THE SOCIETY FOR VASCULAR TECHNOLOGY OF GREAT BRITAIN AND IRELAND

SVT Image & Report Auditing Guidelines

The overarching purpose is to **ensure patient safety and quality of diagnostic tests**. The purpose of diagnostic image and report auditing is to ensure the ultrasound image quality and reports issued meet the SVT quality standards (or service defined standards) and to ensure the information given in the report is accurate and consistent with the images captured and recorded as part of the whole examination. For non-imaging tests this will be to ensure data acquired in the test is accurately recorded and concluded in a report. This whole process should be described in a service quality policy or separate Image & Report Auditing document, including method and frequency of audit, reporting process for findings, and management of non-conformity. It will also enable services to ensure that all the required images are captured, labelled and measured according to the SVT scan guidelines and/or local Standard Operating Procedure (SOP), and that the issued report contains the same consistent data captured on the scan recordings and reported as per the SVT scan guidelines and/or SOP. The audit can ensure services have an opportunity to detect and manage any discrepancy or non-conformity including equipment performance, test validity, and individual staff performance in a timely manner.

To enable sufficient sampling volume and frequency for effective audit, it is recommended to sample **5% of all activity of all staff at least monthly**. This is to ensure that if a significant discrepancy or non-conformity is identified, there is not a delay in being able to take appropriate timely action and management, such as recalling patients for repeat scans, assuring equipment is performing correctly, and/or supporting and training staff to improve scan image and report quality as per the required service SOP. The sampling needs to cover a sufficient range of scan activity per individual, proportional to the activity performed, therefore a minimum 5% of each core modality should be included in routine audit. Where electronic systems allow, it may be useful to select the sample volume randomly from the data pool to reduce any selection bias. Less frequent diagnostic tests performed by an individual should be monitored in an appropriate manner and timescale as per above if possible. Where a discrepancy or non-conformity is discovered and managed according to local policy, re-audit needs to be implemented to assure service defined quality standards are achieved going forward. Services may wish to consider setting agreed KPIs for audit outcomes.

A simple table may be useful for planning audit:

Staff Member:		Audit Period:
Scan Type	Total Number of Scans performed per Month	Number of scans required to sample 5%, or a minimum for low numbers
Carotid		
Lower Limb Arterial		
Venous Reflux		
DVT		
AAA Scan		
ABPI		
Other…		

Services may wish to implement the SVT Quality Standards:

B-Mode

- **Gain** should be set so that detail of structures can be seen i.e. outline and composition of plaques, thrombus, but image should not be 'over-gained' resulting in a loss of contrast resolution.
- **Focal zones** (where available) should be adjusted so that they are placed at the region of interest. Multiple focal zones may be used for improving image quality as long as the adverse effect on temporal resolution does not compromise the diagnostic capability of the scan.
- **Depth** should be adjusted correctly to image the necessary structures with the minimum depth required
- **TGC** should be adjusted to compensate for attenuation due to depth and enhancement artefacts.
- **Calipers** should be placed correctly for obtaining measurements in accordance to SVT Guidelines or following local service SOP

Colour

- **Colour box** large enough to examine the segment of vessel in question but small enough to prevent excessively slow frame rates
- **Colour box steered** in the appropriate position to maximise colour filling and definition of the velocity profile in the vessel
- **Colour gain** high enough to fill the patent vessel but low enough to prevent colour noise over the image
- **Scale/PRF** been selected which will be able to detect disease

PW Doppler

- **Gain,filter** and frequency set properly to allow all parts of the waveform to be clearly defined without blurring of the waveform into an over-gained background or filling in of the spectral window
- **PW steered** to maximise the strength of the Doppler signal
- **Scale and baseline** set so that the entire waveform appears on the spectral tracing and takes up as much of the tracing as possible
- **Calipers** placed correctly when measuring waveform parameters. Auto-trace used appropriately
- **PW cursor** been correctly **angled** (≤60 degrees, to angle of blood flow)
- **Sample volume** been set in the correct place in the vessel, large enough to sample venous flow or small enough to sample arterial flow (without filling in the spectral window)

Units of Measurement

- **Units appropriate** to structure size, for example mm used for structures less than 1cm and cm used for larger than 1cm
- **Decimal places** for measurements are appropriate, taking into account uncertainty of measurement factors, often influenced by the specific probe frequency and resolution possible and according to depth, as well as clinical significance.
- **PW Doppler units** of measurement stated, such as peak diastolic, end diastolic, or variations of mean velocities (Time average mean, time average mean of the peak etc)
- **Other** PW Doppler measurements stated where used, such as Pulsatility Index, Resistance Indices, Systolic Rise Time etc.

Labelling

- **Correct anatomy**, pathology, and/or vessels identified using labelling(using vessel nomenclature as per SVT Guidelines or following local service SOP)
- **Correct anatomical location** identified (using terms such as right/left, proximal/mid/distal, anterior/posterior and suchlike) as per SVT Guidelines or following local service SOP
- **Labels** must not obscure areas of significance on the saved image
- **Patient data** correctly entered on images, reports, and other systems.

Scan modality limitations

The report should acknowledge any limitations of the diagnostic test (imaging and non-imaging tests) and the significance of these, to form a diagnosis without being falsely confident. Image quality limitations may include attenuation from bowel gas or vessel calcification, poor patient compliance or positional factors, or other factors including environmental issues often associated with bedside scans. The report should highlight the significance of the limitations in regards to diagnostic accuracy or confidence to allow a referring clinician to make an informed decision whether to order additional tests where required.

Final Considerations

Does the report answer the clinical question on the referral?

A useful table to consider

B-mode, colour, spectral Doppler optimised
Ultrasound probe/frequency suitability
Accuracy of labelling
Minimum image set recorded
Appropriate units of measurement
Patient data/demographics
Limitations reported
Report matches the image findings, recordings and referral clinical question

Audit Scoring

It is useful to consider a simple scoring acceptance system:

Images or Non-Imaging recordings		
3	GOOD	Everything required as per Service SOP/SVT Quality Standards. This may include suboptimal images or Non-Imaging recordings, but with evidence that this was due limitations acknowledged in the report (as per Service SOP/SVT Quality Standards).
2	ACCEPATABLE	Images or Non-Imaging recordings (including all measurements) may have minor discrepancy to Service SOP/SVT Quality Standards, which does not affect the overall diagnostic accuracy or outcome of the report. This may include missing or suboptimal images or Non-Imaging recordings but these limitations are acknowledged in the report.
1	POOR	Images or Non-Imaging recordings have a significant discrepancy or non-conformity found against the Service SOP/SVT Quality Standards which does affect the diagnostic accuracy or outcome of the report. Images or Non-Imaging recordings required are an unacceptable standard (or missing) to demonstrate the correct diagnostic conclusions.
Reports		
3	GOOD	Everything required as per Service SOP/SVT Quality Standards. The report accurately records the data from the Images or Non-Imaging recordings, applies correct diagnostic calculations, answers clinical question on the referral and arrives at the accurate diagnostic conclusion (as per Service SOP/SVT Scan Guidelines)
2	ACCEPATABLE	The report may have minor discrepancy to Service SOP/SVT Quality Standards, which does not affect the overall diagnostic accuracy or outcome of the report. This may include missing recordings which do not affect diagnostic outcome, or limitations which are not acknowledged in the report.
1	POOR	The report is of an unacceptable standard (as per Service SOP/SVT Scan Guidelines), have a discrepancy or non-conformity found against the Service SOP/SVT Quality Standards which does affect the diagnostic accuracy or outcome of the report.
Actions		
For any finding which scores a ‘1’ or ‘POOR’ the service will need to act on this and follow procedures for management and reporting of errors (as per Service SOP or other local policies eg Datix)		

It is recommended that anyone performing audit should receive appropriate local training and support in order to understand and follow the documented audit procedures, and this can be developed and delivered by the service, and may also include more formalised audit training programmes if required. It is often beneficial to include all staff members to participate in regular audit as it generates an open and transparent attitude to the process and also enables self-reflection and personal development. Where possible, data should be anonymous to the person performing the audit to prevent bias, but the data needs to be sufficiently tracked in the case of any findings. Once the process of audit is embedded in usual service practice, it is expected that it should take less than 5 minutes per test/patient to complete.