

GUIDELINES AND RECOMMENDATIONS

British Society of Echocardiography Departmental Accreditation Standards 2019 with input from the Intensive Care Society

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Abstract

This article sets out a summary of standards for departmental accreditation set by the British Society of Echocardiography (BSE) Departmental Accreditation Committee. Full accreditation standards are available at www.bsecho.org. The BSE were the first national organisation to establish a quality standards framework for departments that support the practice of individual echocardiographers. This is an updated version which recognises that, not only should all echocardiographers be individually accredited as competent to practice, but that departments also need to be well organised and have the facilities, equipment and processes to ensure the services they deliver are of an appropriate clinical standard. In combination with individual accreditation, departmental accreditation lays down standards to help ensure safe and effective patient care. These standards supersede the 2012 BSE Departmental Accreditation Standards. Standards are set to cover all potential areas of practice, including transthoracic (level 2) echocardiography, transoesophageal echocardiography, stress echocardiography, training, and emergency (level 1) echocardiography. The emergency echocardiography standard is a new addition to departmental accreditation and has been developed with input from the Intensive Care Society.

Key Words

- ▶ Departmental Accreditation
- ▶ echocardiography
- ▶ guidelines

Introduction

The Departmental Accreditation Committee aims to raise the quality of practice and equipment nationally, and to provide standards against which departments can be benchmarked. This is in recognition that, not only should echocardiography staff be individually accredited as competent to perform studies, but that departments also need to be well organised and have the appropriate facilities, equipment and processes to ensure the services they deliver are clinically adequate to provide safe and effective patient care. Accredited departments benefit from national recognition of the quality of their echocardiography service. Although accredited departments will need to demonstrate a high-quality service through adherence to these standards, the departmental accreditation application is intended to be supportive and non-judgemental. The departmental accreditation process is separate but linked with the British Society of Echocardiography (BSE) echo quality framework (EQF), in that departments seeking accreditation are expected to participate in the EQF (1). For the first time, the BSE has also incorporated departmental accreditation standards for emergency echocardiography which have been developed in association with the Intensive Care Society (ICS). In addition, it is assumed that all departments that are of sufficient quality for accreditation will be actively involved in training, and therefore meet the requirements for accreditation in training to the BSE proficiency standard as well as transthoracic echocardiography. Full BSE departmental accreditation standards should be reviewed prior to any application and are available at www.bsecho.org.

Departmental accreditation may be applied for in respect of any or all of the following five modules:

- Transthoracic echocardiography (compulsory module)
- Transoesophageal echocardiography (TOE)
- Stress echocardiography (stress echo)
- Training to the BSE proficiency standard (compulsory module)
- Joint BSE and ICS emergency echocardiography standard

Upon submission of an application, departmental accreditation assessors will undertake a visit of the department. This visiting team will usually be made up of a doctor and a healthcare scientist (HCS) who work in accredited departments. A patient representative may also accompany the visiting team. Upon completion of the visit, the assessors will submit a written report of their findings to the BSE Departmental Accreditation Committee.

This will offer one of the following conclusions for each category of accreditation applied for or held:

- Accreditation awarded
- Remedial measures required before accreditation may be awarded
- Accreditation not awarded

Standard 1: Transthoracic echocardiography

1. Requirements for staffing and training

1.1. All centres must have a designated head of department (HoD). The HoD may be either a specialist registered physician or a specialist HCS. The HoD must spend at least three sessions each week within the applicant department in order for the department to qualify for accreditation.

1.2. There must be defined separate leadership roles for both the medical and scientific teams within the department: the 'medical lead', 'healthcare scientist lead' and 'quality assurance lead'.

1.3. The medical lead must be trained in clinical cardiology, specialist echocardiography and be registered with the GMC. They must hold individual BSE/EACVI accreditation and set up a system for reviewing requests and reports, audit, quality control, protocols for imaging, and urgent clinical review in response to findings at echocardiography.

1.4. The healthcare scientist lead must hold individual BSE accreditation (or equivalent) and be graded at least Band 7. They must spend at least five sessions directly related to echocardiography per week.

1.5. The quality assurance lead for the echocardiography department must hold individual BSE accreditation and be graded at least band 7. They are responsible for setting up systems for quality assurance, e.g. ensuring the EQF status is continually graded amber or green.

1.6. Anyone (HCS or medic) who performs and reports studies unsupervised should have individual BSE/EACVI accreditation (or equivalent) and be graded at least band 6, ideally band 7.

1.7. Attendance at the BSE conference for HCS should be encouraged to assist with re-accreditation.

2. Requirements for organisation and equipment

2.1. Echocardiography rooms used for inpatients on beds should be at least 20 m² in area.

2.2. Ventilation, heating, lighting and ancillary facilities must be appropriate.

2.3. Echocardiography machines must have stand-alone continuous wave Doppler and tissue Doppler. 3D capability is recommended on at least one machine in the department, as suggested in the BSE minimum dataset for standard adult transthoracic echocardiogram (2).

2.4. The machines used by the department must be serviced regularly, and be replaced or have a major upgrade at least every 5 years. No machine in regular use should have been purchased or last upgraded more than 10 years ago.

2.5. There must be an electronic report database with facilities for storing and retrieving specific echocardiography studies.

2.6. There must be appropriate storage space.

2.7. A patient information leaflet must be available including information on chaperones. The patient information leaflet should outline whether or not the patient could expect to be given any information or not regarding the result of the scan at the time of the appointment, subject to local departmental rules.

2.8. There must be evidence of ongoing user satisfaction surveys in accordance with the EQF, including both patients and those receiving reports.

3. Requirements for performing studies

3.1. A list of indications for echocardiograms must be agreed.

3.2. Evidence must be presented to show that the prioritising and filtering of inappropriate requests is performed and supported by the HCS/medical lead.

3.3. Minimum standards for studies must be established. Further details are available in BSE minimum dataset for standard adult transthoracic echocardiogram (2). Study protocols appropriate to specific clinical conditions must be used. All protocols must be reviewed regularly and updated when appropriate. There must be processes in place to update staff of new protocols or protocol updates.

3.4. A format for reports must be established, including who should issue conclusions and who is qualified to sign reports.

3.5. A protocol must be in place for reporting and escalating cases that require urgent clinical attention. If this protocol incorporates parties which are not under the umbrella of the host institution applying for accreditation, then evidence

must be present of formal collaboration between different parties (e.g. a service level agreement document).

3.6. Regular meetings, ideally weekly, must be held to review unusual, challenging or otherwise difficult cases. There must be established processes issuing appropriately revised reports as a result of multi-disciplinary team discussions. This should include aspects of the EQF.

3.7. Departments are expected to participate in the EQF and achieve a minimum grade of amber in all areas.

4. Indicative factors

In addition to the minimum factors set out above, the BSE will consider the following when considering whether to grant accreditation to an applicant seeking accreditation for transthoracic echocardiography:

4.1. Continuing education should be given (including funding) to fulfil the BSE re-accreditation requirements or to a similar level. There should be a small library of relevant reference textbooks within the department.

4.2. The job profile of a HCS should include training, self-education, audit and quality control, in addition to performing echocardiograms.

4.3. In an institution performing 3000 or more studies per year, it is recommended that the medical lead has at least one professional activity (PA) per week allocated directly to echocardiography. In a large volume centre, the medical lead may be supported by other named clinicians to ensure an appropriate level of clinical input. There must be evidence of a clear and regular commitment and involvement in running the echocardiography department. For example, audits, presentations and revision of standards, as well as a commitment to clinical work.

4.4. Reports from routine studies should usually (approx. 95%) be issued within 24 h of the examination. For urgent or inpatient studies, at least a preliminary report should usually be issued immediately.

4.5. The medical lead's responsibilities would ordinarily include providing medical input to departmental guidelines and policy, performing studies, training doctors and healthcare scientists, medical audits, medical triage, quality control, and providing clinical input at review meetings.

4.6. The HCS lead's responsibility should ordinarily include the day-to-day running of the echocardiography service, including first line triage, performing studies, organising audit, service improvement and training doctors.

They are usually responsible for the implementation of local occupational health policies, equipment safety and maintenance processes, and ongoing risk assessment. They are usually responsible for the maintenance of quality standards and the effectiveness of patient pathways. They should lead the team on a day-to-day basis.

4.7. There should be awareness of health and safety issues, especially relating to back and eye problems, and adequate liaison with occupational health and risk management departments.

4.8. A single echocardiography machine can ordinarily handle up to a maximum of 2500 studies each year, but this figure will be lower if there is a significant ward-based or complex workload.

4.9. Appropriate consideration should be given to patient comfort, privacy, dignity and the provision of adequate information.

4.10. A separate viewing room is recommended for reviewing studies and off-line reporting.

4.11. A standard transthoracic study slot (including reporting time) should be at least 40 min. A complex study may require 1 h. Ideally, a HCS should perform no more than 1800 studies per year.

Standard 2: Transoesophageal echocardiography (TOE)

1. Requirements for staffing and training

1.1. All centres must have a designated head of TOE. The head of TOE must have BSE/ACTACC or EACVI TOE accreditation.

1.2. Outpatient TOE studies must have one operator with appropriate training whose role is to control the probe and obtain a full image dataset, a healthcare professional with experience in patient monitoring whose responsibility is the patient and a healthcare professional whose responsibility is to acquire optimised images by controlling the echocardiography machine. Further detail is given in the BSE dataset for a standard transoesophageal echocardiogram (3).

1.3. Continuing education must be provided for the operators.

1.4. Each operator must perform or directly supervise at least 25 studies per year. Where clinical needs demand that a patient has a TOE undertaken by an operator who does not perform regular lists, those images should be

reviewed by a BSE TOE accredited practitioner as soon as is practically possible.

1.5. All operators should have, or be working towards, BSE/ACTACC or EACVI TOE accreditation.

1.6. A list of indications for TOE must be agreed.

2. Process

2.1. Minimum standards for studies must be established and the head of TOE must be responsible for ensuring that all operators adhere to them.

2.2. A preoperative checklist must be used such as the BSE TOE safety checklist (4).

2.3. Written, informed consent should also be documented and ideally obtained before the patient attends the exam, in accordance with the recommendations given in the GMC guide to consent, available at www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors.

2.4. Whenever sedation is used, it must be in accordance with the recommendations given in the BSE recommendations for safe practice in TOE, available at www.bsecho.org.

2.5. The TOE probe must be regularly serviced, including electrical safety testing. A log of these checks must be kept.

2.6. The TOE probe must be cleaned regularly as directed in BSE TOE probe decontamination guidelines (5).

2.7. Formal TOE audit processes must be in place. Departments are expected to participate in the EQF and achieve a minimum grade of amber in all areas. In relation to TOE, this should include external validation of studies and reports, either by review from another department or through validation against an external finding, e.g. surgical results.

3. Requirements for organisation and equipment

The following is required to be eligible for accreditation:

- Room (should be >25 m² in area)
- Couch with facility for head-down tilt
- Facilities for cleaning and sterilising the probe
- Appropriate storage of TOE probes in accordance with TOE decontamination guidance
- Resuscitation apparatus and drugs
- Lockable drug cupboard
- Suction
- Oxygen

- Pulse oximeter
- Sphygmomanometer
- Facilities for recovery of the patient
- Protocols for patient care
- Adequate ventilation

Standard 3: Stress echo

1. Requirements for staffing and training

1.1. All centres must have a designated head of stress echocardiography. The lead for stress echocardiography must hold BSE transthoracic echocardiogram (TTE) accreditation, and at least one operator should be working towards BSE stress echo accreditation (HCS or medical staff).

1.2. Stress echocardiography studies require an experienced operator and an HCS or trained nurse. A qualified doctor must be immediately available if not in the room.

1.3. The study reporter must be specially trained in stress echocardiography, ideally with BSE stress echo accreditation.

1.4. Formal stress echocardiography audit processes must be in place. Departments are expected to participate in the EQF and achieve a minimum grade of amber in all areas.

1.5. Each operator/reporter must perform or report at least 100 studies per year.

1.6. Continuing education must be provided for the interpreter.

1.7. At least one member of staff performing the study must possess at least advanced life support (ALS) training or be a specialist cardiologist.

1.8. A list of indications for stress echocardiograms must be agreed.

1.9. Patient information should be provided.

1.10. Appropriate protocols for studies must be established, and the head of stress echocardiography is responsible for ensuring that all operators adhere to them.

2. Requirements for organisation and equipment

The following is required to be eligible for accreditation:

- Designated room (size should be >20 m²)
- Stress echocardiography software
- Contrast agents and contrast specific software
- Infusion syringe for pharmacological stress or equipment for exercise stress, e.g. bicycle

- ECG monitor and recorder
- Sphygmomanometer
- Resuscitation apparatus and drugs readily available

Standard 4: Training to BSE proficiency standard

1. Requirements for staffing and training

1.1. There must be a BSE accredited individual responsible for training. This person may be from a medical or HCS background.

1.2. Staffing levels and workload must be appropriate to the number of trainees, to ensure adequate clinical capacity. As a guideline rather than an absolute requirement, BSE would usually expect to see two BSE accredited staff and 2000 echoes per year for a department to accommodate one trainee.

1.3. At least one half-day training session must be provided by the department each week.

1.4. Both trainer and trainees should be supported to attend local, national and international meetings that substantially involve echocardiography.

1.5. There must be regular weekly departmental case review sessions. Departments are expected to participate in the EQF and achieve a minimum grade of amber in all areas.

1.6. There must be a formal training package. A log of trainees must be kept.

2. Requirements for equipment

2.1. There must be a core library in the department, containing at least three up-to-date echocardiography textbooks and one general cardiology textbook, plus access to cardiology journals either electronically or within the hospital.

2.2. There should be a history of success in passing candidates for individual BSE accreditation (e.g. TTE, TOE, stress echo, level 1, and FICE) appropriate to size of the department.

Standard 5: Joint BSE and ICS emergency echocardiography standard

1. Requirements for staffing and training

1.1. All individuals who scan and report independently should be trained to their level of clinical practice (i.e. focused intensive care echo (FICE),

focused echocardiography in emergency life support (FEEL), BSE level 1 or level 2).

1.2. An emergency echocardiography service lead should be identified. This person should be BSE level 1 or level 2 accredited. This person will have responsibility for ensuring the ongoing training of staff, maintenance of equipment and co-ordination of a formal out of hours emergency echocardiography service rota (if this service is available). They will have time in their job plan for emergency echocardiography.

1.3. If the emergency echo service lead is not a cardiologist, a link-person from the host institution's cardiology department should be identified. This will usually be either a senior echocardiographer or a consultant cardiologist.

1.4. Ideally, regional networks and electronic image transfer systems should be created to allow for prompt access to over-reading of scans by a BSE level 2 accredited (or equivalent) individual when requested.

2. Requirements for equipment

2.1. Ninety per cent of emergency echocardiograms should be performed within an hour of their request.

2.2. The appropriate minimum dataset of images should be stored electronically for each case (depending on the level of practice of the individual).

2.3. A structured report should be produced in a timely manner, and stored in the patient records for each scan performed or verified by an accredited practitioner.

2.4. Unverified training images and reports should be stored for subsequent review, but not in the patient records.

2.5. Echocardiography machines should be easily portable, less than 10 years old (ideally less than 5 years old) and regularly serviced.

2.6. Echocardiography machines should be stored in a secure location that is readily accessible at any time and geographically close to the site(s) where emergency echocardiograms are most likely to be performed.

2.7. Echocardiography machines should be easily attachable to a network which allows for the uploading of images to the same archive that is used by the host institution's cardiology department.

2.8. Reporting workstations should be readily available in areas where it is anticipated that emergency echocardiograms will be performed.

3. Requirements for Governance

3.1. Every individual who participates in an emergency echocardiography service should regularly attend a clinical governance forum, for example, their host institution's cardiology department echocardiography meeting. Ideally, this should be job planned.

3.2. There should be a process of quality assurance in place for the emergency echocardiography service. It is expected that departments will utilise the EQF to achieve this and achieve a minimum grade of amber in all areas.

Conclusion

Appropriate organisation, equipment and processes, in addition to highly trained staff, are required to provide excellent echocardiography services. These departmental accreditation standards set out the BSE's recommendations for these in the five main areas of echocardiography and thus provide a benchmark to which all echocardiography departments can aspire.

Declaration of interest

The authors declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of this guideline.

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References

- Ingram TE, Baker S, Allen J, Ritzmann S, Bual N, Duffy L, Ellis C, Bunting K, Black N, Peck M, *et al.* A patient-centred model to quality assure outputs from an echocardiography department: consensus guidance from the British Society of Echocardiography. *Echo Research and Practice* 2018 **5** G25–G33. (<https://doi.org/10.1530/ERP-18-0053>)
- Wharton G, Steeds R, Allen J, Phillips H, Jones R, Kanagala P, Lloyd G, Masani N, Mathew T, Oxborough D, *et al.* A minimum dataset for a standard adult transthoracic echocardiogram: a guideline protocol from the British Society of Echocardiography. *Echo Research and Practice* 2015 **2** G9–G24. (<https://doi.org/10.1530/ERP-14-0079>)

3 Wheeler R, Steeds R, Rana B, Wharton G, Smith N, Allen J, Chambers J, Jones R, Lloyd G, O’Gallagher K, *et al.* A minimum dataset for a standard transoesophageal echocardiogram: a guideline protocol from the British Society of Echocardiography. *Echo Research and Practice* 2015 **2** G29–G45. (<https://doi.org/10.1530/ERP-15-0024>)

4 Sharma V, Alderton S, McNamara H, Steeds R, Bradlow W, Chenzbraun A, Oxborough D, Mathew T, Jones R, Wheeler R, *et al.* A safety checklist for transoesophageal echocardiography

from the British Society of Echocardiography and the Association of Cardiothoracic Anaesthetists. *Echo Research and Practice* 2015 **2** G25–G27. (<https://doi.org/10.1530/ERP-15-0035>)

5 Kanagala P, Bradley C, Hoffman P, Steeds RP & British Society of Echocardiography. Guidelines for transoesophageal echocardiographic probe cleaning and disinfection from the British Society of Echocardiography. *European Journal of Echocardiography* 2011 **12** i17–i23. (<https://doi.org/10.1093/ejehocard/jer095>)

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