VSQIP
VASCULAR SERVICES QUALITY IMPROVEMENT PROGRAMME

*National Vascular Registry (NVR)*

NVR IT System Online Reporting

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1. Accessing the reports

- Login to the NVR IT system as usual.
- The online reports are accessible by hovering over the reports tab.
- You will then be able to choose between Activity Tables and Graphs.
- If you are logged into the NVR as an individual clinician, your reports will be based on all of your procedures. You will have the options of producing them by hospital with the reporting tool.
- If you are logged into the NVR as an individual clinician, you will also be able to see a revalidation report, which you will be able to download and print off.
- If you are logged into the NVR as a local admin, your reports will be based on all of the procedures undertaken at that hospital. If you are an administration for more than hospital you will have to 'change location' in the normal way to view reports for any other hospitals.
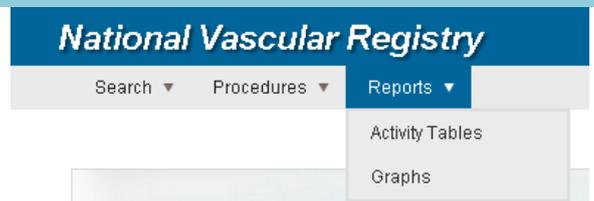
2. Running the reports

- The first table for either procedure will be a summary of procedures.
- It will show the breakdown of all of your records, the number that are submitted and the number of submitted records with discharge dates entered.
- Discharge status and date is required for many of the outcome reports, which is why this is needed.
- The table will help you to identify how many records need to be submitted and/or have the discharge date entered in order for them to appear within the online reports.
- It is possible to run reports based on dates by typing or selecting dates in the 'Start' and 'End' boxes (these are using the discharge/death dates).
- If no dates are entered, the reports will be run on all submitted records with discharge dates entered.
- If no end date is entered, the reports will be run to the current date.

3. Selecting and interpreting the reports

- The activity tables are split into three categories: activity, demographics and outcomes.
- It is possible to choose which variable should be the row headers in the first column for the demographics and outcomes tables.
- It is also possible to filter the results (e.g. to only display results based on elective admissions) for the demographics and outcomes tables.
- If you are a logged on as a consultant, the organisation row will break your data down by hospital. If you are logged on as an administrator, the organisation row will break your data down by consultant.

Type	renal	renal	renal	renal
Complex EVAR	5	122	1	31
EVAR	365	13	74	8
EVAS	1	0	0	0
Open	8	5	28	6
Revision EVAR	3	2	2	0
All	382	142	105	45

Filter

Row	Variable	Filter
⦿	Procedure Type	All ▾
○	Admission Source	All ▾
○	Site Aneurysm	All ▾
○	AAA Status	All ▾
○	Time By Years	
○	Organisation	☐ Primary Surgeons only? Run

Demographics

Variable	All Cases	Cases with Patient Data	Average Age	% Male	Average AAA Size
Complex EVAR	89	89	72.22	84	66.5
EVAR	452	452	75.55	87	63.44

- It is now possible to just view results based on the primary operator (vascular specialist 1). If you are logged on as a consultant this will allow you to distinguish between cases where you were primary operator and where you were assisting. If you are logged on as an administrator and you select 'organisation' as the row header, the tables will show results based on the primary operators only.

N.B. These results are only based on records that have been submitted and locked within the NVR IT system. The data will not have gone through the various data cleaning checks that are run by the NVR project team as part of the analysis for reports.

4. Graphs

Within the reports section, there are also a number of graphs that can be produced. These are also only based on records that have been submitted and locked within the NVR.

1. **Funnel plot**. This shows the unadjusted inpatient mortality (or inpatient stroke and/or mortality for carotid interventions) of a consultant or a unit, in comparison to others.

- Similarly to the summary tables, it is possible to select the start and end date of the funnel plot.
- Depending on the procedure type selected, there will be additional filters on the procedure type that you can select.
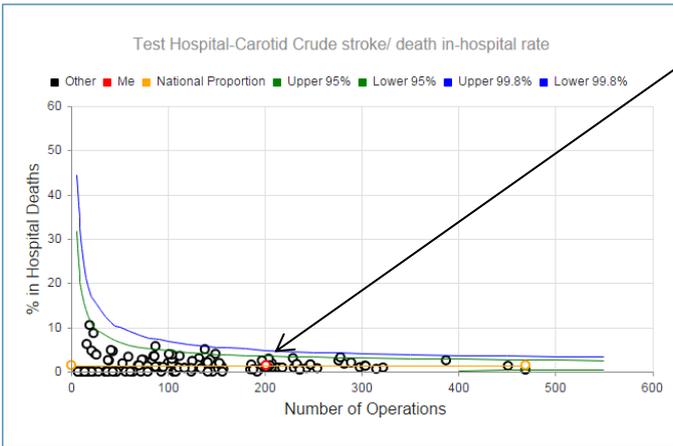
Funnel Plot
Activity Graph
Run Charts

Funnel Report

Record Status	Number of Records
All records	1613
Submitted records	1565
Submitted records with discharge date after 01/01/2008	1437

Filter

Time Period: Start: 01/01/2012   End (based on discharge date): 31/12/2015

	Variable	Filter
	Procedure Type	Carotid Intervention ▾
	Admission Mode	All ▾
	Carotid Intervention Type	Endarterectomy ▾

Run

Test Hospital-Carotid Crude stroke/ death in-hospital rate

Legend: Other ■ Me ■ National Proportion ■ Upper 95% ■ Lower 95% ■ Upper 99.8% ■ Lower 99.8%

OrganisationName	All Cases	Cases with Outcome Data	In Hospital Deaths	Motality Rate
Test Hospital	201	201	3	1.49

- 'You' are shown as a red circle within the funnel plot.
- Other consultants/hospitals will be shown as black circles.
- A summary table will be shown below the funnel plot, with your results.
- It is possible to show/hide any of the lines on the funnel plot by clicking on the labels at the top of the graph.

2. **Activity Graph.** This graph enables a user to quickly see how many of each procedure they have carried out over time.

- Again, you select the start and end dates for the graph.
- It is possible to set the scale of the graph to be monthly, quarterly or annually.

- Similarly to the funnel plot, it is possible to show and hide the lines on the graph by clicking on the labels at the top of the graph.
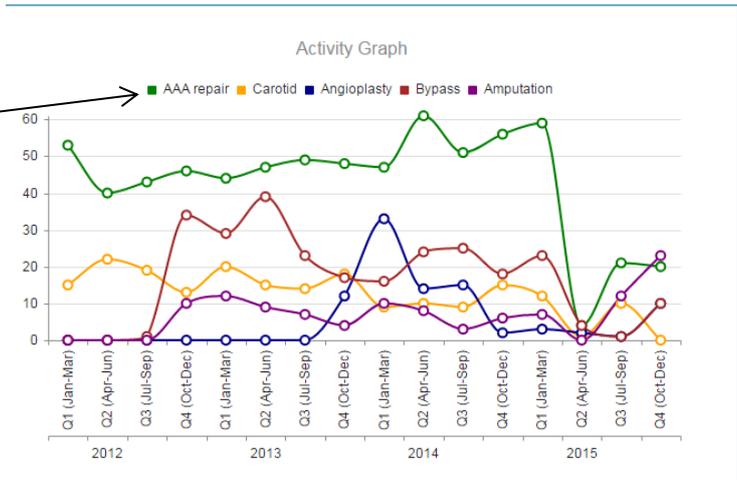
3. **Run Charts.** These are designed to assist with continuous monitoring of outcomes.

- Currently these are only available for elective infra-renal AAA repair and carotid endarterectomy.

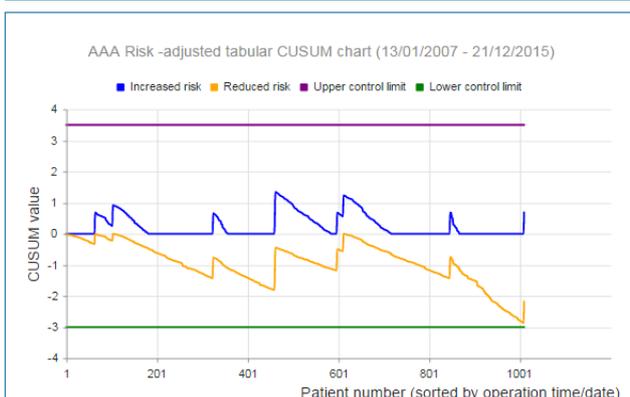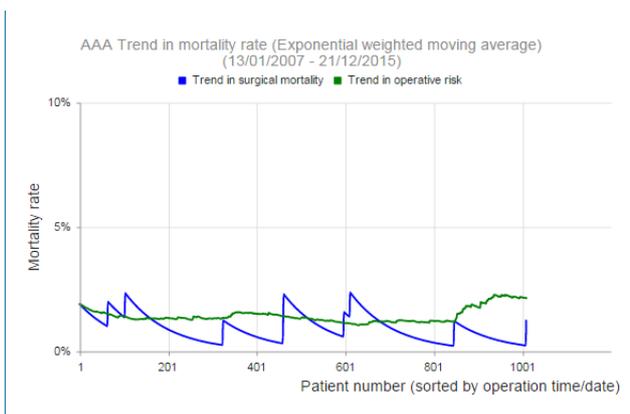| Funnel Plot |
| Activity Graph |
| **Run Charts** |

Run Charts

Filter

Procedure Type: AAA repair ▼   Admission mode: Elective

AAA site: Infra-renal

Time Period Start: All Procedures ▼
- All Procedures
- Last 200 procedures
- Last five years (starting 1 Jan)

[Run]

- It is possible to look at all procedures, the last 200 procedures or the last five calendar years.

AAA Trend in mortality rate (Exponential weighted moving average) (13/01/2007 - 21/12/2015)
■ Trend in surgical mortality ■ Trend in operative risk

Mortality rate vs Patient number (sorted by operation time/date)

AAA Risk -adjusted tabular CUSUM chart (13/01/2007 - 21/12/2015)
■ Increased risk ■ Reduced risk ■ Upper control limit ■ Lower control limit

CUSUM value vs Patient number (sorted by operation time/date)

- The top graph is based on a risk-adjusted exponentially weighted moving average (EWMA) run chart.
- The blue line shows the average outcome rate of surgery, based on a EWMA of the previous sequence of outcomes.
- The green line shows the average predicted risk for the sequence of patients, given their patient characteristics.
- Each time there is an adverse outcome (inpatient death for AAA repair, inpatient death/stroke for CEA), the blue line will spike up.
- It will fall if a patient is discharged alive (AAA repair) or discharged alive with no post-operative stroke (CEA).
- This gives it a characteristic 'sawtooth' appearance.
- The green line will rise if the cohort of patients becomes more high-risk and will fall if the cohort becomes less high-risk.

- The lower graph is a risk adjusted double-sided CUSUM chart.
- The CUSUM chart uses a probability testing procedure that sequentially assesses whether the observed adverse outcome rate is consistent with the expected baseline rate.
- In statistical terms, the plotted value in the upper part of the CUSUM chart is the log likelihood of detecting a doubling in the odds of an adverse outcome.
- The value plotted in the lower part of the CUSUM chart is the log likelihood of detecting a halving in the odds of an adverse outcome.
- The graph suggests there has been an increase in the postoperative outcome rate if the CUSUM value in the upper section of the chart crosses the control limit.
- If the CUSUM value in the lower section crosses the control limit, it suggests there has been a decrease in the postoperative rate.

NOTE:
- Both charts take into account the predicted risk of the operation for the patient and use the same risk model.
- These are based on the models used in the consultant outcomes publication.
- It has been necessary to adapt them, however, to deal with records that contain missing values. If a record has a risk factor with missing data, the patient is assigned a value associated with the least risk level on that risk factor.
- The control limits have been set to be more sensitive than the ones in the funnel plots used in our public reporting. This is because this online graph is designed to flag up a potentially deteriorating situation in time for an appropriate review.
- This should prevent situations in which results are flagged as being an outlier.