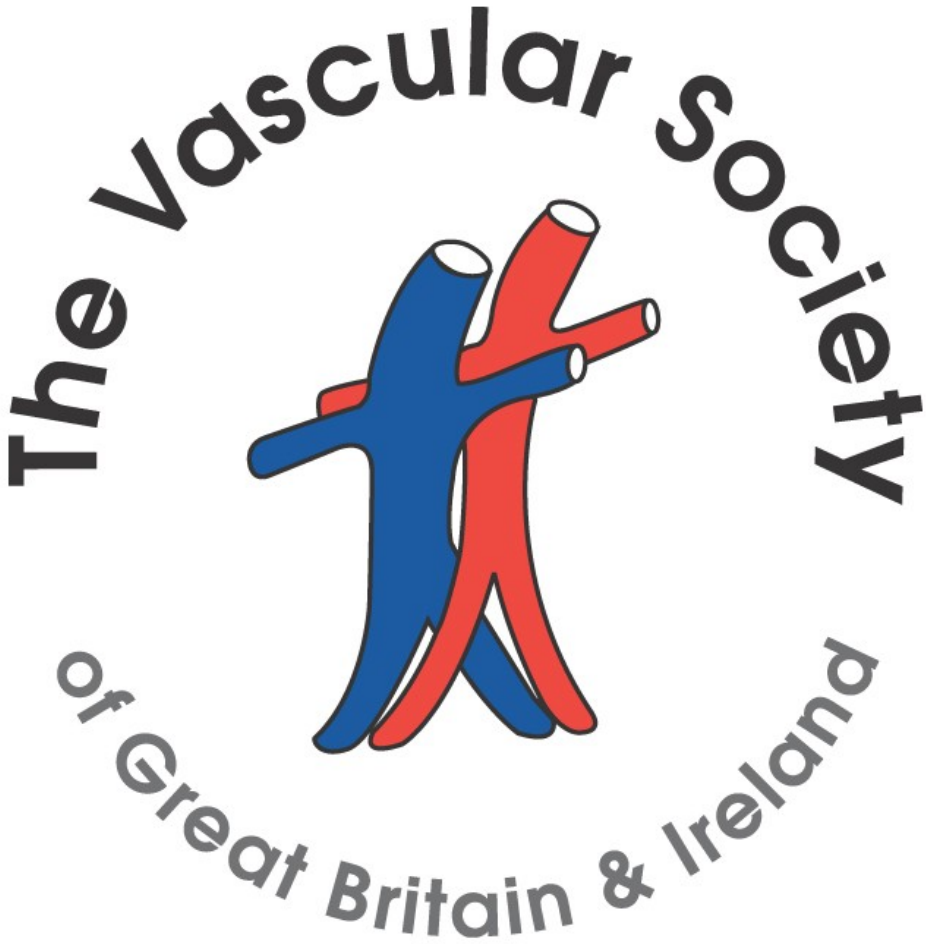

The National Vascular Database Report

2009

Audit & Research Committee of the Vascular Society of Great Britain & Ireland

THE NATIONAL VASCULAR DATABASE

REPORT

2009

Edited by Tim Lees & Gerard Stansby

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1 FOREWORD

Peter Taylor, President VSGBI

The National Vascular Database (NVD) is now an important part of the Vascular Society. Started in 1997 by Jonothan Earnshaw who gave a Kinmonth lecture on the subject entitled "a shield for our profession" the NVD has gathered in strength and usefulness through the successive chairmanships of Jonathan Beard, Simon Ashley and now Tim Lees. Tim has managed to continue to develop the NVD despite a nasty hiccough when Dendrite was replaced by Dr Foster. The reasons for this change are outlined in this report, and were probably inevitable given the large amount of data the NVD now processes.

It is clear from the example of cardiothoracic surgeons that the results of the NVD could at some stage be placed in the public domain. The cardiothoracic surgeons now have a league table containing not only the cardiothoracic units but individually named surgeons which are published in the national press. Many of you will have received a request from a national newspaper requesting information about the outcome of procedures for infrarenal abdominal aortic aneurysms under the freedom of information act. Trusts have a duty to divulge this information, but at present this only applies to the hospital and does not apply to individual surgeons. This request caused a huge amount of anxiety at the time, and Tim Lees handled the situation with good sense and great calm.

However, it is portent for things to come. Vascular surgeons have in common with cardiothoracic surgeons, some very easily identifiable end points which lend themselves to critical appraisal. I can see a time in the not too distant future when a league of vascular surgeons will appear in the national press. I believe that we should be able to cope with this level of inspection. If our results are not up to the standard of our contemporaries both in Europe and further afield, then we should be self-critical in order to improve these results. The NVD will give us the information to do this. Much has been made of the poor results for infrarenal abdominal aortic aneurysm repair as cited in the European registry. This coincides with the introduction of screening for abdominal aortic aneurysms in the UK. Clearly the government would not want to place screen detected aneurysms in hospitals where the results are below par. One of the requirements to be a screening centre is participation in the NVD. The results of operations on screen detected aneurysms will be subjected to intense scrutiny and a good track record will be deemed an essential requirement.

The quality of the data is very dependent upon the person who puts the data in. This is a bone of contention in many hospitals where data entry is of variable quality. The best data seems to come from units which have research nurses or specialist nurses working under consultant surgeons. The importance of data entry to the NVD needs to be a high priority for vascular surgeons and they should seek support from their hospital management to ensure that they have sufficient high quality people with enough time to input this data.

Unfortunately not all vascular surgeons put their data on the NVD. The council and the members of the audit and research committee would strongly urge all members of the society to do so. There may come a time when this will become part of the appraisal process, and failure to take part in the audit may become severely problematic.

I would like to congratulate Tim Lees and the members of the audit and research committee for their sterling work particularly over the last year. I am sure David Mitchell will continue the good work in the future.

2 ABBREVIATIONS

A&R	Audit & Research
AAA	Abdominal aortic aneurysm
AMP	Amputation
BSIR	British Society of Interventional Radiology
C Diff	Clostridium Difficile
CCF	Congestive Cardiac Failure
EVAR	Endovascular Aneurysm Repair
GAS	Glasgow Aneurysm Score
GMC	General Medical Council
HES	Hospital Episode Statistics
IHD	Ischaemic Heart Disease
IIB	Infrainguinal bypass surgery
IT	Information Technology
MI	Myocardial Infarction
MRSA	Methicillin Resistant Staphylococcus Aureus
n	Number
NAAASP	National Abdominal Aortic Aneursym Screening Programme
NHS	National Health Service
NVD	National Vascular Database
ONS	Office of National Statistics
OPCS	Office of Population Census Surveys
OR	Open Anuerysm Repair
PCT	Primary Care Trust
POSSUM	Physiological & operative severity score for the enumeration of mortaltiy & morbidity
PUO	Pyrexia of unknown origin
Resp	Respiratory
SD	Standard deviation
SpR	Specialist Registrar
VASGBI	Vascular Anaesthetic Society of Great Britain & Ireland
VBHOM	Vascular biochemistry and haematology outcomes model
VSGBI	Vascular Society of Great Britain & Ireland

3 INTRODUCTION

Tim Lees, Chairman, Audit & Research Committee VSGBI

The National Vascular Database commenced in 1997 with a few interested surgeons pooling data from different centres to provide a comparison of outcomes in vascular surgery. This gradually expanded to include more centres and formal reports on the amalgamated data were produced in 1999, 2001, 2002 and 2004.

By the time I took over as Chairman of the Audit and Research Committee in 2005 the database had grown progressively over the years since its inception under the careful management of successive Audit and Research Committee Chairmen (Jonothan Earnshaw, Jonothan Beard, Simon Ashley).

With the increasing contribution from individual surgeons and centres, however, came some unforseen problems. One of the strengths of the data amalgamation in the earlier years was that data could be collected in any format and submitted centrally and so individual centres could, and did, develop their own bespoke systems for data collection. As long as they collected the required data for the national system they could contribute to the subsequent analysis. The data was submitted each year to a commercial company who sorted and cleaned the data and converted it into a format in which it could be analysed. However as the amount of data grew year on year this system became unmanageable; the data was being collected in too many different formats, individual questions were recorded in different ways between different systems, data was often very incomplete, and as there was no central "store" of the data, and statistical concerns over double counting of cases it was necessary to do a new sort on historic data year on year, thereby increasing the work required each year. It therefore gradually became apparent that this system was no longer sustainable and the NVD had in many ways become a victim of its own success and was in danger of collapsing. A new system was urgently required.

Simon Ashley had introduced the concept of a web based system of data collection and the audit and research committee agreed that this was the most appropriate way forward. The advantage of such a system is that it is readily accessible to all who wish to use it and all that is required is internet access and a log in and password. In addition the data is collected in a single database and is therefore collected in a single format making subsequent analysis much easier; year on year sorting of data is not required.

A tendering process was undertaken by the audit and research committee and several companies were invited to bid for the contract to produce a web based system of data collection and analysis for the VSGBI. Dr Foster Intelligence Limited was the preferred

supplier. The new National Vascular Database was duly built and is accessible online at www.nvdonline.org.uk .

In developing this new system we have tried to accommodate the requirements of all our users and to make it easy for everyone who wishes to contribute data to do so. For many the ability to enter data online 24 hours a day is a major step forward, and all that is required is internet access and there is no charge for using the system. However we were aware that others already had their own systems of data collection and did not wish to change. For this reason we have introduced an upload facility to the web based system. The data has to be put into a prescribed format in order to upload it and this can be time consuming but this step is essential in order to ensure that all our data is in the same format and that we don't run into the problems we had before with the data.

The NVD is evolving all the time and adjustments will need to be made to it on an ongoing basis as the need for different data and analyses changes with time. As the data collected changes, as has occurred for the aneurysm screening project, so the upload will need to change and centres using this facility will need to keep updating their own systems to reflect these changes.

Another important aspect of the new NVD is the analysis. In the past the reports, both national and individual, have been well received. However written reports are labour intensive to produce and, as with this report, are out of date by the time they are published. Centres, and surgeons need to know their results in comparison to national figures much more rapidly than written reporting allows. Therefore considerable work has been applied to enable on-line analysis with real time reporting of numbers, complications including mortality, and funnel plots. This can be accessed by all users and the database can be interrogated for information on various aspects of treatment.

This written report represents the first one incorporating data from the new system, and the first to be produced by the VSGBI itself. All of us in the audit and research committee hope that you will find it a useful document.

4 MANAGING THE DATABASE

Sara Baker, Research Associate, VSGBI

4.1 Maintenance

4.1.1 Responding to users

Much of the coordinator's time is used to ensure that a quick and detailed response can be given to surgeons and users who need to understand the rationale behind the way the web ware is set up to manage their data. It is designed to support them and their team in the use of the system as they learn to use the new website account. To ensure that personal data and records are secure, only the NVD coordinator has the key for the hospitals and surgeons using the NVDonline system.
Users fall into two groups, administrators and clinicians. The former will have access to all the records and accounts at one hospital site. This facility allows trusted members of the local surgical team to support some of the demographic data entry fields whilst allowing the surgeon to still have full control over the actual clinical data. The importance of this is clear when NVD data is compared to Hospital Episode Statistics [HES].
In the early days of the NVDonline each surgeon required their own account to be set up and there was a considerable effort expended to populate the system with the users and the hospital coding system, together with the OPCS codes. Ease of use from any computer with internet access was our main criteria and it was essential to allow ease of access to surgeon without having to recall constantly changing passwords and pin numbers. No formal training was possible but with most of the population now using the internet to find and book trains, airline flights or for online supermarket shopping this was deemed to be unwarranted.

4.1.2 Administrators, surgeons, and helpers

Local administrators come from many clinical health service backgrounds assisting with NVD data collection across the four countries of the UK. It is notable that the most complete and timely data comes from centres where the surgeon is supported by research or specialist nurses in their data entry. This seems to apply irrespective of whether data entry is direct or by upload from bespoke systems. Allocating a newly appointed surgeon locally can be done by the local administrator provided that a GMC number and an NHS email address are available.

4.1.3 Reports and upload support

Database development and problem sorting are the main day to day tasks for the database manager. Once the new NVDonline system was running smoothly the evolution was vastly aided by comments and observations on the practicalities of the system from early adopters. Although the mandatory fields are very few to ensure data capture for the online analysis, fields which might be used for risk adjustment e.g. using vPOSSUM and VBHOM are also captured as preferred fields. This will become important for the Professional standards committee governance procedure and in the future iterations for offering patient risk analysis guidance prior to surgical intervention. Reports are available online for all users and allow personal and local performance to be mapped against national activity in real time on the website.

4.1.4 Gatekeeper for users and access

Several requests are received daily for new access codes to the NVDonline, each of these is checked for veracity and an NHS email account is a stipulated requirement. No personal email account holders are permitted to have access to the NVDonline. All requests are checked back to the source hospital for those who are not known to the VSGBI, or BSIR, or who are not listed in the yearbook and if necessary a call to the surgeon at the site is required to confirm the requestor identity and role in data capture. Some requests have been refused if these criteria have not been met.

Requests for access to data from the database for the purpose of, for example, research have to go through the Chairman of the A&R committee, and the VSGBI has a policy on the release of data for such purposes available on the VSGBI website. Most academic requests are supported, but we do not release data for commercial or other non-academic purposes.

Care has been taken with reference to the requirements of NAAASP to only give the basic details required to confirm contribution to the NVD. However in the future there will be an increasing requirement for centres to allow the release of more detailed information as part of the quality assurance process for the screening programme.

4.1.5 Online reporting

The NVD now allows surgeons to view mortality data. This can be limited using the filters provided. For example admission status and /or open or endovascular abdominal aortic aneurysm repair can be defined and then the funnel plot for these choices can be displayed. Surgeon specific reporting is available only to the NVD coordinator at present. Personal reports will however be made available in a confidential manner to the

individual surgeon. In the future we hope that network reporting will be available in real time on line. It should be noted that incomplete red records will not be used for analysis and so it is important that all records have all the mandatory fields completed in order to that the reporting fully represents activity.

4.1.6 Administrator Functions

The NVD administrator view allows tracking of users, enabling the administrator to monitor the pattern and frequency of use. The system allows flexibility for live data entry, or for bulk upload of data, and how the system is being used can be assessed. This also allows the NVD administrator to target specific users (or non-users!) with prompts by automated email and reminders to complete outstanding records with missing mandatory fields. These are intended to encourage complete and timely data submission to enhance reporting to members. It also allows the NVD administrator to support the site with novel ideas for better or different data capture using the experiences of other sites, or by adoption of a different style of data entry.

4.1.7 Collaboration with BSIR & VASGBI

Collaboration with our vascular anaesthetic colleagues will expand the datasets but will not impact on the surgical fields, and anaesthetists will add to the existing records started by the surgeons and their team. We have also recently incorporated carotid stenting into the carotid database and these cases will be completed by vascular interventional radiologists. Apart from the current questions recording whether an aneurysm is repaired by open surgery or EVAR, we have also now developed further questions on EVAR in conjuction with the BSIR. These are currently being tested on the NVD test site and will be added to the live database once testing is complete. The NVDonline has a security certificate and is not available for public view although due to links from other websites it is now occasionally visible to search engines.

4.1.8 Developing the Database & liaison with users

Comments and suggestion from users have been instrumental in the development of the current NVDonline. Future versions will reflect suggestions from users as well as the changing information needs of clinicians and the Society's response to emerging Health agendas.
Demonstrations and presentations to regional vascular groups have enabled a degree of both learning and liaison for users. The adoption of a web system has not required the support of formal training for access to and use of the database. Contact with users has been helpful in explaining how the database works, and this has also helped the executive

to plan changes in database design. The upload facility for bulk monthly submission to the online system has been developed in response to suggestions from users. This allows a quick efficient and secure data transfer method, provided the data is in the correct format.

There are plans to expand the OPCS codes to allow those centres without their own system of data collection to use the NVD for all their arterial procedures.

Changes to the AAA database are currently being constructed in order to meet the requirements of the NAAASP, and there will be some fundamental changes to this database. In particular the database will now link with the screening module of the IT solution for the screening programme and will also link with data from ONS in order to capture all patients who die with a known diagnosis of abdominal aortic aneurysm.

4.1.9 Test site

We are able to continue development at the same time as managing the live site by using a test platform. This allows us to lift and store data during the writing of this report without affecting any functionality of the live data entry site. It also allows us to try out new developments in the software and to sort out any problems with these before making them available for use.

4.2 Contributors

The number of cases entered by centre is shown in table 1 below. It should be noted that this includes cases up to September 2009, although the remainder of the report includes data only up to 31st December 2008. Due to the development of the upload system and the learning curve of centres using this system not all centres using the upload managed to do this in time for doing the analysis for this report. The table below therefore gives a more up to date indication of the centres contributing to the National Vascular Database. Centres marked as "CIA" are using the database to enter carotid endarterectomy data but are not contributing data to the remainder of the NVD. The numbers submitted to the carotid database are not included below but are reported separately in the national carotid intervention audit reports.

Table 1. Contribution to the NVD by centre

Hospital	Number of Records
Aberdeen Royal Infirmary, Scotland	161
Addenbrookes Hospital - Cambridge	492
Altnagelvin - Northern Ireland	19
Arrow Park Hospital - Wirral	55
Ayr Hospital - Ayrshire	4
Barnet & Chase Farm - North London	52
Barnstable - North Devon	151
Basildon Hospital - Essex	17
Bedford Hospital - Bedfordshire	199
Belfast City Hospital	229
Belfast, Royal Hospital Group	28
Birmingham Heartlands Hospital	272
Blackpool Victoria Hospital	CIA
Bradford Royal Infirmary	259
Brighton & Hayward's Heath	305
Bristol Royal Infirmary	161
Broomfield Hospital - Chelmsford	0
Burnley General Hospital & South Manchester	155
Calderdale & Huddersfield	177
Carlisle - North Cumbria	118
Charing Cross Hospital - London	79
Cheltenham General Hospital	83
Chesterfield Royal - Derbyshire	54
City Hospital Birmingham	193
Colchester Hospital - Essex Rivers	183
Countess of Chester Hospital	29
Craigavon Northern Ireland	70
Dartford - Kent	6
Derriford Hospital - Plymouth	676
Dewsbury & District General	CIA

Doncaster & Basset Law	109
Dorset County Hospital	86
Dumfries & Galloway Royal Infirmary	141
Eastbourne District General Hospital	147
Edinburgh Royal Infirmary	CIA
Freeman Hospital - Newcastle	2109
Frimley Park Hospital - Surrey	181
Glan Clwyd Hospital -Denbighshire	26
Glasgow Royal Infirmary -Scotland	62
Gloucestershire Royal Hospital	272
Guy's and St Thomas's Hospital London	286
Halton General Hospital - Cheshire	CIA
Hereford - historical data	122
Hillingdon Hospital - Middlesex	24
Hull University Hospital	243
Inverclyde Hospital Glasgow	23
Ipswich Hospital	120
James Cook University Hospital - Middlesbrough	329
Kent & Canterbury Hospital	296
Kettering General Hospital -Northamptonshire	597
Kings College London	7
Kings Mill Hospital - Nottinghamshire	42
Leeds General Infirmary- incorporated in Leeds Vascular Institute	
Leeds Vascular Institute	199
Leicester Royal Infirmary	259
Leighton Hospital - Crewe	5
Lincoln County Hospital - Lincolnshire	58
Lister Hospital - Stevenage, Kent	31
Manchester Royal Infirmary	161
Mayday University Hospital, Croydon	CIA
Medway Maritime Hospital, Kent	180
Milton Keynes General Hospital - Buckinghamshire	116
Morriston Hospital, Swansea	1

Musgrove Park Hospital - Taunton	399
New Cross Hospital -Wolverhampton	98
Ninewells Hospital - Dundee, Scotland	193
Norfolk & Norwich University Hospital	477
North Bristol NHS Trust	186
North Manchester General Hospital	2
North Staffordshire University Hospital	63
Northampton General Hospital	304
Northern General Hospital, Sheffield	1163
Northwick Park Hospital, Middlesex	80
Pinderfields Hospital , Wakefield	188
Princess Alexandra Hospital -Harlow	233
Princess of Wales - Bridgend, South Wales	230
Queen Alexandra Hospital, Portsmouth	CIA
Queen Elizabeth Hospital -Gateshead	86
Queen Elizabeth's Hospital - Kings Lynn	28
Queen Margaret Hospital [incorporated in Ninewells]	
Queens Hospital - Romford	18
Queen's Medical Centre, Nottingham	262
Raigmore Hospital, Inverness	CIA
Royal Berkshire Hospital, Reading	1
Royal Blackburn Hospital, Lancashire	6
Royal Bolton Hospital, Lancashire	59
Royal Bournemouth Hospital	346
Royal Cornwall Hospital - Truro	170
Royal Derby Hospital	0
Royal Devon & Exeter Hospital	122
Royal Free Hospital*	225
Royal Glamorgan Hospital	5
Royal Gwent Hospital	18
Royal Hampshire Hospital - Winchester	45
Royal Infirmary - Glasgow, Scotland	62

Royal Infirmary of Edinburgh, Scotland	CIA
Royal Lancaster Infirmary	18
Royal Liverpool University Hospitals	248
Royal Oldham Hospital	21
Royal Preston Hospital	5
Royal United Hospitals -Bath	137
Russells Hall Hospital - Dudley	67
Salisbury District Hospital -Wiltshire	69
Sandwell District General Hospital - Birmingham	2
Scarborough Hospital - Yorkshire	CIA
Selly Oak Hospital - Birmingham	0
Shrewsbury and Telford	571
Southampton General Hospital	175
Southend Hospital - Westcliff-on-sea, Essex	48
Southport & Formby District General Hospital	27
St Bartholomew's & The London Hospital	122
St Georges Hospital - London	438
St Helier Hospital -Carshalton, Surrey	CIA
St Mary's Hospital - London	146
St Peters Hospital - Chertsey	28
St Richard's Hospital - Chichester	174
Stafford General Hospital	55
Stirling Royal Infirmary, Scotland	98
Sunderland Royal Hospital	285
Tameside General Hospital - Manchester	36
The John Radcliffe A17Hospital - Oxford	47
Torbay and South Devon	387
University College Hospital - London	120
University Hospital Aintree - Liverpool	70
University Hospital Coventry (Walsgrave)	31
University Hospital of North Durham	117
University Hospital of Wales - Cardiff	126
Wallsall Hospital- Birmingham	48

Warrington Hospital - Cheshire	9
Watford General Hospital - London	40
Wexham Park Hospital - Slough	285
Whipps Cross University Hospital - London	15
Worcestershire Royal Hospital	284
Worthing & Southlands - West Sussex	6
Wrexham Maelor Hospital - North Wales	10
Wycombe Hospital -Buckinghamshire	19
York Hospital	553
Ysbyty Gwynedd Hospital - Bangor, Wales	35

5 DATA QUALITY

There is always a balance to be achieved between the ideal of an all encompassing comprehensive dataset and the more practical minimum dataset. One the one hand if an important piece of data is not collected it is never really possible to go back and obtain it. On the other hand if too much data is collected a large proportion of it may be incomplete and incomplete data in some cases can be as poor as no data at all. It is therefore important to keep the datasets to a minimum whilst maintaining the core questions necessary for achieving the desired outcome.

5.1 Minimum Dataset

There has been expansion of the datasets in recent years, and with the aneurysm screening programme coming on board there will be some further expansion of this part of the dataset which will now include follow up data. To this end there has been some justifiable criticism that these datasets are now no longer minimal. On the other hand many centres have been telling us that they wish to record all their vascular activity on the National Vascular Database and we have had requests for expansion of the existing fields to incorporate specific requirements of local centres.
The answer to this is perhaps to define a minimal core dataset, whilst enabling individual centres to record additional data according to their own local needs. The fields in the minimal dataset would then need to be mandatory. This would require a closer

interlinking of local and national systems, and is perhaps something to be considered for the future.

5.2 Accurate Data

We are all ready to criticise administrative datasets such as HES, but when it comes to data collected by surgeons or their representatives, there are also inaccuracies. This can be readily seen in the NVD where there are, for example, patients who appear to have dates of birth which are inconsistent with reality and these presumably have been entered incorrectly. This has been dealt with in a more robust fashion in the carotid audit than in the rest of the NVD with validation limits put on many of the questions, and pop up boxes with a "did you really mean this" message. For the future this should be considered for all the NVD questions.

5.3 Comprehensive Data

What we do not currently know is what proportion of the total number of cases centres are submitting to the National Vascular Database, although the HES comparison gives us some indication of this. For the NVD results to give a true national picture it is important not only for every centre performing vascular surgery to contribute but for each of those centres to submit all their index cases. There is evidence that when compared to HES some centres are not submitting all cases, but on the other hand some centres have more cases than HES and therefore this questions the accuracy of the HES data.

5.4 Validation

As the NVD grows and becomes more influential in national outcome reporting it is clear that the issue of validation of data will need to be addressed. The audit committee is seeking advice from other database users as to the best method to use for both internal and external validation. A validation exercise is planned within the next year and centres may be contacted to help with this. Further work will also be undertaken to encourage non-contributing centres to submit their data. Additional software validation checks will be introduced into the database in order to minimise incorrect data at the point of entry.

5.5 Data Quality Reporting

As the NVD becomes more sophisticated it will be important to produce reports not only on data and outcomes but also on data quality. This can then be fed back to centres in order to help them improve their data

5.6 HES Data Comparison

We now have the facility to compare HES data with our own data collected via the NVD, and we will be receiving regular HES data for the index procedures. Initial examination of this data indicates that there are considerable variations between these 2 sets of data. It is too early to include this comparison of datasets in this report as there needs to considerable cleaning of the data and matching of years as the data from HES is provided for a financial year rather than a calendar year. However it is possible to match the data down to the level of individual GMC number and therefore this will provide a very useful comparison of administrative and clinical datasets. A criticism of the NVD has always been that contribution is incomplete but with this comparison for the first time the VSGBI will be in a position to report outcomes of index procedures for all surgeons performing vascular surgery in England. Unfortunately at the time of publication this data is not available to the Society for Wales and Scotland (apart from for carotid endarterectomy), but it may be possible for the Society to purchase this data also in the future.

6 GOVERNANCE OF THE NATIONAL VASCULAR DATABASE

Peter Lamont, Chairman Professional Standards Committee, VSGBI

Submission of index procedure outcomes to the National Vascular Database (NVD) remains voluntary, so there may well be some element of selection bias in the data submitted and there remain a significant number of surgeons who submit no data at all. For those vascular units that do submit all their data, there are occasions when the reported outcomes appear to be outside the "norms" selected by the Audit and Research Committee. Such outliers are readily identified from the funnel plots used to chart, for example, mortality after aortic aneurysm repair, but must be tempered by the fact that the norms are derived only from those centres that are happy to submit data. Likewise analysis of the data is only as good as the quality of the data submitted and there can be significant errors in translation from a local database to the NVD.

Despite these caveats, the General Medical Council have advised the Society that it has a duty to take action if figures from the NVD suggest that patients might be at risk as a result of operation in a particular vascular unit or by a particular surgeon. They have advised that enquiries could be kept confidential and that if the Society became satisfied that there was no cause for concern then no further action would need to be taken. However, if the Vascular Society remained concerned then it ought to inform others, including employers.
As a result of this advice, the Professional Standards Committee (PSC) has drawn up guidance on procedures when the NVD shows up outliers. Scrutiny of the results of the NVD will be done by the Chairman of the Audit and Research Committee on an annual basis, when the data merge process and analysis has been completed. If the figures of any surgeon or unit transgress pre-determined thresholds suggested by the Audit and Research Committee and agreed by Council, the Chairman will first check that the identity of the surgeon/unit and the figures are correct. He will then tell the President and the Chairman of the PSC. The identity of the surgeon/unit will be confidential to these three officers and to the Chief Executive of the Society who will personally deal with any correspondence.

The President will inform the surgeon and the Medical Director of the employing Trust simultaneously by confidential letter. He will contact the surgeon personally by telephone ***before*** dispatching the letters. He will tell the surgeon about his figures and the imminent letter to his Medical Director. He will suggest to the surgeon that he should not undertake the particular procedure in question until the matter has been resolved. The letter to the Medical Director will be copied to the surgeon and will include:

- Background about the NVD and its governance.
- Explicit information about the cause for concern, with detailed figures.
- A suggestion that the Trust might wish to explore the figures as a governance matter, but emphatic advice that the figures should be verified locally.
- Emphasis that this is a sensitive matter which would best be handled in a confidential manner initially.
- A suggestion that the figures should be interpreted in the context of casemix and local circumstances.
- Advice that the surgeon should not perform the particular procedure in question until the Trust has investigated the matter to its satisfaction: but that there is no reason the surgeon should not continue to undertake other work and procedures in the normal way.
- A request that the Vascular Society President be informed of the findings and conclusion of the Trust's investigation.
- A specific request to be informed about the findings of the local data verification process – in particular whether local audit correlated with the NVD figures, or not.
- Figures from the NVD for the surgeon's other index operations.

- A list of the names of the other vascular surgeons in the Trust who contribute to the NVD.
- An offer of assistance from the Society in the form of
    - Personal support for the surgeon from a senior member of the Society.
    - Advice on interpretation of figures; setting them in context; and explanation of any matters relating to vascular practice.
    - Advice on making changes in the local vascular service.

Problems relating to the clinical governance of outcomes from a particular unit or surgeon are the responsibility of the local Medical Director to resolve on behalf of his or her Chief Executive. Thus decisions on whether or not to involve a Royal College of Surgeon's Professional Standards team or whether to refer the matter on to the General Medical Council rightly lie with the Medical Director and not the Society.

The above procedures have been followed on a number of occasions to date, all relating to aortic aneurysm surgery outcomes rather than any other index procedures. As a general rule, those units or surgeons involved in the process have welcomed it and used it as a positive force for change. The majority of poor outcomes have related to poor investment in the infrastructure surrounding aneurysm surgery rather than surgeon competence. The involvement of the Society has frequently resulted in a fresh look at the infrastructure by the local Trust and the promise of investment in the service which individual surgeons had previously struggled to secure on their own. Although undoubtedly stressful initially to the surgeons to hear that their patient outcomes are being investigated, the majority of such cases have had positive end results. Thus the possibility of such a process being invoked should not inhibit surgeons from inputting all their index procedure data into the NVD.

7 AAA SCREENING REPORT

Jonothan Earnshaw. Honorary Secretary, VSGBI, Director of NAAASP

Ultrasound screening for abdominal aortic aneurysm in sixty-five year old men has the potential to reduce the number of premature deaths from rupture by up to fifty percent. An NHS funded programme (NAAASP) is currently being introduced in England. There are also advanced preparatory discussions for similar programmes in Scotland, Wales and Northern Ireland. The value of the programme will depend on two factors

- Efficient detection of men at risk (i.e. with an abnormal aortic ultra sound scan)
- Safe treatment of men with large aortic aneurysm

Most screening programmes have little interest in the management of patients once the condition has been detected. Aneurysm screening is therefore unusual in that it is reliant

on the outcome of treatment for its efficacy. The significant risks of aortic aneurysm treatment and the well known problems of excessive elective mortality rates in the UK mean that the NHS Screening Programme will remain focused on outcomes. High perioperative mortality is one of the main risks associated with the Programme.

For this reason NAAASP has entered into a partnership with the VSGBI. The Screening Programme has purchased a bespoke database from Northgate IT Solutions which will organise the call and recall system for men screened in the Programme. It has been agreed to link this database to the National Vascular Database to merge the screening process with outcome. The Department of Health has funded an upgrade to the NVD software to enable it to record the process and outcome data needed to monitor the performance of the Screening Programme. It has also funded a clerk to assist with data processing and handling.

The importance of the NVD to the NAAASP is underlined by the fact that one of the conditions of becoming a local screening programme is complete submission of all the procedures to the NVD, including both screened and non screen detected aneurysms. One reason that submission to the NVD has increased so gratifyingly this year is this rule. The NAAASP has also adopted the VSGBI Quality Improvement Framework to try to help improve the results of aortic intervention and meet the Society's target of a fifty percent reduction in the elective mortality rate by 2013.

The fact that NAAASP is working with the VSGBI may have additional benefits. We are working on a flexible reporting system that will enable detailed process and outcome reports for individual surgeons as well as local programmes, Trusts, PCTs etc. With this increase in information comes increasing responsibility. Whilst NAAASP is mainly interested in the results at the level of the local screening programme, commissioners and even patients will want data at individual surgeon level. I would encourage the Society to start the debate about whether it should be moving towards an annual report like the cardiac surgeons describing outcome results at individual surgeon level.

The Screening Programme and the NVD will very quickly become an enormously valuable resource for conducting epidemiological research into aortic aneurysm disease and could also be used to conduct trials into methods of trying to slow aneurysm growth. In the coming months we will be discussing how best to organise this research so that it is coherent and comprehensive.

The introduction of screening and the consequent remodelling of vascular services that has gone with it offers a great opportunity to vascular surgeons and their teams to improve our service to patients with vascular disease. The NVD is a wonderful resource and it is the responsibility of all of us to ensure it is accurately completed and widely used.

8 DATABASE SUMMARY DATA

From December 2005 the National Vascular Database data for carotid endarterectomy have been collected as part of the UK Carotid Endarterectomy Audit with the Royal College of Physicians and this audit is published separately. Reports of the carotid audit are available on the NVD website (www.nvdonline.org.uk) and the VSGBI website (www.vascularsociety.org.uk). The overall numbers of carotid procedures are included in this report for clarity but other details are excluded.

Figure 1. Overall number of cases up to 31st December 2008

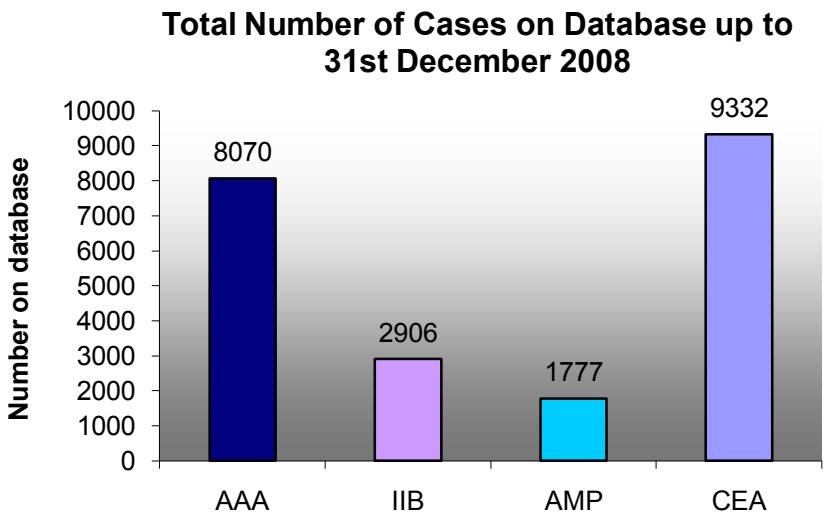


Table 2. Number of cases per calendar year from 2004 to 2008

	AAA	IIB	AMP	CAROTID	Total
2004	411	199	0	0	610
2005	522	236	67	183	1008
2006	605	237	225	2912	3979
2007	1568	449	369	2902	5288
2008	4009	1540	1116	3518	10183

Figure 2. Number of index procedures recorded per annum

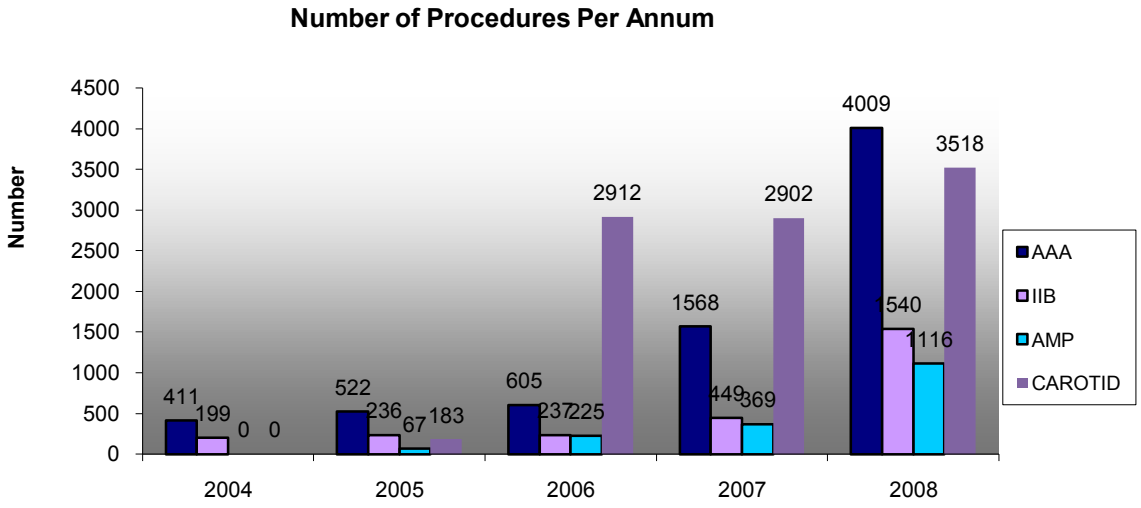
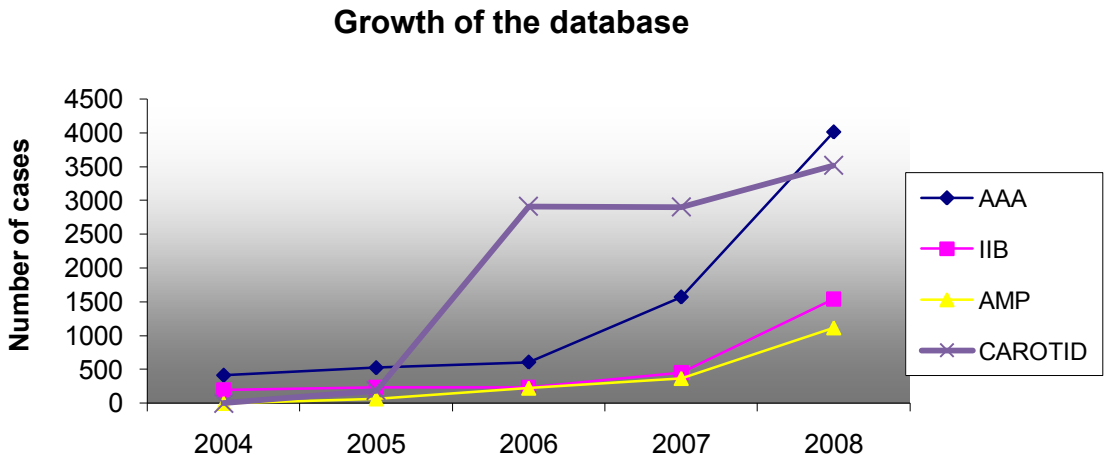


Figure 3. Growth of database 2004 to 2008



8.1 Statistics

As most of the data from the NVD is descriptive of practice we did not feel extensive statistical analysis was appropriate. When statistics have been applied in the following

sections, data has been assessed for normality using the Anderson-Darling test, and significance explored using ANOVA and t-tests. For non- parametric data comparisons have been made using the Mann-Whitney U-test. Categorical data has been analysed using Chi-square with Yates' correction. Analysis was performed using Microsoft Excel 2007(Microsoft) and Minitab 15 (Minitab Ltd.).

9 ABDOMINAL AORTIC ANEURYSM

Abdominal aortic aneurysm repair has been the subject of much debate recently within the Vascular Society. This follows the publication of the second Vascunet report with comparative outcomes between several countries, which showed that the UK had a higher mortality rate than the other countries studied. The UK data this was based on was incomplete and subject to the difficulties of data sorting and amalgamation highlighted previously in this report. However the data was in keeping with other publications of mortality following AAA surgery, and therefore the current mortality rate following AAA surgery is of great interest, along with the year on year mortality trends.

Reporting outcomes can be difficult because of the different ways AAA treatments can be classified. We know that patients who are admitted as an emergency with a symptomatic aneurysm that has not ruptured and who undergo surgery, have a higher mortality than those that have true elective admission and surgery. However if these are analysed separately it is difficult to define what constitutes a symptomatic aneurysm and there may be a tendency to place the higher risk patients in the symptomatic category. In the current database we record elective and emergency admission, ruptured or non-ruptured and whether or not the aneurysm was symptomatic. For the purposes of this report the analysis is confined to the two groups, ruptured and non-ruptured.

Aneurysm repair can be by open surgery or endovascular repair and these treatment modalities are separated out in this analysis.

Up to 31st December 2008 the database had 8070 aneurysm cases included. Of these 5814 were non-ruptured (with an average per centre of 70), 1390 were ruptured (average per centre of 14), and in the remainder it was not recorded whether the aneurysm was ruptured or not.
2522 cases were reported as being repaired by EVAR and 4332 by open surgery. Data on the remaining 1216 was missing, but it should be noted that the NVD has only recorded this for approximately that last 2 years and therefore some of the historic data will lack

this information. The likelihood is that most of these cases missing this data were repaired by open surgery.

9.1 Coding

The code for the operation was recorded in 8015 cases and these are shown below. This demonstrates that the codes being used for endovascular stenting of aortic aneurysms are predominantly the L28 codes. Recent coding advice issued by Connecting for Health indicates that the L27 codes should be used.

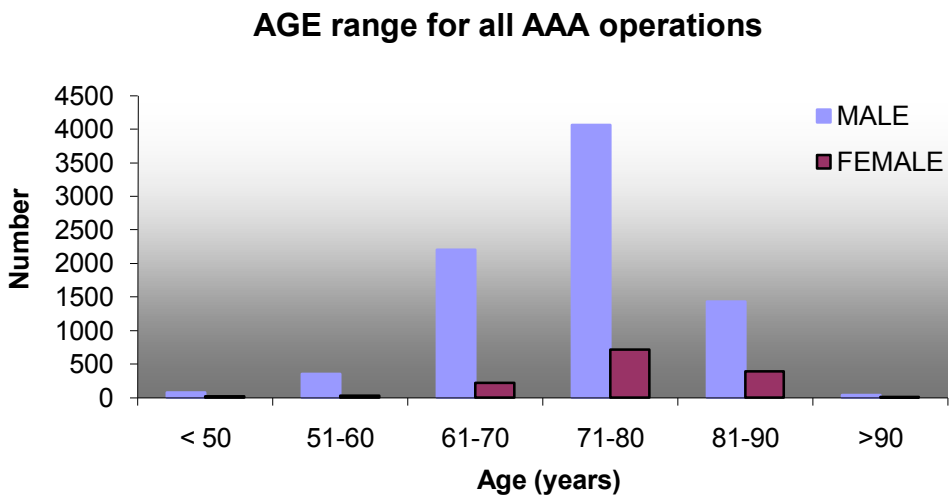
Table 3. Number of aneurysm cases classified according to OPCS code

Opcs Code	Number of cases	Procedure
L18.3	35	Emergency replacement of aneurysmal segment of aorta, Emergency replacement of aneurysmal segment of suprarenal abdominal aorta by anastomosis of aorta to aorta
L18.4	966	Emergency replacement of aneurysmal segment of aorta, Emergency replacement of aneurysmal segment of infrarenal abdominal aorta by anastomosis of aorta to aorta nec
L18.5	277	Emergency replacement of aneurysmal segment of aorta, Emergency replacement of aneurysmal segment of abdominal aorta by anastomosis of aorta to aorta nec
L18.6	274	Emergency replacement of aneurysmal segment of aorta, Emergency replacement of aneurysmal bifurcation of aorta by anastomosis of aorta to iliac artery
L19.3	123	Other replacement of aneurysmal segment of aorta, Replacement of aneurysmal segment of suprarenal abdominal aorta by anastomosis of aorta to aorta nec
L19.4	1937	Other replacement of aneurysmal segment of aorta, Replacement of aneurysmal segment of infrarenal abdominal aorta by anastomosis of aorta to
L19.5	769	Other replacement of aneurysmal segment of aorta, Replacement of aneurysmal segment of abdominal aorta by anastomosis of aorta to aorta nec
L19.6	818	Other replacement of aneurysmal segment of aorta, Replacement of aneurysmal bifurcation of aorta by anastomosis of aorta to iliac artery nec
L19.8	174	Other replacement of aneurysmal segment of aorta, Replacement of aneurysmal segment of abdominal aorta by anastomosis of aorta to femoral artery
L20.3	1	Other emergency bypass of segment of aorta, Emergency bypass of segment of suprarenal abdominal aorta by anastomosis of aorta to aorta
L20.4	11	Other emergency bypass of segment of aorta, Emergency bypass of segment of infrarenal abdominal aorta by anastomosis of aorta to aorta

L20.5	6	Other emergency bypass of segment of aorta, Emergency bypass of segment of abdominal aorta by anastomosis of aorta to aorta nec
L20.6	20	Other emergency bypass of segment of aorta, Emergency bypass of bifurcation of aorta by anastomosis of aorta to iliac artery nec
L21.3	10	Other bypass of segment of aorta, Bypass of segment of suprarenal abdominal aorta by anastomosis of aorta to aorta nec
L21.4	65	Other bypass of segment of aorta, Bypass of segment of infrarenal abdominal aorta by anastomosis of aorta to aorta nec
L21.5	15	Other bypass of segment of aorta, Bypass of segment of abdominal aorta by anastomosis of aorta to aorta nec
L21.6	81	Other bypass of segment of aorta, Bypass of bifurcation of aorta by anastomosis of aorta to iliac artery nec
L21.8	41	Replace aneurysm bifurcation aorta by anastomosis aorta to femoral artery
L26.5	0	Percutaneous transluminal balloon angioplasty stenting aorta
L26.6	0	Percutaneous transluminal aortic stent graft fenestration
L27.1	371	Endovascular insertion of stent graft for infrarenal abdominal aortic aneurysm
L27.2	8	Endovascular insertion of stent graft for suprarenal abdominal aortic aneurysm
L27.3	4	Endovascular insertion of stent graft for thoracic aortic aneurysm
L27.5	64	Endovascular insertion of stent graft for aortic aneurysm of bifurcation NEC
L27.6	24	Endovascular insertion of stent graft for aorto-monoiliac aneurysm
L27.8	8	Other specified transluminal insertion of stent graft for aneurysmal segment of aorta
L27.9	2	Unspecified transluminal insertion of stent graft for aneurysmal segment of aorta
L28.1	1662	Endovascular stenting for infrarenal abdominal aortic aneurysm
L28.2	33	Endovascular stenting for suprarenal aortic aneurysm
L28.3	3	Endovascular stenting for thoracic aortic aneurysm
L28.4	6	Endovascular stenting for aortic dissection in any position
L28.5	118	Endovascular stenting of aortic bifurcation NEC
L28.6	71	Endovascular stenting of aorto-uniiliac aneurysm
L28.8	14	Other specified transluminal operations on aneurysmal segment of aorta
L28.9	3	Unspecified transluminal operations on aneurysmal segment of aorta
T30.9	1	Opening of abdomen and exploratory laparotomy

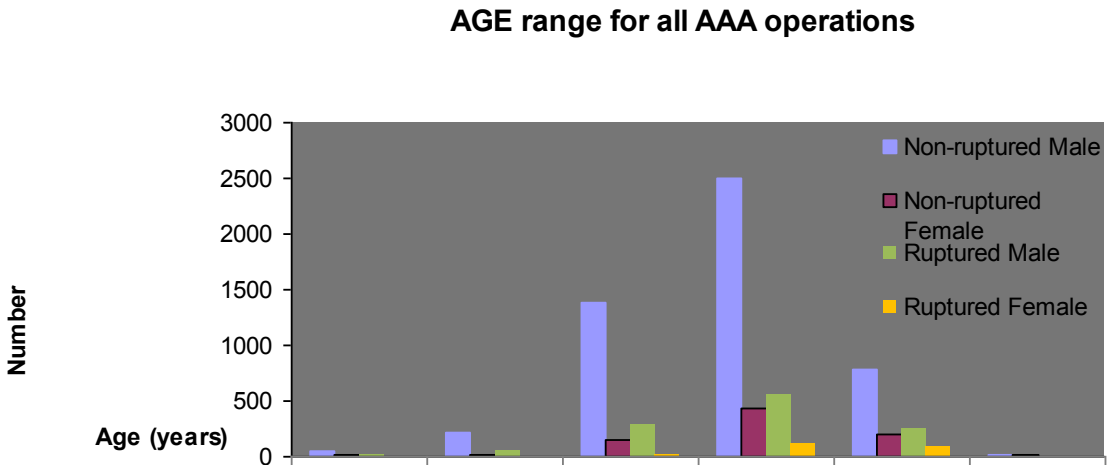
9.2 Age and aortic aneurysm surgery

Figure 4. Age of patients undergoing aortic aneurysm surgery



The graph below shows the age range for all AAA operations split into male and female and also the age ranges, combined for males and females for ruptured and non-ruptured aneurysms.

Figure 5. Age of patients grouped according to type of aortic aneurysm



	< 50	51-60	61-70	71-80	81-90	>90
Non-ruptured Male	46	225	1382	2500	785	22
Non-ruptured Female	11	17	148	433	207	9
Ruptured Male	9	50	289	556	248	5
Ruptured Female	5	2	25	109	81	2

9.3 Comorbidities

The following comorbidities were reported for all patients with the diagnosis of abdominal aortic aneurysm. The figures are positive responses expressed as a percentage of all completed responses, not including missing data. The figures including missing data are shown in Table 4.

Figure 6. Pre-operative comorbidities in patients undergoing aortic aneurysm surgery

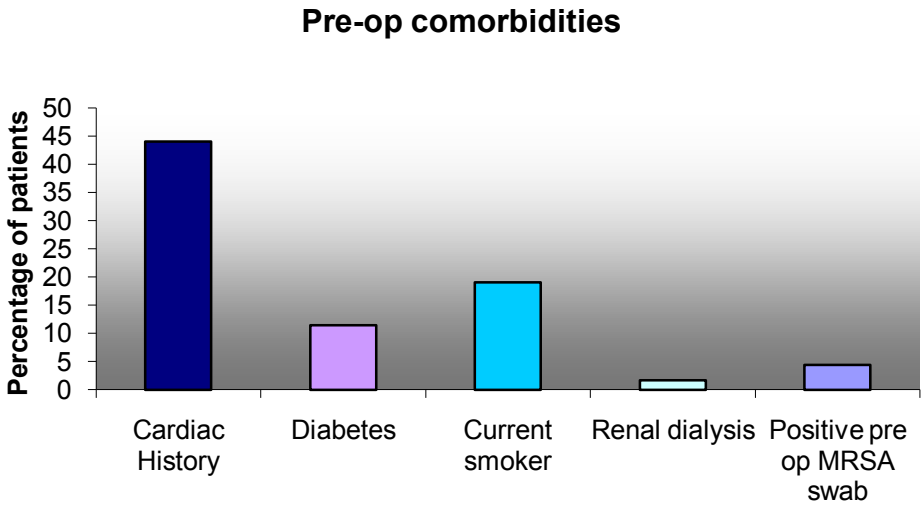


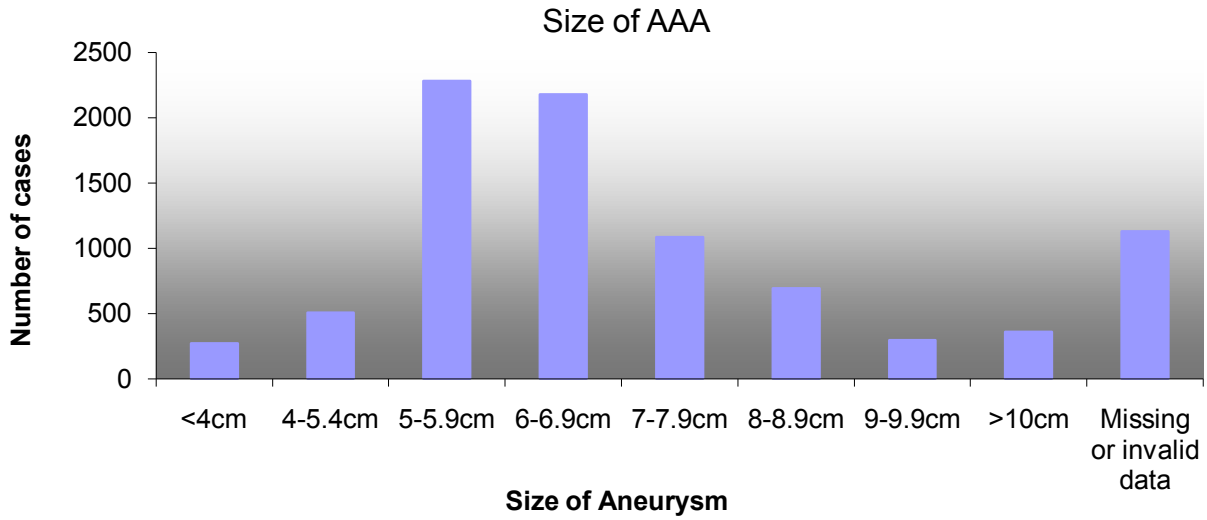
Table 4. Numbers of AAA patients on database with pre-operative comorbidities

	YES	NO	SUM	MISSING DATA
Cardiac History	3245	4135	7380	690
Diabetes	868	6745	7613	457
Current smoker	1192	5052	6244	1826
Renal dialysis	116	6812	6928	1142
Positive pre op MRSA swab	198	4287	4485	3585

9.4 Aneurysm Size

The distribution of the size of aneurysm operated on is shown in figure 7.

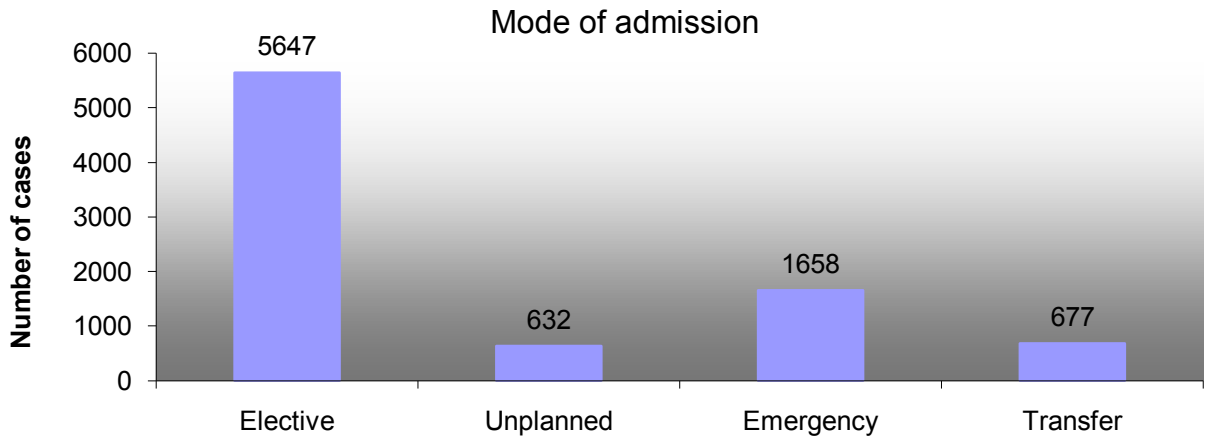
Figure 7. Aneurysm size at time of surgery



9.5 Mode of admission

The mode of admission was recorded for 7937 patients and is shown in figure 8. The transfer of cases from another hospital was recorded separately and these patients are also recorded within the first 3 groupings.

Figure 8. Mode of admission of patients with AAA



9.6 Medication

The percentage of patients taking statins, antiplatelet agents and beta blockers is shown in figure 9. The positive responses are expressed as a total of the responses, excluding missing data. The figures for the missing data are shown in table 5. It is of note that only 40% of patients undergoing AAA repair are taking a statin.

Figure 9. Medications of patients undergoing AAA repair

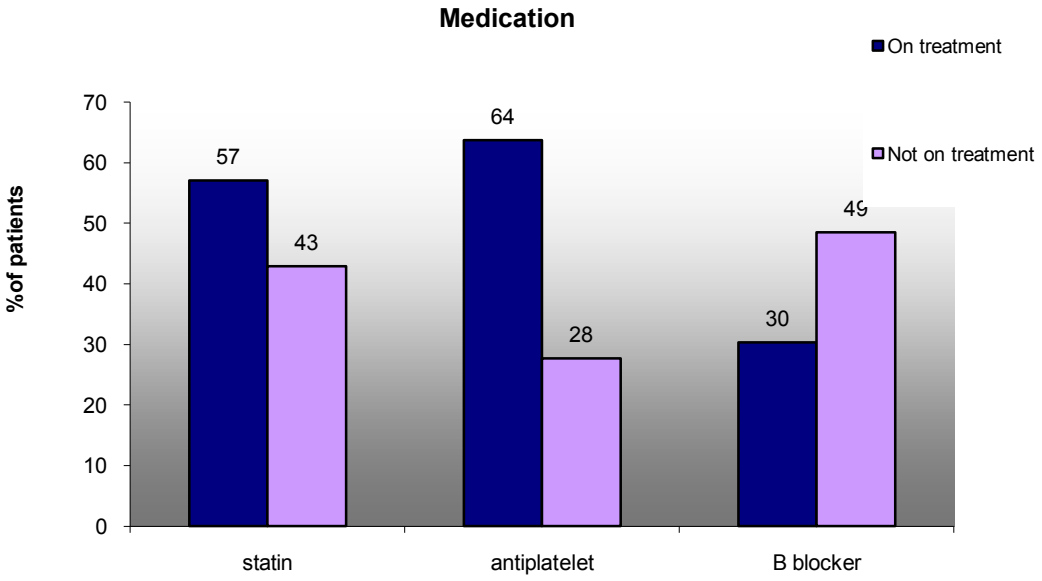


Table 5. Medications in AAA patients

	YES	NO	SUM	MISSING DATA
Statin	3270	2461	5731	2339
Antiplatelet agent	3902	2223	6125	1945
Beta Blocker	1694	3892	5586	2484

9.7 Surgery

Figure 10 shows that AAA surgery is a consultant led procedure with the grade of the most senior surgeon present being a consultant in 98% of cases. Similarly the senior anaesthetist was a consultant in 94% of cases (Figure 11).

Figure 10

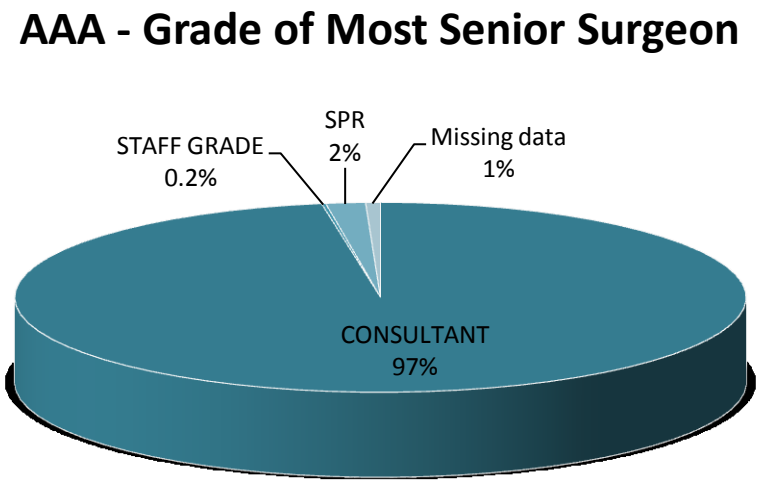


Figure 11

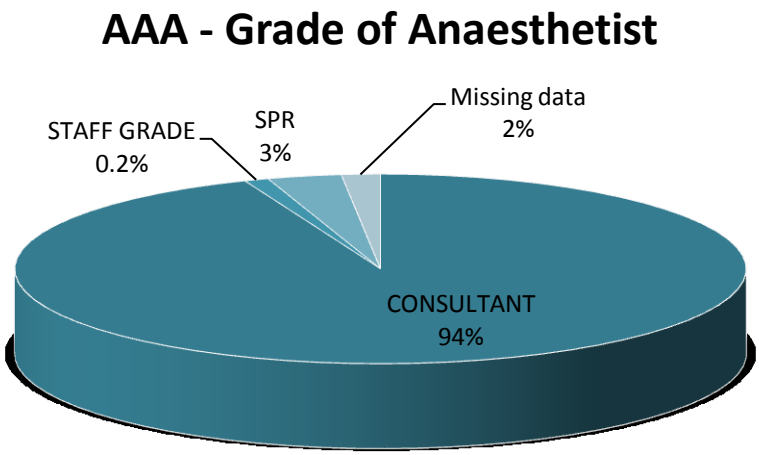
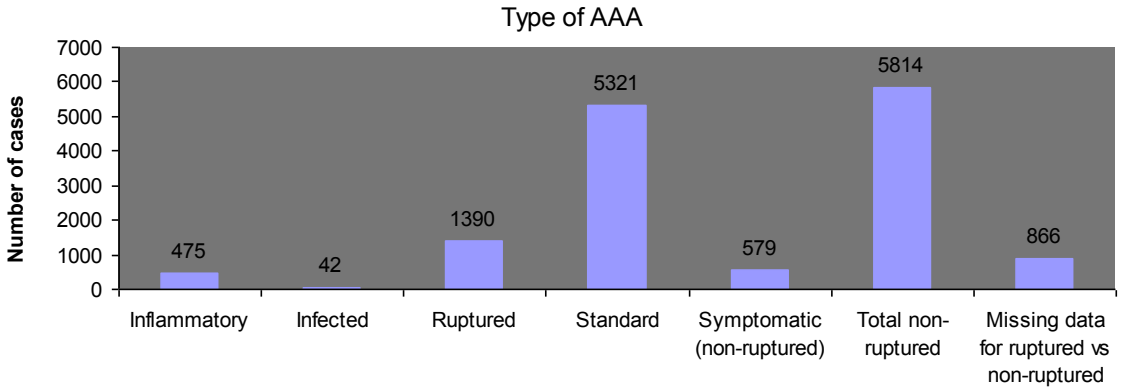


Figure 12 shows the different types of abdominal aortic aneurysm treated. The types are not mutually exclusive, with the total number of aneurysms treated up to 31st December

2008 being 8070, with some missing data accounting for the fact that the total ruptured and non-ruptured do not add up to this figure.

9.7.1 Type of aneurysm treated

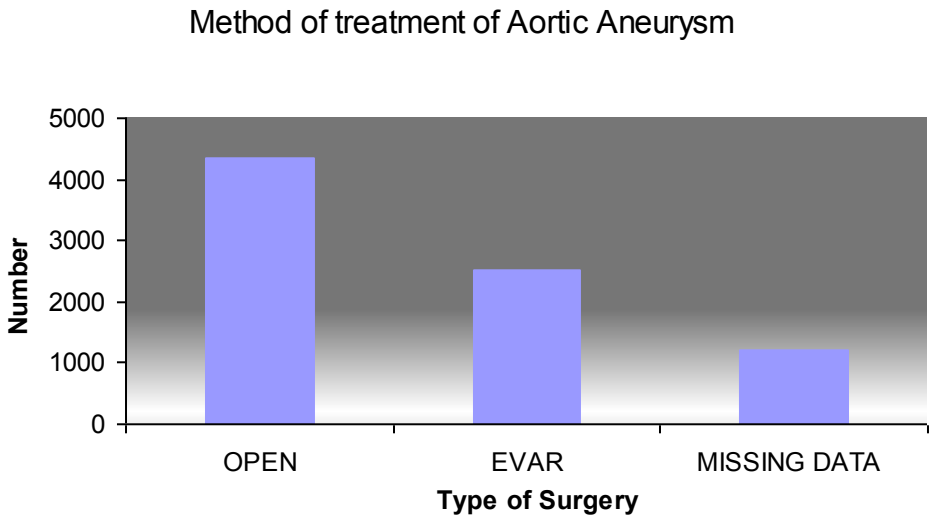
Figure 12



9.7.2 Method of aneurysm treatment

The method of treatment of aortic aneurysms, either by open repair or by EVAR is shown below, with the figures for 2006 to 2008 shown in figure 13.

Figure 13



The amount of missing data in this question seems unusually high for this question which is a fundamental question for the aneurysm database analysis. However this can be explained by the fact that the database historically did not record EVAR and as there has been upload of historic data into the current database this question will not have been completed for many of the older cases. It is anticipated that in future years this question will be more complete. The data separated out per annum is shown in figures 14 and 15.

Figure 14. Number of cases performed by open repair and EVAR analysed by year

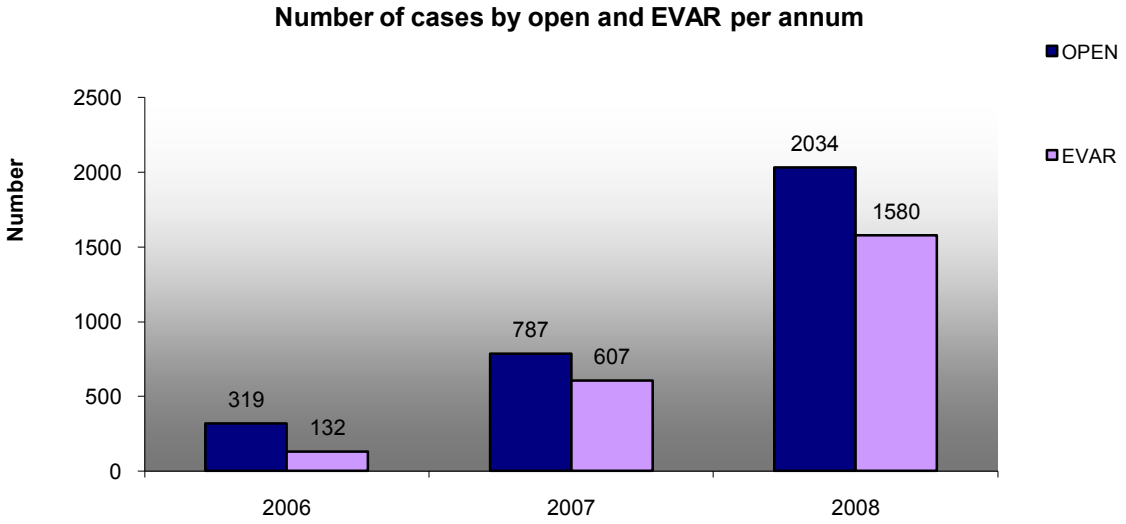
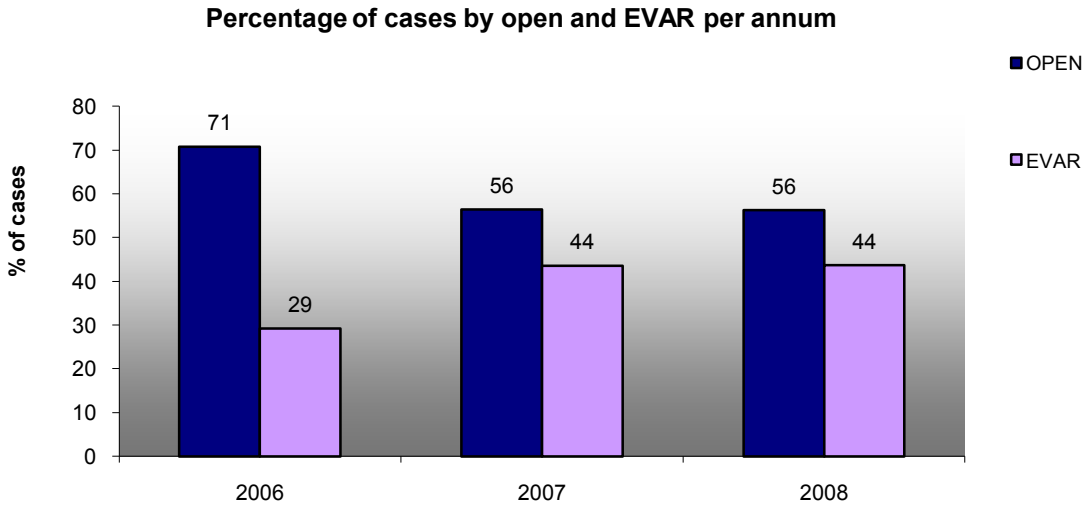


Figure 15. Percentage of cases performed by open repair and EVAR analysed by year

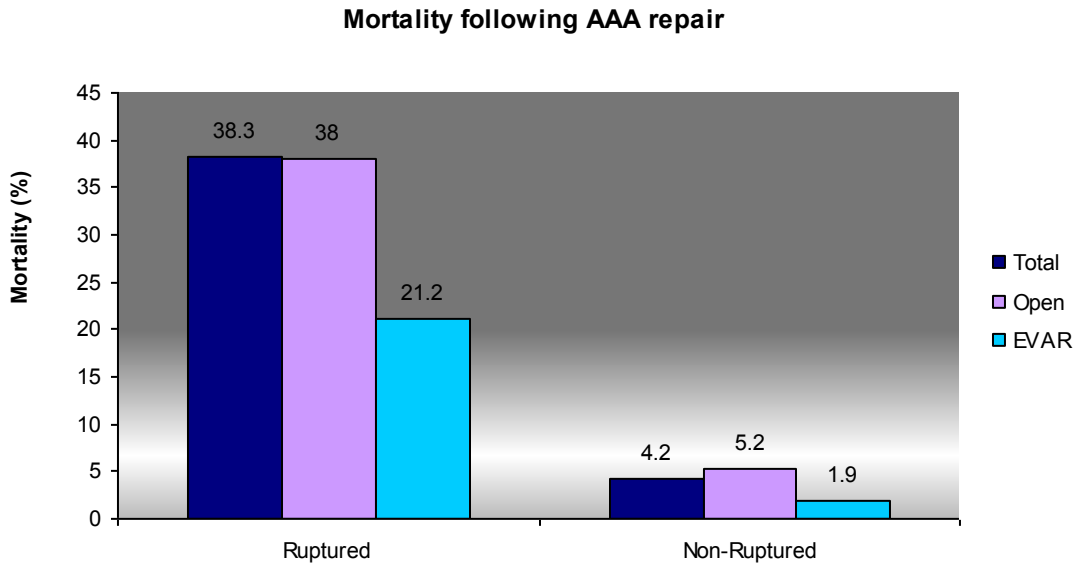


9.8 Outcomes

9.8.1 Mortality

Figure 16 shows the mortality rates following abdominal aortic aneurysm repair for ruptured and non- ruptured aneurysms. The total mortality is higher than either that for open or endovascular repair, and this reflects the fact that data for the type of repair performed was missing in many cases, as discussed above.

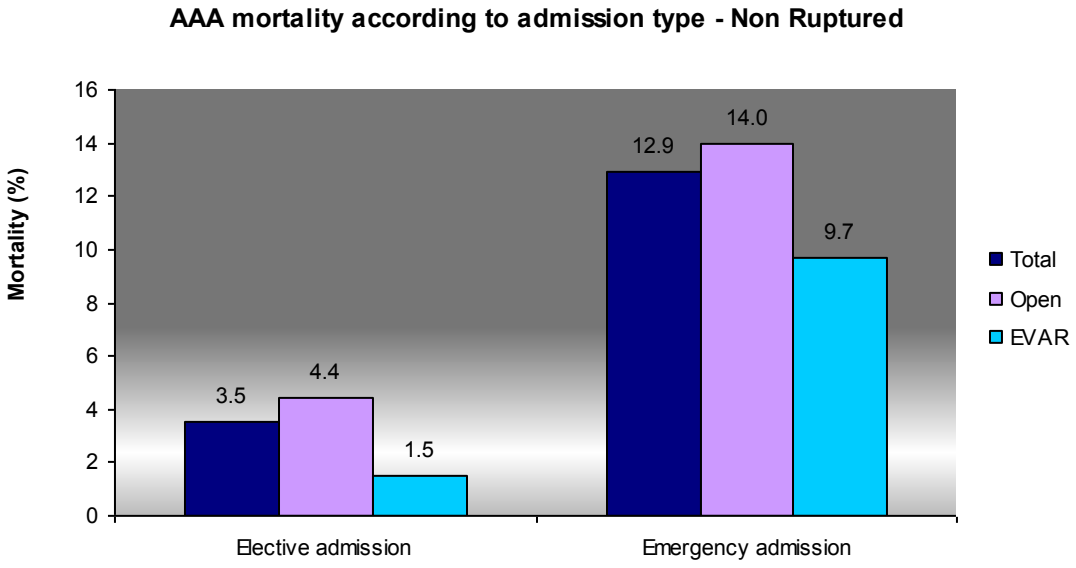
Figure 16. Mortality for open and endovascular repair



The data is normally distributed. Using a Chi squared test the mortality rate for endovascular repair for non-ruptured aneurysms was significantly lower when repaired by EVAR compared to open repair ($p<0.0001$). Similarly for ruptured aneurysms the mortality rate was significantly lower when repaired by EVAR compared to open repair with EVAR than with open repair ($p<0.01$).

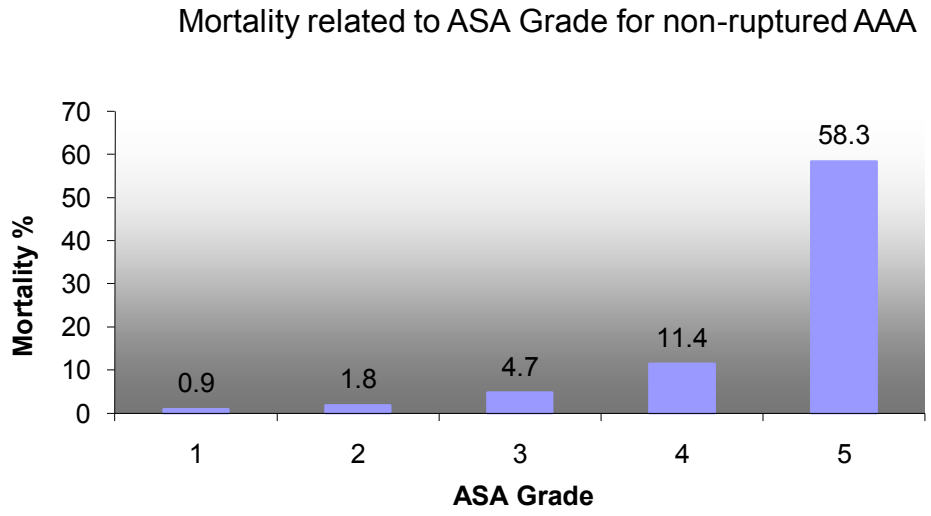
Within the database the type of admission is separated out into three categories, elective, unplanned and emergency. There were few unplanned admissions and therefore analysis was done for the two groups elective and emergency admission. The mortality rates for these 2 groups in patients with **non-ruptured** aneurysms are shown in figure 17. This demonstrates a signficantly higher mortality in patients who are admitted as an emergency and undergo surgery, even when the aneurysm is found not to have ruptured.

Figure 17. Mortality in AAA patients according to admission type



Mortality rates for each different ASA grade are shown in figure 18. It is perhaps surprising to find patients with an ASA grade of 5 in non-ruptured aneurysms raising the question as to whether these patients were classified correctly. However it may also be that these were patients who were admitted in a moribund state and were assumed to have ruptured their aneurysm, but were found to have an intact aneurysm at surgery.

Figure 18



The mortality related to blood loss for both non-ruptured and ruptured AAA is shown in figures 19 and 20. The blood loss is grouped into bands but following the addition of the questions agreed by the Vascular Anaesthetic Society of Great Britain and Ireland this will be collected as an actual figure in future. It can be seen, as perhaps might be expected, the mortality rate rises considerably in both the non-ruptured and the ruptured aneurysms with increasing blood loss.

Figure 19

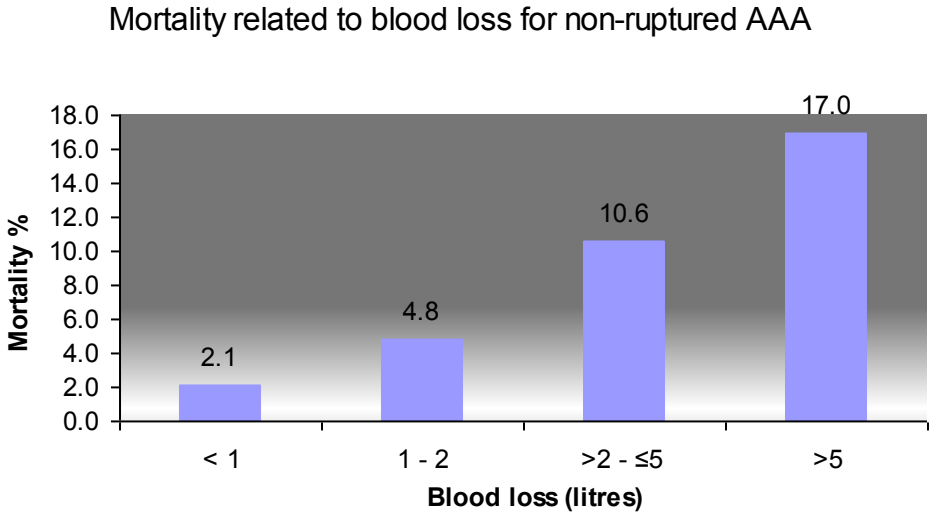
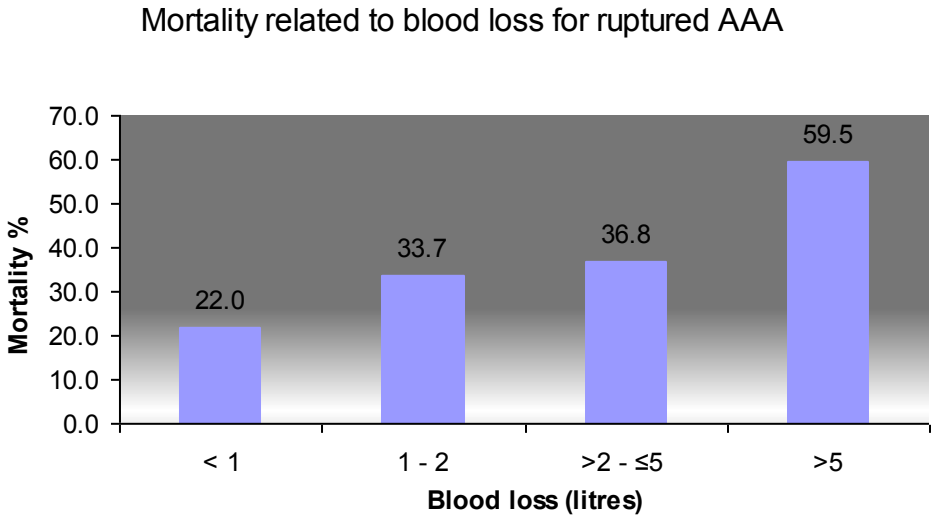
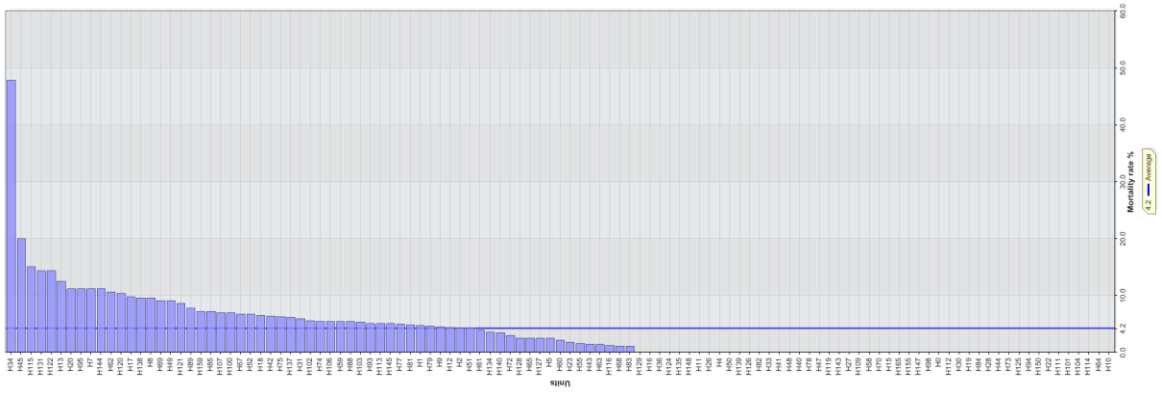


Figure 20



An example of a mortality bar chart for abdominal aortic aneurysm reporting by centre is shown in figure 21.

Figure 21 Mortality bar chart for AAA surgery by centre



In addition to the mortality bar graphs produced on the online system it is possible to obtain funnel plots of mortality, and examples of these are shown below for AAA repair. It can be seen that the bulk of the data points are compressed to the left hand side of the graph due to the large number of cases submitted by one centre. There is now also the facility to report by surgeon as well as by centre and this will be an important tool for vascular surgeons for the purposes of recertification in the future.

Figure 22. Funnel plot of mortality by centre for non-ruptured AAA repaired by both endovascular and open surgery

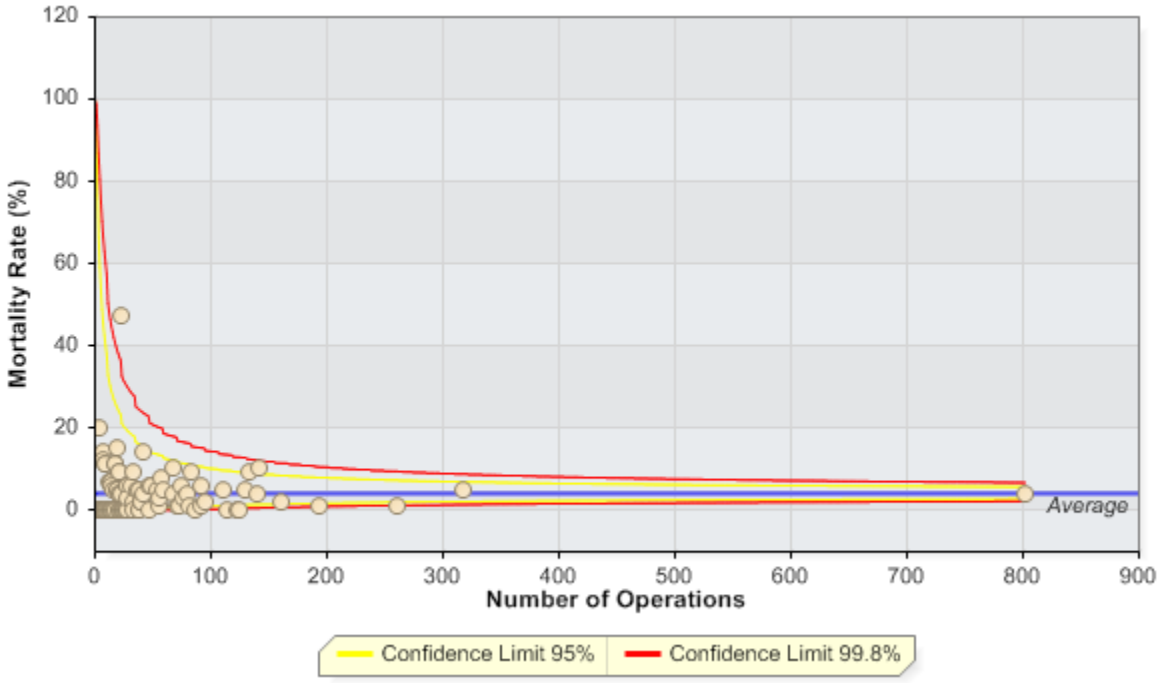


Figure 23. Funnel plot by GMC number for non-ruptured AAA repaired by both endovascular and open surgery

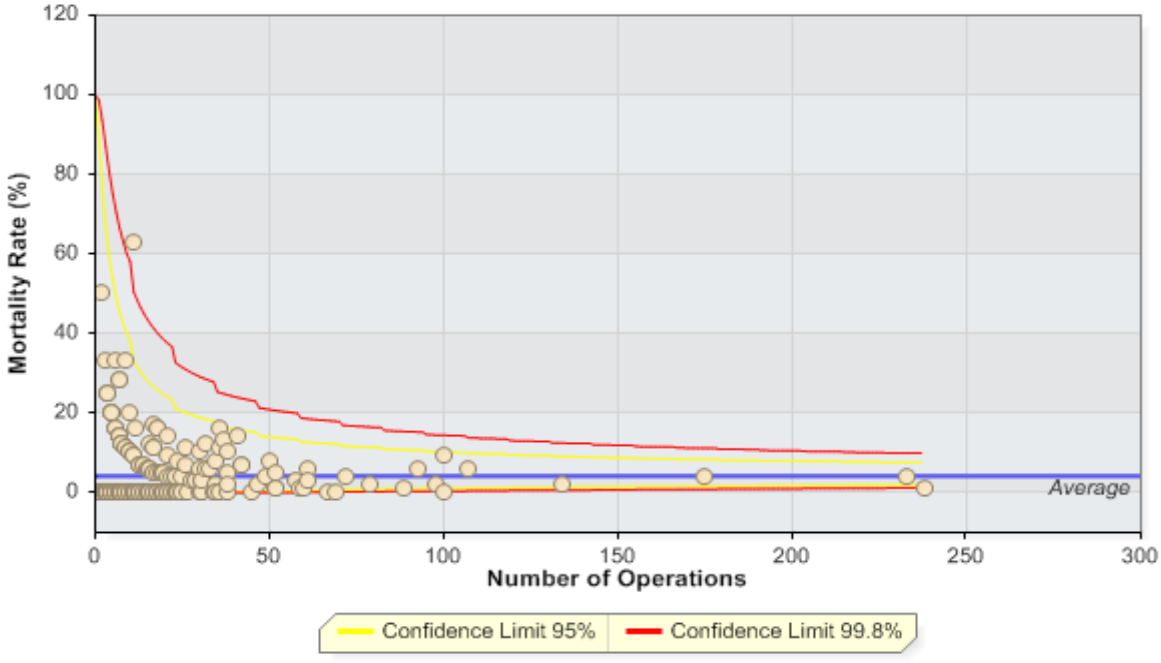


Figure 24. Funnel plot of mortality by centre for non-ruptured AAA repaired by open surgery

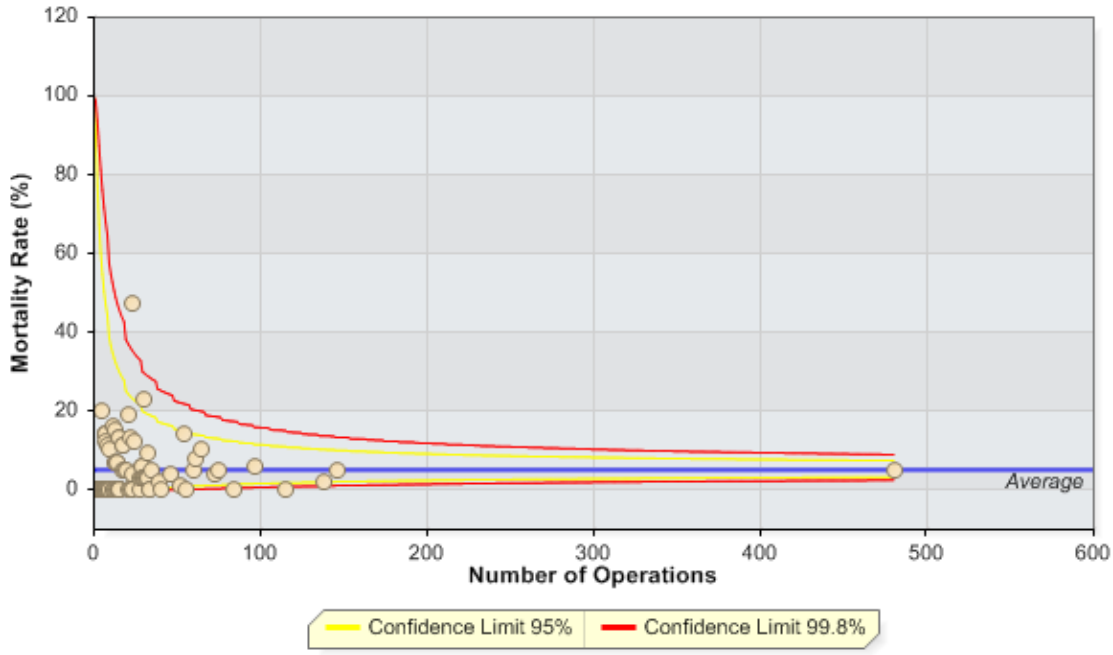
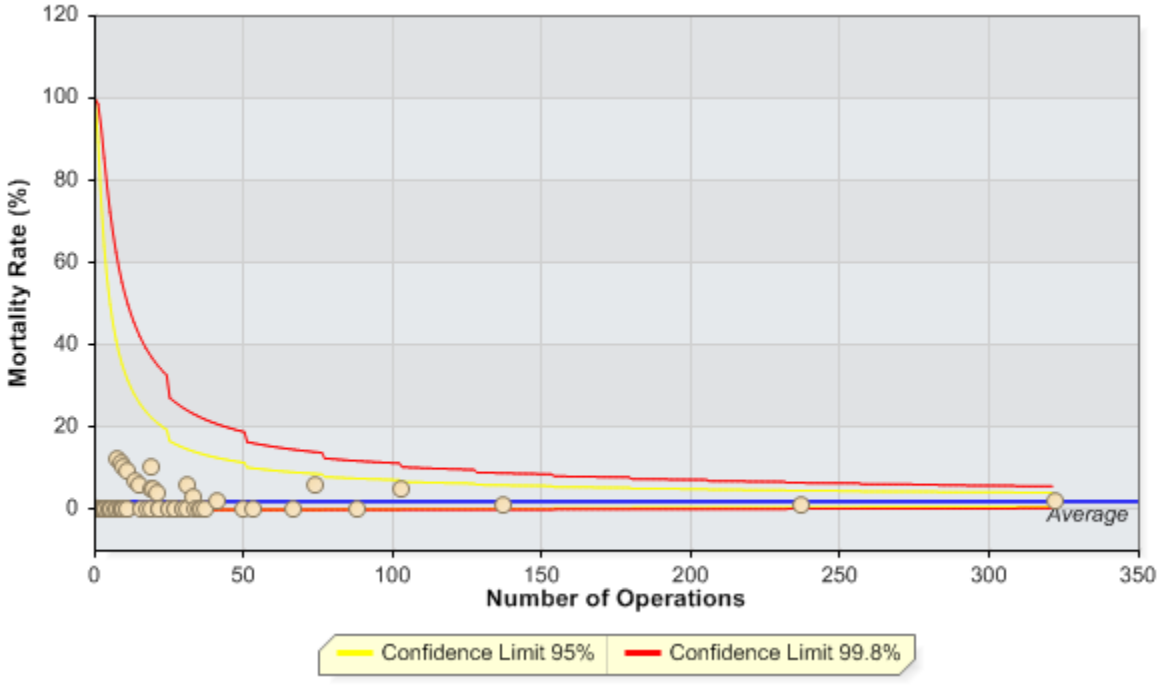


Figure 25. Funnel plot of mortality by centre for non-ruptured AAA repaired by EVAR



9.9 Complications of Aneurysm Repair

Table 6 lists the complications of aortic aneurysm surgery. The figures are given for all cases in which a response was entered and the percentages calculated as a percentage of all responses. Due to missing data in terms of both the recording of all complications and also whether or not the aneurysm was ruptured or not the sum of the data for the separated ruptured and non-ruptured aneurysms does not necessarily add up to the total figure.

Table 6. Complications of AAA repair

COMPLICATION		OVERALL	%	NON-RUPTURED	%	RUPTURED	%
Any complication	Yes	2546	35.8	1593	29.5	808	65.1
	No	4560	64.2	3814	70.5	433	34.9
Limb ischaemia	Intervention	135	4.1	80	3.5	47	5.4
	Amputation	26	0.8	11	0.5	12	1.4
	No	3114	95.1	2178	96.0	810	93.2
Graft/anastomotic	Yes	190	5.6				
	No	3199	94.4				
Haemorrhage (major)	Yes	218	6.4	114	4.8	836	37.6
	No	3214	93.6	2250	95.2	1387	62.4
Infection	Chest	698	37.4	446	36.8	231	43.3
	PUO	50	2.7	36	3.0	13	2.4
	Wound	75	4.0	57	4.7	10	1.9
	Intraabdominal	18	1.0	14	1.2	3	0.6
	Septicaemia	23	1.2	17	1.4	3	0.6
	Graft	11	0.6	10	0.8	2	0.4
	No	990	53.1	631	52.1	271	50.8
Became +ve MRSA	Yes	57	2.0	29	1.5	22	2.9
	No	2760	98.0	1897	98.5	732	97.1
MRSA bacteraemia	Yes	16	0.6	7	0.4	6	0.8
	No	2795	99.4	1914	99.6	749	99.2
C Diff diarrhoea	Yes	44	1.6	31	1.6	10	1.3
	No	2775	98.4	1896	98.4	746	98.7
Wound dehiscence	Superficial	62	2.0				
	Deep	35	1.1				
	No	2950	96.8				

MI	Yes	351	9.9	184	7.5	150	15.9
	No	3210	90.1	2284	92.5	795	84.1
Cardiac failure	Yes	294	9.2	122	5.5	152	17.8
	No	2889	90.8	2077	94.5	704	82.2
Impaired renal function	Yes	596	16.9	274	11.2	291	31.0
	No	2937	83.1	2172	88.8	649	69.0
Dialysis/haemofiltration	Yes	297	9.1	137	6.0	148	17.4
	No	2971	90.9	2142	94.0	702	82.6
Resp failure	Yes	469	14.3	192	8.4	250	29.1
	No	2821	85.7	2099	91.6	610	70.9
Ischaemic bowel	Yes	121	3.6	55	2.4	56	6.1
	No	3268	96.4	2282	97.6	856	93.9

9.10 AAA Repair: Creatinine

Table 7

DISCHARGE STATUS	n	MEAN CREATININE (µmol/L)	S.D.	MEDIAN CREATININE (µmol/L)
Ruptured Alive*	674	132.3	68.2	120
Ruptured Dead*	374	146.4	65.0	134
Nonruptured Alive^{+}	5322	106.5	39.8	99
Nonruptured Dead^{+}	210	127.2	51.4	115

(*$p < 0.0001$, Mann-Whitney U test) ($^{+}p < 0.0001$, Mann-Whitney U test)

9.11 AAA Repair: Albumin

Table 8

DISCHARGE STATUS	n	MEAN ALBUMIN (g/L)	S.D.	MEDIAN ALBUMIN (g/L)
Ruptured Alive*	369	34.2	7.4	35
Ruptured Dead*	215	32.2	10.0	34
Nonruptured Alive+	2955	39.5	6.2	40
Nonruptured Dead+	114	37.3	8.2	40

(*$p < 0.01$, Mann-Whitney U test) (+$p < 0.01$, Mann-Whitney U test)

There was a significantly higher creatinine and a significantly lower albumin in patients who died following aortic aneurysm surgery compared to those who survived. This was the case for both ruptured and non-ruptured aneurysms.

10 INFRAINGUINAL BYPASS SURGERY

10.1 Introduction

Infrainguinal bypass (IIB) is one the main tracker operations reported in the database. Unfortunately no data is currently recorded regarding graft patency rates or the number of patients who require secondary procedures including amputations.

Table 9. IIB Procedures performed divided according to OPCS codes (2899 cases)

Code	Number of cases	Description
L16.1	3	Emergency aortic bypass by anastomosis axillary to femoral artery
L16.2	16	Axillo-bifemoral bypass graft
L20.6	2	Emerg bypass bifurc aorta by anastom aorta to iliac
L21.6	3	Bypass bifurcation aorta by anastomosis aorta to iliac artery
L50.3	3	Emerg bypass leg artery by aorta/com fem art anastomosis NEC
L51.1	1	Bypass common iliac artery by anastomosis or aorta to common iliac artery
L51.2	2	Bypass iliac artery by anastomosis aorta to external iliac artery
L51.3	9	Bypass leg artery by aorta/com femoral art anastomosis NEC
L56.5	0	Emergency replacement of aneurysmal femoral artery by anastomosis of femoral artery to tibial artery using vein graft
L57.2	2	Replacement of aneurysmal segment of femoral artery by anastomosis of femoral artery to popliteal artery using prosthesis nec
L57.3	0	Replacement of aneurysmal segment of femoral artery by anastomosis of femoral artery to popliteal artery using vein graft nec
L58.2	80	Other emergency bypass of femoral artery, Emergency bypass of femoral artery by anastomosis of femoral artery to popliteal artery NEC
L58.3	127	Other emergency bypass of femoral artery, Emergency bypass of femoral artery by anastomosis of femoral artery to popliteal artery using vein graft nec
L58.4	18	Other emergency bypass of femoral artery, Emergency bypass of femoral artery by anastomosis of femoral artery to tibial artery using prosthesis nec
L58.5	58	Other emergency bypass of femoral artery, Emergency bypass of femoral artery by anastomosis of femoral artery to tibial artery using vein graft nec
L58.6	13	Other emergency bypass of femoral artery, Emergency bypass of femoral artery by anastomosis of femoral artery to peroneal artery using prosthesis nec
L58.7	20	Other emergency bypass of femoral artery, Emergency bypass of femoral artery by anastomosis of femoral artery to peroneal artery using vein graft nec
L59.2	531	Other bypass of femoral artery, Bypass of femoral artery by anastomosis of femoral artery to popliteal artery using prosthesis nec
L59.3	1291	Other bypass of femoral artery, Bypass of femoral artery by anastomosis of femoral artery to popliteal artery using vein graft nec
L59.4	100	Other bypass of femoral artery, Bypass of femoral artery by anastomosis of femoral artery to tibial artery using prosthesis nec
L59.5	369	Other bypass of femoral artery, Bypass of femoral artery by anastomosis of femoral artery to tibial artery using vein graft nec
L59.6	34	Other bypass of femoral artery, Bypass of femoral artery by anastomosis of femoral artery to peroneal artery using prosthesis nec
L59.7	94	Other bypass of femoral artery, Bypass of femoral artery by anastomosis of femoral artery to peroneal artery using vein graft nec
L60.1	32	Endarterectomy patch repair femoral artery

L60.2	8	Endarterectomy femoral artery NEC
L60.3	4	Profundaplasty patch repair femoral artery
L60.4	1	Profundaplasty femoral art NEC
L65.3	61	Revision of reconstruction of femoral artery
L65.8	17	Revision of reconstruction of popliteal artery

10.2 Indications for surgery

Possible indications allowed are:

1. Claudication
2. Non healing mixed ulcer
3. Rest pain
4. Rest pain & gangrene
5. Aneurysm
6. Other

More than a single indication can be entered into the NVD; for example claudication, non healing mixed ulcer and rest pain. For the purpose of this analysis claudication alone was compared to "critical ischemia" consisting of non-healing ulcer, rest pain or gangrene, and aneurysm or any other indication in isolation. 2766 records contained useable codes for indications.

Table 10. Indications for IIB surgery

Clinical Status	*Number*	*%*
Claudication	627	22.7
Critical ischaemia	1819	65.8
Aneurysm/other	320	11.6

10.3 Length of stay

2591 records contained accurate data for admission and discharge dates allowing length of stay to be calculated. 18 patients did not have an admission type coded.

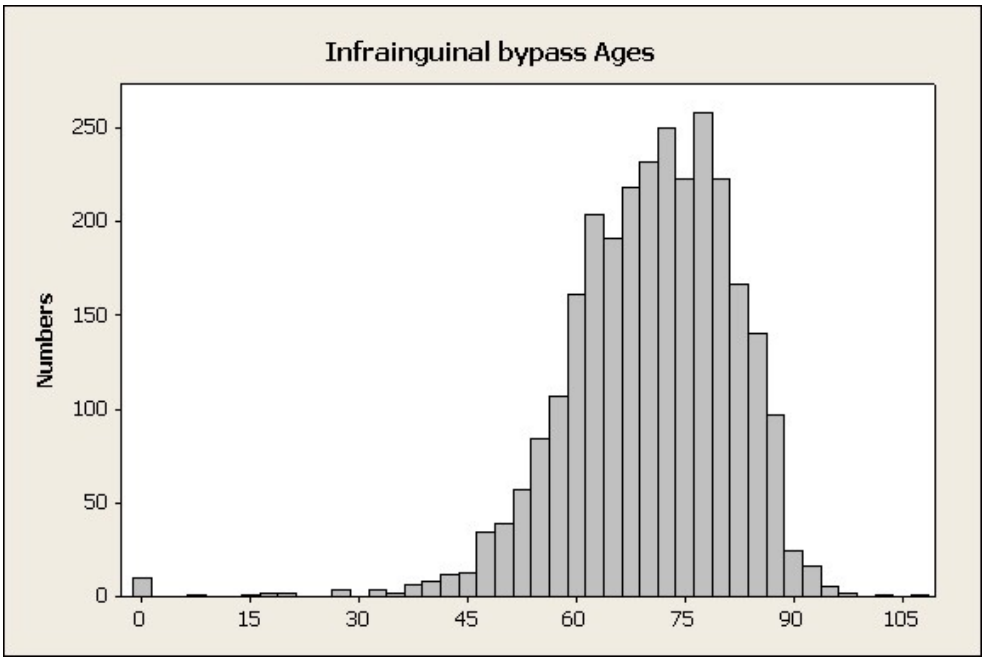
Table 11. Length of stay grouped according to admission status

Category	*Number*	*Mean Stay (Days)*	*S.D.*	*Median*
Overall	2591	20.7	29.8	11
Elective	1596	14.4	26.0	8
Unplanned	231	32.0	43.8	20
Emergency	746	30.6	28.3	22

10.4 Age and IIB

Up to 31st December 2008 there were 2899 patients in the database who had undergone IIB, including 99 "missing" records where date of operation was not recorded. As a result age at operation could not be calculated in these patients. It is to be noted that a small number of patients had dates of birth entered which made them have minus ages which defaulted to zero when analysed. A recurring theme when analysing the data was the number of fields which have been left blank or incorrectly filled in. All date analyses which returned negative ages were discarded! There were a small number where age calculated to zero because date of operation and date of birth were entered as the same date! There were a small number of IIBs performed on children and young adults– as would be expected in such a large database.

Figure 26. Ages of IIB patients



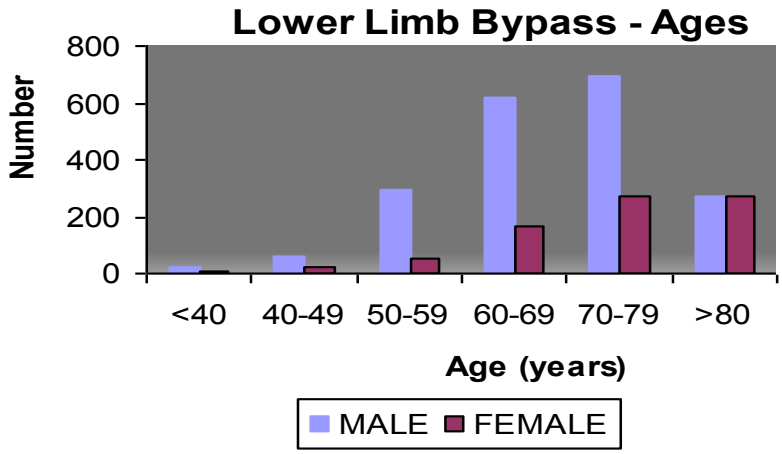
10.4.1 Age at time of surgery and gender

Table 12

Age Group	*<40*	*40-49*	*50-59*	*60-69*	*70-79*	*>80*
Male	25	57	295	622	691	273
Female	11	22	54	167	273	274
Total	36	79	349	789	964	547

It is interesting that at ages up to 80 males are preponderant. After 80 numbers of males and females are approximately equal.

Figure 27



10.5 Type of admission

Table 13

Mode of admission	*Number*	*Mean Age (years)*	*Median Age (years)*	*S.D.*
Elective	1744	64.8	69.4	25.8
Unplanned	265	72.1	81.0	13.5
Emergency	860	67.1	79.7	25.8
Not recorded	30	70.5	74.0	15.5

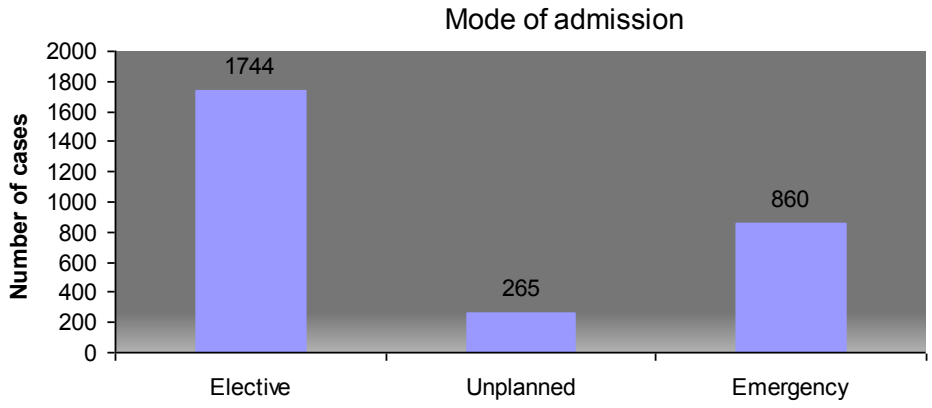
The NVD records IIB admissions as elective, emergency and unplanned. Unfortunately we suspect that the definitions may be loosely applied with confusion as to exactly what constitutes "unplanned". It may be appropriate to consider differentiating between only 2 modes of admission in the future- emergency and elective. Only 60.8% of admissions who underwent IIB were elective, 39.2% were unplanned or emergency admissions. This needs to be kept in mind when planning the provision of vascular services, emergency operating provisions and on-call arrangements for the future.

10.5.1 Mode of admission

Table 14

Mode of Admission	*Number*
Elective	1744
Unplanned	265
Emergency	860
Not recorded	30

Figure 28



10.6 Mortality

In the database there were 119 deaths recorded in 2899 analysable records = 4.28%.

10.6.1 Mortality by age

Table 15

Age group	*<40*	*40-49*	*50-59*	*60-69*	*70-79*	*>80*
Number	36	79	349	789	964	547
Deaths	4	3	9	26	40	37
%	11.1	2.9	2.1	2.5	3.3	4.9

There is a surprisingly high mortality in younger patients. However, the numbers are low and cause of death was not given in 2 of these 4 deaths. Such small numbers should probably not be over interpreted. Some of these cases may have required IIB for reasons other than atherosclerotic occlusions, such as trauma.

10.6.2 Deaths by admission mode

Table 16

Mode of admission	*Number*	*Deaths*	*%*
Elective	1744	40	2.3
Unplanned	265	17	6.4
Emergency	860	61	7.1
Not recorded	30	1	3.3

Not surprisingly mortality rates are significantly higher in emergency and unplanned admissions (Chi Square, $p<0.0001$)

10.6.3 Deaths by diagnosis of diabetes

Table 17

Status	*(n)*	*Deaths*	*%*
Diabetes	709	35	4.9
Not diabetic	1539	56	3.6
Not recorded	651	28	7.1

The differences in mortality between diabetics and non-diabetics was not statistically significant (Chi square test, $p=0.18$).

10.7 Age by Diabetes

Table 18

Status	*Number*	*Mean Age*	*Median Age*
Diabetic	**687**	**67.6**	**69.0**
Not diabetic	**1473**	**70.5**	**71.5**
Not recorded	**639**	**69.7**	**71.1**

It might be expected that diabetics would tend to be younger, however these differences were not statistically significant ($p>0.05$, T-test).

10.8 Preoperative Medications (2899 records)

Table 19

Drug	*Beta-Blocker n*	*%*	*Antiplatelet (n)*	*%*	*Statin (n)*	*%*
On drug	385	22.3%	1740	79.9%	1172	68.0%
Not on drug	1342	77.7%	438	20.1%	721	32.0%
Not recorded	1172	N/A	601	N/A	1019	N/A

The majority of patients were on an antiplatelet agent and a statin. This is encouraging as these have been shown to reduce adverse cardiovascular events.

10.9 Grade of most senior surgeon and anaesthetist

Table 20

Grade	*Surgeon*	*Anaesthetist*
Consultant	2590	1777
Staff grade	14	83
Registrar	128	193
Not recorded	167	846

Figure 29

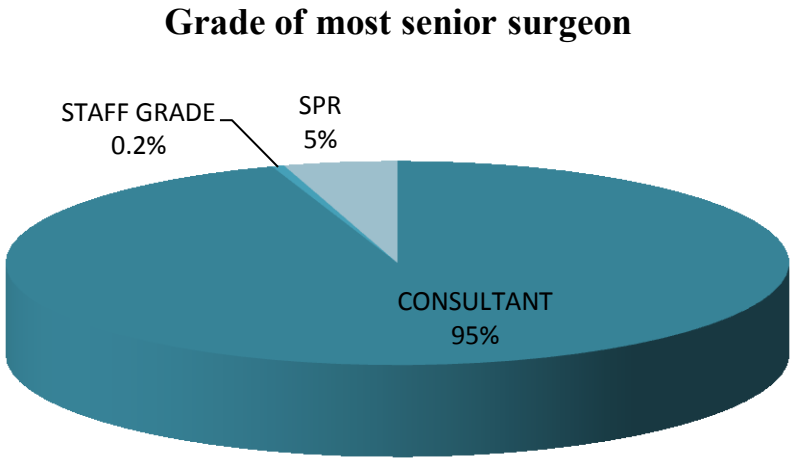
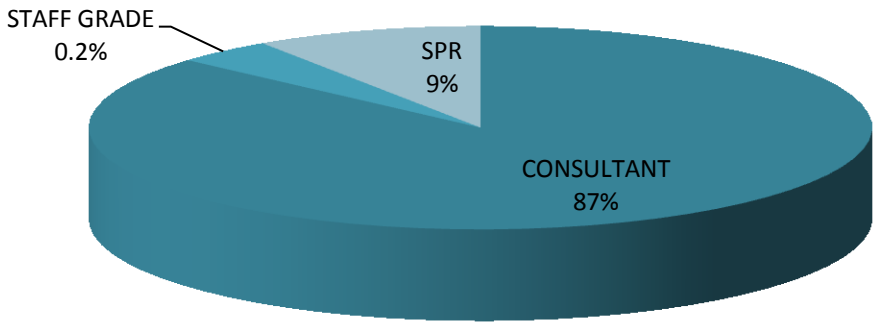


Figure 30



10.10 Type of Graft

In 721 (17.4%) cases the type of graft used was prosthetic, in 3284 (79.3%) autologous, and in 138 (3.3%) biological.

10.11 Comorbidities (of 2899)

Table 21

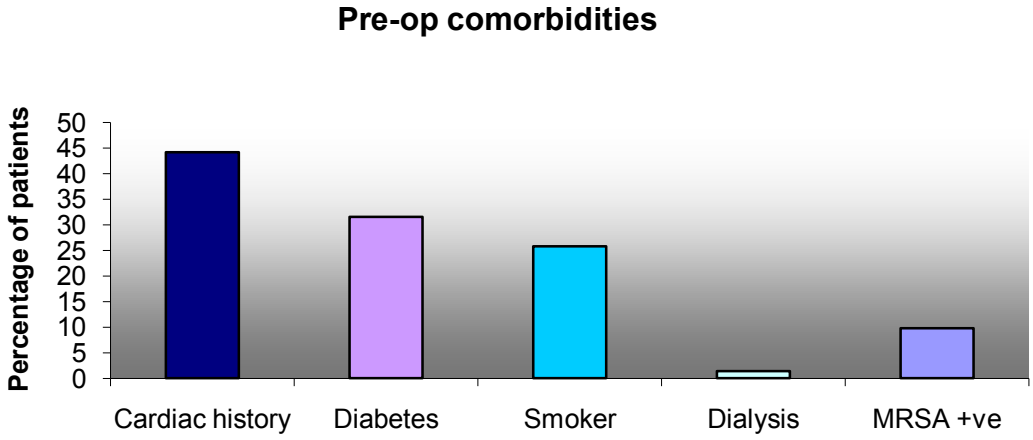
Status	*Cardiac history (any IHD or CCF)*	*Diabetes*	*Smoker (Current or within 3 months)*
Yes	983	709	535
No	1241	1539	1059
Blank	675	651	1305

Table 22

MRSA (within 3/12)	*Number*
Positive swab	108
Negative	991
Not done	285
Blank	1515
Total records	2899

In addition in 6 of 1842 records where the field was recorded patients were on dialysis and 9 of 1835 had had a renal transplant.

Figure 31. Pre-operative comorbidities in Infrainguinal bypass patients



10.12 Infrainguinal bypass : Creatinine

Table 23

Admission Mode	*n*	*Mean Creatinine(µmol/L)*	*S.D.*	*Median Creatinine(µmol/L)*
All	2652	102.9	56.2	93
Elective	1603	100	48.3	92
Unplanned	239	108.41	59.3	94
Emergency	794	106.8	68.72	92

10.12.1 Creatinine Died vs Survived Patients

Table 24

Admission Mode	*n*	*Mean Creatinine(µmol/L)*	*S.D.*	*Median Creatinine(µmol/L)*
Alive	2441	102.3	55.1	92
Dead	107	122.5	88.6	102

($p < 0.01$, Mann-Whitney U test)

Creatinine at admission was higher in emergency and unplanned admissions than elective cases. When analysed for those that survived or died after surgery there was a statistically significant difference. Whilst not surprising this confirms that poor renal function is a marker for increased risk.

10.13 Infrainguinal bypass : Albumin

Table 25

Admission Mode	*n*	*Mean Albumin(g/L)*	*S.D.*	*Median Albumin(g/L)*
All	1248	34.9	38	38
Elective	705	37.4	40	40
Unplanned	145	31.1	34	34
Emergency	344	32.0	35	35

10.13.1 Albumin Died vs Survived Patients

Table 26

Admission Mode	*n*	*Mean Albumin(g/L)*	*S.D.*	*Median Albumin(g/L)*
Alive	1196	35.1	11.1	38
Dead	52	29.5	12.6	31

($p < 0.0001$, Mann-Whitney U test)

Unsurprisingly albumin was lower in unplanned and emergency admissions than in elective cases. When analysed for those that survived versus those that died this difference was significant.

10.14 Complications of IIB

10.14.1 C.Difficile

Table 27

C.dif status	*All*	*Elective*	*Unplanned*	*Elective*
Positive	16	2	7	11
Negative	1548	973	169	390
Not recorded	1335	769	85	459
Total	2899	1744	265	860

Only a small number of cases of C.difficile in IIB patients are recorded in the NVD. This is encouraging, although there are a large number of cases in which this field has not been filled out.

10.14.2 Other complications

Table 28

Complication	*Overall (%)*	*Elective (%)*	*Unplanned (%*	*Emergency*
MI Yes	98 (5.4%)	34 (3.1%)	18* (9.1%)	46 * (8.8%)
MI No	1735 (94.6%)	1070 (96.9%)	180 (90.9%)	475 (91.2%)
Cardiac Failure Yes	59 (3.5%)	21 (2.0%)	12 * (6.7%)	26 * (5.8%)
Cardiac Failure No	1616 (96.5%)	1020 (98.0%)	167 (93.3%)	419 (94.2%)
Dialysis/HF Yes	20 (1.3%)	6 (0.6%)	5 # (4.0%)	9 # (2.1%)
Dialysis/HF No	1486 (98.7%)	949 (99.4%)	121 (96.0%)	414 (97.9%)
Became MRSA	54	19	12 *	23*

Yes	(3.5%)	(2.0%)	(6.8%)	(5.8%)
Became MRSA	1505	954	165	376
No	(96.5%)	(98.0%)	(93.2%)	(94.2%)
MRSA	28	14	7	6
Bacteraemia	(2.4%)	(1.4%)	(4.0%)	(1.5%)
Yes				
MRSA	1531	958	169	395
Bacteraemia No	(97.6%)	(98.6%)	(96.0%)	(98.5%)

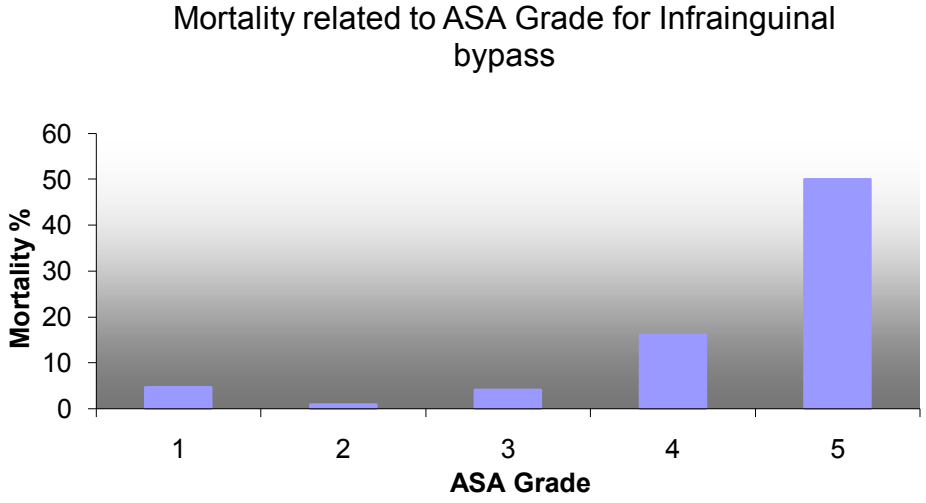
(* = p<0.001, # = p<0.05, versus Elective. Chi square test with Yates' correction).

10.15 ASA Grade

Table 29

Grade	*N*	*deaths*	*%*
5	2	1	50.0
4	87	14	16.1
3	882	36	4.1
2	570	4	0.9
1	30	2	4.7
No ASA	1333	62	4.1
Totals	3727	137	

Figure 32



11 AMPUTATION SURGERY

It is only relatively recently that amputation has been included as an index procedure and the numbers are currently still small compared to the other index procedures. Up to the 31st December 2008 there were 1777 cases on the NVD. The distribution of these cases according to OPCS code and type of amputation is shown below.

11.1 Coding

Table 30. Numbers of amputations divided according to OPCS codes

Opcs Code	Number of cases	Procedure
X07.1	1	Amputation of arm, Forequarter amputation
X07.2	0	Amputation of arm, Disarticulation of Shoulder
X07.3	0	Amputation of arm, Amputation of arm above elbow
X07.4	0	Amputation of arm, Amputation of arm through elbow
X07.5	3	Amputation of arm, Amputation of arm through forearm
X07.8	0	Amputation of arm, Other specified
X07.9	0	Amputation of arm, Unspecified
X08.1	0	Amputation of hand, Amputation of hand at wrist
X08.2	0	Amputation of hand, Amputation of thumb
X08.3	0	Amputation of hand, Amputation of phalanx of finger
X08.4	0	Amputation of hand, Amputation of finger nec
X08.8	0	Amputation of hand, Other specified
X08.9	0	Amputation of hand, Unspecified
X09.1	3	Amputation of leg, Hindquarter amputation
X09.2	3	Amputation of leg, Disarticulation of hip
X09.3	784	Amputation of leg, Amputation of leg above knee
X09.4	81	Amputation of leg, Amputation of leg through knee
X09.5	792	Amputation of leg, Amputation of leg below knee
X09.8	7	Amputation of leg, Other specified
X09.9	14	Amputation of leg, Unspecified
X10.1	0	Amputation of foot, Amputation of foot through ankle
X10.2	0	Amputation of foot, Disarticulation of tarsal bones
X10.3	3	Amputation of foot, Disarticulation of metatarsal bones
X10.4	12	Amputation of foot, Amputation through metatarsal bones
X10.8	0	Amputation of foot, Other specified
X10.9	0	Amputation of foot, Unspecified
X11.1	19	Amputation of toe, Amputation of great toe

X11.2	11	Amputation of toe, Amputation of phalanx of toe
X11.8	25	Amputation of toe, Other specified
X11.9	19	Amputation of toe, Unspecified

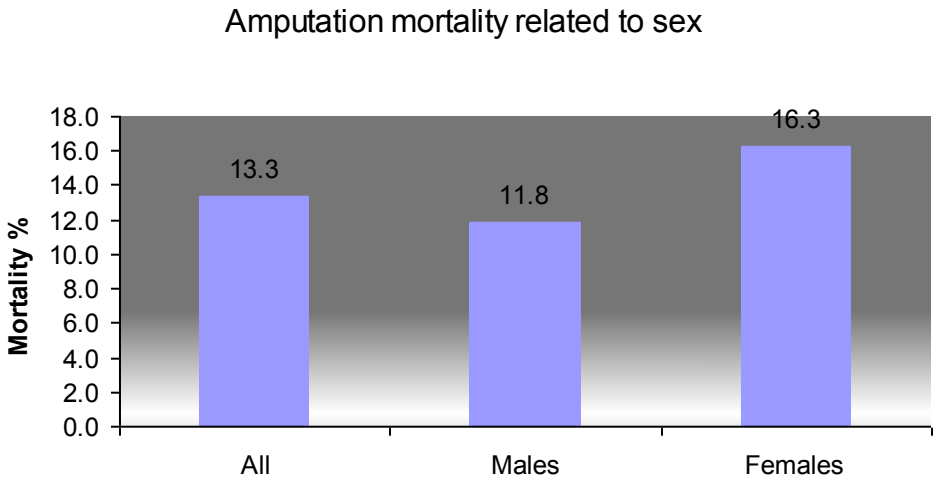
Of note is that the ratio of below knee to above knee amputations is almost 1. Historically it was considered that approximately twice as many below knee as above knee amputations should be performed. This change in practice needs further examination but may reflect the increasingly elderly population treated and perhaps more amputations are being done in sicker patients who lack the capacity to walk with an artificial limb.

11.2 Sex distribution of amputation patients

Of the 1777 patients undergoing amputation 1218 were male and 559 were female giving a male to female ratio of just over 2. The mortality rate in amputation patients separated according to sex is shown in figure 33.

11.2.1 Mortality related to sex

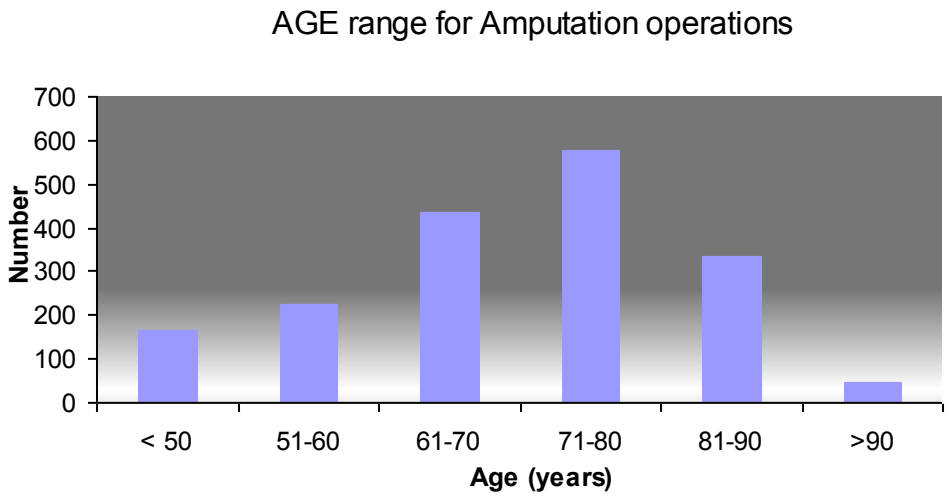
Figure 33



11.3 Age of patients undergoing amputation

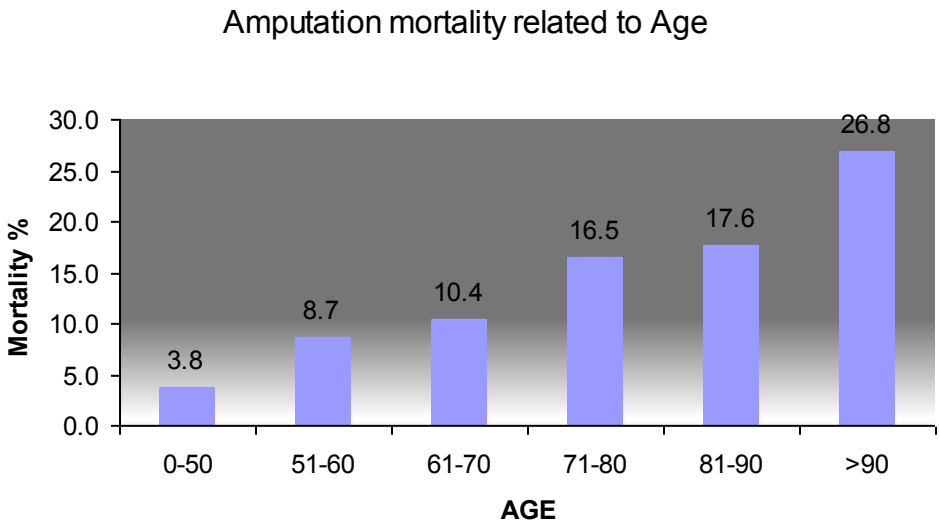
The ages of patients undergoing amputation is shown in figure 34 and the mortality rates related to age in figure 35.

Figure 34



11.3.1 Mortality related to age

Figure 35

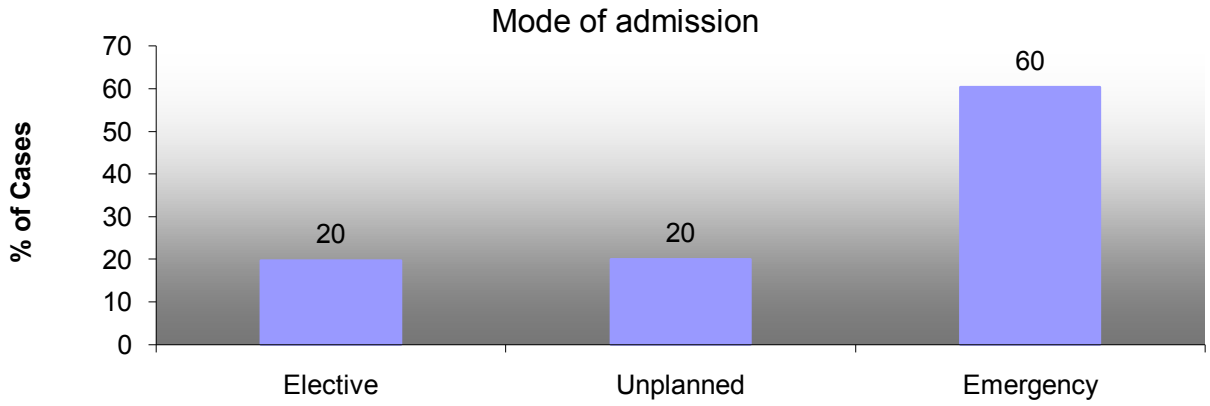


Amputation is therefore associated with a high mortality, in particular in patients over the age of 70. There is a need to improve this and the VSGBI is currently embarking on a quality improvement framework for amputations in a similar process to that already started for aortic aneurysm surgery.

11.4 Mode of admission

The mode of admission and type of surgery for patients undergoing amputation is shown below. Eighty per cent of patients are admitted as unplanned or emergency admissions, reflecting the high emergency workload in vascular surgery.

Figure 36



11.5 Surgery

Figure 37

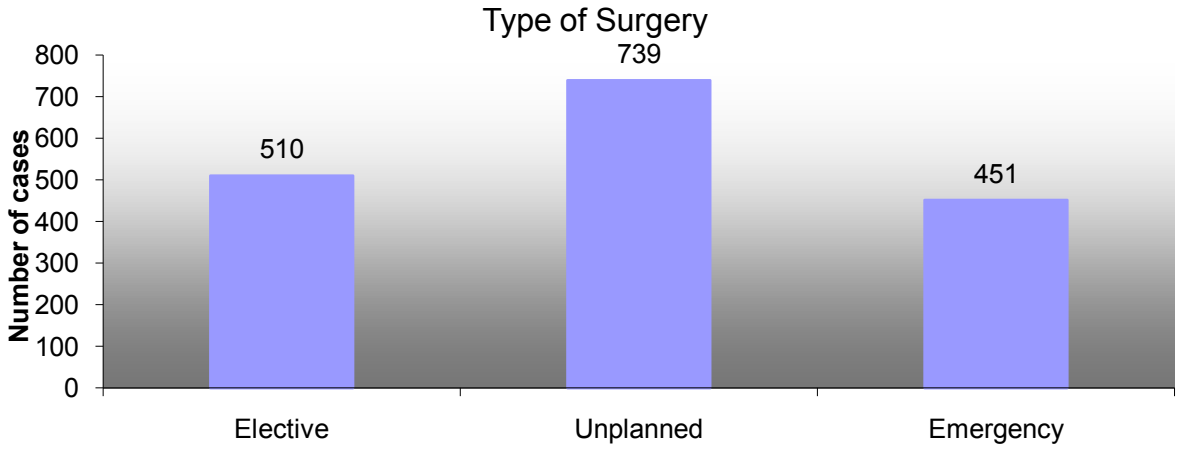


Figure 38 shows the grade of surgeon in relation to amputation surgery. This is perhaps a surprising finding in that consultants are the senior surgeon in theatre for 57% of operations, but this reflects a changing practice in which the service is increasingly delivered by consultants. The figures for anaesthetists are very similar to those for consultants.

Figure 38

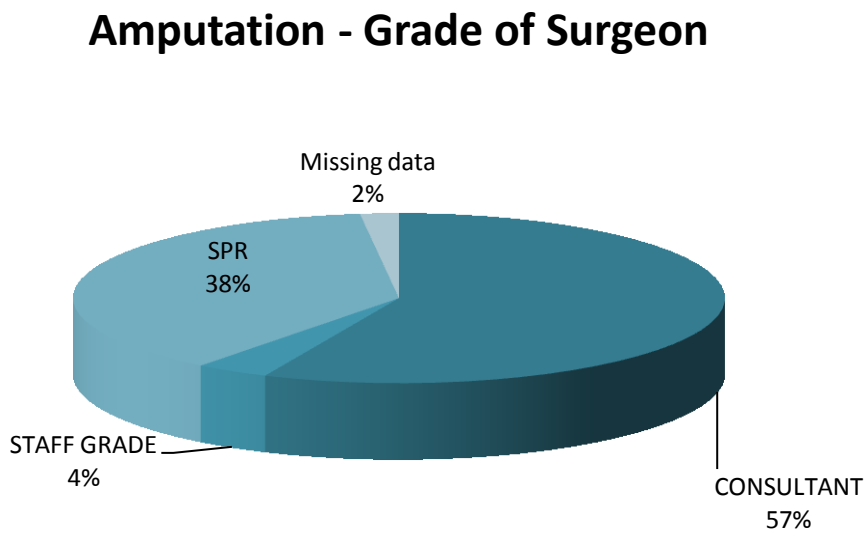
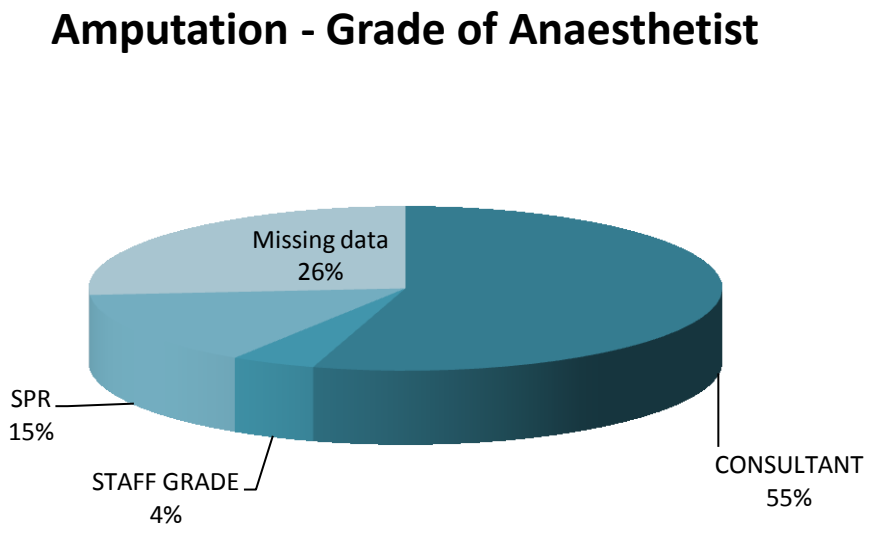


Figure 39

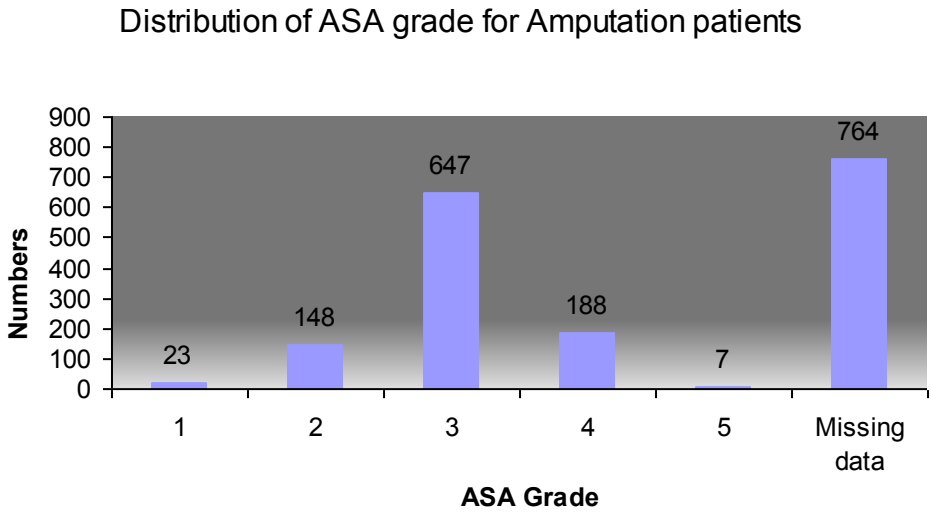


192 amputation operations were recorded as having been done out of hours. Of these patients for surgeons 61% were done by consultants, 5% by staff grades and 34% by trainees. For anaesthetists 51% were done by consultants, 15% by staff grades and 34% by trainees.

The distribution of ASA grades in amputation patients is shown in figure 40 along with the mortality rates in each ASA category in figure 41.

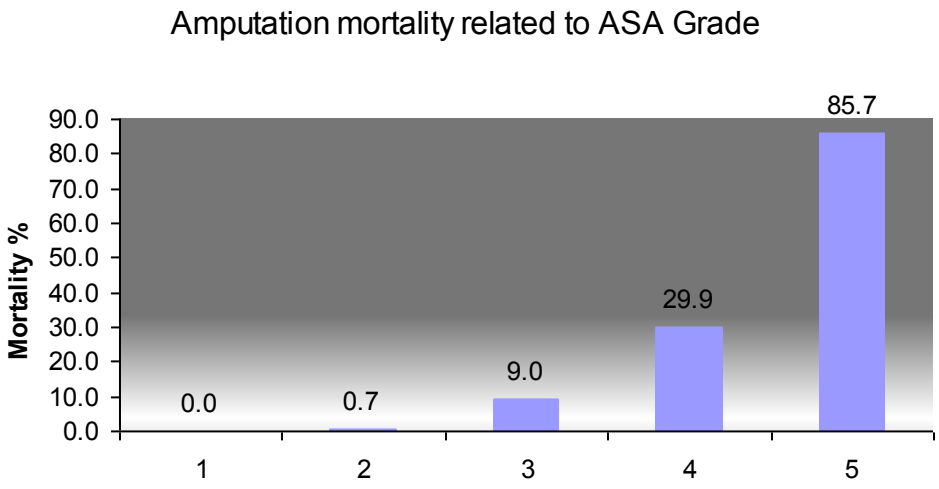
11.6 ASA Grade

Figure 40



11.6.1 Mortality related to ASA grade

Figure 41



The comorbidities of patients undergoing amputation are shown in figure 42 and table 31. The percentages in figure 42 are calculated as a percentage of the total where a response was recorded. Table 31 gives the figures for all responses including missing data.

11.7 Comorbidities

Figure 42

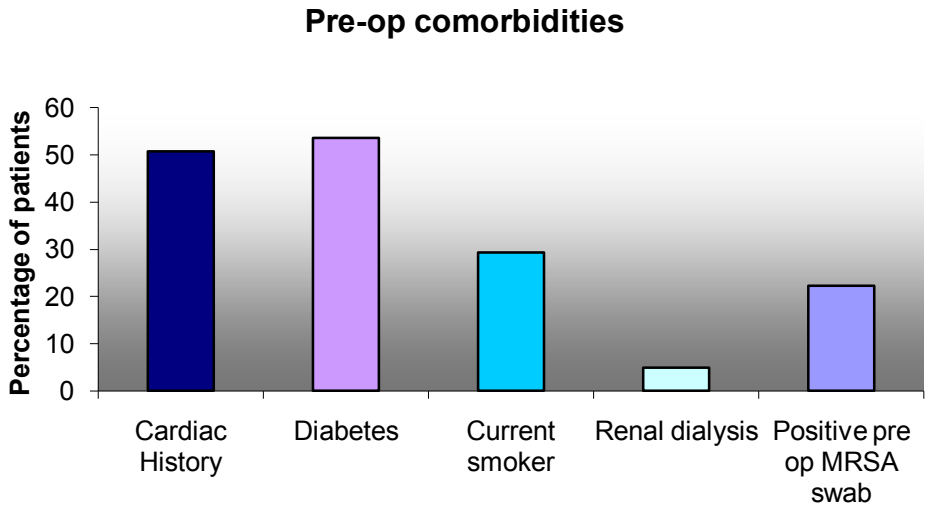


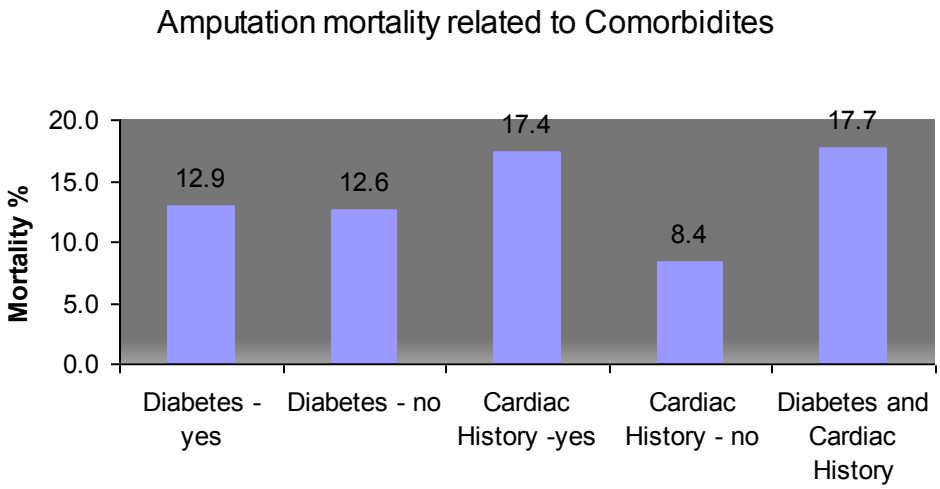
Table 31. Pre-operative comorbidities in ampuation patients

	YES	NO	SUM	MISSING DATA
Cardiac History	710	690	1400	377
Diabetes	769	665	1434	343
Current smoker	277	667	944	833
Renal dialysis	67	1281	1348	429
Positive pre op MRSA swab	180	630	810	967

The mortality rates analysed according to the presence or absence of comorbidities are shown in figure 43. Perhaps surprisingly there does not seem to be a difference in mortality in diabetics compared to non-diabetics but the presence of a cardiac history and the combination of diabetes and a history of cardiac disease does seem to be associated with a higher mortality rate.

11.7.1 Mortality related to comorbidities

Figure 43



11.8 Complications

The complications following amputation are shown in table 32. The percentages are expressed as a percentage of responses, excluding missing data.

Table 32. Complications of amputation surgery

COMPLICATION		OVERALL	%
Infection	Chest	63	6.7
	PUO	10	1.1
	Wound	118	12.6
	Intraabdominal	7	0.7
	Septicaemia	15	1.6
	Graft	3	0.3
	No	719	76.9
Became +ve MRSA	Yes	86	8.1
	No	974	91.9
MRSA bacteraemia	Yes	26	2.7
	No	929	97.3
C Diff diarrhoea	Yes	38	4.0
	No	915	96.0
MI	Yes	66	6.1
	No	1021	93.9
Cardiac failure	Yes	79	8.4
	No	861	91.6
Impaired renal function	Yes	95	10.1
	No	846	89.9
Dialysis/haemofiltration	Yes	31	3.6
	No	832	96.4
Resp failure	Yes	61	6.5
	No	873	93.5

12 RISK SCORING

Peter Holt, Audit & Research Committee, VSGBI & Ben Patterson

Use of risk prediction systems in elective aortic aneurysm repair: current status and future directions

Across a variety of intervention-based specialties predictive models have been developed to help plan procedures and predict outcomes. Scoring systems specific to vascular surgery have been focussed on AAA repair. The most frequently described of these scores include the Glasgow Aneurysm Score (GAS), a variety of POSSUM scores and the Vascular Biochemistry Haematology Outcomes Model (VBHOM) amongst others. These models were designed for open aneurysm repair (OR) but several have been used to predict the results of endovascular aneurysm repair (EVAR).

The GAS is a simple, well published system designed around OR. It is easier to use than most other scores, the dataset is easily obtainable and t has been validated successfully in several populations. Historically, GAS appeared to predict in-hospital mortality with acceptable accuracy for OR. However, when the GAS was compared directly with more recent models it performed poorly despite a statistically acceptable discriminatory ability for OR. A consistent finding of such studies has been that GAS does not reliably identify individual high-risk patients due to a low-positive predictive value and that it was also poorly predictive of post-operative morbidity.

The suitability of the GAS for predicting mortality following EVAR has been assessed in a number of studies, including use of the data from the DREAM trial and EUROSTAR data. Borderline significance was shown in the latter study, and a low event rate in the former makes interpretation of the results difficult. Further studies have shown GAS to be a weak predictor of mortality and inaccurate for predicting morbidity with reference to EVAR and most studies have ultimately concluded that GAS cannot be used to predict results of EVAR.

The various POSSUM-based scores have produced variable results when undergoing validation as a pre-operative predictive score when using physiology only variants. It must be noted that they were designed originally for comparative audit. The POSSUM scores are the most complex scoring systems and require a large number of variables. The POSSUM systems would likely need major modification if they were to become useful in a clinical setting.

The VBHOM system uses a minimum dataset that is objective and is suitable for collection pre-operatively in both emergency and elective situations. The results of validation have not been consistent however, and the original version of the model

demonstrated poor calibration. A second version based on the National Vascular Database requires further validation.

A number of studies have quantified the predictive ability of existing scores in patients undergoing EVAR, largely without success. There are a number of potential explanations for this. All previous scores focus chiefly on pre-operative physiological parameters, with no consideration of aneurysm morphology, which has been proven to determine the outcome of EVAR. Factors such as the size and angulations of the aneurysm neck, maximum aneurysm size, thrombus burden, the extent of the aneurysmal disease distal to the aortic bifurcation and the tortuosity and calcification of the iliac arteries are all known to contribute to mortality and endograft-related morbidity. Consequently these must be accounted for in any scoring system directed towards EVAR.

The Australian national audit of vascular surgery sample was recently used to describe factors that influenced long term survival and graft related outcomes. Four morphological and four physiological factors were found to be related to adverse outcomes and used to construct a risk scoring system. As the audit was derived from a limited data set, complex anatomical features such as iliac tortuosity or presence of thrombus in the lumen of the aneurysm were not included in the model. Overall, the model accurately predicted a number of key outcomes including peri-operative death and Type 1 and 3 endoleaks. A study of the external validation of this system is pending based on an English dataset.

A further problem in the development of risk prediction models for EVAR is that a lower post-operative adverse events rate means that the number of cases required to generate a robust model is high. Furthermore, common to other studies of long-term events outside the confines of randomised clinical trials, the number of patients lost to follow-up increases with time meaning that late complications are therefore likely to be under-represented in the final analysis of such samples.

After a model has been created and validated successfully at a specific time in a specific sample, there is still the potential for the model to lose calibration over time (model drift). The populations for any interventional procedure change over time as the indications for intervention expand in parallel with technological advances. This means that a model developed a decade ago may no longer be accurate as they tend to lose predictive power over time, an effect that has been well described in interventional cardiology. It is important therefore that models are re-calibrated periodically making risk prediction an ongoing assessment.

A new risk prediction system for EVAR is clearly required and work is underway to develop and validate an English model using a multi-centred dataset. This focus is supported by the recent NICE report focussed on delivery of EVAR in the UK. The system will incorporate morphological and physiological data where appropriate and aims to be predictive of both mortality and graft-related. Any new system could drive

further improvements in AAA repair in the UK by identifying patients at high risk of mortality or endoleak. This is particularly important with the advent of AAA screening, which must be delivered at the lowest possible mortality and morbidity to maximise the clinical and economic effectiveness.

12.1 Risk Score Calculation

The methods of calculation of the risk scores described above are shown below

12.1.1 GAS (technically for ruptures):

Risk score = (age in years) + (17 for shock) + (7 for myocardial disease) + (10 for cerebrovascular disease) + (14 for renal disease)

12.1.2 Modified VBHOM:

In? (R / (1 – R)) = -2.257 + (0.1511 x sex) + (0.9940 x mode of admission) + (0.05923 x age on admission (years)) + (0.001401 x urea) + (-0.01303 x sodium)) + (-0.03585 x potassium) + (-0.2278 x haemoglobin) + (0.02059 x white cell count)

12.1.3 V-POSSUM (preoperative using physiology score only):

In (R/1-R) = -6.0386 + (0.1539 x physiology score) Physiology score based on
* Age
* Cardiac Signs
* Respiratory signs
* Pulse rate
* GCS
* Urea / Sodium / Potassium
* Haemoglobin / White cells
* ECG

13 QUALITY IMPROVEMENT

The Vascular Society has demonstrated its commitment to audit and it is a tribute to the members of the Society who contribute data that the National Vascular Database has developed to the extent it has over the last 12 years. The Society has not only embraced the value of audit, but has been willing to invest time, effort and money in order ensure that valuable information is collated. The ultimate aim of collecting this audit data is to improve outcomes for patients, and the next stage of development is to concentrate on improving the quality of the care we provide for our patients. This may cover a wide range of aspects of care including pre-operative assessment, surgical decision making, risk reduction, post-operative care, surgical techniques, and the facilities available to look after these patients.

The challenge for the Society will be how to use the wealth of data now available to the best effect. This will require an ongoing process of feedback of data along with recommendations for change. The easy part of this will be data feedback, the more difficult aspect will be effecting change when the Society has no formal mechanism for this.

Experience in this field is already being obtained within the Quality Improvement Framework for aortic aneurysm surgery defined by the Society in conjunction with other professional bodies including the Vascular Anaesthetic Society and the British Society of Interventional Radiologists. The VSGBI has also obtained a grant to work with the Health Foundation in a quality improvement project to reduce the mortality associated with elective aortic aneurysm surgery to 3.5% by 2013. In addition the UK carotid intervention audit has allowed us to build on the experience of the Clinical Effectiveness Unit of the Royal College of Physicians in improving the provision of care for patients requiring intervention following a stroke or TIA.

This is a developing area for the Society and as we move to independent specialty status this is a particularly important aspect of our work.

14 THE FUTURE ROLE OF THE NVD

David Mitchell, Chairman Elect, Audit & Research Committee, VSGBI

Clinicians face significant changes in their clinical practice over the next few years, with the emphasis being on our ability to demonstrate both good team working and a focus on patient safety. In addition the introduction of a national screening programme for aortic aneurysms will see a focus on providing a high quality service for patients. The NVD will play a central role in both these areas and the Society is committed to providing robust information to support its members in their clinical practice.

Both revalidation and accreditation for inclusion in the national aortic aneurysm screening programme will require vascular specialists to demonstrate that they have good outcomes for core vascular procedures. By contributing all cases to the NVD, surgeons, both individually and as teams (defined by hospital, Trust, network or region) will be able to access instant reporting both for professional revalidation and to provide information to external agencies and patients. We will shortly be expanding the reporting capability of the NVD to enable reporting from the individual to network level (the latter upon request). We undertake regular comparisons with the HES dataset. We will only overcome criticisms of the incompleteness of the NVD by ensuring that we contribute all available cases.

The aortic aneurysm screening programme will manage patients requiring treatment through the NVD and participating vascular networks will need to provide data on their care to feedback to quality assure the programme. This gives the NVD a wider role within the NHS in helping to provide assurance to patients that the service that they are receiving is of a high quality.

The NVD also offers the society an opportunity to develop national audits. At the present time, we feel that these should be carefully defined and time limited. They will provide the society members with data to inform clinical decision-making. Our next audit will be of acute kidney injury following aortic aneurysm surgery (both open and EVAR) and is funded by the Department of Health. Such audits allow the Society to demonstrate our commitment to improving patient safety and delivering high quality care.

Linking the NVD to ONS, through the NHS number, will allow us to track both hospital re-admission and mortality over the longer term and give us a better understanding of the longer term implications of surgical procedures.

Throughout the next few years the NVD will undergo some changes. The Audit committee will continue to communicate with you on a regular basis. It is my intention that the time Society members spend ensuring that we have high quality data to defend our service and promote patient care is recognised through regular feedback to contributors. To this end we are developing links to Biostatistical departments in universities to ensure that we utilise the NVD to its maximum potential. As ever, the quality of our outputs is critically dependent on the quality of data we receive from you, so please let us know if there are issues with data gathering or entry and we will try and help as best we can.

Finally, the NVD is a Society resource. Any member wishing access to the dataset (or a part of it) for particular audits is encouraged to submit an application to the A&R committee. We are happy to provide access for defined periods for suitable projects.

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See SPC before prescribing. 600 mg Tablets, 100 mg/5 ml Granules for Oral Suspension, 2 mg/ml Solution for Infusion.
Indications: Hospital treatment of susceptible Gram positive infections under specialist supervision; nosocomial and community acquired pneumonia, complicated skin and soft tissue infections only when microbiological testing has established that the infection is known to be caused by susceptible Gram positive bacteria. Should only be used in patients with known or possible co-infection with Gram negative organisms if there are no alternative treatment options available. Consider official guidance. **Dosage:** *Adults only:* 600mg IV or orally bd for 10-14 days. Max 28 days. Tablets/suspension may be taken with or without food; solution should be administered over period of 30-120mins. **Contra-indications:** hypersensitivity to linezolid or excipients, MAOIs within 2 weeks, uncontrolled hypertension, phaeochromocytoma, carcinoid, thyrotoxicosis, bipolar depression, schizoaffective disorder, acute confusional states. Concomitant SSRIs, tricyclic antidepressants, triptans, sympathomimetics (including adrenergic bronchodilators, pseudoephedrine and phenylpropanolamine), vasopressors, dopaminergic agents, pethidine or buspirone. **Precautions:** those at risk from MAO inhibition; severe renal/hepatic insufficiency, history of seizures, Suspension contains sodium, sucrose and mannitol; avoid in phenylketonuria and sucrose intolerance; Solution contains glucose and sodium. Limit tyramine-rich foods. Monitor for myelosuppresion in susceptible patients, those who are receiving concomitant medications that may decrease haemoglobin levels, depress blood counts or adversely affect platelet count or function; those on therapy >10-14 days, or with severe renal insufficiency. Weekly blood counts recommended for all. If significant myelosuppression occurs, treatment should be stopped unless absolutely necessary to continue therapy. If antibiotic-associated diarrhoea or antibiotic-associated colitis is suspected or confirmed, ongoing treatment with antibacterial agents, including linezolid, should be discontinued Treat lactic acidosis if it develops. Treat Gram negative co-infections/ polymicrobial infections concomitantly. In skin/soft tissue infections only use Zyvox in possible co-infection with Gram negative organisms if no alternative with treatment against Gram negative organisms initiated concomitantly. Patients experiencing visual changes or impairment require prompt evaluation with referral to an ophthalmologist as necessary. Monitor visual function regularly if linezolid treatment exceeds 28 days. **Pregnancy/Lactation:** Not recommended. **Drug Interactions:** See SPC. **Undesirable effects:** See SPC for full details. Common Side effects: Headache, diarrhoea, nausea, vomiting, candidiasis, metallic taste, abnormal liver function tests, altered blood counts. Other serious side effects include myelosuppression and other blood disorders, antibiotic-associated colitis, anaphylaxis, angioedema, Stevens-Johnson syndrome, optic neuropathy, convulsions, visual impairment, lactic acidosis, serotonin syndrome, isolated cases of localised abdominal pain, transient ischaemic attacks, pancreatitis, hypertension, renal failure. POM PL Infusion/Tablets/Suspension 00032/0259, /0261, /0262. **Presentation and basic NHS Cost:** Zyvox Infusion 300ml bag, 10 bags £445.00. Zyvox 600mg tablet, 10 tablets £445.00. Zyvox Suspension 150 ml bottle, 1 bottle £222.50. **MA Holder:** Pharmacia Ltd, Ramsgate Road, Sandwich, Kent,CT13 9NJ.
Date of Revision: August 2009 (Ref ZY 7_1)
Further information on request from: Pfizer Limited, Walton Oaks, Dorking Road, Tadworth, Surrey KT20 7NS.
References:
1. Welshman IR *et al. Biopharm Drug Dispos* 2001; **22** (3): 91-97.
2. Stevens DL *et al. Clin Infect Dis* 2002; **34** (11): 1481-1490.

Adverse events should be reported. Reporting forms and information can be found at www.yellowcard.gov.uk Adverse events should also be reported to Pfizer Medical Information on 01304 616161

ZYV745 Date of preparation: October 2009.

Pfizer Anti-Infectives


The Vascular Society
of Great Britain & Ireland