** Variation in the number of cases per procedure recorded each year (2004-2010).

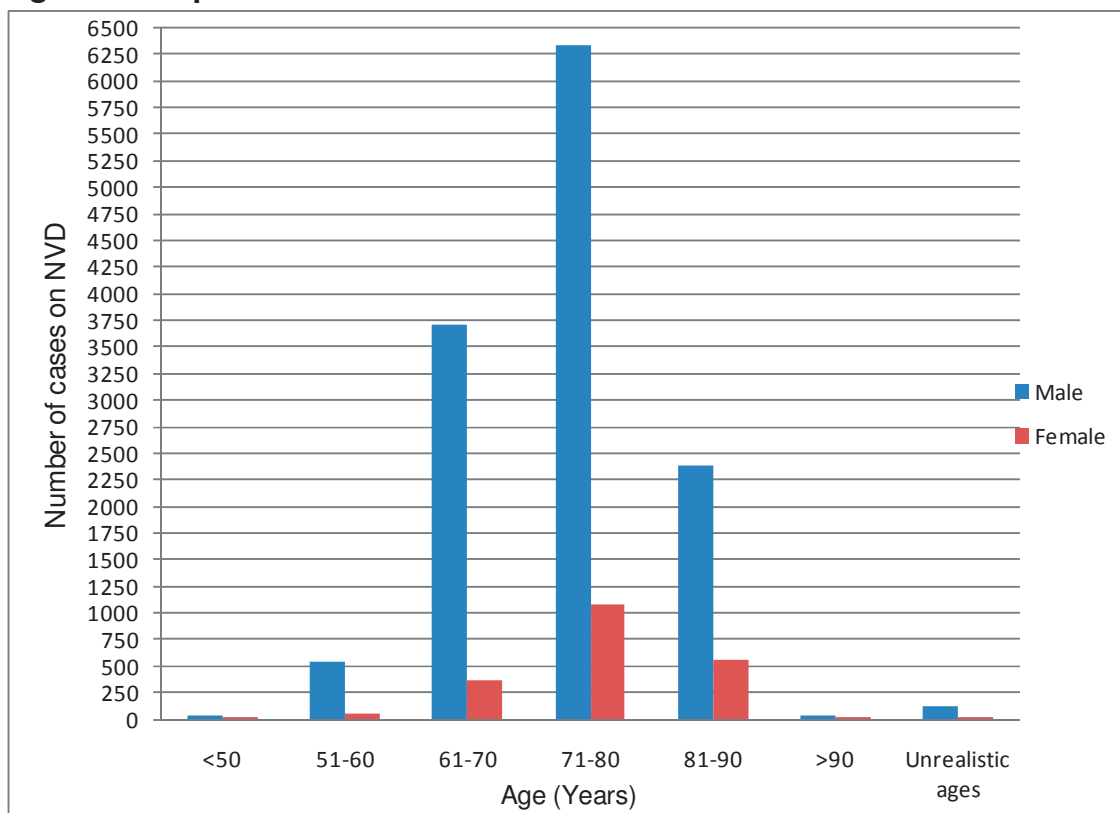
Up until the 31<sup>st</sup> December 2010 the NVD had 21512 aneurysm cases recorded. Of these, 15020 were non-ruptured, 10014 were ruptured, and the remainder did not record whether the aneurysm was ruptured.

8210 of the aneurysm cases were reported as being repaired by EVAR and 9945 by open surgery. Data on the remaining 3397 is missing. However, it should be noted that the NVD has only recorded the type of repair for approximately the last 4 years. Therefore, some of the historic data will lack this information. The probability is that most of these cases were repaired by open surgery.

## 4.2 Abdominal Aortic Aneurysm Data

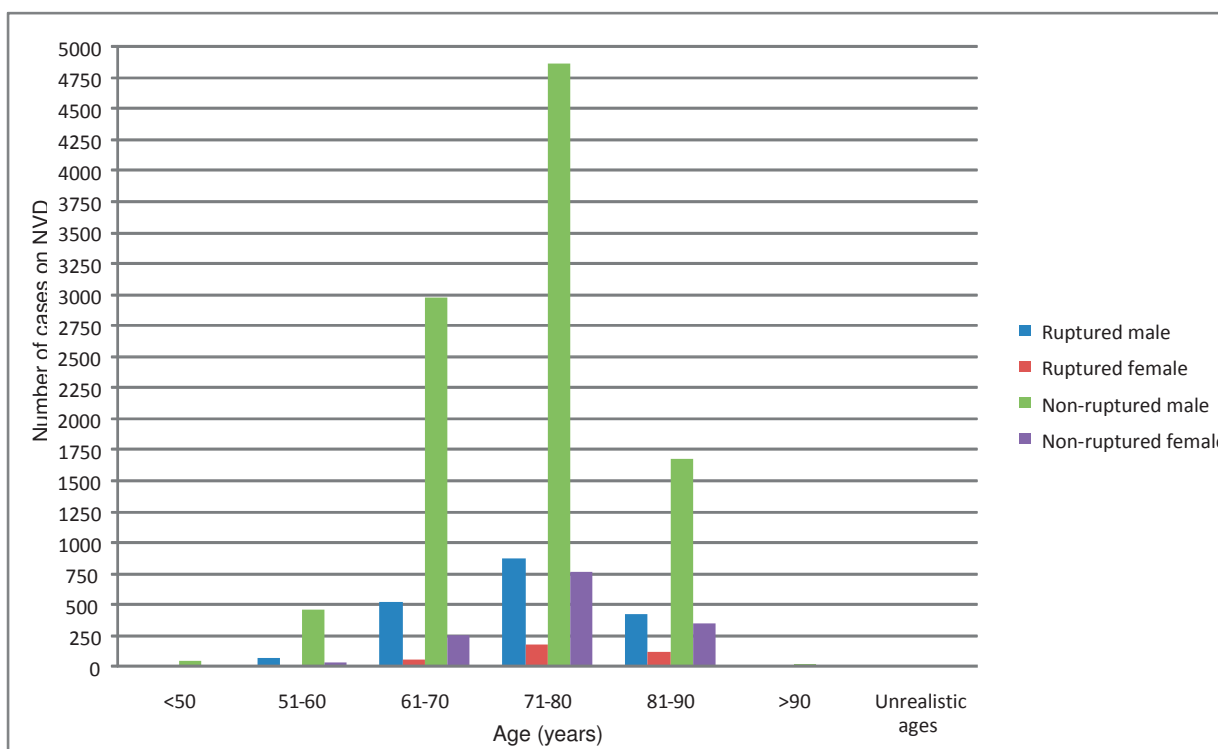
The following data outputs are all based on **AAA cases** from **01/01/08-31/12/10** using the following **OPCS codes: L18.4, L18.5, L18.6, L19.4, L19.5, L19.6, L19.8, L21.4, L21.5, L21.6, L21.8, L27.1, L27.5, L27.6, L27.8, L27.9, L28.1, L28.5, L28.6, L28.8, L28.9**

### Age of AAA patients



**Figure 4:** Number of elective AAA patients by age and gender. N.B gender is not specified in 44 cases

### Age of ruptured vs. non ruptured AAA patients



**Figure 5:** Age range of patients according to type of AAA (ruptured/non ruptured)

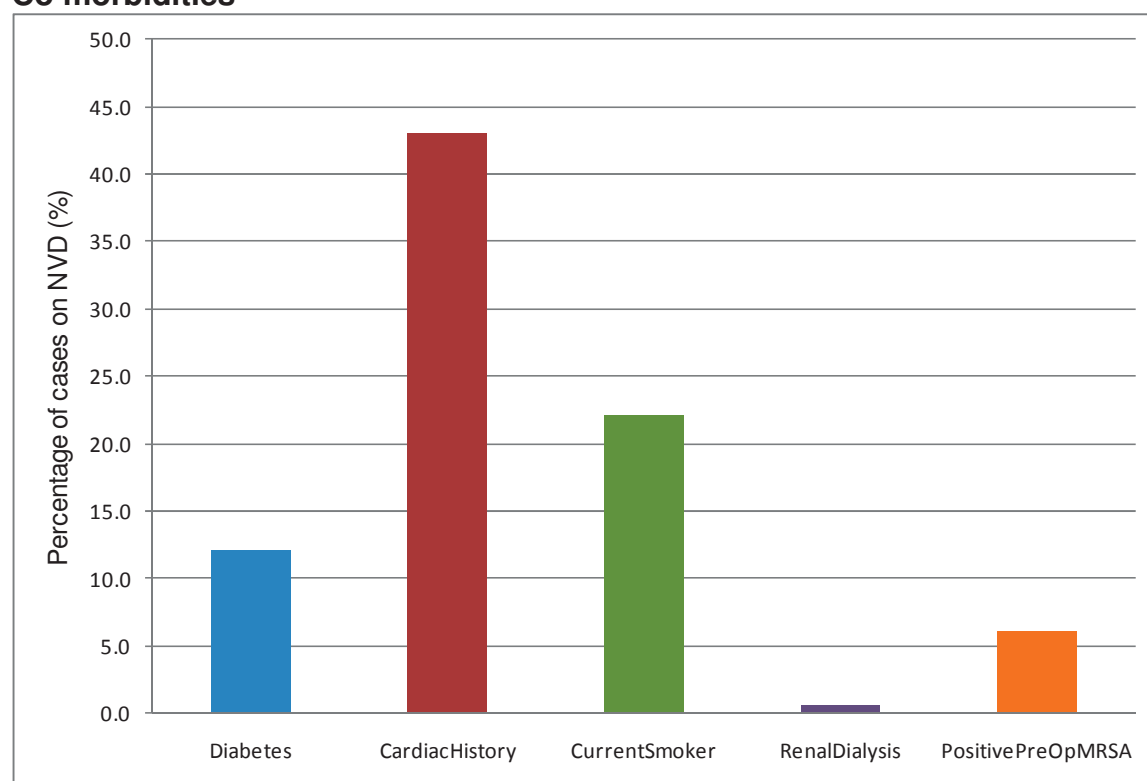


**Table 1:** Number of ruptured/ non ruptured AAA patients within each age range

Age at time of operation	≤50	51-60	61-70	71-80	81-90	>90	Unrealistic ages (<20)
Ruptured male	5	74	518	873	425	7	3
Ruptured female	1	7	57	181	124	5	3
Non-ruptured male	44	458	2979	4867	1683	25	17
Non-ruptured female	8	32	260	764	355	3	4

N.B 2170 cases were missing data required for analysis (i.e. aortic findings/gender)

### Co morbidities

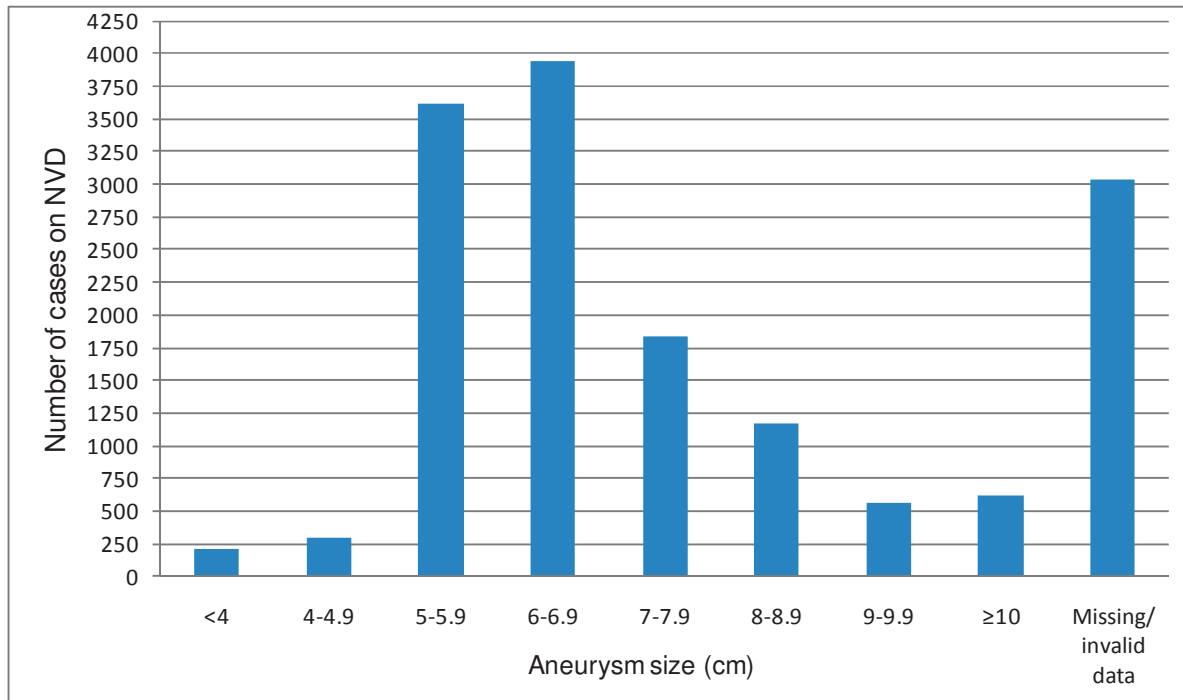


**Figure 6:** Percentage of patients undergoing elective AAA repair with preoperative co-morbidities

**Table 2:** Number of AAA patients identified to have a pre-operative co-morbidity

Co-morbidity	No	Yes	Total	Missing data
Diabetes	12050	1646	13696	1618
Cardiac History	7791	5883	13674	1640
Current Smoker	10276	2910	13186	2128
Renal Dialysis	13276	77	13353	1961
Positive Pre-op MRSA	9326	606	9932	5382

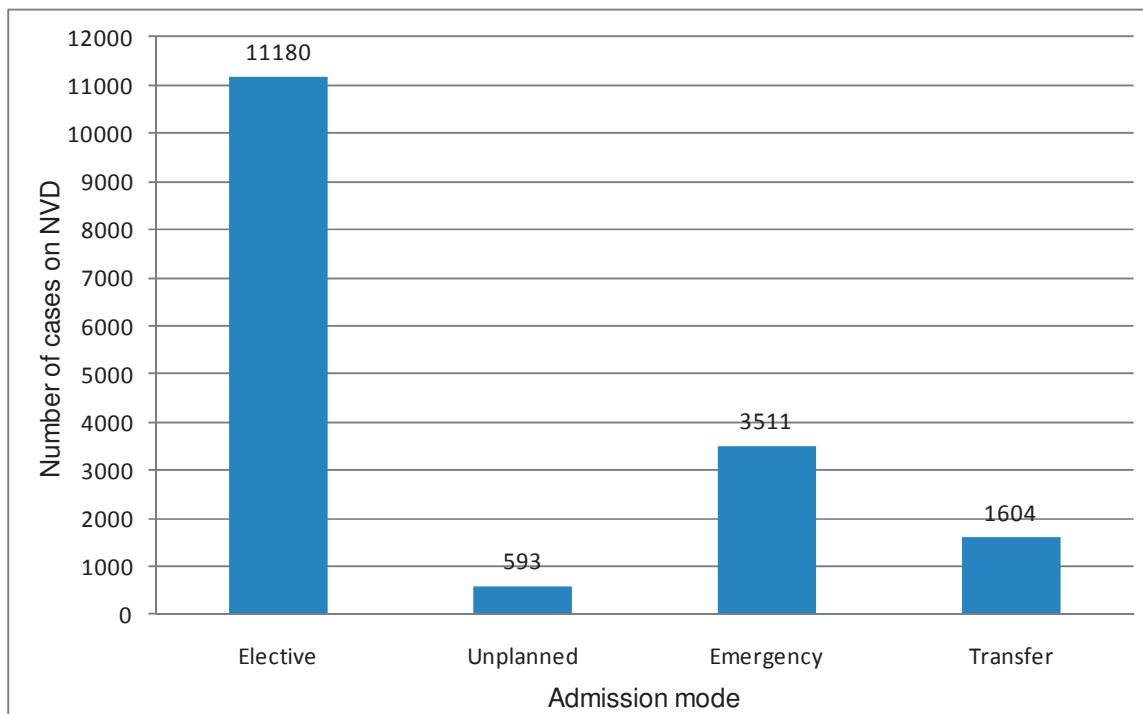
## Aneurysm size



**Figure 7:** AAA cases and the aneurysm size at time of surgery

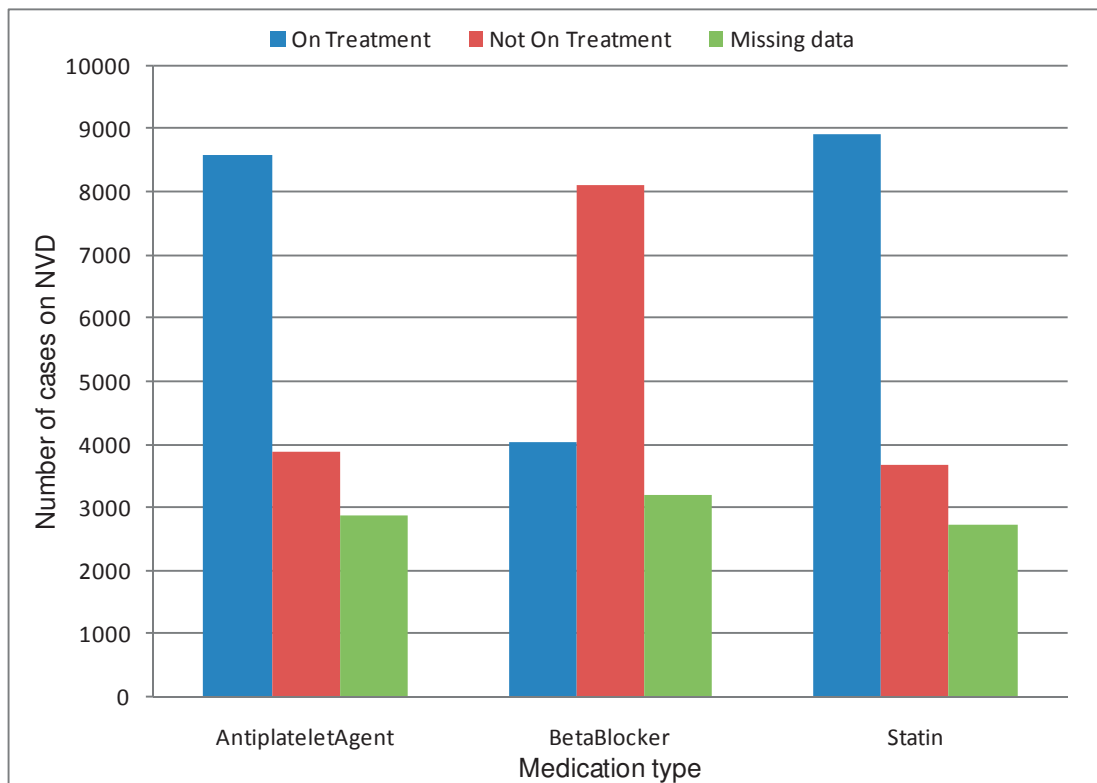
N.B Invalid data classed as aneurysm size >20cm

## Mode of admission



**Figure 8:** Mode of admission for AAA cases

## Medication

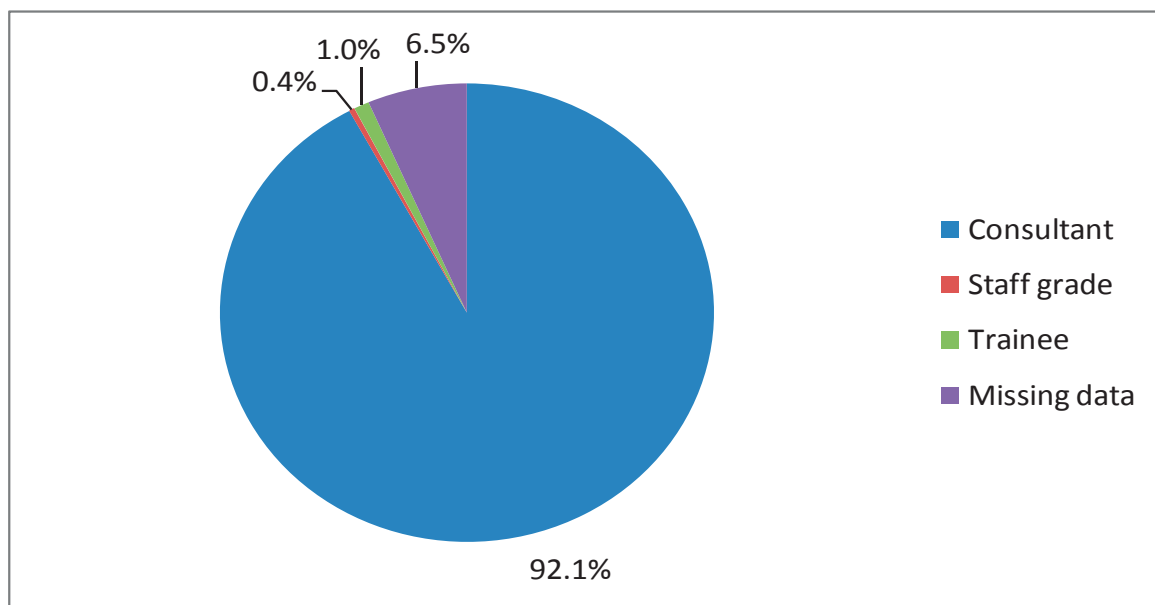


**Figure 9:** Types of medication taken by AAA patients

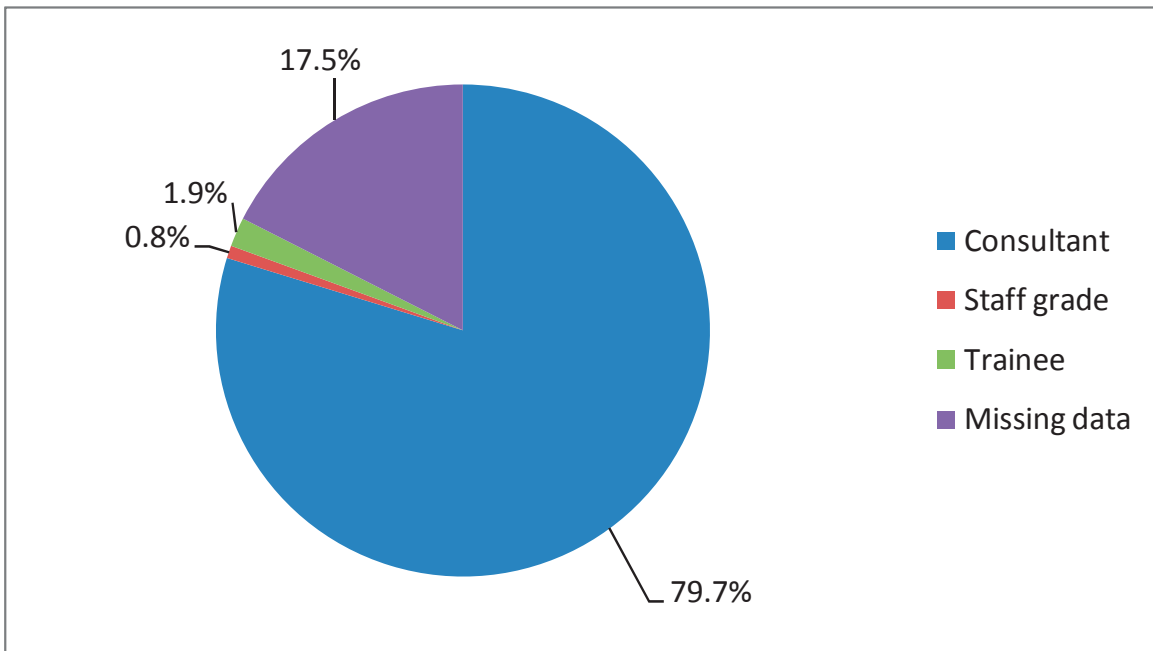
**Table 3:** Number of AAA patients on different types of medication

	On Treatment	Not On Treatment	Total	Missing data
Antiplatelet Agent	8575	3869	12444	2870
Beta Blocker	4029	8100	12129	3185
Statin	8908	3680	12588	2726

## Clinician Involvement

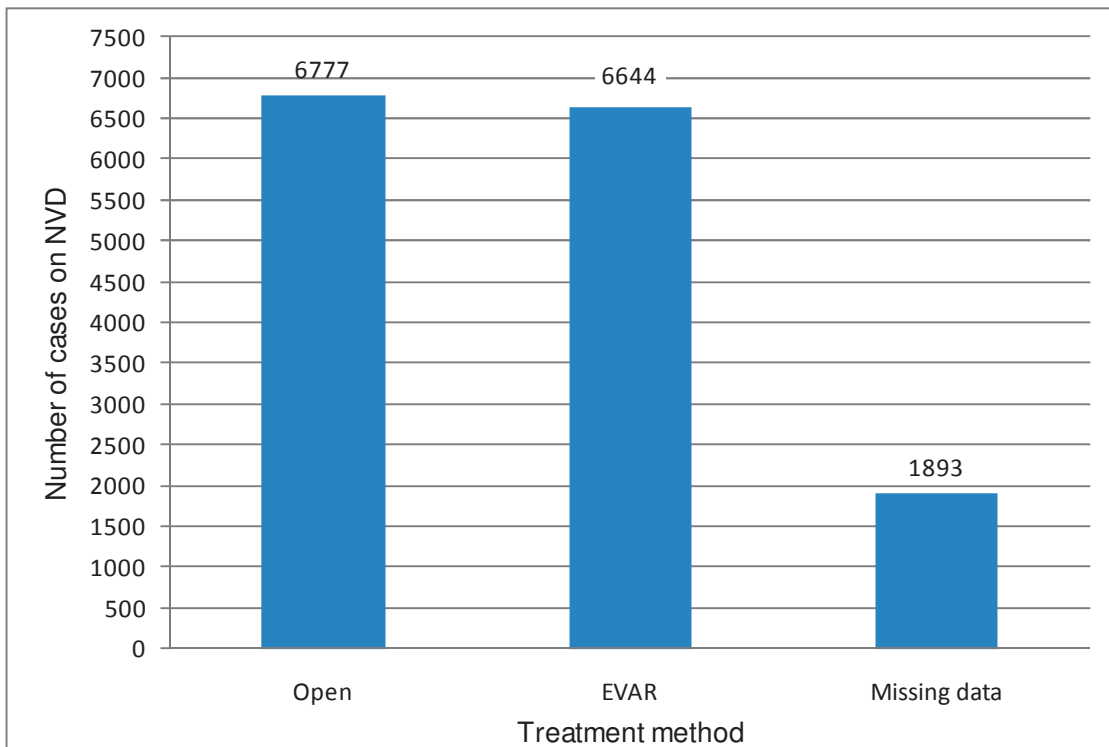


**Figure 10:** AAA - Grade of most senior surgeon



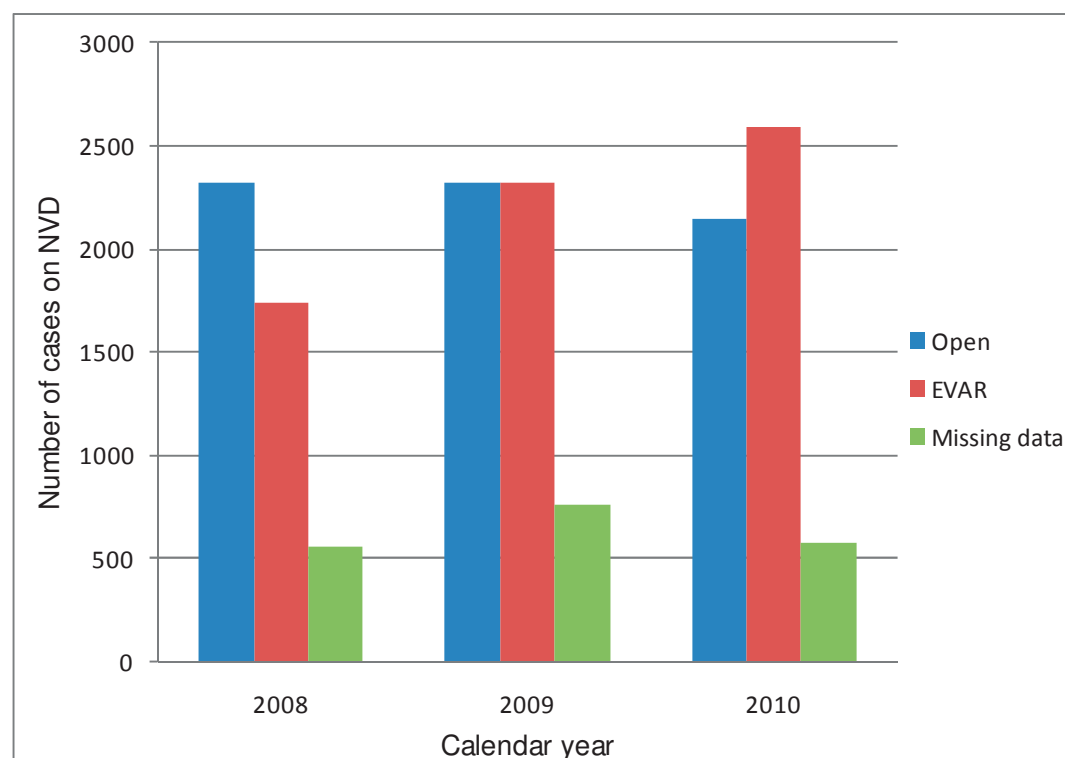
**Figure 11:** AAA – Grade of most senior anaesthetist

**Method of AAA treatment**



**Figure 12:** Number of AAA cases per type of AAA repair

## Treatment type over time



**Figure 13:** Number of cases by treatment type per annum

**Table 4:** Number of cases by treatment type per annum

Method of treatment	2008	2009	2010
Open	2319	2316	2142
EVAR	1739	2316	2589
Missing data	553	759	581

### 4.3 AAA Data Contribution onto the NVD as compared to HES

The AAAQIP aims to improve data contribution onto the NVD. This has been driven through quarterly reporting of all AAA and carotid cases recorded on the NVD and HES for 3 monthly time periods. This is being sent to Vascular Leads and Clinical Governance Leads within each Trust performing AAA surgery in the UK. It is vital that all AAA cases are entered into the NVD and a process should be in place within each unit to ensure data is validated between the two datasets. Complete submission will ensure that data is robust and reliable enabling the Vascular Society to lead the way in reporting patient outcomes and targeting improvements in care.

#### National standards for AAA data entry into the NVD

The Vascular Society has endorsed the following national standards for AAA data entry onto the NVD. The table below outlines the standards using a traffic light system. The numbers of AAA cases on the NVD are compared to those reported by HES to calculate the percentage contribution rate.

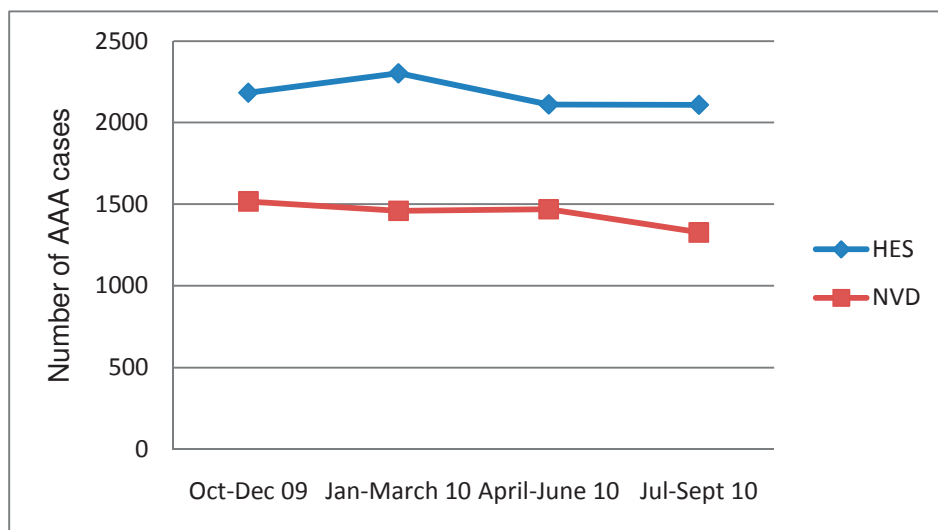
Quality Standards: Percentage of AAA data entry onto the NVD	Coded Category
≤75%	Red
76-90%	Amber
91-110%	Green
>110%	Amber

Percentage contribution rates >110% are classed as amber as there may be coding errors and regular coding validation work is encouraged.

These data entry standards were integrated into the quarterly AAAQIP reports from January 2011 and Trusts have been encouraged to improve their contribution rates accordingly.

### 4.3.1 National AAA Data Contribution: (1<sup>st</sup> October 2009-30<sup>th</sup> September 2010)

The following data outputs are all based on **AAA cases** from **01/10/09-30/09/10** using the following OPCS codes: L18.4, L18.5, L18.6, L19.4, L19.5, L19.6, L19.8, L21.4, L21.5, L21.6, L21.8, L27.1, L27.5, L27.6, L27.8, L27.9, L28.1, L28.5, L28.6, L28.8, L28.9.



**Figure 14:** Total number of AAA cases in UK recorded on the NVD and HES between Oct 09-Sept 10.

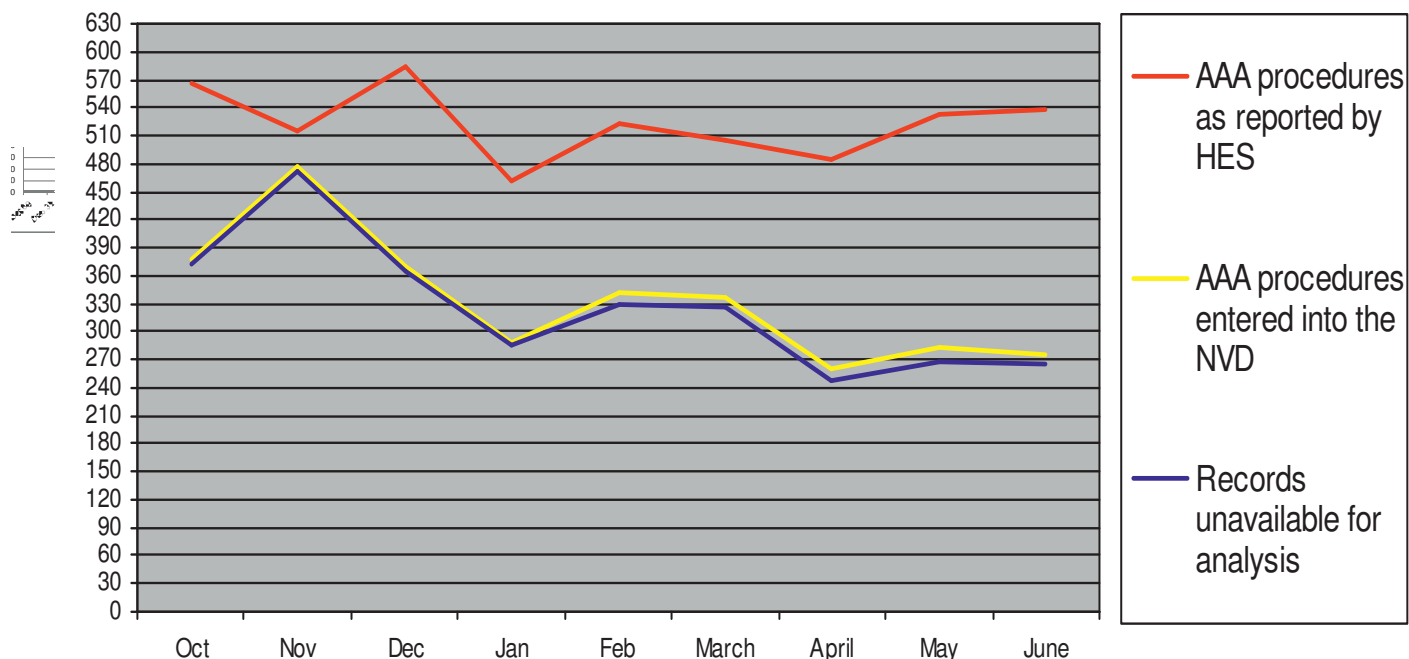
**Table 5:** Total number of AAA cases in UK recorded on the NVD and HES between Oct 09-Sept 10.

Time period	01/10/09-31/12/09	01/01/10-31/03/10	01/04/10-30/06/10	01/07/10-30/09/10	TOTAL
<b>HES total</b>	2183	2302	2111	2108	8704
<b>NVD total</b>	1517	1459	1469	1327	5772
<b>Percentage contribution</b>	69.5	63.4	69.6	63.0	66.3

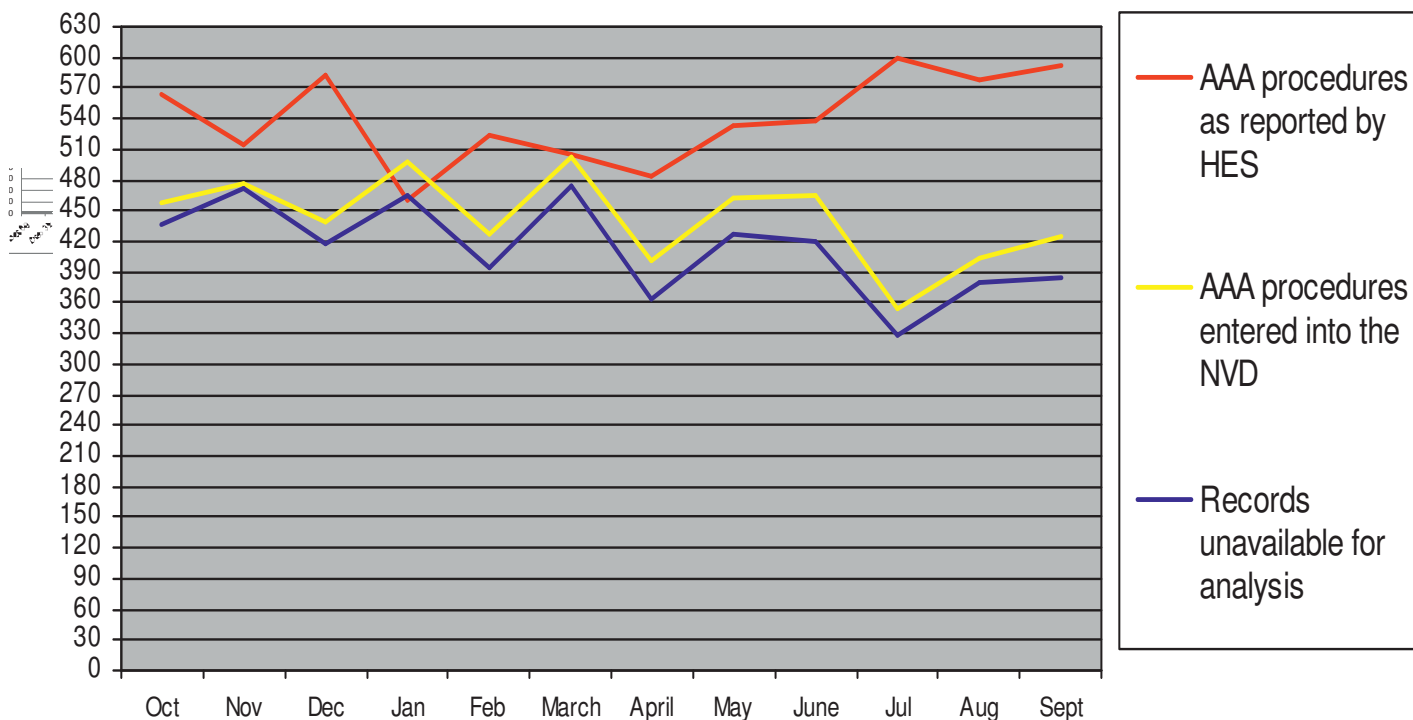
### 4.3.2 Time lag in data entry

There is currently a time lag in NVD data entry rates nationally of approximately 6 months. This is demonstrated by Figures 15 and 16. The delay in data availability then imposes a delay in reported outcomes both nationally and on a local basis. The case studies later in this report highlight various drivers that have aided improved data submission rates onto the NVD.

#### AAA data contribution over time

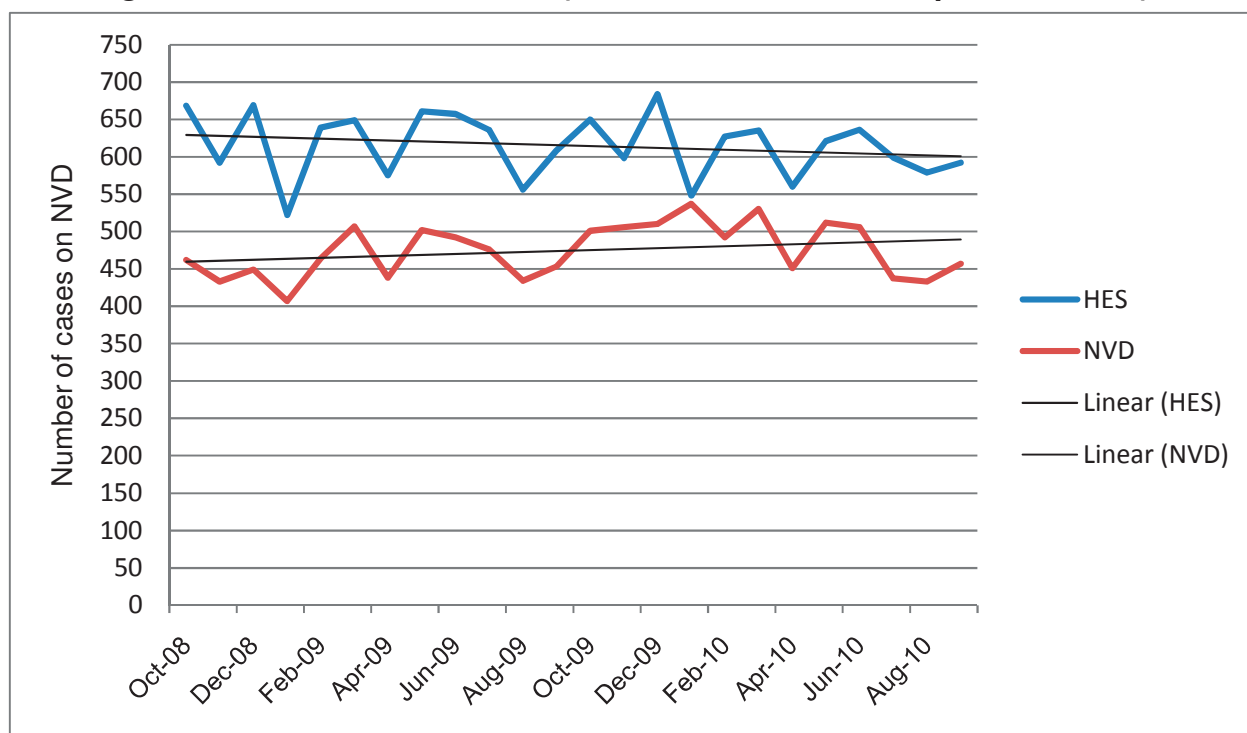


**Figure 15:** AAA data contribution by month from Oct 09 - June 10 (Analysed Oct 10)



**Figure 16:** AAA data contribution by month from Oct 09 - June 10 (Analysed Feb 11)

### 4.3.3 English AAA Data Contribution (1<sup>st</sup> October 2008-30<sup>th</sup> September 2010)



**Figure 17:** English AAA data contribution onto the NVD and HES (1<sup>st</sup> October 2008-30<sup>th</sup> September 2010)

**Table 6:** English AAA data contribution onto the NVD and HES (1<sup>st</sup> October 2008-30<sup>th</sup> September 2010)

	HES total	NVD total	Percentage contribution
2008/2009	6050	4693	77.6
2009/2010	5834	4821	82.6

### 4.3.4 Regional AAA Data Contribution (1<sup>st</sup> October 2009-30<sup>th</sup> September 2010)

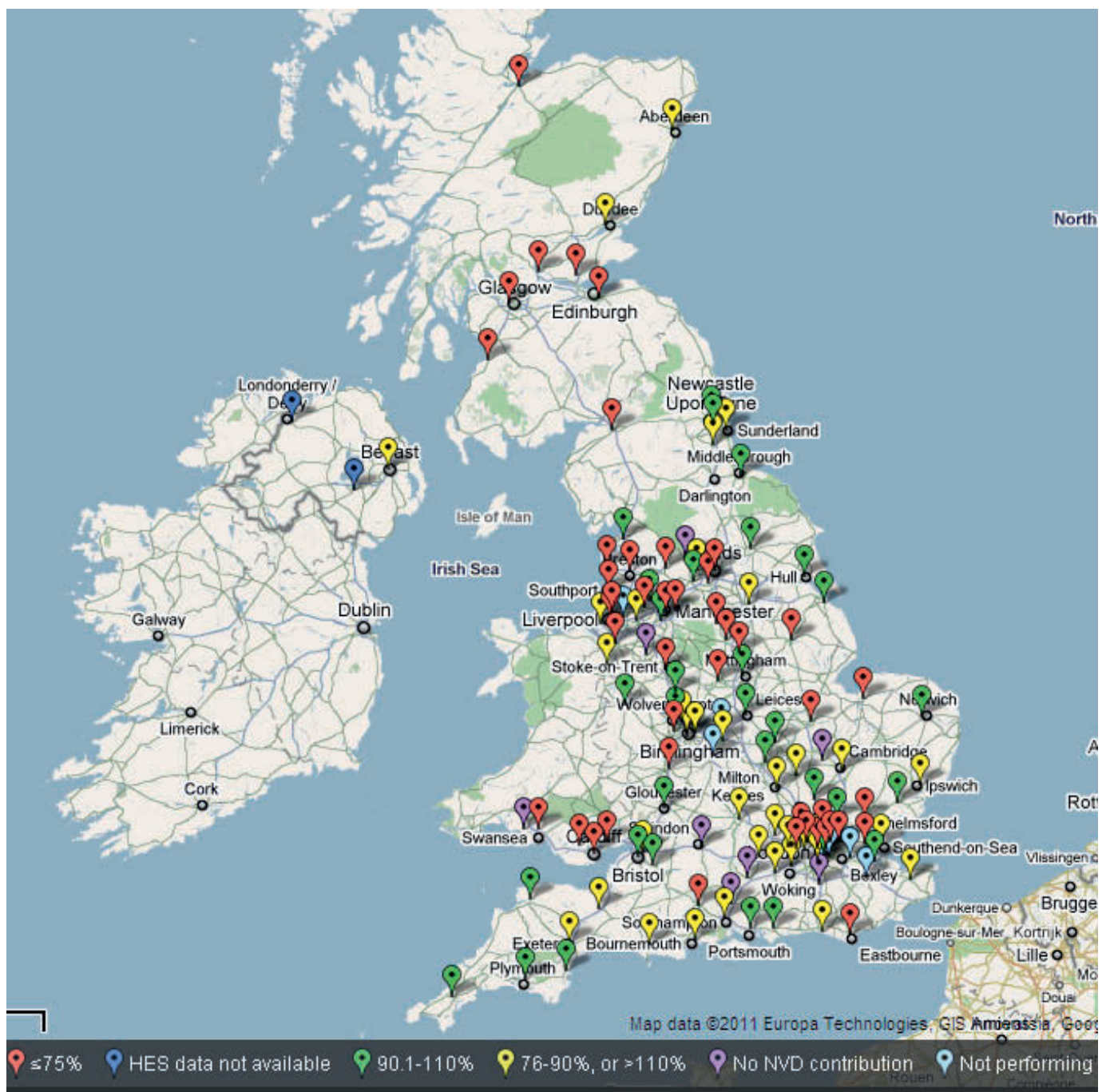
**Table 7:** Regional AAA data contribution rates on the NVD

Time period	01/10/09-31/12/09	01/01/10-31/03/10	01/04/10-30/06/10	01/07/10-30/09/10	Total
<b>North East</b>					
HES total	107	107	92	98	404
NVD total	89	106	84	93	372
Percentage contribution	83.2	99.1	91.3	94.9	92.1
<b>North West</b>					
HES total	247	201	209	217	874
NVD total	172	149	165	156	642
Percentage contribution	69.6	74.1	78.9	71.9	73.5
<b>Yorkshire and the Humber</b>					
HES total	123	132	151	149	555
NVD total	106	106	122	117	451
Percentage contribution	86.2	80.3	80.8	78.5	81.3



East Midlands					
HES total	107	95	99	109	410
NVD total	95	96	77	95	363
Percentage contribution	88.8	101.1	77.8	87.2	88.5
West Midlands					
HES total	171	149	140	132	592
NVD total	119	105	86	76	386
Percentage contribution	69.6	70.5	61.4	57.6	65.2
East of England					
HES total	220	216	185	191	812
NVD total	168	175	153	140	636
Percentage contribution	76.4	81	82.7	73.3	78.3
South East Coast					
HES total	95	96	108	93	392
NVD total	105	94	108	77	384
Percentage contribution	110.5	97.9	100	82.8	98
London					
HES total	199	174	185	177	735
NVD total	160	128	151	145	584
Percentage contribution	80.4	73.6	81.6	81.9	79.5
South Central					
HES total	83	79	86	93	341
NVD total	94	84	95	59	332
Percentage contribution	113.3	106.3	110.4	63.4	97.4
South West					
HES total	188	173	184	153	698
NVD total	185	169	165	133	652
Percentage contribution	98.4	97.7	89.7	86.9	93.4
Wales					
HES total	77	133	138	144	492
NVD total	47	40	46	45	178
Percentage contribution	61.0	30.1	33.3	31.3	36.2
Scotland					
HES total	117	301	98	128	644
NVD total	51	55	55	51	212
Percentage contribution	43.6	18.3	56.1	39.8	32.9
Northern Ireland					
HES total	57	58	58	66	239
NVD total	50	52	48	41	191
Percentage contribution	87.7	89.7	82.8	62.1	79.9

#### 4.3.4 Trust Level AAA Data Contribution (1<sup>st</sup> October 2009-30<sup>th</sup> September 2010)



**Figure 18:** Trust level AAA data contribution onto the NVD. (For tabulated data see Appendix A)

## 4.4 AAA Mortality

The AAAQIP was introduced in order to reduce the gap in mortality following elective AAA surgery between UK and the rest of Europe. Part of this programme involves working with centres with high mortality to offer support in introducing known best practice protocols. In order for this to be effective it is important to establish accurate mortality data for each trust. As a result, as part of the AAAQIP communication strategy a mortality analysis was sent to all UK Trusts identifying their NVD mortality for elective AAA procedures compared to that reported by HES over a 2 year period (2008-2010). Trusts were encouraged to validate the mortality data provided and to resolve discrepancies where possible.

### National Elective Infrarenal AAA Mortality

National elective infrarenal AAA mortality data is shown below in table 8. The data looks at annual time periods from 1<sup>st</sup> October 2008 to 30<sup>th</sup> September 2010 based on date of discharge. OPCS codes (as shown below) were used to ensure that only infrarenal procedures were captured and analysed.

**Table 8:** AAA mortality data as recorded on the NVD and HES (01/10-08-30/09/10)

	HES OPEN (%)	NVD OPEN (%)	HES EVAR (%)	NVD EVAR (%)
<b>English</b>				
01/10/08-30/09/09	7.8	6.0	2.9	2.4
01/10/09-30/09/10	5.8	5.2	3.1	2.3
<b>OVERALL</b>	6.9	5.6	3.0	2.3
<b>Wales</b>				
01/10/08-30/09/09	Data not available	5.4	Data not available	0.0
01/10/09-30/09/10	6.0	5.1	2.8	3.4
<b>OVERALL</b>	Data not available	5.2	Data not available	2.3
<b>Scotland</b>				
01/10/08-30/09/09	Data not available	3.1	Data not available	0.0
01/10/09-30/09/10	Data not available	7.7	Data not available	0.0
<b>OVERALL</b>	Data not available	5.8	Data not available	0.0
<b>Northern Ireland</b>				
01/10/08-30/09/09	Data not available	8.9	Data not available	1.8
01/10/09-30/09/10	Data not available	6.0	Data not available	3.7
<b>OVERALL</b>	Data not available	7.7	Data not available	2.8
<b>UK</b>				
01/10/08-30/09/09	Data not available	6.0	Data not available	2.3
01/10/09-30/09/10	Data not available	5.3	Data not available	2.3
<b>OVERALL</b>	Data not available	5.7	Data not available	2.3

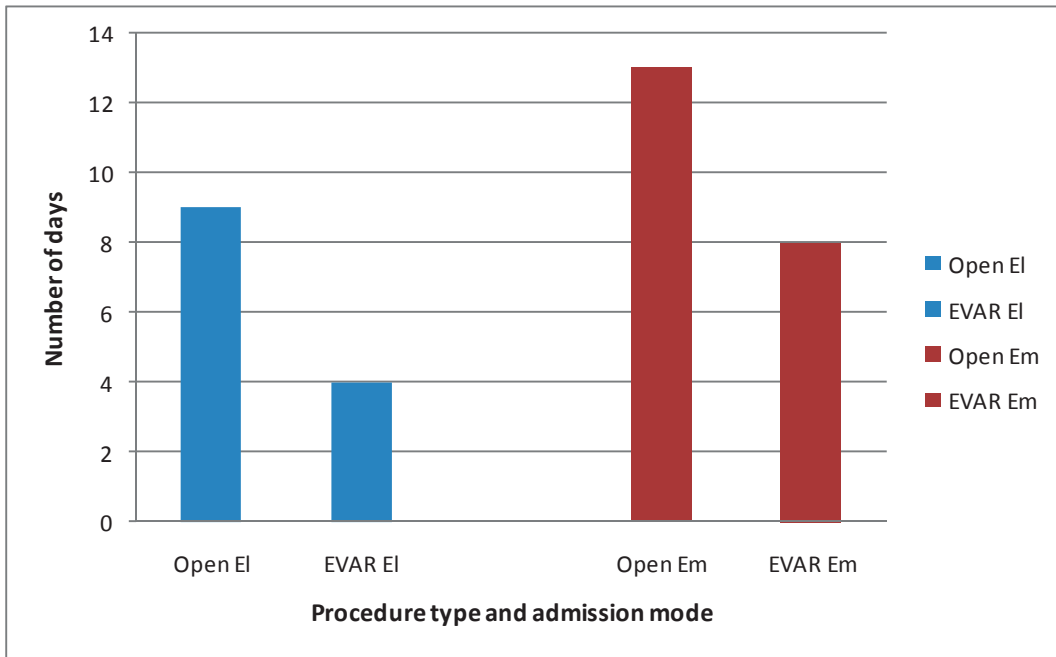
#### **OPCS CODES:**

Open - L19.4, L19.5, L19.6, L19.8, L21.4, L21.5, L21.6, L21.8

EVAR - L27.1, L27.5, L27.6, L27.8, L27.9, L28.1, L28.5, L28.6, L28.8, L28.9

### 4.4.1 Length of stay for Infrarenal AAA procedures 01/10/08-30/09/10

Length of stay (LOS) is a measurement that is used to report duration of patient in hospital stay following AAA surgery. AAAQIP has identified LOS as one of its key outcome measures to monitor change in hospital stay for AAA patients. Median LOS is shown in Figure 19 for both procedure and admission types over 2 year period (01/10/08-30/09/10).



**Figure 19:** Median length of stay for Infrarenal AAA procedures by procedure type and admission mode

	Open EI	EVAR EI	Open Em	EVAR Em
Range (days)	0-225	0-140	0-228	0-95

#### 4.5 Best Practice for Data Entry

Strategies for submitting cases onto the NVD are largely varied throughout the UK, as best practice is yet to be defined. Data entry methods vary from operating consultant surgeons entering cases, to administrators/data entry clerks adopting this role. Direct real time data entry is one of the recommended methods in which to enter cases onto the NVD. However, there are still centres (<8) that enter cases via an upload process. The upload function will cease to be available from early 2012 thus it is important to move to more direct methods of data entry over the coming year.

Data should also be entered onto the NVD in real time. Real time data collection is more efficient than retrospective collection [Miller 2002]. Real time electronic submission of data will allow the NVD to report accurate and timely outcomes.

#### **Case Study: Norfolk and Norwich University Hospital's AAA data entry process**

Matthew Armon, Consultant Vascular Surgeon, Norfolk and Norwich

We keep a book in the vascular theatre into which all arterial operations are entered and then transferred to our own (Excel) database. Each month the audit lead collates the information and circulates it to each consultant, asking them to check it for completeness and fill in any complications. The length of stay is checked against the Hospital Administration System (PAS) and this also lets us know of any deaths. We are also notified of all deaths on a monthly basis by the hospital mortality committee. We then have a meeting to discuss the previous month's activity, complications and deaths. I usually provide quarterly reports to our departmental meeting, including each surgeon's activity, which may act as a stimulus to make sure no-one misses any cases.

I've found that our own prospectively maintained database is more accurate than the hospital HES data, and it acts as our gold standard. If the number of NVD cases is less than on our own database, it's fairly straightforward to cross-check and find which one's are missing and encourage colleagues to fill them in. Failing that, I end up putting them on myself.

### **Case Study: Central Manchester Foundation Trust's AAA data entry**

Vince Smyth, Consultant Vascular Surgeon, Manchester Royal Infirmary  
AAAQIP North West Vascular Lead

#### **Raising your game on data submission**

There are several factors underpinning the Manchester Royal Infirmary improvement in data submission to the AAA audit over the last couple of years. There has always been an excellent and active regional vascular database, and increasing convergence of the dataset is allowing this to grow in collaboration rather than competition with the NVD. At the level of our unit, there were some external drivers, some internal drivers and some opportunities seized. A change in personnel was accompanied by a change in attitudes regarding national audit, data input was a requirement to participate in the introduction of the AAA screening programme in Manchester, the GM Stroke network similarly included participation in the carotid interventions audit as a condition of taking their referrals, the ongoing discussions about revalidation meant activity needed to be tracked accurately and the increased workload both necessitated and allowed recruitment of a part-time data clerk and the setting up of a prospective database of the unit's vascular activity which allowed crosschecking of activity.

#### **The lessons we have learnt are essentially:**

- don't rely on your trust audit department, keep data entry and tracking 'in-house'
- don't delegate to frequently changing and busy junior staff, try and keep a constant style of input
- don't do this at individual surgeon level: make it a unit or network level activity
- make sure all the surgeons are committed to involvement, carrots and sticks judiciously applied
- regular review of the data on the NVD and reconciliation with local data to reduce missed cases
- use the requirements of related clinical groups to strengthen your own case with the Trust for the importance of NVD data entry
- keep it simple, the fewer people involved or moving parts the less likely the system is to crash
- local audit is a powerful stimulus: consider a regional subgroup reporting on NVD data at surgeon, unit, network and regional levels

**Our problems and solutions will probably differ from yours, but hopefully some of the lessons we've learned are more generally applicable.**

### **Recommendations**

- 1) Real time data entry of all AAA cases onto the NVD (target 10 days).
- 2) Team approach to entering cases onto the NVD and agreement from all surgeons to support the activity.
- 3) Maintain "in house" record and use this to cross reference with the Trust audit department.
- 4) Include data entry as part of the AAA pathway of care.
- 5) Hold regular (e.g. monthly) meetings to review NVD cases, or make this part of MDT meetings.

## **4.6 The Future of the NVD**

The NVD is currently under review. The dataset will be revised at the end of 2011 to ensure that it meets the needs of the Society and its members. It is vital that the NVD is fit for purpose and is in keeping with modern day. All NVD users are encouraged to put their suggestions forward to help shape the revised NVD.



## 5. MEASUREMENT

### 5.1 Outline

Measurement is a key component of quality improvement. Without measurement, it is difficult to determine whether change has led to improvement, how instrumental a particular change has been and whether it has been sustained. This covers outcomes measures such as mortality as well as process measures including the implementation of best practice protocols through regional action plans. This strategy is essential in order to provide evidence of the effectiveness of the AAAQIP and whether the changes implemented have led to improvement.

### 5.2 Measurement types

There are 4 main types of measurement used on the AAAQIP to evaluate the impact of changes made throughout the project.

These include:

**1. Outcomes measures:** Evaluation of the results of an activity, plan or process and their comparison with the intended or projected results.

Outcome measures selected as part of the AAAQIP directly relate to the aims of the project and indicate whether we have achieved the ultimate aim of reducing the elective mortality for infrarenal AAA repair in the UK to 3.5% by 2013. This is defined within the NVD by the fields containing:

- Elective admission
- Elective repair
- Unruptured AAA.

**2. Process measures:** Measures a sequence of linked steps of the care pathway. The aim is to achieve consistency of practice in a particular domain. These measures help to identify whether the steps in the system are performing as planned and if changes are required.

Data contribution onto the NVD is included as a process measure to determine whether we have achieved our aim of increasing data entry onto the NVD from 65%-90% by April 2012. Additional process measures include auditing the use of care bundles such as the pre-operative bundle as well as measuring adherence to nationally recommended steps in the AAA care pathway.

**3. Balancing measures:** Balancing measures look at the bigger picture to see whether the changes that are being introduced in one area are impacting on the outcomes elsewhere.

Regional AAAQIP teams are also carrying out local audits of the percentage of AAA patients turned down for surgery to assess the relationship between outcomes and turn down rates.

**4. Baseline measure:** Data is recorded prior to any changes being made in order to determine the initial level of care prior to intervention. Baseline measures are then compared to findings once the change(s) have been implemented to demonstrate whether changes resulted in improvements.

### 5.3 Measures adopted within AAAQIP

The AAAQIP has devised a measurement strategy to help identify areas of change and the impact of interventions. These are outlined in Figure 5.3.1 below and are monitored at regular intervals. These measures will aid the demonstration of progress towards achieving the aims on the programme; run charts can be viewed on the AAAQIP website [www.aaqip.com/data](http://www.aaqip.com/data).

## 5.4 Measures on a local level

In order for units to demonstrate improvements in practice, it is vital to measure baseline activity and re-measure after interventions. All units should track NVD contribution rates and undertake local data validation.

## 5.5 Challenges faced with measures

Capturing measures can be difficult due to resource limitations, such as capturing turndown rates nationally. Turndown rates have been proposed to be captured through the NVD. However, this is not currently practical due to the variance in data entry compliance as highlighted in this report. Thus, it is anticipated that turndown rates can be captured through snapshot audits in the future.

Long term outcomes for AAA patients are not currently captured nationally. Patient status at 30 days and 1 year is now captured through the NVD. Information about longer term survival is expected to help refine indications for intervention.

Patient Reported Outcome Measures (PROMs) are a nationally recognised method of assessing the level of care and patient experience of intervention and recovery. Preliminary work to develop a PROM has begun with a group from St George's Hospital NHS Trust, London to further develop and validate this tool.

### Recommendations

- 1) Longer term outcomes should be captured nationally (1 year)
- 2) Local QI initiatives are described more effectively if baseline measures are taken prior to implementing change.
- 3) Once changes have been introduced, audits should be undertaken to check that new practice is embedded.
- 4) Units should undertake surveys of patients' view of their experience of care.
- 5) PROM development should continue with the aim of introducing this nationally once a validated instrument is available.
- 6) Surgeons should capture turndown rates to fully describe their AAA practice

**Figure 5.3.1**

**What are we trying to accomplish?  
OBJECTIVES**

**OUTCOME MEASURES**

**Objective 1:** Reduce the mortality for elective Abdominal Aortic Aneurysm (AAA) repair in the U.K. from 7.5% to 3.5% by 2013.

**PROCESS MEASURES**

**Objective 2:** Increase data contribution onto the National Vascular Database (NVD) from 65%-90% by April 2012.

**Objective 3:** Achieve 500 cases of complete Acute Kidney Injury (AKI) data entered onto the NVD by April 2012.

**Objective 4:** Standardise the management of patients' through the AAA care pathway in regions throughout the U.K. Implement best practice protocols into vascular units through regional action plans (RAPs).

**OUTCOME/PROCESS MEASURES**

**Objective 5:** Engage and collaborate with patients to improve informed consent, communication throughout the care pathway and patient satisfaction. Implement new patient approved information leaflets, responsive to patient's needs as part of (R.A.Ps).

**RAI ANCIING MFASIIRFS**

**Objective 6:** Measure unanticipated consequences and adverse events.

**AAA QIP: MEASUREMENT STRATEGY  
How will we know a change is an improvement?  
MEASURES**

1. Elective mortality for infrarenal AAA repair defined within the National Vascular Database (NVD) by the fields containing:  
• Elective admission/ Elective repair/ Unruptured AAA Infra renal OPCS codes only  
**NVD & HES: OVERALL/OPEN/EVAR  
RUN CHARTS....TRUST/REGIONAL/NATIONAL (monthly)**

2. No. of clinicians (surgeons, radiologists and anaesthetists) signed up and contributing to the NVD.  
**RUN CHARTS....NATIONAL (monthly - starting 2011)**  
3. Total AAA contribution onto the NVD- white (available), yellow (partially available) and red (unavailable).  
**RUN CHARTS....REGIONAL/NATIONAL (monthly)**  
4. NVD AAA contribution compared to numbers reported on HES.  
**RUN CHARTS....TRUST/REGIONAL/NATIONAL (monthly)**  
5. AAA contribution identified as: red (<75%), amber (76-90%), green (>90%).  
**RUN CHARTS....TRUST/REGIONAL/NATIONAL (monthly)**

6. AAA records on the NVD with complete AKI data (days 1-3 post op).  
**RUN CHARTS....TRUST/ NATIONAL (monthly)**

7. Trusts/teams in regions implement and test ONE best practice protocol and complete P.D.S.A cycle template forms (1 month into implementation).  
**P.D.S.A CYCLES....TRUST**  
8. Percentage of patients provided with care using best practice protocol.  
**LS2 MEETING/SNAP SHOT AUDIT .....TRUST**  
9. Adverse events recorded alongside regional action plans: complication rate, length of stay.  
**RUN CHARTS....TRUST/REGIONAL/NATIONAL**

10. Feedback from patient groups on experience through AAA care pathway in a region/ practical input on information leaflets/consent forms/questionnaires.  
**PATIENT GROUPS....REGIONAL**  
11. Percentage of patients receiving appropriate pre-operative patient information leaflets and recovery leaflets.  
**LS2 MEETING/SNAP SHOT AUDIT ....TRUST/REGIONAL**  
12. Patient satisfaction and reported experiences through the care pathway.  
**Patient satisfaction surveys/ Experience based design approach....TRUST**

12. Percentage of patients turned down for AAA surgery  
**REGIONAL ACTION PLANS....TRUST/REGIONAL**

**BASELINE MEASURES**

NVD 2008: OR 8% EVAR 5%  
ICNARC 2007: 6.4%  
NCEPOD 2005: 6.2%  
VASGBI Audit 1999: 7.3%  
Users in NVD (01/03/10):  
H Units: 85, RCP Units: 187  
Surgeons: 402  
Anaesthetists: 10  
Radiologists: 24

Total AAA cases 03/03/10: 16506  
NVD AAA contribution (03/03/10):  
White: 7562, Yellow: 8115, Red: 829  
Period: 01/03/08-28/02/10  
Total AAA cases NVD: 8903  
Total AAA cases HES: 12679  
Infrarenal total AAA NVD: 8490  
Infrarenal total AAA HES: 11924  
Percentage contribution 14/01/11  
Red: 58.7%, Amber: 26.9%, Green: 14.4% of trusts.

None  
None  
None  
NVD (03/03/10)  
Complication rate: 34.9%  
LOS: median 9d OR, 4d EVAR  
None  
None  
None  
None



## 6. BEST PRACTICE PROTOCOLS & QUALITY IMPROVEMENT INTERVENTIONS

### Evidence base around the provision of high quality care

#### 6.1 Formal Risk Assessment: Elective AAA Safe for Intervention Checklist.

In the first decade of the 21<sup>st</sup> century there has been a strong focus on the provision of care for patients with AAA. This has in part, been driven by the advent of new technologies to enable endovascular repair. These entered mainstream clinical practice at the turn of the century. The UK undertook early multi-centre randomised clinical trials of EVAR against the established open repair. The EVAR 1 trial [The EVAR Trial Participants 2004] demonstrated that EVAR reduces short term AAA related mortality from repair (compared to OR), but also that OR could be delivered within the UK with mortality rates much closer to the European average rates reported through Vascunet 2008. The QIP has adopted and modified the EVAR trial protocol to provide clinicians with a “**safe for surgery**” checklist (Appendix B). It has been reviewed and adopted for use by the Vascular and Vascular Anaesthesia Societies of Great Britain and Ireland. The document forms a preliminary checklist to indicate whether AAA patients should proceed with intervention or whether treatment should be postponed whilst patient fitness is improved. It is advised that all patients being considered for intra-abdominal aneurysm surgery should be assessed against it prior to being investigated for surgery. **This document should be used, but not modified.**

This is not intended to be used as a definitive assessment, but as a first check of fitness for intervention to ensure that patients are correctly assessed for risk. It divides patients into groups, denoted safe (green), caution (amber) and unsafe (red). It should be used to flag up the need for further assessment and optimisation in the amber and red category before proceeding.

#### Case Study: Standardising Pre-operative Assessment at North Bristol NHS Trust.

##### AAA Pre-operative Care Bundle Audit

An initial audit was carried out over a 4 months period (Dec 10-March 11) to measure whether patients are assessed consistently at NBT for AAA surgery. The ultimate aim was to utilise findings from the audit to agree and implement recommended changes to the AAA pre-operative assessment pathway.

##### Findings

##### Areas of good practice:

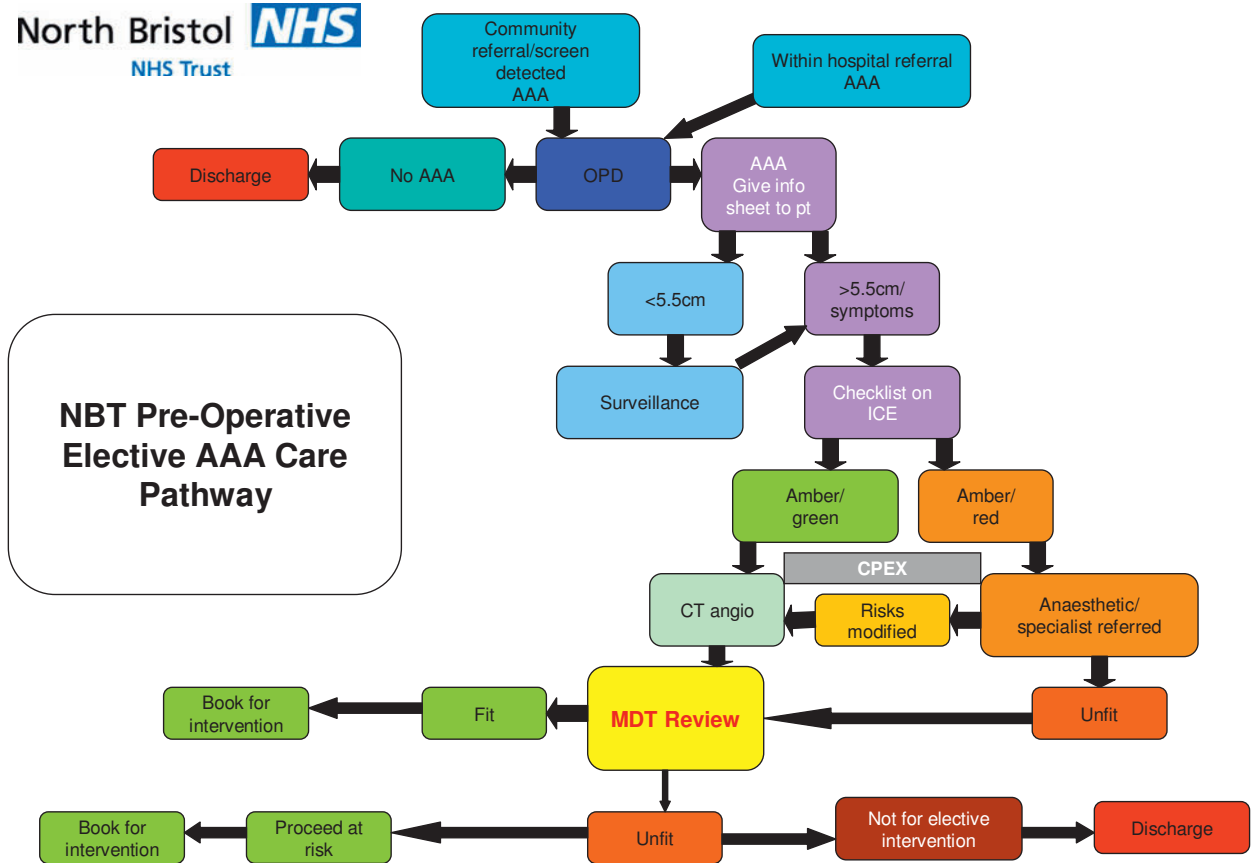
- The majority of patients were risk assessed before admission using the safety checklist (71%).
- 100% of patients received CT angiography in order to establish their suitability for EVAR.

##### Areas for improvement:

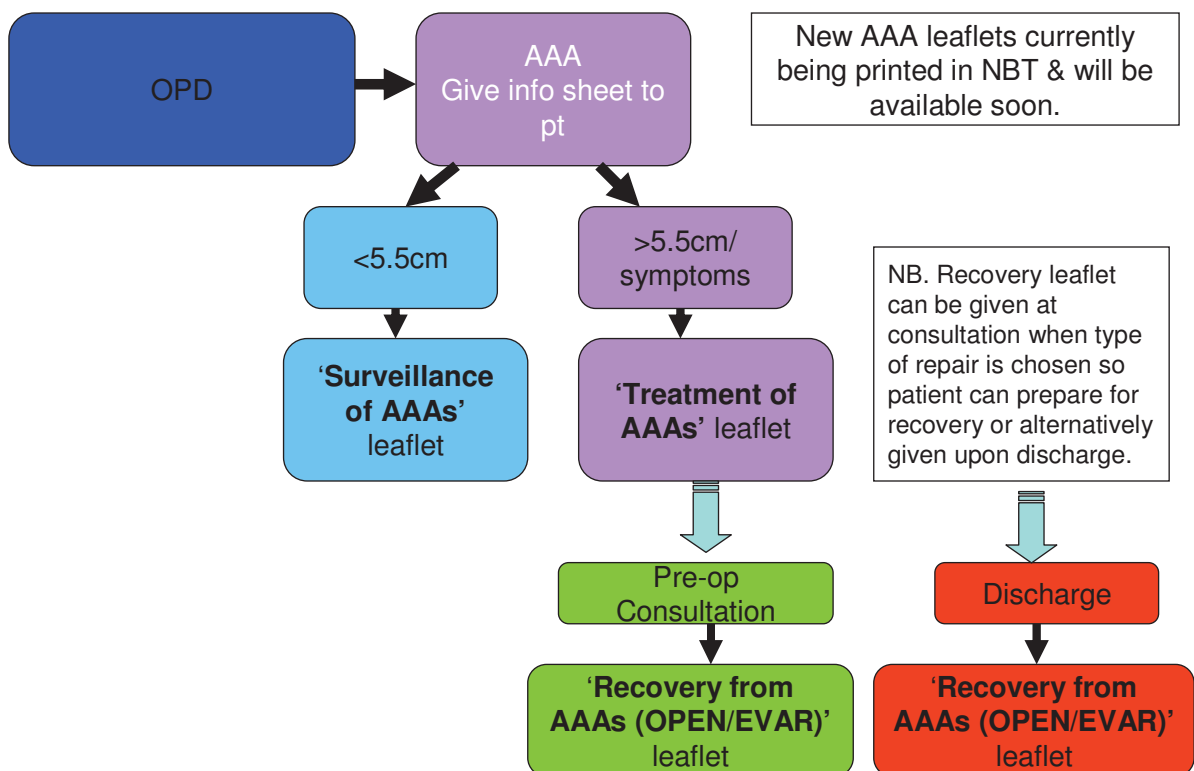
- Not all patients were assessed by a Multi-Disciplinary Team (MDT) to include a surgeon, radiologist and anaesthetist as a minimum.
- The provision of information to patients was not documented throughout the pathway. This is problematic as it is important to clarify whether patients have been able to make an informed and joint decision about their treatment and if they have received the appropriate time (e.g. 2 weeks) to be able to provide consent to surgery.
- 86% of patients were consistently risk assessed for VTE on admission compared to only 57% reassessed at 24 hours (national standard).

##### Current Action Plan: Reconfiguring the Care Pathway

We have developed a pathway (see next page) for pre-hospital care using both checklist and MDT to guide patient assessment and provide clarity about how the patient should proceed. The checklist is used in the out-patient setting to guide assessment appropriately. It can be seen that patients with an “amber” score may progress down either part of the pathway toward the MDT depending as to how many factors are scored positively. Active clinical team consultation and audit will be required to test and refine this part of the pathway.



## Patient Information Leaflets



## 6.2 Multi-Disciplinary Teams: MDT Proforma

As part of the process of improving care, we believe that formal assessment should involve the anaesthetic and radiology service that is going to provide care for the patient. For complex interventions such as cancer, there is evidence that formal MDTs provide more consistent decision making and improve progress along the pathway [Junor et al. 1994]. We believe that vascular services should adopt these structures and processes and use them to standardise assessment and decision making around interventions and the timing of intervention. Currently most vascular services will have combined X-ray meetings with radiologists. This is not a MDT and should not be regarded as an adequate substitute for one.

The ideal structure is one where all parties come together to discuss patients. To achieve best practice, centres should move towards vascular anaesthetists attending vascular MDT meetings. If this is not currently achievable, applications for sessions for anaesthetists to attend the MDTs and to provide formal pre-operative assessment should be supported by NHS Trusts. Formal documentation should be used to record the involvement of all members of the MDT prior to admission to hospital. This report contains a document (Appendix C) that can be adapted for this purpose. A clinical co-ordinator (not necessarily a surgeon, but someone clearly identified in the role) needs to be responsible for ensuring that the process of consultation is completed, and requirements for patient optimisation are met before patients are listed for intervention.

## 6.3 Improving Reliability: AAA Pre-operative Care Bundle

Making clinical processes consistent and reliable mitigates against wasted effort and reduces error and harm to patients. We are using a systematic quality improvement approach through 'care bundles' to create error-free processes that deliver high-quality, consistent care and use resources efficiently [Fulbrook and Mooney 2003]. We have developed an AAA pre-operative care bundle (Appendix D) which groups together best practice guidelines to help standardize practice and improve patient outcome.

We have been working with clinical teams and quality improvement consultants from the Health Foundation to help devise this care bundle. Each element in the bundle acts to ensure a vital intervention is undertaken to reduce the risk from AAA repair and improve patient safety.

The first bundle outlines the essential guidelines for AAA patients proceeding to intervention. These include:

1. Patients should undergo standard pre-operative assessment and risk scoring. (Complete AAA Pre-Operative Safe for Intervention Checklist).
2. Patients should be risk assessed by a vascular anaesthetist prior to listing for intervention.
3. Patients should be reviewed by a Multi-Disciplinary Team that includes a vascular surgeon, vascular interventional radiologist and a vascular anaesthetist as a minimum requirement. (Complete MDT Proforma).
4. Patients agreed for intervention should undergo CT angiography to assess their suitability for OR or EVAR.
5. Patients should be given evidence based written information about their treatment and condition.

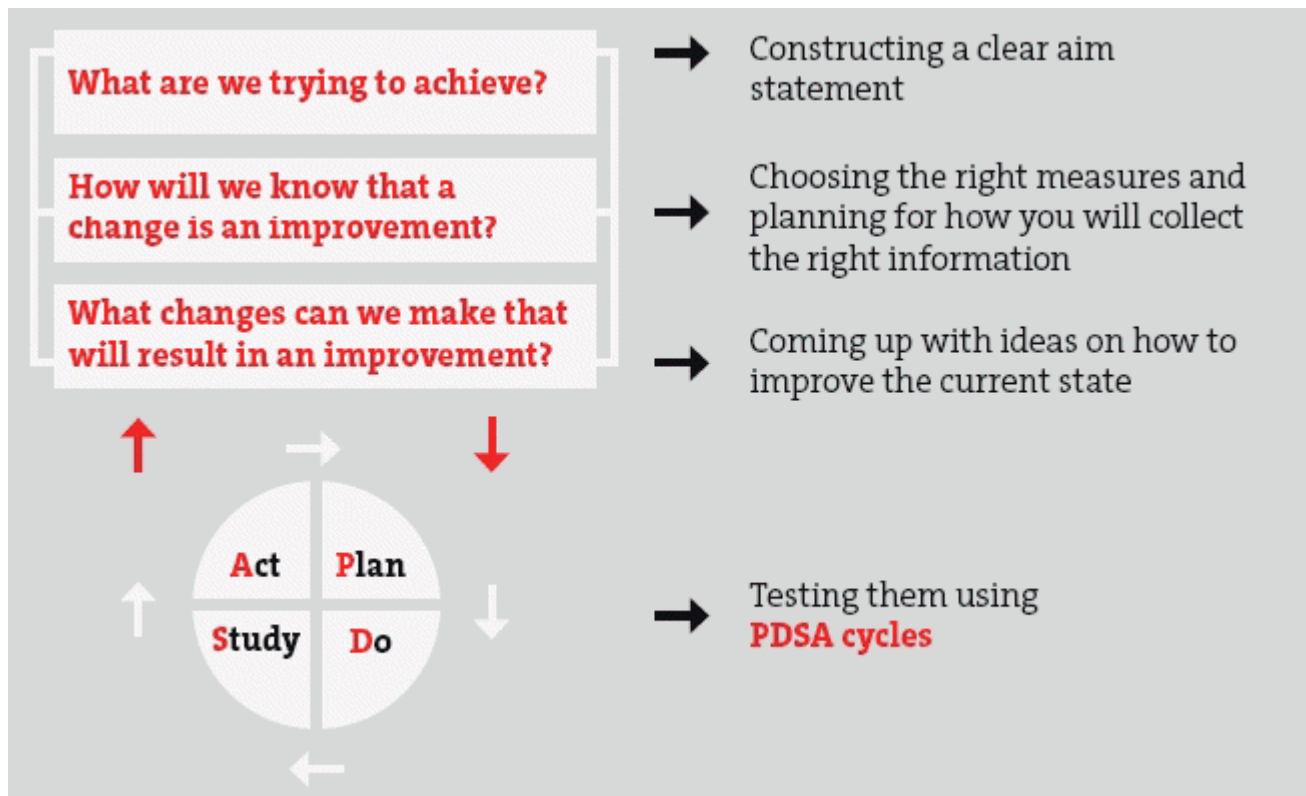
## 6.4 Implementing Best Practice: Tests of Change.

### Care Bundles and AAA care pathways are tested through Plan, Do, Study, Act (PDSA) Cycles

The core principle of this model is empowerment of 'local teams' of staff to develop and undertake small scale testing of our care bundles and make local amendments to ensure full implementation into practice.

- Testing a change in the real work setting.
- Small rapid scale testing.
- Minimises resistance.
- Indicates whether proposed change will work in environment in question.
- Provides opportunity to refine change as necessary before implementing on a broader scale.

## Plan, Do, Study, Act (PDSA) Cycles



### Step 1: Plan

- Plan the test or observation, including a plan for collecting data.
- State the objective of the test.
- Make predictions about what will happen and why.
- Develop a plan to test the change. (Who? What? When? Where? What data need to be collected?)

### Step 2: Do

- Try out the test on a small scale.
- Carry out the test.
- Document problems and unexpected observations.
- Begin analysis of the data.

### Step 3: Study

- Set aside time to analyze the data and study the results.
- Complete the analysis of the data
- Compare the data to your predictions.
- Summarize and reflect on what was learned.

### Step 4: Act

- Refine the change, based on what was learned from the test.
- Determine what modifications should be made.
- Prepare a plan for the next test.

## **Case Study: Implementing AAA QIP at Doncaster Royal Infirmary: An Anaesthesia Trainee's Perspective**

Dr Helen Findley FRCA

ST5 Registrar in Anaesthesia, South Yorkshire Anaesthetic Rotation.

As a registrar with an interest in vascular anaesthesia I was keen to get involved in a major service improvement project and implementing AAA QIP at Doncaster Royal Infirmary (DRI) has given me the opportunity to do just that.

At DRI we have been running our AAA fast-track recovery pathway since 2009. The pathway is progress based, rather than time based; it advocates early removal of lines and catheters, encourages early feeding, prompt mobilization and discharge planning from admission. Initial audit showed a trend toward reduction in hospital length of stay. The pathway anecdotally had high staff satisfaction ratings because it empowered staff and allowed valid and endorsed decision-making at all levels.

During the past year we have developed the pathway using PLAN-DO-STUDY-ACT (PDSA) cycles involving small numbers of patients to gain regular feedback from critical care staff, anaesthetists, surgeons and physiotherapists and implement small but important changes.

Our improvements have included:

- Rolling out the staged recovery pathway for all appropriate patients having both open AAA and EVAR procedures.
- Encouraging a culture of non-acceptance of less than excellent analgesia for open AAA patients, with a 24-hour service for replacing a poorly working epidural.
- Addition of a guideline for use of prophylactic CPAP in patients identified pre and peri-operatively as being at higher risk of respiratory deterioration.

It has been vital to brief all critical care staff well during this process and with over 100 critical care nursing staff, it has been a challenge. Attendance at monthly management meetings, regular communications with critical care consultant and senior nursing staff and the use of posters have helped.

We have also recently launched the first version of our AAA repair integrated care pathway (IPOC), which is initiated at the first clinic appointment and documents the entire perioperative process for all patients.

The IPOC includes:

- Flowcharts to standardise the pre-operative assessment process; a consensus was sought amongst physicians, anaesthetists, surgeons, physiotherapists and specialist nursing staff.
- A new framework for patient education; AAA QIP patient information leaflets were adapted for local use, with particular focus on post-operative recovery.
- A database of all AAA patients being worked up, highlighting high-risk patients, available for all members of the MDT to view.

We expect our standardised flowcharts for pre-operative assessment will improve efficiency, save time and empower specialist nursing staff to initiate agreed optimisation measures for high-risk patients. The database will improve communication between surgeons, radiologists and anaesthetists during pre-operative decision-making. In the coming months we plan to test our new IPOC with PLAN-DO-STUDY-ACT cycles and to audit patient experience and satisfaction, as well other key outcomes.

From being involved in the early MDT meetings and attending the Yorkshire and Humber Regional AAA QIP meeting to producing our integrated care pathway for all elective AAA patients, I have gained vital experience of a host of management issues and I would recommend senior trainees, both surgical and anaesthetic, get involved locally in implementation of the project.

## 7. REGIONAL ACTION PLANS

### 7.1 What are Regional Action Plans?

We are working within regions to hold ongoing meetings in order to introduce best practice AAA protocols. Template protocol documents are discussed and reviewed through group sessions with suggestions of region specific requirements for each protocol. Meetings are then followed by implementation, where Trusts/ teams carry out one intervention. Changes are introduced through local testing to increase ownership of the protocols and to improve implementation into standard practice.

#### Key elements of regional action plan process:

- **Improvement work over time**
- **Trusts/teams test ONE best practice protocol/intervention**
- **Follow up meetings to report back on progress, share outcomes and learning**
- **AAAQIP team to provide ongoing support, track data contribution and outcomes**

#### Who is involved?

All those involved in the care of AAA patients including surgeons, radiologists, anaesthetists, nurses, managers, Cardiac and Stroke Networks as well as Commissioners.

#### What is involved?

It begins with an organised event. The QIP team provides an overview of the QIF, data quality issues within the region and nationally and advice about quality improvement. The regional clinical teams are involved in breakout sessions to discuss the QIF and make decisions around issues of local implementation.

We aim to cover each element in the AAA care pathway. These include:

1. **Patient Consultation: AAA patient information leaflets and consent forms**
2. **The decision to treat: Preoperative screening and risk scoring.**
3. **MDT: Who should be involved in the decision to treat?**
4. **Intra-operative care**
5. **Post-operative and discharge care.**
6. **Measurement of outcomes and patient experience.**

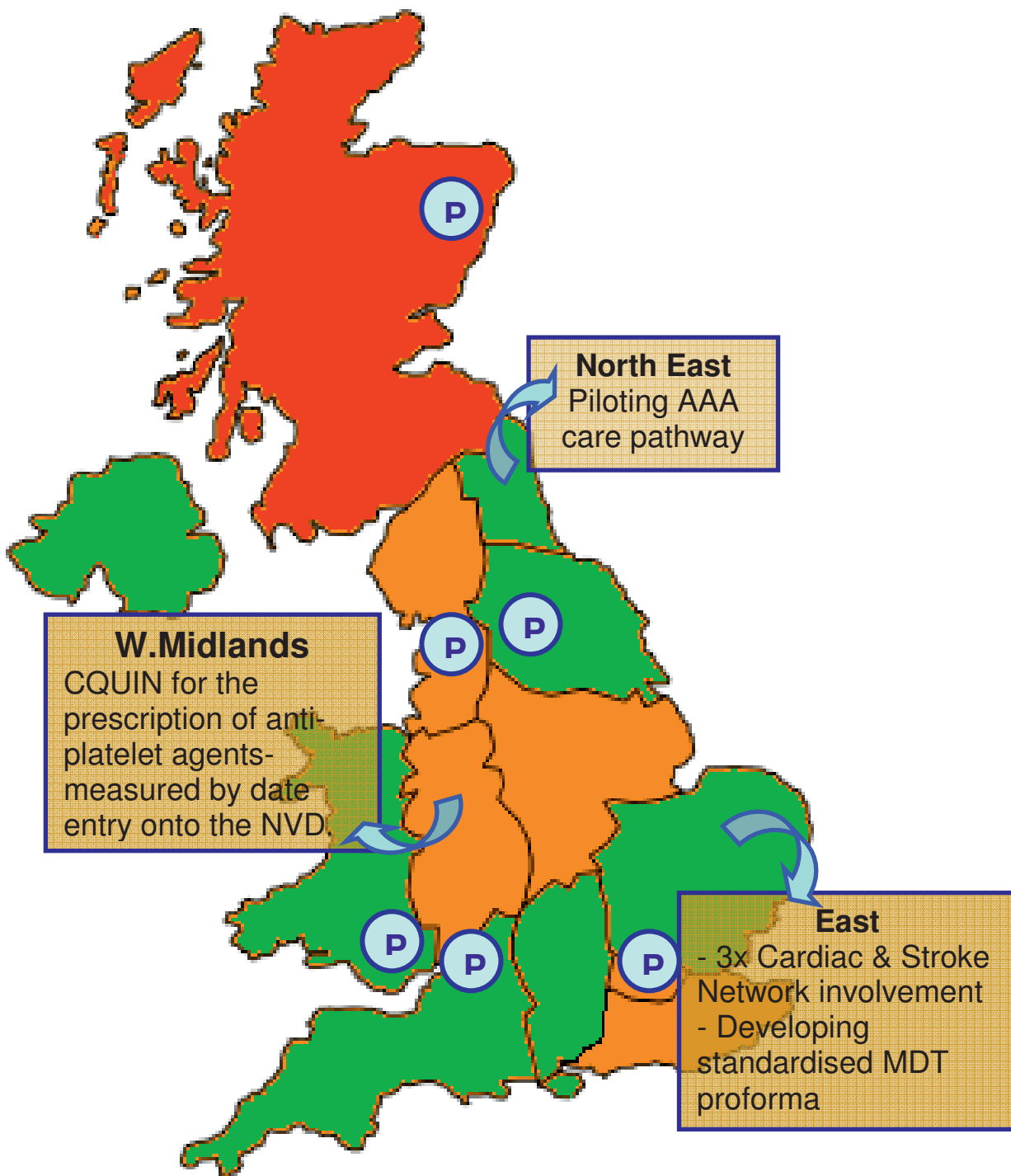
The day is ended by summarizing discussions and agreeing an action plan for implementation. Follow up meetings are arranged with local team leaders to discuss progress, and set plans for further development. The learning from these events is publicised to other groups.

#### What are the benefits in participating?

Regional action plans work to bring clinicians involved in the care of AAA patients together. Experiences are shared based on local processes thus protocols can be adopted with the optimal changes to suit the region. This will act to standardise vascular practice throughout a region and improve patient safety.



## 7.2 Regional Action Plan Participation



### KEY

 1<sup>ST</sup> Regional Action Plan Meeting held, change interventions agreed

 Regional Action Plan meeting due

 No Regional Action Plan yet organised

 AAA Patient Focus Group held

## **Case Study:           QUALITY IMPROVEMENT PROGRAMME FOR AAA                                   IN THE NORTH EAST OF ENGLAND**

Tim Lees Consultant Vascular Surgeon, Newcastle University Teaching Hospital  
Chair of Vascunet

### **Introduction**

Vascular services in the North East of England cover a well defined but large geographical area from Northern Yorkshire in the South of the region to the Scottish border in the North. There are also links with vascular services in Cumbria and historically the Cumbrian vascular teams have been part of the Northern Vascular Group. The Quality Improvement Programme for abdominal aortic aneurysms in the North East was commenced in July 2010 as part of the national programme run by the Vascular Society.

### **Standardising Care**

There is evidence that standardisation of care processes can help to reduce morbidity and mortality, particular for processes which are high volume and performed regularly. On the other hand every patient is slightly different, and every healthcare professional has their own particular way of doing things which has often been developed over many years of practice. It is important to reduce bad variation leading to poor outcomes on the one hand whilst keeping the good variation which allows us to respond to unusual and unique clinical situations on the other.

The basis of this project in the North East is to try and standardise the whole of the care pathway of the AAA patient and to produce a care pathway which all healthcare professionals involved in AAA management and individual institutions can sign up to as best practice in AAA care.

### **Processes**

The first meeting of the NE QIP group was held on July 2010 and included representation from each hospital (Teeside, Durham, Newcastle, Gateshead, Carlisle, Sunderland) and from each specialty group (surgeons, anaesthetists, radiologists, nurses, managers). The national QIP team also attended and facilitated the meeting. Enthusiasm was high and through breakout workgroup sessions we covered most of the key elements of patient care related to AAA treatment. This was broadly divided into patient information, pre-operative anaesthetic assessment, radiological and anaesthetic classification of EVAR, criteria for MDT meetings, intraoperative and postoperative management. At the end of the day we had a clear structure to work on to define a care pathway for AAA patients.

Further work was then done by several individuals who attended the initial group meeting in order to develop the structures agreed into a clear well defined care pathway. A second meeting was held in September. Not all the people who attended the first meeting were able to attend this second meeting but a core group examined the pathways that had been developed and refined these further. Advice was also taken from patient representatives and from the Society of Vascular Nurses.

At the end of this process we had the following documents:

1. Two new information sheets for patients. One of these was for patients undergoing surveillance for small aneurysms and the other was for patients approaching intervention for their aneurysm.
2. Care pathway guidance, indicating in detail what actions should be undertaken at each stage of the patients' management.
3. Care pathway documentation to be completed at each stage and filed in the patient records.

The next stage was to circulate these to all members of the initial group who had attended in July for their comments and amendments. Further changes were made to the documentation following this and the documents were then circulated more widely to cover as many people as possible who are involved in the care of AAA patients. The documentation was amended again following further feedback and then distributed for use.



The introduction of the documentation was done as a pilot programme for three reasons:

1. Despite wide circulation it was anticipated that many would not have actually looked at the documentation prior to introduction.
2. It is not until such documentation is used in real clinical situations that problems can be fully identified.
3. Ultimately these documents will need to be approved by the Trusts' medical records committees and there is little point in going through this process until the documents have been refined to a final version.

### **Care Pathway**

Other groups who are embarking on this project in their own region are welcome to use the documentation developed in the NE to adapt for their own needs as appropriate. These are available on the QIP website.

### **Potential problems**

For those embarking on this project it is important to discuss some early issues that have been identified and which may require adjustments to our processes, others are potential problems which will be tested in our pilot process. These are:

1. The balance between enough and too much information is a difficult one to get right. The current pathway documentation may be too long for routine use but this will be assessed in the pilot. (*A short description of the core components is given below*)
2. The pathway guidance is comprehensive but as there are so many guidelines and protocols accompanying patient care these days it may just gather dust on the wards and in clinics and may not be read.
3. The pathway will require a change in the way MDT meetings are run in some units and the number of patients to be discussed will increase. This potentially the most important change in the process of care of these patients but changing practices which may have been in place for many years which will be difficult
4. The pathway may be used selectively
5. It is important to apply this pathway to all patients with an AAA who have reached the threshold for treatment. At present the NVD does not record those patients who are turned down for treatment and this is important if we are to evaluate the true benefit of this QIP.

### **The next stage**

We are currently at the most difficult stage of the process, converting what we have developed as a sound theoretical concept into something which will be used in routine practice and which will aid the reduction in peri-operative mortality of AAA patients. The project will only work if those involved in AAA management believe that there is a need to minimise mortality and that this method will work.

We have some clear enthusiasts and we have some clear sceptics. None of us know for certain that this will work but the methodology is based on clear evidence from other areas of health care. It will require champions in each hospital involved in the project in the North East to drive it and make it happen.

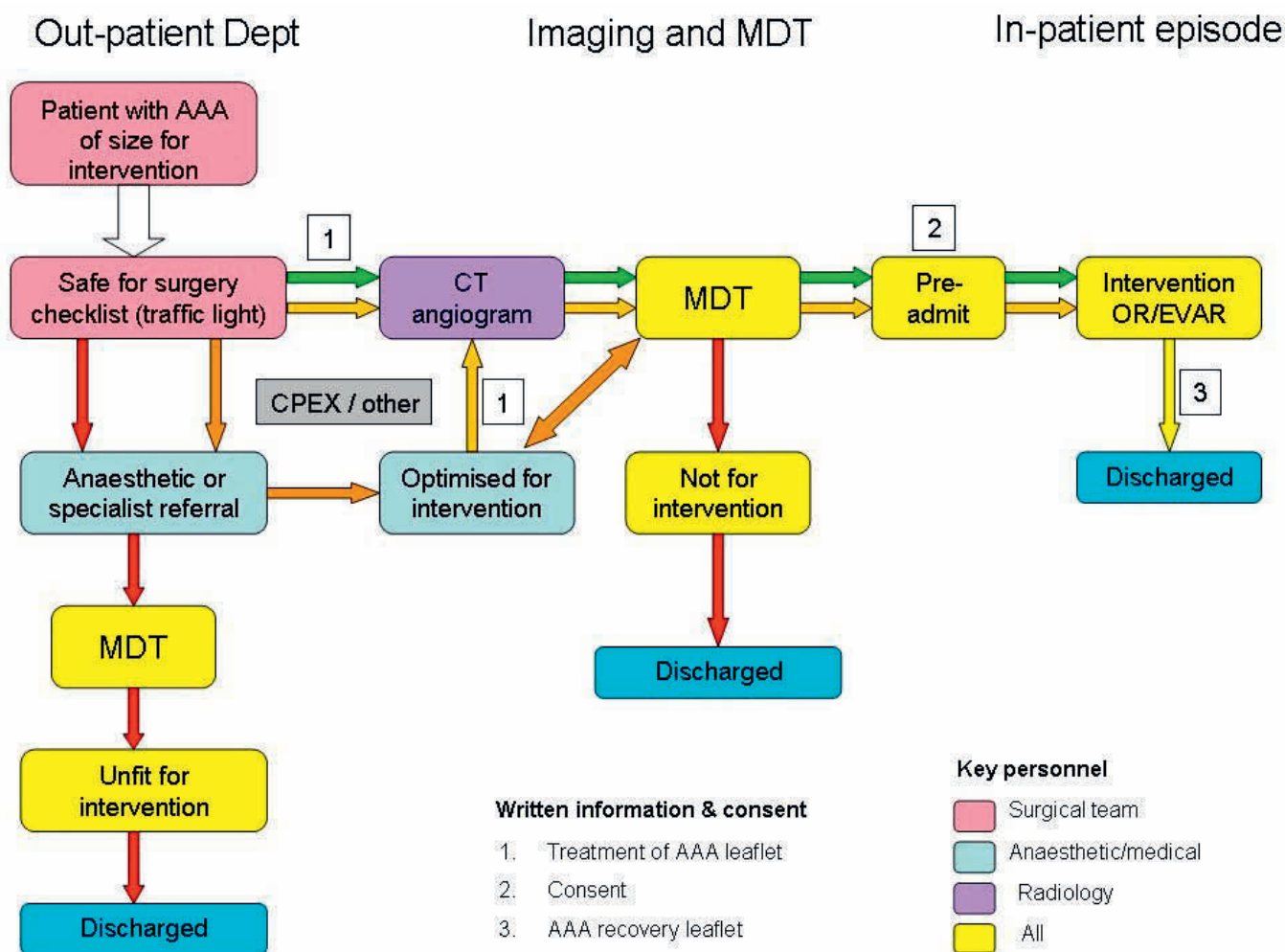
The strengths of the NE vascular community are that we are used to collaborating in other areas, we have a strong Northern Vascular Group which meets twice per year, and we have recently linked with the regional cardiovascular network which will provide administrative support.

Can we achieve the ultimate aim of 0% mortality from ruptured AAA and 0% mortality following intervention for AAA? I don't know, but why not aim for it?

## 7.3 Regional Recommendations for Improving Elective AAA Repair

### Develop and use the Care Pathway

- To make the pathway useable, we present the core components that should be used by all units.
- Units may configure their own pathways, by adding to the core components (e.g. nursing documentation, VTE assessment etc)
- Units should audit performance of the pathway locally to demonstrate improved consistency of clinical assessment, care delivery and communication.



- The arrows are colour coded by checklist assessment.
- Patients assessed as “amber” for risk, may proceed down either part of the pathway, depending on number of factors positive and local protocols. Further studies are needed to refine this part of the pathway.

### Summary of key findings from regional meetings held to date.

#### Assessment

- Most hospitals have vascular x-ray meetings but not specific MDTs. Anaesthetists are not largely included in vascular MDTs although most expressed a strong desire to be involved.
- A variety of vascular patients are discussed at x-ray meetings. This was seen as useful as vascular anaesthetists could be consulted about patients needing other (non AAA) complex vascular interventions.

- For the MDT to function well, it is best if an individual within each unit can be designated as the local MDT co-ordinator (a variety of individuals can fulfill this role, but it is most commonly held by a team member with a central role), to ensure the pre-op care bundle is fully implemented.
- Recording of the MDT is variable across and within regions. There was broad agreement that a coordinator should be responsible for recording decisions and ensuring that they were implemented. Units would need to audit MDT performance.

### Facilities and Team Composition

- The loss of experienced theatre assistants for both elective surgery and out of hours was raised as an issue by some teams. It was agreed that a MRCS grade registrar was needed for safe operating. The alternative is joint consultant surgery. It was reported that many teams are now adopting this practice for complex open surgery and EVAR.
- It was felt that a minimum team requirements should be set for difficult cases (unexpected difficulties/operations that over-run). Examples were given of setting minimum numbers of staff and secure access to level 2 or 3 care as agreed in the MDT.

### Post-operative Care

- All regions support the concept of setting discharge aims prior to admission in order to manage patient and staff expectations.
- There is medical staff support for the care pathway to incorporate criteria led discharge. If achieved, this would make the discharge process more consistent. There was interest in nurse led discharge for patients with an uncomplicated recovery.
- Setting clear protocols for pathway progression will smooth pathway flow. This will allow nurse led discharge against protocol. Nurses felt that they would need guidance about how to manage pathway variance, but were supportive of plans for protocol led discharge.
- There is support for setting planned discharge dates to manage patient expectations. These should be agreed with patients and carers prior to admission. Patients requiring complex packages of care in the community should be referred to OT and social services prior to admission wherever possible.

### Communication with Patients

- It was consistently revealed that surgeons often provide risk information based on their personal experience of complications.
- Regional group feedback recommends standardisation of the process for providing patient information. Consultations should allow appropriate time for discussion of written information and for taking consent once intervention is agreed.
  - 1. Outpatients:** Explain what an AAA is, provide link to other sources of information, verbal information should always be accompanied by written information for patients and carers to take away. Patients should be told about the need for pre-operative assessment and that they may need formal tests (e.g. CPEX) or to see a vascular anaesthetist. They should be reassured that this is a normal part of care.
  - 2. Pre-assessment:** Should ideally involve consultation with the surgical team a specialist nurse and vascular anaesthetist. Patients should be provided with written information and consent taken or reviewed at this stage (including placing personal data on the NVD). The clinical team should discuss with and agree an expected discharge date with patient.
  - 3. In hospital:** The team should have a consistent approach to communication about progress along the pathway and reinforce agreed discharge plans. Variance should be clearly documented and explained along with implications for discharge from hospital and future recovery.
  - 4. Discharge:** Patients should be given a written recovery information sheet. This should have contact telephone numbers to the unit providing care, and advice about what to do if problems occur out of hours. A named contact for day time discussion of problems should be provided.
  - 5. Verbal telephone follow up.** The patient should be contacted by a named individual member of the team between 48 - 72 hours following discharge. This provides an opportunity to ensure that recovery is proceeding as planned and to answer any queries that patients or their carers may have.

### **AAA Patient Case Study: The value of good communication.**

My aneurysm was triggered by accident during tests triggered by a prostate problem. When the tests confirmed prostate cancer I tended to regard the aneurysm as secondary to the cancer and something to be dealt with as quickly as possible. I think this attitude helped by reducing my assessment of the importance of the aneurysm and contributed significantly to my speedy recovery.

In the preliminary phase after the diagnosis of the AAA the unequivocal optimism of the consultant regarding my prospects for a complete recovery was very reassuring. The early counselling together with the supporting documentation and a bit of well-aimed surfing made the treatment options very clear and my choice of EVAR procedure rather than the open operation a no-brainer. After my choice was made admission to the hospital followed a few days afterwards.

The first day I spent acclimatising and being briefed by an extremely professional and confidence boosting anaesthetist on the general merits of anaesthesia and epidurals. Again, the choice seemed a no brainer.

I was in hospital for less than 3 days. My recovery at home was swift. I started taking walks after one or two days and within a month was walking 2 or 3 km and contemplating 9 holes. Everything else had returned to normal.

Deryk McNeill. AAA Patient, Angus, Aberdeen. 28<sup>th</sup> March 2011

### **AAA Patient Case Study: The Importance of Post-operative Follow Up and Communication.**

My AAA was repaired by major abdominal surgery in 2002 and was entirely without complications until I left the hospital. I was extremely well looked after on the ward and made a rapid and complete recovery.

An ongoing problem which occurred and persisted for nearly 3 months following release from hospital was a serious lung infection. I was not warned of this possibility though I believe it be a fairly common occurrence with most forms of abdominal surgery. I felt unsupported by the hospital and very much on my own with an interminable, unpleasant infection which was treated only by my GP and monitored by x-ray by my local accident hospital. I felt isolated and abandoned after the superlative care I have been receiving. That could have been treated a lot better.

Douglas G. Williamson. AAA Patient. Huntly. 22 March 2011

## Measurement

- Complete data entry into the NVD is universally supported. There is debate about the appropriate size and extent of the dataset. The Vascular Society is reviewing the datasets currently and clinicians are encouraged to contact the Society with suggested improvements.
- There is agreement that units should capture information on all AAA patients, not just those offered intervention. It is felt that the NVD should provide space for capturing patients with large, and symptomatic AAA who do not proceed to intervention.
- Combining turn down rates and intervention rates would give a more complete picture of the service provided by vascular teams.
  - All patients with AAA should be discussed at the MDT and a record kept as to why they were turned down.
- There is support for capturing both complication data and cancellations (captured by NHS Trusts) to provide a complete picture of care provision.
- There is disagreement about how best to capture complications. It is agreed that this is important, but there is a wide variety of opinion as to how this should be done. Voluntary self reporting is felt to be unreliable by some teams. A formal review process is widely supported and unit should develop a plan to capture and review complication data.

## 7.4 Regional Action Plan Progress

### Change interventions agreed

REGION & TEAMS	BEST PRACTICE INTERVENTIONS	LEAD
<b>North East</b>		<b>Tim Lees</b>
Newcastle Upon Tyne City Hospitals Sunderland Gateshead County Durham South Tees North Cumbria North of England Cardiovascular Network	<b>Piloting AAA care pathway</b>	Tim Lees/Lynsey Dovey
<b>West Midlands</b>		<b>Stan Silverman</b>
<b>West Midlands Vascular Review Service</b>	<b>CQUIN for statin/antiplatelet agent prescription as measured on the NVD.</b>	Stan Silverman/Andrew Garnham/ Jon Cook/ Collette Marshall
<b>East of England</b>		<b>Kevin Varty</b>
<b>Addenbrookes</b>	<b>Develop standardised MDT proforma</b>	Claire Cousins
	<b>Implement pre-op anaesthetic assessment</b>	Peter Bradley
	<b>Collecting complication data</b>	Paul Hayes
<b>Bedford</b>	<b>Develop standardised MDT proforma</b>	Arindam Chaudhuri
<b>Broomfield and Harlow</b>	<b>Implement AAA patient information leaflets/PROMS</b>	Marie Galley/Fiona Macguire
<b>Colchester</b>	<b>Capture turn down rates</b>	Chris Blackhouse/ Sohail Choksy
<b>Norfolk and Norwich</b>	<b>Early return of patients to ward</b>	David Nunn/ Darren Morrow
<b>Peterborough</b>	<b>Capture turn down rates</b>	Brandon Krijgsman
<b>Princess Alexandra Harlow</b>	<b>Retrospective study of AAA patients. Implement information leaflets/PROMS</b>	Charlotte Hunns
<b>Queens Hospital Romford</b>	<b>Trial pre-operative care bundle</b>	Gabriel Sayer/Selvarajah Yoganathan
<b>NHS East of England</b>	<b>Working with Trusts in the region on data audit/ MDT process</b>	Sally Standley
<b>Essex EoE Cardiac &amp; Stroke Network</b>	<b>Working with Trusts in the region on data audit/ MDT process</b>	Gail Shepherd/Jackie King/Carol Wilson
<b>Anglia EoE Cardiac &amp; Stroke Network</b>	<b>Working with Trusts in the region on data audit/ MDT process</b>	Genevieve Dalton/ Gina Radford/ Mei Li
<b>Beds &amp; Herts EoE Cardiac</b>	<b>Working with Trusts in the region on data</b>	Judith McVey/ Candy Jeffries



<b>&amp; Stroke Network</b>	<b>audit/ MDT process</b>	
<b>Yorkshire</b>		<b>Sewa Singh/ Nandan Haldipur</b>
<b>Bradford Royal Infirmary</b>	<b>Written patient communication</b>	
<b>Doncaster Royal Infirmary</b>	<b>Trailing pre-op care bundle</b>	Helen Findley/ Alaisdar Strachan
	<b>Criteria led discharge</b>	Siobhon Gorst/ Julia Perry
	<b>AAA PROMS</b>	Martha Mayhew
	<b>Capture turn down rates</b>	Sewa Singh/ Nandan Haldipur
<b>Huddersfield Royal Infirmary</b>	<b>Trial pre-op care bundle/ criteria led discharge</b>	Jeremy Pinnell
<b>Hull and East Yorkshire</b>	<b>Criteria led discharge</b>	Venkat Srinivasin
<b>Leeds General Infirmary</b>	<b>Written patient communication</b>	David Russell
<b>Sheffield Northern General Hospital</b>	<b>Amalgamating safety checklist and MDT proforma</b>	Jonathan Beard
	<b>Criteria led discharge</b>	Sumera Sanghera/ Hazel Trender
<b>Wakefield Pinderfields</b>	<b>MDT proforma / capture turn down rates</b>	Jon Hossain
<b>York Hospital</b>	<b>Written patient communication/AAA PROMS</b>	Amanda Stanford/Nicky Wilson/Stephen Cavanagh
<b>South West/Central &amp; Wales</b>		<b>David Mitchell</b>
<b>Derriford Hospital</b>	<b>Standardise pre-op assessment</b>	Martin Price/ Simon Ashley
<b>Gloucester Royal Hospital</b>	<b>Post discharge patient information sheet</b>	Jonathan Earnshaw/ Caroline Rodd
<b>John Radcliffe Hospital</b>	<b>Develop intra-op pathway (OPEN)/ capture turn down rates</b>	Jeremy Perkins/ Mark Stoneham/ Catherine Atkinson
<b>Morrison Hospital</b>	<b>Criteria led discharge</b>	Louis Figelstone
<b>Musgrove Park Hospital</b>	<b>MDT proforma</b>	Andrew Stewart
<b>North Bristol NHS Trust</b>	<b>MDT coordinator/ implement pre-op care bundle/ capture turn down rates</b>	David Mitchell/ Kate Humphries/ Michael Milne
<b>Royal Bournemouth Hospital</b>	<b>Criteria led discharge/ capture turn down rates</b>	Lasanthe Wijisingh
<b>Royal Cornwall Hospital</b>	<b>MDT coordinator/develop intra-op pathway (EVAR)</b>	Jonathan Davies
<b>Royal Devon and Exeter</b>	<b>Anaesthetist attending MDTs and CT before investigation.</b>	Richard Telford
<b>Royal Glamorgan Hospital</b>	<b>Develop intra-op pathway (OPEN)</b>	
<b>Royal Gwent Hospital</b>	<b>PEDW-NVD data validation/turn down rates</b>	David McLain
<b>Royal United Bath</b>	<b>Develop intra-op pathway (EVAR)/ HES-NVD data validation</b>	Mahesh Pai
<b>Salisbury District Hospital</b>	<b>Criteria led discharge</b>	Sarah Hulin
<b>Southampton General Hospital</b>	<b>MDT proforma</b>	Tom Peck/ Gareth Morris
<b>Torbay Hospital</b>	<b>Trailing MDT assessment sheets and organising anaesthetic input into the MDT</b>	Ian Currie
<b>University Hospital of Wales</b>	<b>Post discharge patient information/ expectation management</b>	Kate Rowlands/ Gininna Conway
<b>Wrexham Maelor Hospital</b>	<b>HES-NVD data validation</b>	Tony Da Silva
<b>Northern Ireland</b>		<b>Paul Blair/ Bernard Lee</b>
<b>Belfast City Hospital</b>	<b>Develop structured MDT process/ Audit patients sent to HDU after open repair/ Capture turn down rates</b>	Kathy McGuigan/ Louis Lau
<b>Royal Victoria Hospital</b>	<b>Consent process/ Audit patients sent to HDU after open repair.</b>	Paul Blair/ Judith McClements
<b>Altnagelvin Hospital</b>	<b>Develop structured MDT process/ Audit time from decision to treatment</b>	Zola Mzimba/ Brendan Devlin
<b>Craigavon Hospital</b>	<b>Refine the intra-operative WHO checklist. Recovery and discharge information.</b>	Alastair Lewis/ Trudy Reid/ Heather Trouton

## 7.5 First Phase of Implementation: Leaders and Contributors

### ❖ North East

A standardised AAA care pathway with guidance notes and patient records has been developed for use in the North East (available to view on the AAAQIP website: <http://www.aaqip.com/aaqip/rap-north-east.html#tp>). This was developed with multi-disciplinary input from vascular surgeons, radiologists, anaesthetist as well as specialist input from the Society of Vascular Nurses (SVN) and physiotherapists. The final care pathway has now been agreed and is being implemented as a pilot by Trusts in the region.

- The North of England Cardiovascular Network is working in collaboration with the region to collect feedback on implementation.

### ❖ East of England

**Norfolk and Norwich & Addenbrookes** - *David Nunn, Darren Morrow & Kevin Varty*

Norfolk and Norwich are studying sending EVAR patients directly back to the ward rather than extended recovery or HDU. A nursing care plan has been developed in collaboration with Addenbrookes (available to view on AAAQIP website at: <http://www.aaqip.com/aaqip/rap-east.html#tp>). Increased staff nursing levels have been arranged and they are currently auditing the outcomes in 20 cases. Findings will be collected and publicised in the final AAAQIP report in April 2012.

### ❖ Yorkshire

**Sheffield Northern General Hospital & Wakefield Pinderfields** - *Jonathan Beard & Jon Hossain*

Sheffield have incorporated the AAA pre-operative safe for surgery checklist and the Multi-Disciplinary Team (MDT) proforma to trial locally. Wakefield have additionally developed a local MDT proforma (Appendix E) and plan to develop an electronic version so the MDT process and outcomes can be stored and accessed electronically. These are working versions and feedback on implementation will be collected and fed back to the AAAQIP.

**Doncaster Royal Infirmary** - *Helen Findley, Alaisdar Strachan, Siobhon Gorst, Julia Perry, Martha Mayhew, Sewa Singh and Nandan Haldipur.*

Doncaster have been developing an integrated care pathway for AAA patients which includes the AAAQIP pre-operative care bundle along with pre-operative flowcharts for assessment of complex patients, documentation of the MDT, plans for patient education/preparation, peri-operative documentation and an enhanced recovery pathway which is used on critical care. The documentation is currently being finalised and feedback on implementation will be composed. (For more information contact the Doncaster team: [helenfindley@doctors.org.uk](mailto:helenfindley@doctors.org.uk), [alasdair.strachan@dbh.nhs.uk](mailto:alasdair.strachan@dbh.nhs.uk), [nandan.haldipur@dbh.nhs.uk](mailto:nandan.haldipur@dbh.nhs.uk)).

### ❖ South Central

**Oxford Radcliffe Hospitals** - *Jeremy Perkins, Mark Stoneham, Catherine Atkinson, Karunakaran Ramaswamy, Vikram Halikar and John Griffiths.*

The Vascular Team at Oxford Radcliffe Hospitals have been working hard to develop standardised intra-operative pathways for both open and endovascular elective abdominal aortic aneurysm repair (Appendix F & G). This includes surgical and anaesthetic facilities and equipment, surgical and anaesthetic technique and team meetings, time out and sign out procedures. They are currently in the development phase and feedback and findings on implementation will be collected and published in the final AAAQIP report (April 2012).



## **Case Study: West Midlands, Update on Improving Quality.**

Colette Marshall: Consultant Vascular surgeon, University Hospitals Coventry and Warwickshire Associate Medical Director, NHS Coventry.

Within vascular surgery, quality improvement efforts in the West Midlands region within have focussed on four main areas:

- Peer review visits
- The centralisation agenda
- Developing vascular outcome metrics to measure improvement
- Development of a vascular CQUIN

### **Peer Review:**

The regional peer review process has been led by the West Midlands Quality Review Service (WMQRS) under the directorship of Jane Eminson. WMQRS has been set up as a collaborative venture by NHS organisations in the West Midlands to help improve the quality of health services by:

- Developing evidence-based Quality Standards
- Carrying out developmental and supportive quality reviews - often through peer review visits
- Producing comparative information on the quality of services
- Providing development and learning for all involved.

Expected outcomes are:

- Better quality, safety and outcomes.
- Better patient and carer experience.
- Organisations with better information about the quality of clinical services.
- Organisations with more confidence and competence in reviewing the quality of clinical services.

WMQRS has a history of peer review in other specialties across the West Midlands and in 2010 focussed on vascular services in tandem with reviews of stroke, acute services and critical care.

Being the first regional review of its kind in vascular surgery there was a need to develop agreed quality standards to benchmark against. Draft standards were developed by a Steering Group and presented to relevant clinicians for further suggestions and refinement. The final panel of standards consisted of a series of "process and structure" quality measures agreed by local clinicians to be important in demonstrating the quality of a vascular service. Clinician engagement with the process was encouraged by a number of workshops held centrally in Birmingham and an open invitation for all clinicians to become involved in the process by training as peer reviewers. Training to undertake the quality reviews consisted of a day's training by WMQRS.

Of the eleven major vascular units in the area, ten engaged with the process and agreed to be reviewed against the standards. Peer review teams consisted of a surgeon, vascular nurse specialist and an executive manager, with patients and commissioners also being involved in some teams. Trusts were invited to self-evaluate against the standards in preparation for the visit and presented evidence in a folder to demonstrate compliance with the standards. On the day of the visit teams visited the relevant areas of the hospital and spoke with key team members. Compliance against each individual standard was assessed, good practice was identified and any areas of concern were noted.

Although the final report of the review is still in progress there are already benefits materialising from the process. The quality standards produced have been adopted by other regions to form the basis of their own quality reviews or as part of their regional AAAQIP framework. There is no doubt that the review has focussed the minds of commissioners on the importance of centralising vascular surgery to higher volume units; the review seems to have been a catalyst in driving the centralisation agenda forward. The next review is planned in 2012 and it is hoped that it will be able to demonstrate improvements in quality over time.

### **The Centralisation Agenda:**

It has been appreciated by surgeons in the West Midlands for some time that centralisation of vascular services is both desirable and inevitable. There are some well-established hub and spoke models in the region offering excellent services to a wide population (eg. Worcester and Hereford) and negotiations have been instigated in other areas that are coming together to form networks. Progress has been swift and catalysed by both the quality review standards and the AAA screening programme that stipulates minimum populations required for a vascular unit.

### **WMQI:**

West Midlands QI (WMQI) is the quality observatory for the region and is under the directorship of Richard Wilson. In tandem with the quality review process WMQI has been developing a set of quality indicators or metrics in vascular surgery in order to assess outcomes. This work started by asking local vascular clinicians what they thought would be good quality indicators. A long list of 48 indicators was whittled down to a short list of 27 that clinicians thought were relevant and useful. The list includes mortality, length of stay, complications, readmission rates, and anti-platelet and statin usage across the domains of aortic, carotid, bypass and amputation surgery. These indicators are now being developed by a team at University Hospital Birmingham by extracting data from Hospital Episode Statistics. It is planned that in the first instance the data will be displayed on a secure website for clinicians to review for comments. Once the data have been refined and are acceptable to clinicians they will be published in the public domain. The data will allow comparisons between units with the aim of improving quality by highlighting areas for improvement. Some of the proposed metrics rely on data capture from the National Vascular Database (NVD) and local clinicians have been encouraged to improve contributions to the NVD so that these data can become more accurate and meaningful.

### **Vascular CQUIN:**

The West Midlands SHA has developed a vascular CQUIN with the aim of improving quality in vascular surgery. The CQUIN payment framework enables commissioners to reward excellence, by linking a proportion (1.5% in 2011/2012) of English Trust's providers' income to the achievement of local quality improvement goals. For each individual CQUIN scheme a Trust can potentially earn an additional six figure sum for meeting a quality goal.

The vascular CQUIN proposes that Trusts be rewarded for ensuring that vascular surgical patients are prescribed anti-platelet agents and statins. The aims of this CQUIN are three-fold:

- to improve data submission to the NVD by making this the data submission tool for measuring and monitoring the CQUIN;
- to ensure patients are treated adequately and appropriately with anti-platelet agents and statins in order to improve outcomes
- by linkage to a substantial financial incentive it is hoped that Trusts will allocate some of the money to improving data collection for the NVD with appropriate support.

Vascular surgeons interested in harnessing CQUIN money for improving their services should start negotiations with their local Trusts and PCTs in early summer in order to finalise schemes by early in 2012. The CQUIN can be accessed here: <http://www.aaqip.com/aaqip/rap-west-midlands.html#tp>

### **References:**

WMQRS: <http://www.wmqi.westmidlands.nhs.uk/wmqs/about-wmqs>

WMQI: <http://www.wmqi.westmidlands.nhs.uk/about-wmqi/>

Vascular quality standards: <http://www.wmqi.westmidlands.nhs.uk/about-wmqi/>

CQUIN schemes:

[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_091443](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_091443)

## 8. PATIENT ENGAGEMENT

The QIP seeks to drive up the standard of care provided to patients with AAA. An important component of this work is a better understanding of patients' experiences and views.

- ❖ *Vascular surgeons have much to gain from wider patient involvement in planning care.*
- ❖ *We believe that patient groups have a central role in defining national standards.*
- ❖ *Patients have implicit faith in the healthcare service. Clinicians have a responsibility to ensure that patients are fully informed and supported.*

Vascular clinicians taking part in our regional action plans have consistently revealed that they are unsure about what information patients receive, when, and particularly what the patient gets out of the information. There are few studies into communication around vascular surgery, but there is evidence that communication of risks can be inconsistent [Berman et al. 2008].

It is self evident that communication with patients should be of a high quality both pre-, peri and post-operatively. This ensures patients are fully informed and able to make an appropriate choice of intervention. High quality communication helps to set expectations appropriately so that patients are mentally prepared for their operation. The QIP recommends that teams develop a communication strategy that uses high quality written information backed up by consistent verbal explanations. Specimen patient information sheets are available through the Circulation Foundation website and have been developed with the help of patient focus groups. Communication forms an integral part of the care pathway. Part of the QIP revolves around ascertaining patient views and seeking their active contribution to the production of written information and delivery of the programme. It is intended that this process will contribute to the development of a PROM for AAA surgery.

### 8.1 Organisation of National AAA Patient Groups

**Aim:** To use patient experiences to inform our quality improvement programme.

**Method:** Patient groups were convened in six regions of the U.K.

- Bristol, Newcastle, Leeds, Manchester, Aberdeen and Cardiff.

**Patient sample:** AAA patients; 42 men, 6 woman (average age= 73).

- 2 spouses, 7 cardiac patients.
- 21 EVAR, 26 OPEN, 1 both.
- Average LOS= 11 days.
- 35% reported complications.
- C.Diff, hernias, lung and wound infections.

**Focus group model:** Facilitator (Consultant Surgeon or Vascular Nurse) and Note Taker

#### Open and semi structured questions:

Exploring patients' experiences of AAA repair.

- Diagnosis, information and communication, recovery and follow up.

Seeking patient views on specific themes:

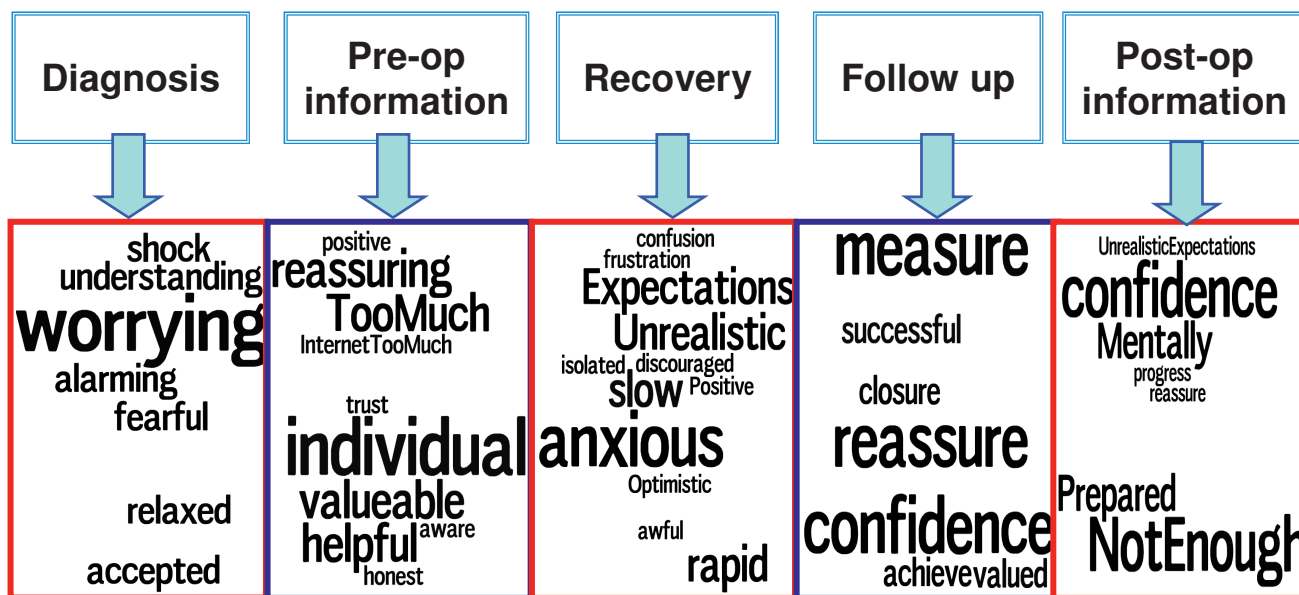
- Decision making, MDT working, centres of excellence.

Formal questionnaires

## 8.2 Patient Experiences through the Care Pathway



### AAA patient experiences through the care pathway



The diagram above displays patient experiences collected through our AAA patient focus groups. A Wordle chart technique has been used to capture outcomes with the size of the words directly relating to the frequency at which they occurred. Larger words reveal the salient and significant themes within the focus groups. Pre-operative information was found to be both valuable but at times too much. This highlights the need for vascular clinicians to individually tailor information. Patients revealed they often had unrealistic expectations of post operative outcome leading to anxiousness in a slow recovery. Not enough post operative information was provided and patients felt this is needed to provide confidence in their recovery.

*Pre-operative: What patients want.*



*Post-operative: What patients want.*

## 8.3 Summary of Key Patient Group Findings

### Diagnosis:

- Patients are particularly concerned if AAAs can delay treatment plans for other pathologies. Once the diagnosis is made patients are reassured by rapid care pathways.

### The decision to treat:

- There is agreement that clinicians must move away from ageism. **“Not chronological age but fitness factors.”** The following factors were considered to reflect factors for fitness:
  - Mental health
  - People being able to look after themselves
  - Patients’ outlook/attitude to life
  - Quality of life is very important
- It is felt that ultimately patients themselves should make the decision to proceed or not with surgery.

### Providing consent:

- Patients need time to reflect to make an informed choice and the impact on family should be considered.

### Pre-operative information:

- Patients particularly value surgeon explanations, but also found explanations by vascular nurses, or anaesthetists very reassuring.
- Drawings to explain an AAA and descriptions particularly on ‘coming round’ is valued.

### When providing written information:

- Percentages/statistics have less meaning. Patients would rather know about functioning after surgery.
- Information should be in different formats: Written information to digest as well as verbal reassurance.
- Any unrealistic expectations need to be dealt with. It is important to inform patients that it may take them a significant time to recover. This avoids unnecessary anxiety associated with a slow recovery.

### Post-operative information:

- General consensus among patients that not enough post-operative information about after AAA surgery is provided, *“Nothing was provided to give confidence in recovery”*. The effects of EVAR & OPEN procedures are underestimated. Clinical teams need to give more realistic information.
- Various experiences of symptoms/pains post operatively were recounted. Patients like to receive information on what to expect (e.g. impact of surgery on bowel function, or post-operative impotence). This prevents misinterpretation of symptoms being due to other factors such as medication.

### Follow up:

- All patients wish to be seen in clinic postoperatively, even if just for quick check of scar at 6 weeks. Patients felt it achieved a degree of closure, even for those on EVAR follow up programmes, *“It is so important to know the operation has been successful”*.
- Benchmarks for patients post surgery would be very useful. Whilst they were generally happy with information provided in hospital, the group members frequently commented how isolated they felt after discharge.
- A telephone point of contact to a named individual in the vascular service post discharge would be beneficial.

### How should surgical success be measured?

- A successful operation is if a patient is able to resume a normal life (return to how they were before).
- Patients feel that assessing functional recovery at 6 weeks is too early; capture at 3 months, or possibly longer time interval.

### Networks:

- Patients felt strongly that there should be regular meetings to discuss outcomes between hospitals/surgeons and data entry for major AAA cases should be compulsory.
- Simulators (open and stent) were suggested as an effective way to train and update surgeon’s skills. Any difficult cases/complications experienced during surgery should be entered onto the simulator, shared between units and surgeons required to regularly undergo training.



## AAA Patient Case Study: Providing information on 'what to expect' and effects of treatment on quality of life



My diagnosis (quite accidental during a scan prior to cholecystectomy) and consultative process progressed very satisfactorily with one exception. I was informed that my internal iliac arteries must be embolised prior to EVAR and that collateral blood flow to my pelvis/ lower torso areas would take 6-12 months to become fully established. Now, 2 years after embolization I still have regular and quite severe pains in my buttocks and thighs after gentle exercise. These pains considerably limit my mobility. Further improvement seems unlikely and I feel I could have been better informed of this problem.

All other aspects of my preparatory care were excellent. My programme was completed very rapidly; day 1- admittance, day 2- EVAR procedure and day 3- discharged.

I am very grateful to all concerned for my current good health and I'm aware that things could have been very different. I lead an active life (albeit with limited mobility) including piloting aircrafts and gliders and I plan to continue for years to come!

John Nevill, AAA Patient, Montrose. 30<sup>th</sup> March 2011.

### Conclusion:

Patient groups wish to see a standardised approach nationally to assessing the risks and benefits of surgery with appropriate MDT review. They want this to be followed by an individualised consultation with joint decision making. Communication from medical teams is felt to be inadequate, particularly around post operative care. There is perceived to be a lack of information, and that current information is over-optimistic with regard to recovery from surgery. Uncorrected unrealistic expectations led to anxiousness and discouragement in a slower recovery. Patient groups are supportive of the development of networks as a means for managing complex cases by pooling expertise. There is also interest in surgeons using simulators to practice difficult cases pre-operatively.

### Recommendations

- 1) Patient experiences should be measured (at a regional/unit level?):
  - i) To identify gaps in the care pathway and make improvements.
- 2) The provision of patient information needs to be complete, consistent and measured.
  - i) Provide surveillance, pre-operative as well as post operative information (see newly developed patient information leaflets at [www.aaqip.com](http://www.aaqip.com)).
  - ii) Consent should be sought before admission to hospital.
  - iii) Ensure the provision of information is documented for audit
- 3) Focus on the provision of post operative and recovery information
  - i) Use the AAAQIP recovery specific patient information leaflet (OPEN & EVAR).
- 4) Ensure greater communication and follow up checks with patients post-operatively
  - i) Telephone follow up by a vascular nurse is highly valued
  - ii) There is value in developing self help tools for recovery at home (e.g. exercise plans)
- 5) Measure quality of life following surgery

## 9. FUTURE WORK FOR THE AAAQIP

### Further recommendations for change in the last year of the programme:

#### A lay person's perspective of the AAAQIP project

**Peter Barker – Patient Lay Representative for the VSGBI**  
**27 April 2011**

My role in the project is to support the objectives of developing best practice, achieving better outcomes, and particularly as a lay person, improving the patient experience. By looking critically at whether a better understanding of patients' concerns is being incorporated into AAA vascular practice, I hope to see a link between increased patient involvement and improved clinical outcomes, and also to see this link being maintained and refreshed over time.

It took a while to realise what has already been learnt, written about, and achieved in patient care nationally. I have been amazed at the number and extent of patient surveys carried out by a wide range of bodies, and by the findings, conclusions and guidance that have grown out of them. It seems that there is nothing new to say on the subject, but I have been reminded that it is not what you say, but the way you say it. Making meaningful changes in any organisation is essentially a hearts & mind task. All the procedures, rules and guidelines in the world will only yield results if the messages are taken to heart.

The project has developed pathways to achieve this outcome. Patient groups are being established around the country, giving opportunities for AAA patients to meet with vascular clinicians in a relaxed and informal setting. Below are some of the common themes that have already emerged; the details of these and others can be found in the notes of the meetings on the AAAQIP website, and in summaries elsewhere in this report.

- Information to patients - debate about how much, and when given. Explanation of risk. Delays in passing information between services, e.g. from radiographer to consultant to GP to patient. Insufficient advice to carers about possible after effects, e.g. mood changes.
- Information from patients – patients' stories, PROMS, and the need for patients to see the practical value of this data collection. Data confidentiality and patient consent for use of personal data. Views of the bereaved.
- Help for patients to remember to ask the right questions at the right times, for example using notes kept in a diary as an aide memoire.

The area of communication and information exchange between clinicians and patient groups is a rich source of material that should be exploited further. Better still would be to engage in this two-way flow of information at pre-op, by way of a PROM, or rather a series of them at appropriate times along the pathway. The "KISS" (*keep it short and simple*) principle must apply!

A second pathway is the dissemination of knowledge about quality improvement principles and best practice for vascular surgery, through regional meetings of clinicians. These are the "hearts and minds" forums, where the project aims to give aspirers to best practice the tools for improvement. This is the place to get the message across that a happy patient is more likely to lead to a happy outcome. Some of the points I try to make at these meetings are:

- The quality process must be part of a culture of continuous improvement, and not limited to the surgical procedures alone. It should be applied from first patient contact to the last, including for example the timely passing of necessary information with the patient through the process. Who will check whether this is really happening?
- Are sufficient ongoing processes in place to gather, learn from, and apply change arising from patient surveys and comments, and to address technical or cross departmental issues of improvement that may arise during treatment? Who will check whether this is really happening?



- Will the trend in the quality of the patient experience be monitored at each unit, and can a relationship be established with clinical outcomes?

The project is above all seeking maximum contribution to the NVD in order to measure performance outcomes such as mortality, but this gives little direct information about patient experience. In addition, analysis and utilisation of statistical data always lags a long way behind the events that generated the data and averages alone tell little about extreme or unwelcome events. Patients as individuals should be encouraged to tell their stories, and clinicians should be encouraged to listen to them, act on them, and demonstrate that they have, as part of continuous improvement.

## 10. CONCLUSION

This document describes the early phase of a national quality improvement programme in vascular surgery. The key to progress is the clear enunciation of a framework that enables clinicians, commissioners and patients to measure progress. The programme cannot succeed by central directive but requires active participation from all parts of the clinical community.

We choose to publish this interim report now to publicise some of the early progress made and to make available information and tools to aid clinicians in providing better care to their patients.

There is much work to be done and both time and money are limited. We would encourage clinicians not yet actively involved in quality improvement work to use the tools provided in this document to begin to change the care that they provide. There are many resources available within NHS Trusts to support quality improvement and to improve the safety of patients coming to major surgery. Although the focus of this document is on improving care to patients with aortic aneurysms, the techniques and messages hold good for all patients requiring vascular interventions.

There is an urgent need for clinicians to improve contribution to national audit. Without the ability to accurately measure what we do, we are unable to describe how we need to change, or what change we are achieving. Surgeons used to be able to say that their practice was good. Recent publications have given the lie to this [Vascunet 2008]. National clinical audit will allow clinicians to reclaim the right to advise patients from a clear understanding of the quality of service that they provide. Audit needs to be a central part of our culture. We are already asking for validation of mortality data by units and intend that this will be published in future reports.

The other strong message is that we have much to gain from listening more to our patients. There is a need to provide both better and more consistent information to support patients through what are major, life changing events. The experience of those involved in our patient focus group work (from both sides) is that we will all benefit from communicating well with each other. This approach can only improve the quality of care that the NHS provides.

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## 12. APPENDICES

### APPENDIX A

NHS Trust	HES total	NVD total	Percentage contribution
Abertawe Bro Morgannwg University Health Board	116	25	21.6
Aintree University Hospitals NHS Foundation Trust	33	15	45.5
Airedale NHS Trust	4	0	0.0
Aneurin Bevan Health Board	64	48	75.0
Ashford and St Peter's Hospitals NHS Trust	33	25	75.8
Barking, Havering and Redbridge University Hospitals NHS Trust	51	20	39.2
Barnet and Chase Farm Hospitals NHS Trust	34	21	61.8
Barts and the London NHS Trust	59	14	23.7
Basildon and Thurrock University NHS Trust	39	23	59.0
Basingstoke and North Hampshire NHS Foundation Trust	4	0	0.0
Bedford Hospital NHS Trust	48	40	83.3
Belfast Health and Social Care Trust	216	177	81.9
Betsi Cadwaladr University Health Board	98	81	82.7
Blackpool, Fylde and Wyre Hospitals NHS Foundation Trust	38	24	63.2
Bradford Teaching Hospitals NHS Foundation Trust	29	37	127.6
Brighton and Sussex University Hospitals NHS Trust	65	75	115.4
Buckinghamshire Hospitals NHS Trust	27	34	125.9
Calderdale and Huddersfield NHS Foundation Trust	36	39	108.3
Cambridge University Hospitals NHS Foundation Trust	152	132	86.8
Cardiff and Vale University Health Board	116	14	12.1
Central Manchester University Hospital NHS Trust	94	66	70.2
Chesterfield NHS Trust Foundation	23	9	39.1
City Hospitals Sunderland NHS Foundation Trust	66	59	89.4
Colchester Hospital NHS Foundation Trust	62	64	103.2
Countess Of Chester Hospital NHS Foundation Trust	25	15	60.0
County Durham and Darlington NHS Foundation Trust	46	37	80.4
Cwm Taf University Health Board	66	10	15.2
Dartford and Gravesham NHS Trust	1	0	0.0
Derby Hospitals NHS Foundation Trust	85	52	61.2
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	66	50	75.8
Dorset County Hospital NHS Foundation Trust	18	25	138.9
Ealing Hospital NHS Trust	5	4	80.0
East and North Hertfordshire NHS Trust	24	23	95.8
East Kent Hospitals University NHS Foundation Trust	51	92	180.4
East Lancashire Hospitals NHS Trust	40	20	50.0
East Sussex Hospitals NHS Trust	35	19	54.3
Epsom and St Helier University Hospitals NHS Trust	20	0	0.0
Frimley Park Hospital NHS Foundation Trust	96	86	89.6
Gateshead Health NHS Foundation Trust	25	25	100.0

George Eliot Hospital NHS Trust	2	0	0.0
Gloucestershire Hospitals NHS Foundation Trust	79	76	96.2
Great Western NHS Foundation Trusts	8	0	0.0
Guy's and St Thomas' NHS Foundation Trust	136	115	84.6
Heart Of England NHS Foundation Trust	73	57	78.1
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	29	26	89.7
Hull and East Yorkshire Hospitals NHS Trust	105	110	104.8
Hywel Dda Health Board	32	0	0.0
Imperial College Healthcare NHS Trust	133	61	45.9
Ipswich Hospital NHS Trust	32	36	112.5
Kettering General Hospital NHS Foundation Trust	39	42	107.7
King's College Hospital NHS Foundation Trust	90	88	97.8
Knowsley Hospitals NHS Trust	2	0	0.0
Lancashire Teaching Hospitals NHS Foundation Trust	62	40	64.5
Leeds Teaching Hospitals NHS Trust	66	43	65.2
Maidstone and Tunbridge Wells NHS Trust	0	0	0.0
Mayday Healthcare NHS Trust	0	0	0.0
Medway NHS Foundation Trust	41	45	109.8
Mid Cheshire Hospitals NHS Foundation Trust	9	0	0.0
Mid Essex Hospital Services NHS Trust	34	1	2.9
Mid Staffordshire NHS Foundation Trust	15	14	93.3
Mid Yorkshire Hospitals NHS Trust	31	15	48.4
Milton Keynes Hospital NHS Foundation Trust	17	13	76.5
Newcastle upon Tyne Hospitals NHS Foundation Trust	140	148	105.7
NHS Ayrshire & Arran	30	6	20.0
NHS Dumfries and Galloway	15	10	66.7
NHS Fife	18	2	11.1
NHS Forth Valley	32	16	50.0
NHS Grampian	52	58	111.5
NHS Greater Glasgow & Clyde	123	26	21.1
NHS Highland	51	9	17.6
NHS Lanarkshire	64	0	0.0
NHS Lothian	123	40	32.5
NHS Tayside	56	45	80.4
Norfolk and Norwich University Hospitals NHS Foundation Trust	137	140	102.2
North Bristol NHS Trust	48	38	79.2
North Cumbria University Hospitals NHS Trust	43	21	48.8
North West London Hospitals NHS Trust	31	23	74.2
Northampton General Hospital NHS Trust	38	37	97.4
Northern Devon Healthcare NHS Trust	14	14	100.0
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	15	15	100.0
Nottingham University Hospitals NHS Trust	88	95	108.0
Oxford Radcliffe Hospitals NHS Trust	110	92	83.6
Papworth Hospital NHS Foundation Trust	11	0	0.0

Pennine Acute Hospitals NHS Trust	59	35	59.3
Peterborough and Stamford Hospitals NHS Foundation Trust	31	14	45.2
Plymouth Hospitals NHS Trust	53	48	90.6
Portsmouth Hospitals NHS Trust	54	57	105.6
Queen Elizabeth NHS Trust	15	6	40.0
Royal Berkshire NHS Foundation Trust	24	29	120.8
Royal Bolton Hospital NHS Foundation Trust	38	41	107.9
Royal Cornwall Hospitals NHS Trust	57	59	103.5
Royal Devon and Exeter NHS Foundation Trust	41	35	85.4
Royal Free Hampstead NHS Trust	65	75	115.4
Royal Liverpool and Broadgreen University Hospitals NHS Trust	165	123	74.5
Royal United Hospital Bath NHS Trust	83	76	91.6
Salisbury NHS Foundation Trust	12	6	50.0
Sandwell and West Birmingham Hospitals NHS Trust	26	20	76.9
Sheffield Teaching Hospitals NHS Foundation Trust	113	65	57.5
Sherwood Forest Hospitals NHS Foundation Trust	18	10	55.6
Shrewsbury & Telford Hospital NHS Trust	62	60	96.8
South Devon Healthcare NHS Foundation Trust	51	55	107.8
South Tees Hospitals NHS Foundation Trust	84	82	97.6
South Warwickshire NHS Foundation Trust	1	0	0.0
Southampton University Hospitals NHS Trust	72	81	112.5
Southend University Hospital NHS Foundation Trust	41	35	85.4
Southern Health and Social Care Trust	Not available	4	Unable to calculate
Southport and Ormskirk Hospital NHS Trust	18	13	72.2
St George's Healthcare NHS Trust	129	143	110.9
Surrey and Sussex Healthcare NHS Trust	5	0	0.0
Tameside Hospital NHS Foundation Trust	23	8	34.8
Taunton and Somerset NHS Foundation Trust	69	81	117.4
The Dudley Group Of Hospitals NHS Foundation Trust	38	17	44.7
The Hillingdon Hospital NHS Trust	16	8	50.0
The Princess Alexandra Hospital NHS Trust	45	47	104.4
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	110	83	75.5
The Royal Wolverhampton Hospitals NHS Trust	50	48	96.0
United Lincolnshire Hospitals NHS Trust	38	27	71.1
University College London Hospitals NHS Foundation Trust	54	45	83.3
University Hospital Birmingham NHS Foundation Trust	51	0	0.0
University Hospital Of North Staffordshire NHS Trust	82	40	48.8
University Hospital Of South Manchester NHS Foundation Trust	128	123	96.1
University Hospitals Coventry and Warwickshire NHS Trust	66	58	87.9
University Hospitals of Bristol NHS Foundation Trust	55	56	101.8
University Hospitals Of Leicester NHS Trust	119	118	99.2
University Hospitals Of Morecambe Bay NHS Trust	44	48	109.1
Walsall Hospitals NHS Trust	16	13	81.3

Warrington and Halton Hospitals NHS Foundation Trust/North Cheshire NHS Trust	23	18	78.3
Was Lewisham, procedures now at St Thomas's	1	0	0.0
West Hertfordshire Hospitals NHS Trust	67	34	50.7
Western Health and Social Care Trust	Not available	10	Unable to calculate
Western Sussex Hospitals NHS Trust	45	41	91.1
Whipps Cross University Hospital NHS Trust	15	8	53.3
Whittington NHS Trust	1	0	0.0
Winchester and Eastleigh Healthcare NHS Trust	4	0	0.0
Wirral University Teaching Hospital NHS Foundation Trust	43	38	88.4
Worcestershire Acute Hospitals NHS Trust	113	59	52.2
Wrightington, Wigan and Leigh NHS Foundation Trust	32	15	46.9
York Hospitals NHS Foundation Trust	56	51	91.1

<b>Key</b>	
≤ 75% contribution	
76-90%, or >110% contribution	
91-110% contribution	
HES data not available	
No NVD contribution	
<i>Not performing AAA procedures</i>	



## Appendix B

# Elective Abdominal Aortic Aneurysm – Preoperative Safe for Intervention Checklist

### Guidance Notes For Use

*The Quality Improvement Programme is designed to reduce the peri-operative mortality rate for elective AAA intervention to less than 3.5% by 2013.*

The Safe for Intervention Checklist (overleaf) will help to grade the risk of treatment for individuals with an unruptured AAA. It is recommended that the Checklist is completed for every patient being considered for elective AAA treatment and filed in the patient case notes.

The Checklist is designed to be used as part of decision-making process on whether to proceed with intervention or whether treatment should be postponed whilst patient fitness is improved. It is not designed to be used to decide on the need for intervention, but to inform the consent process with individual patients. It is recommended that the results of the Checklist should be shared with the patient and their views recorded in the case notes.

This Checklist should be used as part of preoperative workup as defined in the Quality Improvement Framework which should include preoperative assessment by an anaesthetist with experience in elective vascular anaesthesia (1). It is intended that the Checklist should be used as part of a suite of Quality Improvement Programme tools including an AAA pathway and an Multi-Disciplinary Team (MDT) proform ([www.aaaqip.com](http://www.aaaqip.com)).

*This document is endorsed by the VSGBI and VASGBI as a preliminary checklist. It is advised that all patients being considered for intra-abdominal aneurysm surgery should be assessed against it prior to being investigated for surgery.*

(1) <http://www.vascularsociety.org.uk/library/quality-improvement.html>

## Elective Abdominal Aortic Aneurysm – Preoperative Safe for Intervention Checklist

<b>PATIENT DETAILS</b>	NHS Number:
Patient Name:	
D.O.B:	Hospital Number:

Questions	Y	N
1. Has the patient had a myocardial infarct or unstable angina/ angina at rest in the last 3 months?		
2. Has the patient had new onset of angina in the last 3 months?		
3. Does the patient have a history of poorly controlled heart failure? (nocturnal dyspnoea or inability to climb one flight of stairs due to SOB)		
4. Does the patient have severe or symptomatic cardiac valve disease? (e.g. Aortic stenosis with gradient >60mmHg or requiring valve replacement, drop attacks)		
5. Does the patient have significant arrhythmia? (Symptomatic, ventricular, severe bradyarrhythmias or uncontrolled supraventricular tachycardia)		
6. <b>If available</b> , does the patient have any of:- 1. FEV1 < 1.0 L or <80% of predicted value ; 2. PO2 < 8.0 kPa; 3. PCO2 > 6.5 kPa		

If the answer to any of 1 – 6 is yes, the patient is **coded RED** and is very high risk for surgery

Questions	Y	N
7. Does the patient get SOBOE climbing one flight of stairs? (short slope if lives on one floor)		
8. Does the patient have evidence of moderate renal impairment (creatinine >180 micromol/l) or previous renal transplant ?		
9. Has the patient had treatment for cancer in last 6 months, or has life threatening tumour?		
10. Does the patient have poorly controlled diabetes mellitus? (HbA1c > 7.5%, blood sugar usually >10 mmol/l)		
11. Does the patient have uncontrolled hypertension (i.e. SBP >190; DBP >105)		
12. Has the patient had a TIA or CVA within the last 6 months?		

If the answer to any of 7-12 is yes, the patient is **coded AMBER** and is higher risk for intervention.

Questions
If the answers to <u>all</u> of the above are no, the patient is <b>coded GREEN</b> and is fit to proceed, provided they are on appropriate preoperative medication

### Other Risk Factors

Other risk factors that increase the risk (**amber**) or preclude (**red**) repair (circle): Yes / No  
(e.g. dementia, cancer, stoma, adhesions - specify if yes):.....

Please Tick

Patient is coded:	Proposed Action:
<b>Red</b>	Not recommended for immediate intervention – Specialist review required if surgical treatment still to be considered.
<b>Amber</b>	Significant comorbidity requiring preoperative optimisation.
<b>Green</b>	Fit to proceed to further stage of formal assessment

**N.B. It is recommended that all patients scoring red or amber should be reviewed by an Anaesthetist with experience in Vascular anaesthesia prior to listing for intervention.**

Name: \_\_\_\_\_ Grade: \_\_\_\_\_ Date: \_\_\_\_\_

## APPENDIX C

### NHS: Multidisciplinary Care Pathway for Elective AAA Intervention

#### PATIENT LABEL

Name:  
DOB:  
Hospital No:

#### DETAILS OF AAA

Asymptomatic / Symptomatic (circle)  
Give details if symptomatic:  
Maximum diameter (cm):

Date decision made to investigate with a view to intervention:        /        /

Name of Vascular Consultant making this decision:

Information leaflet on AAA and treatment options (circle): Yes / No    State reason if no:

Urgency of investigation (circle): Urgent / Routine

#### KNOWN RISK FACTORS

Tick	Risk	Details
<input type="checkbox"/>	Technical	
<input type="checkbox"/>	Cardiac impairment	
<input type="checkbox"/>	Respiratory impairment	
<input type="checkbox"/>	Renal impairment	
<input type="checkbox"/>	Other (specify):	

#### INVESTIGATIONS REQUESTED (state reason if not requested)

Tick	Test	Results
<input type="checkbox"/>	FBC	
<input type="checkbox"/>	HbA1c (if diabetic)	
<input type="checkbox"/>	U&E	
<input type="checkbox"/>	LFT	
<input type="checkbox"/>	Coagulation screen <sup>1</sup>	
<input type="checkbox"/>	Cross infection screen	
<input type="checkbox"/>	ECG	
<input type="checkbox"/>	CXR*	
<input type="checkbox"/>	CPX	
<input type="checkbox"/>	Respiratory function*	
<input type="checkbox"/>	MUGA or echo*	
<input type="checkbox"/>	CTA	

\* Not required unless unsuitable for CPX or specifically indicated

**MULTIDISCIPLINARY TEAM MEETING**

Date: .. / .. / ....

*To discuss all patients with AAA > 5.5cm including those not operated on and those with aneurysms < 5.5cm being considered for treatment. Based on information captured above and with details of each case presented by the clinical team that did the outpatient consultation.*

**1. Team members present**

Surgeon (s):  
Radiologist(s):  
Co-ordinator:

**2. Anatomy**

Suitable for EVAR: Yes / No / Maybe  
Comment:

**3. Physiology**

Fit for surgery: Yes / No / Maybe  
Comment:

**4. Decision**

Intervene: EVAR / Open  
Further investigation:  
Imaging (comment):  
Physiology (comment):  
Specialist consultation:  
No intervention (comment):

**5. MDT sign off**

Surgeon:  
Radiologist:

**6. Co-ordinator transmits documents to Anaesthetist, date: .. / .. / ....****7. Decision re critical care bed: Yes / No**

Comments on fitness for intervention:

Signed off by Consultant Vascular Anaesthetist:

**TREATMENT PLAN DISCUSSED WITH PATIENT AFTER MDT**

DATE: .. / .. / ....

Open Repair       Waiting list form completed       Patient given OR info leaflet   
EVAR       Request form completed       Patient given EVAR info leaflet   
No Intervention

Patient's comments or requests:

## APPENDIX D

# ELECTIVE ABDOMINAL AORTIC ANEURYSM PRE-OPERATIVE CARE BUNDLE

### Guidance notes for use

#### Introduction

The Vascunet Report (2008) identified elective abdominal aortic aneurysm mortality as substantially greater in the UK than in other countries (7.9% vs. 3.5%)<sup>1</sup>. Early and late AAA mortality rates have been found to be increased in patients with a preoperative clinical diagnosis of “unfit for open surgery”<sup>2</sup>. The U.K. Small Aneurysm Trial also found poor preoperative lung and renal function to strongly associate with postoperative death<sup>3</sup>. Identification of preoperative factors associated with a high mortality risk is important to inform surgical policy and to direct suitable preoperative interventions. Bernstein et al, (1988) advocated a 72% 5-year survival of all their AAA patients as a direct result of an aggressive policy of screening for and selectively treating coronary disease and carotid stenosis preoperatively<sup>4</sup>.

Preoperative assessment, risk scoring and MDT working are defined quality standards in the Vascular Society of Great Britain and Ireland’s (VSGBI) framework for improving the results of elective AAA repair (2009)<sup>5</sup>. To achieve these standards nationally, there is a need to introduce reliable preoperative screening checks through best practice protocols, ensure the involvement of the relevant clinicians and reduce variation in vascular practice.

Therefore, the AAA QIP has outlined a strategy that aims to:

- i) **Reduce risk: Identify those high at risk from surgery and in need of preoperative intervention.**
- ii) **Provide a pathway of care for those who are currently not fit for surgery.**
- iii) **Ensure the minimum personnel required including anaesthetists with interest in vascular anaesthesia are involved in the decision to treat.**
- iv) **Provide patients with the appropriate information and offer them a choice of treatment.**

The following care bundle has been designed to achieve these aims. It should be implemented on all patients before surgical intervention.

#### The Care Bundles Concept

The theory behind care bundles is that when several evidence-based interventions/guidelines are **grouped together** and applied in a single ‘protocol’, it will improve patient outcome<sup>6</sup>.

- It is a simple method of monitoring adherence/existence of local guidelines, and as such is a valid assessment of quality.
- It will provide rapid easily interpretable information.
- It is a form of auditing and can identify areas for improvement.
- It is NOT research.
- It is NOT prescriptive. Each unit can identify their own criteria for each element.

**AAA PREOPERATIVE CARE BUNDLE  
AAA PATIENTS PROCEEDING TO INTERVENTION**

<b>Protocol in Care Bundle</b>	<b>Intervention</b>	<b>Measure</b>
<b>1. All patients should undergo standard pre-operative risk assessment.</b>	Use Elective AAA Safe for Intervention Checklist.	No. of patients having checklist completed.
<b>2. All patients should undergo CT angiography for assessment for OR or EVAR.</b>	Include as integral part of AAA Care Pathway.	No. of patients undergoing CTA.
<b>3. All patients should be seen by an anaesthetist with interest in vascular anaesthesia prior to listing for surgery.</b>	Ensure local process for anaesthetic involvement.	No. of patients being seen by an anaesthetist.
<b>4. Patients should be assessed for surgery through a MDT process involving surgeon and radiologist as a minimum, with input from an anaesthetist interested in vascular anaesthesia.</b>	Complete MDT Proforma.	No. of patients assessed through MDT.
<b>5. Patients should be given written information about their treatment and choice (if suitable) between OR and EVAR.</b>	Use local hospital AAA information leaflet or national AAA QIP patient information leaflets.	No. of patients given AAA patient information leaflets and <b>offered choice</b> of treatment.

**Notes:**

- The Elective AAA Safe for Intervention Checklist is a traffic light protocol taken from the EVAR 1 and 2 trials. It has been reviewed and adapted for use by the Vascular and Vascular Anaesthesia Society of Great Britain and Ireland. The document forms a preliminary checklist to indicate whether to proceed with intervention or whether treatment should be postponed whilst patient fitness is improved. It is advised that all patients being considered for intra-abdominal aneurysm surgery should be assessed against it prior to being investigated for surgery.
- Computed tomography angiography (CTA)** of abdomen- a standard protocol for AAA EVAR assessment:
  - Helical scanning with contrast: measures both extent and diameter of the AAA.
  - Multislice multidetector CT produces even more anatomically defined images
  - Shows relation to key organs and vasculature.
  - Good for pre-operative evaluation of endovascular repair and open surgery.
  - Usually nephrotoxic contrast agents are used - consider risk vs. benefits in people at high risk of contrast nephropathy<sup>7</sup>

**If renal impairment** pre-op depending upon eGFR:

- eGFR > 60 - no additional procedures required.
- eGFR 30-60 – ensure adequate oral rehydration before CT.
- eGFR- <30 – patient to be formally discussed at MDT to decide if fit for intervention, prior to imaging.
  - Patient to be managed using written protocol to minimize risk of contrast induced nephropathy. Consent to include statement on risk of requiring renal replacement therapy.
  - If patient is not EVAR suitable, no further imaging is required.

3. All patients should be seen in preassessment by an anaesthetist with interest in elective vascular anaesthesia. At this stage, medication should be reviewed and optimised for the intervention.
4. All elective procedures should be reviewed preoperatively in an MDT that includes surgeon(s) and radiologist(s) as a minimum. An anaesthetist with interest in vascular anaesthesia should be consulted before deciding to admit for surgery. Centres should move towards anaesthetists attending MDTs. If this is not currently achievable applications for sessions for anaesthetists to attend the MDTs should be supported. Fitness issues that may affect whether open repair or EVAR is offered must be considered. ALL CT scans and patients to be discussed and decisions made regarding Open or Endovascular repair, decision recorded. Other conditions to be discussed / considered as required- e.g. lymphoma, concomitant malignancy and concomitant or staged CABG.
5. Patients should be offered evidence based written information about their condition and offered a choice between open or endovascular repair.

### **Structure Change:**

This bundle needs to be incorporated into routine paperwork.

### **References**

1. Second Vascular Surgery Database Report 2008. European Society for Vascular Surgery. Eds: Gibbons C, Kinsman R, Walton P. Dendrite Clinical Systems Ltd 2008, ISBN 1-903968-21-6
  2. Buth, J. Laheij, R. J. F. (2000). Early complications and endoleaks after endovascular abdominal aortic aneurysm repair: Report of a multicenter study. *Journal of Vascular Surgery*, **31**, (1), 134-146.
  3. Brady, A. R., Fowkes, F.G.R., Greenhalgh, R. M., Powell, J. T., Ruckley, C.V. and Thompson, S.G. (1999). Risk factors for postoperative death following elective surgical repair of abdominal aortic aneurysm: results from the UK Small Aneurysm Trial. *British Journal of Surgery*, **87** (6), 742 – 749.
  4. Bernstein, E.F., Dilley, R.B. and Randolph, H. F. (1988). The improving long-term outlook for patients over 70 years of age with abdominal aortic aneurysms. *Journals of Annual Surgery*, **207**(3): 318–322.
  5. Framework for improving the results of AAA repair. Vascular Society. Available at: <http://www.vascularsociety.org.uk/library/quality-improvement.html>
  6. Fulbrook, P and Mooney, S (2003) Care Bundles in Critical Care: a practical approach to evidence based practice. **Nursing in Critical Care** Vol 8 no 6.
-



## APPENDIX E

### Mid Yorkshire AAA MDT



Demographics	
Name	
Date of birth	
Unit Number	
NHS Number	
AAA Details	
<b>Symptomatic (details)</b>	<input type="checkbox"/> <b>Asymptomatic</b> <input type="checkbox"/>
Maximum size on CT or USS	
Date of decision to investigate	Consultant
MDT Meeting	
<b>Date of meeting</b>	Clinicians present DS <input type="checkbox"/> PC <input type="checkbox"/>
<b>Fit for Intervention</b> Yes <input type="checkbox"/> No <input type="checkbox"/>	PT <input type="checkbox"/> JH <input type="checkbox"/>
<b>CPX</b> <b>AT</b>	KG <input type="checkbox"/> CI <input type="checkbox"/>
<b>Date:</b> <input type="checkbox"/> Normal risk	RR <input type="checkbox"/> SB <input type="checkbox"/>
<input type="checkbox"/> Medium Risk	KC <input type="checkbox"/>
<input type="checkbox"/> High Risk	
<b>Co-morbidities</b> Cardiac <input type="checkbox"/> Respiratory <input type="checkbox"/> Renal <input type="checkbox"/>	
<b>Suitable for EVAR</b> Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>Northern EVAR Classification</b>	<b>EVAR 1</b> simple procedure no adverse features, low/moderate risk <input type="checkbox"/> <b>EVAR 2</b> one adverse feature,easily overcome, low/moderate risk <input type="checkbox"/> <b>EVAR 3</b> multiple adverse features or fenestrated stent, complex procedure, Moderate risk <input type="checkbox"/> <b>EVAR 4</b> multiple adverse features, complex procedure, high risk <input type="checkbox"/>
Decision	
<input type="checkbox"/> <b>EVAR</b>	CWLO form done <input type="checkbox"/>
<input type="checkbox"/> <b>Open repair</b>	CWLO form done <input type="checkbox"/>
<input type="checkbox"/> <b>Surveillance</b>	Request form done <input type="checkbox"/>
<input type="checkbox"/> <b>No Intervention</b>	Reason:
Dual Consultant operating <input type="checkbox"/> Pre EVAR embolisation <input type="checkbox"/>	
ITU <input type="checkbox"/> HDU <input type="checkbox"/> Level 1 <input type="checkbox"/>	
<b>Clinic Review Date:</b>	<b>Present:</b> <b>Booklet given</b> <input type="checkbox"/>
Sign Off:	Date:

## APPENDIX F

<b>Patient Identification Label</b>
-------------------------------------

Date.....
Surgeon.....
Anaesthetist.....

# SOUTH CENTRAL ELECTIVE OPEN ABDOMINAL AORTIC ANEURYSM REPAIR Intra-operative Care Pathway

## Standards of Care

### Team Composition

- Consultant Vascular Surgeon
- Consultant Anaesthetist with experience in vascular anaesthesia  
(If either the primary surgeon or anaesthetist is a senior trainee then there should be a consultant available and responsible for the case)
- Experienced surgical and anaesthetic assistants
- Experienced scrub nurse with two runners
- Trained cell salvage operator

## Facilities and Equipment

### Surgical

- Range of vascular clamps
- Fixed surgical retractor
- Selection of grafts and sutures
- Tissue glue & sealants
- Embolectomy catheters
- Hand held doppler
- Imaging available on PACS or equivalent
- Cell salvage equipment

### Anaesthetic

- Suitable anaesthetic machine, infusion pumps and drugs
- Invasive pressure monitoring equipment
- Rapid fluid infuser
- Patient warming facilities - anaesthetic room and theatre
- Method of optimising fluid management/ monitoring cardiac output
- Immediate availability of blood, FFP and cryoprecipitate
- Availability of platelets within one hour
- Point of care testing for ABG and TEG



11. Closure Fascial layers \_\_\_\_\_  
 Skin \_\_\_\_\_

**12. Additional procedures**

Yes  No

CFA Embolectomy LEFT  RIGHT  BILAT.   
 Inflow  Outflow

Aorto-iliac bypass  Left  Right

Fem-fem cross over

13. End of procedure Blood loss \_\_\_\_\_ mls  
 Urine output \_\_\_\_\_ mls

Foot perfusion

LEFT palpable pulse(s)  Well perfused,no pulses  Further inspection

RIGHT palpable pulse(s)  Well perfused,no pulses  Further inspection

**Initial Team meeting (to be completed before the patient is sent for)**

1. Has the patient been pre-assessed by a vascular anaesthetist?  Yes  No
2. Are there any specific concerns?  
 Yes .....  No
3. Any change in the risk status of the patient since pre-assessment?  
 Yes.....  No
4. Any particular surgical concerns?  Yes.....  No
5. Any special equipment needed? Is it available?  Yes(confirmed availability)  No
6. Is cross matched blood available?  Yes  No
7. Is cell salvage available?  Yes  No
8. Is an HDU/ITU bed available?  Yes (ITU)  Yes (HDU)  No

**Time Out (before the operation starts)**

1. WHO checklist completed?  Yes  No
2. Have the foot pulses been checked and documented?  
 Yes .....  No

**Sign Out (before the patient leaves theatre)**

1. WHO sign out completed?  Yes  No
2. Has the blood loss been documented?  Yes .....ml  No
3. Has foot perfusion been checked and documented?  Yes  No
4. Has the operation note been completed and filed in the notes?  Yes  No
5. Has the anaesthetic chart been completed and filed in the notes?  Yes  No
6. Has the patient been entered into the National Vascular Database?  Yes  No
7. Are there any specific instructions for postoperative care and have they been documented?  
 Yes.....  
 .....  
 .....  
 .....  No

## APPENDIX G

# SOUTH CENTRAL Oxford Radcliffe Hospitals AAA Intra operative care bundle for EVAR

### Team composition:

- a) Anaesthetist competent in vascular anaesthesia and if the anaesthetist is a senior trainee then he/she should be directly supervised by a consultant competent in vascular anaesthesia.
- b) Trained anaesthetic assistant
- c) Consultant Vascular Surgeon trained in endovascular techniques. If the primary surgeon is a senior trainee then direct supervision by a consultant vascular surgeon trained in endovascular repair
- d) Consultant Radiologist trained in endovascular repair
- e) Radiographer
- f) Radiology nurses experienced in EVAR
- g) Scrub team

### Equipment / Facilities:

- a) Dedicated anaesthetic machine, appropriate monitoring equipment and drugs
- b) Dedicated area (Anaesthetic induction room) to anaesthetise patients (general or regional)
- c) Facility for rapid transfusion of fluids/blood
- d) Facilities for patient warming
- e) Emergency buzzer, telephone access
- f) Crash trolley
- g) Blood products: Electronic issue/cross matched blood. Ability to ensure blood or clotting products within forty five minutes in case of accidental rupture
- h) Radiolucent, tiltable operating table
- i) Sterile environment/ scrub
- j) Image intensifier/DSA
- k) Contrast injector/ Bailout kit
- l) Range of rescue stents and devices
- m) EVAR occlusion catheters, tissue glue and sealants
- n) Facility for emergency transfer to theatre
- o) Contingency plan for image intensifier failure

## **Team Brief:**

### **Team brief prior to operating list to include vascular surgeon/interventional radiologist/anaesthetist/scrub staff to discuss-**

- a) Patient co-morbidity and specific anaesthetic concerns.
- b) Results of MDT decision making process available
- c) Vascular surgical considerations, needs endarterectomy/conduit/cross-over. Decision about appropriate environment, ie interventional radiology suite/ theatre.
- d) EVAR morphology (grade 1-4), specific IR concerns, indication of length and complexity of case (ie IIA embolisation etc), preference for regional anaesthesia versus GA (ie difficult neck requiring optimal breath-hold imaging)
- e) Patient consent (specific EVAR standardised consent sticky label) mapped to patient information leaflet
- f) Post-operative care levels agreed dependent on above factors
- g) Patient demographics entered onto NVD (vascular surgeon/anaesthetist)
- h) Ensure appropriate facilities and equipment are available, ie image intensifier if theatre case, stent-graft and ancillary consignment back-up stent-grafts
- i) Facility for management of massive haemorrhage
- j) Facility for conversion to open repair

### **Procedural considerations**

- a) Appropriate balance of personnel in intervention room/theatre to perform the case and allow appropriate training but to limit excess unnecessary staff that impedes case and potentially may increase infection risk (ex- medical students in control room)
- b) Interventional radiology WHO prior to anaesthetic, this supersedes surgical WHO as also includes IRMER questions
- c) Two large bore IV access
- d) Arterial line for invasive blood pressure monitoring (appropriate site)
- e) Appropriate anaesthetic technique (LA / Regional / GA)
- f) Urinary catheter
- g) Antibiotics (*needs standardisation*) prior to start of procedure
- h) Patient warming; Fluid warmer and forced air warming blanket (upper body).
- i) Heparin is given by interventional radiology prior to advancement of stent-graft. Dose dependent on patient factors, range 3-5,000 U unfractionated heparin
- j) Availability of carbon dioxide angiography if concerns about renal impairment/complex cases or consider renal protection strategies such as N-acetyl cysteine etc (need protocols developing)
- k) Xper-CT (on-table flat panel CT acquisition) at end of procedure
- l) Check for EVAR specific complications, if both internal iliac arteries are embolised, monitor for paraplegia, leg and bowel ischaemia
- m) Complete the National Vascular Database entry



## Post operative considerations

- a) Transfer to appropriate post operative care facility
- b) Consider appropriate post operative monitoring
- c) Decision regarding removal of epidural catheter and ensure appropriate pain relief strategy
- d) Urinary catheter removal
- e) Monitor for EVAR specific complications as discussed earlier
- f) Request for full blood count, coagulation study, urea, creatinine and electrolytes
- g) Duplex day 1 only. Request for EVAR surveillance completed by interventional radiology and faxed to vascular lab immediately after procedure (already established pathway). CT angiogram booked for 3 months unless contraindication

## Appendix:

### 1. Endovascular AAA intra-operative care checklist

This form should be completed and filed in the patient's medical records along with pre and post of care pathway.

**Patient ID:**

Please insert patient identification label

Consultant Surgeon:

Consultant Radiologist:

Consultant Anaesthetist:

Scrub Lead:

Other team members:

### 2. Intra-operative care checklist:

Has the patient been through a MDT and the decision recorded.....Yes/No

Has the patient been assessed by a vascular anaesthetist.....Yes/No

Any change from pre-op status.....Yes/No

If so what .....

Blood available.....Yes/No

Necessary grafts or stents available.....Yes/No

Have the foot pulses been recorded prior to the procedure.....Yes/No

Appropriate post-operative care facility bed been booked.....Yes/No

Please circle      PACU                      Level 2                      Level 3

Renal protection for contrast induced nephropathy required.....Yes/No

E-GFR

Serum creatinine

If yes please specify

Has there been any deviation from MDT protocol.....Yes/No

If so please give details below

### **3. Please attach the radiology WHO checklist**

#### **4. End of the procedure**

Foot perfusion checked and documented/ Doppler.....Yes/No

WHO checklist completed.....Yes/No

Dedicated area for monitoring for two hours, including invasive cardiac monitoring if EVAR 1 or 2

Level 2 care overnight if high risk patient, complicated procedure or significant

Peri-op event

OP note and National vascular database completed.....Yes/No

Criteria for discharge from recovery.....Yes/No







