

# Accreditation in Adult Stress Echocardiography Information Pack

This pack is for the use of all candidates undergoing the accreditation process and becomes effective as of

15 June 2023

This document supersedes all previous versions

This document is a guide to completing BSE Stress Echo accreditation Submission and assessment criteria are included

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## Welcome message from Chair of Accreditation

Dear Candidate,

Welcome to the British Society of Echocardiography (BSE). The Stress Echo Accreditation process has been set up to assist all those in stress echo training. It is designed to accommodate the requirements of multiple disciplines, including Cardiologists, Physiologists and Scientists with the ultimate aim of achieving and maintaining a high standard of clinical echocardiography for the benefit of our patients.

The accreditation process is regulated to ensure a high level of proficiency and professional standard. We aim to make it possible for as many members to achieve accreditation. A list of [accredited members](#) is maintained on the [BSE website](#).

Please let us know if we can assist you in this process or if you have constructive feedback to offer the accreditation committee; please just get in touch.

Good luck with your accreditation process.

Best wishes,



Sadie Bennett

Chair, BSE Accreditation Committee

## Introduction & aims

- Accreditation is run as a service for members of the BSE is not a compulsory or regulatory certificate of competence or excellence.
- Accredited members are expected to be able to perform and report echocardiographic studies unsupervised.
- The Accreditation process comprises two parts: a written theory examination and a practical assessment. Further information for both is available within this pack.
- Accreditation is a minimum requirement and cannot be regarded as a guarantee of competence.
- Echocardiography skills can only be maintained by continued education and practical involvement in echocardiography. The importance of this is underlined by limiting accreditation to five years, after which reaccreditation must be sought. Further details surrounding reaccreditation can be found on the [reaccreditation](#) section of [www.bsecho.org](http://www.bsecho.org).

## Summary of process requirements

- The candidate must be a member of the BSE and hold current BSE or EACVI Adult transthoracic echocardiography (TTE) accreditation.
- A candidate must have a designated mentor to assist them through the accreditation process.
- The accreditation process has two compulsory elements: A written theory examination and a practical assessment. Both elements need to be passed in order to become an accredited member.
- The written theory exam comprises two parts: A multiple-choice question (MCQ) theory section and a “best answer” image reporting section.
- The practical assessment comprises three parts: A logbook, a practical scanning assessment and a viva assessment of five patient case studies.
- The candidate must pass the written assessment before registering to attend the practical assessment.
- The logbook should be collected over a period of no more than 24 months from the written examination.
- Any queries regarding the accreditation process should be addressed to: BSE Accreditation Department, contact details and registrations are available on [www.bsecho.org](http://www.bsecho.org). Tel: 0208 065 5794 (lines open from 09:00-17:00 Mon-Fri), Email: [accreditation@bsecho.org](mailto:accreditation@bsecho.org).

## Exam fees

- A fee of £275 is charged for the complete accreditation process. This fee is payable in advance upon registration for the written section of the examination and covers the practical assessment. There is a non-refundable booking fee of £25 to pay upon registering for a secured placement at the practical assessment.
- Candidates who are unsuccessful in the written section of the examination will be charged a reduced fee of £137.50 to re-sit this section. This reduced fee only applies to candidates who re-sit the examination within two sittings of the unsuccessful attempt (i.e. within 12 months of an unsuccessful attempt).

- Candidates are entitled to one re-attempt at the practical assessment. A re-attempt at the practical assessment is subject to an additional fee of £137.50.

## Extensions and appeals

Extensions to the 24-month deadline may be granted per the extensions policy. Extension request information and forms must be submitted **before the submission deadline**. Extension request forms (along with all other BSE application forms) can be found at [www.bsecho.org](http://www.bsecho.org). Requests received after the case deadline may not be granted.

Candidates can appeal the decision on a practical assessment. There is no appeals process for the written section of the examination. Further information can be accessed via [www.bsecho.org](http://www.bsecho.org).

## Mentor

A mentor is an experienced echocardiographer who can successfully guide a candidate through the BSE accreditation process. If the echocardiographer is BSE stress echo accredited, this is an advantage but not essential.

The mentor should have a clear understanding of the accreditation process including the training syllabus (see [Appendix 1](#)) and all relevant assessment criteria (see remainder of this accreditation pack for more details).

The mentor must assess the candidate's ability to undertake a stress echocardiogram to a proficient level. Once a proficient level of ability is achieved the mentor must complete the curriculum-based competency tool and the mentor statements. These can be accessed and completed via the online logbook portal. The curriculum-based competency tool can also be found in [Appendix 2](#).

Candidates who cannot find a mentor should [contact us](#); we will try our best to help source a suitable mentor.

## Details of the written theory examination

- The full training syllabus for this accreditation process is available in [Appendix 1](#). A recommended reading list is available in [Appendix 3](#).
- This is held once a year, usually in the Autumn. The examinations are held at various Pearson VUE centres across the UK, Republic of Ireland, and some overseas locations. Dates and online registration are announced on the [written assessment](#) section of BSE website. Further information on registrations for the written examination can be found in [Appendix 4](#).
- The written examination has two parts, a multiple-choice question (MCQ) theory section and an image reporting section. In order to pass the written examination overall, it is necessary to pass both parts at the same exam sitting.
- The pass mark for the MCQ is 70%, the image reporting section is 60%. These may vary slightly at the discretion of the Accreditation Chair following moderation.
- There is no bar to re-sitting the written examination any number of times.
- Accreditation is awarded once a candidate has also successfully completed the practical assessment. Satisfactory performance at the written assessment alone does not allow 'partial accreditation.'

## Multiple-choice section

- Consists of 20 questions that must be answered within 60 minutes.
- Questions are designed to test the knowledge of echocardiographic findings related to stress echo. There are no questions relating to the physics of ultrasound as this has already been demonstrated in BSE or EAVCI TTE accreditation.
- Each question comprises a brief statement followed by five questions. Candidates are required to answer 'true' or 'false' to each question. Example questions are provided in [Appendix 5](#).
- This part of the examination will be marked +1 for correct answers, 0 for incorrect, or unanswered questions (no negative marking).
- There are no 'trick' questions.
- There are no fixed number of correct answers, i.e. for each question, it is possible for every answer to be false or every answer to be true or any combination of true or false.
- The maximum possible mark is 100.

## Image reporting section

- Consists of 15 stem questions centred on 15 patient case studies that must be answered within 90 minutes.
- The candidate will be presented with 15 patient case studies. Each case study will comprise of relevant patient details and a variety of echocardiographic images.
- Each question will have 5 possible answers and candidates will be asked to select the best answer. An example case study and questions are provided in [Appendix 6](#)
- The maximum possible mark is 15.

## Details of the practical assessment

- This is held up to twice a year and is run as per candidate demand. Dates, locations and online registration instructions are announced on the [practical assessment](#) section of BSE website.
- The practical assessment has three parts, a 200 case logbook, a practical scanning assessment and a viva assessment of five patient case studies.
- All candidates will be required to attend a within 26 months of starting the accreditation process (i.e. within two months of their case collection deadline). A two months of grace period has is designed to give the candidate time to review, prepare and submit the logbook and 5 viva cases.
- Registration should **ONLY** be sought after collecting the logbook and patient case studies.
- It is the Candidates responsibility to ensure they enter correct information on registration forms. Incorrect information will lead to a rejected registration.

## Logbook submission

The logbook should demonstrate the candidate's ability in meeting the competencies as shown [Appendix 2](#). The specific case mix of the logbook is shown below.

It should consist of 200 reports personally **performed and reported** by the candidate during the specified period of 24 months.

The logbook format is copies of the actual clinical report. The reports are to be uploaded and submitted via the BSE logbook portal. Please see the portal user guide in [Appendix 7](#). **Non-portal logbooks will not be accepted.**

For full details of what is expected in reports and how the logbook is marked, please see [Appendix 8](#).

Duplicate reports are not acceptable.

If a candidate has problems finding enough specific cases, this should be discussed with the mentor who may arrange for the candidate to attend a nearby centre.

Competencies and mentor statements are to be completed via the BSE logbook portal.

Fully subscribed BSE members can request access to the portal before sitting the written examination by emailing [accreditation@bsecho.org](mailto:accreditation@bsecho.org).

**The logbook should reflect the normal case-load of a general department with the following constraints:**

- **At least 40 cases should demonstrate ischaemia / viability:** This is the minimum, candidates can provide more. They can be any type of valid stress echo- doesn't matter if they are with or without contrast, with/without dobutamine, with/without exercise.
- **At least 20 cases should demonstrate structural heart disease:** a minimum of 20 cases have to be done for the assessment of structural heart disease (usually moderate-severe valve lesions or cardiomyopathies e.g. HCM). Can be any valid stress protocol (with contrast / dobutamine /exercise) the candidate should be able to justify the use of it, if questioned.
- **At least 50 cases should demonstrate the use of transpulmonary contrast:** The minimum is 50 contrast studies. Can be exercise/dobutamine.
- **A maximum of 140 cases may be normal:** 140 is the maximum allowed to be completely normal so the balance (60 cases) have to show some abnormality. Because all 20 structural cases are abnormal by definition, candidates only need to find 40 ischaemia/viability cases (as mentioned above).

Cases should be a mixture of exercise and pharmacological stress. Depending on the case mix in a candidates department, there may have a predominance of experience in one type of stressor.

At least 25 studies need to demonstrate that a candidate can use another type. For example, if a candidate has trained in a department that predominantly uses Dobutamine Stress echo (DSE), a candidate can submit 175 DSE's and 25 exercise stress studies.

Please note the practical assessment will be with exercise so if a candidate is not confident with either the treadmill or bicycle protocols a candidate will be at a disadvantage.

We would advise candidates to discuss this with their assigned mentor to fill in any training gaps. It may be necessary for the candidate to attend another department to gain experience in certain conditions.

#### Other information regarding the logbook:

- All patient identifiable data should be removed. This may require the manual removal of identifiable data. See [Appendix 9](#).
- **At least the final 180** cases should be reported primarily by the candidate. It is acceptable to include up to 20 reports that have been overseen by an experienced operator.
- The candidate's name must appear on the report as the performing and reporting echocardiographer / sonographer. Where local policy deviates from this, a supporting letter and current standard operating procedure from the departments echo lead stating local policy should be included. This should be submitted under the "optional supporting information" section on the BSE logbook portal.
- Final sign off / validation of the logbook is undertaken by the departments echo lead. Please see the portal user guide in [Appendix 7](#).

### Practical scanning assessment

- Consists of a candidate performing an exercise stress echocardiogram on a normal volunteer.
- The candidate will be asked to select their preferred stressor (supine bicycle or treadmill) prior to attending the practical assessment day. Only the BSE recommended protocol for both apparatus will be used (i.e. WHO 25W protocol for the supine bicycle or BRUCE protocol for the treadmill).
- An assistant will be present to help with the treadmill/bicycle controls on the instructions of the candidate, but the candidate will be expected to acquire all images relevant for the stress echocardiogram. The candidate is not expected to be familiar with the equipment. The Assessor will alter equipment setting as directed by the candidate.
- The study may be stopped before completion of the full protocol at the Assessor's discretion. There may be discussions around image acquisition (e.g. optimisation) during the assessment
- For full details of the practical scanning marking criteria please see [Appendix 10](#).

### Viva case submission

- Consists of a viva assessment of five separate patient case studies. See below for the required cases.
- The candidate will be expected to discuss their patient cases with the Assessor. All five cases may be reviewed.
- For full details of the viva case marking criteria please see [Appendix 11](#).
- A commentary about the patient background should be included (verbal or within the presentation).
- For patient case studies 1-4 a baseline assessment must be present and be to a sufficient standard that demonstrates the candidates ability to appropriately rule out stress echo contra-indications as well as for the assessment of whether to use of contrast (even if not required).
- For patient case study 5, a full TTE at baseline is required and should be in the presentation of this case.



- The cases must represent a complete study that is of good quality. Cases should be accompanied with a printed report. The report should be complete, comprehensive and reflect the patient case study being presented.
- The candidate must ensure that at least one full cardiac cycle is recorded. The cases must play automatically / continuously within a PowerPoint presentation (or equivalent). Cases that do not play appropriately may be classified as an unsuccessful attempt.
- Candidates must bring and present their patient case studies on their own laptop. It is the candidate's responsibility to ensure these are anonymised and can be viewed in a manner to allow an assessment of the cases being presented.

**The patient case studies should include one of each of the following:**

1. A normal Dobutamine stress echo study using trans-pulmonary contrast.
2. A normal exercise stress echo study (any stressor) with or without trans-pulmonary contrast.
3. A reversible ischaemic response (any stressor).
4. A Dobutamine stress echo study showing a non-viable OR viable myocardium.
5. A stress study to evaluate structural heart disease.

**Other information regarding the patient case studies:**

**The following images must be included in the patient case studies:**

1. **Normal Dobutamine study:** Parasternal or apical long axis, parasternal short axis, A4C and A2C views. Four stages (baseline, low dose, intermediate dose and peak dose) displayed in a quad-screen and synchronised format.
2. **Normal exercise study:** At least 4 views have to be acquired as above. If using treadmill baseline and post-peak stress stages should be included. If using cycle ergometer four stage should be included as per case 1.
3. **Reversible ischaemic response:** At least 4 views as per case 1. Four stage should be included for a Dobutamine studies or baseline and post-peak for exercise studies.
4. **4: Non-viable or viable myocardium:** At least 4 views as per case 1. Using at least low and intermediate doses. Peak dose imaging is not required but can be done if reversible ischaemia is also being assessed for.
5. **Structural heart disease:** Full baseline TTE, all relevant images as per the pathology being assessed. Using baseline, low, intermediate, peak and post peak where appropriate and relevant to the pathology.

**\*\*Patient case studies may be used in subsequent BSE written exams, educational and training sessions\*\***

## Practical assessment- Outcomes and process for re-attempts

- In total a candidate will have two attempts at passing the practical assessment part of the accreditation process. A second attempt at the practical assessment is subject to a fee of £137.50.
- If a candidate is successful in all three parts of the practical assessment, the candidate will be awarded BSE TTE accreditation and will join the accredited member list.
- If a candidate is unsuccessful in any of the three parts of the practical assessment, the candidate will be deemed to have been unsuccessful at this first attempt. The candidate will be provided with constructive feedback to facilitate a re-attempt. See below for more details.

- In the event of an unsuccessful first attempt, the candidate may be requested to resubmit logbook reports / patient case studies. These must be new reports / patient case studies. A candidate is not permitted to resubmit previously assessed work under any circumstance.
- If a candidate is unsuccessful at the second attempt of the practical assessment. The accreditation process must be started over with the candidate undertaking the written examination again.

**In the event of an unsuccessful attempt, the candidate is required to:**

- Attend another practical assessment and re-attempt **ONLY** the parts of the practical assessment that the candidate was unsuccessful at in the first attempt. The pass marks from the remaining practical assessment elements will be upheld.
- The timescale allowed for re-attempts will depend on which elements were unsuccessful and the candidates current and future work commitments. This will be discussed with the candidate during the first attempt. Typical timeframes may include: 3-9months.

Our feedback consistently demonstrates that non-face to face feedback does not adequately equip a candidate to pass at the next sitting. Therefore, all re-attempts at the practical assessment, require the candidate's attendance in-person to facilitate adequate and helpful face-to-face feedback\*

*\*Subject to government guidance we may authorise virtual submissions.*

## Appendix 1: Training syllabus

The following sections form the minimum suggested training syllabus for this accreditation process. Candidates should use as a guide to prepare for the written and practical assessments of this accreditation process.

### 1. Underlying Principles

- a. Ischaemic cascade
- b. The difference between wall motion imaging and perfusion imaging
- c. The relationship between coronary arteries and LV segments
- d. Working knowledge of chest pain guidance form NICE (ref 1) and ESC guideline on stable coronary disease (ref 2)
- e. Role of stress echo in the assessment of structural heart disease (ref 3)

### 2. Indications

- a. Diagnosis of ischaemia
- b. Functional significance of known CAD
- c. Risk stratification post-myocardial infarction
- d. Post revascularisation (thrombolysis, PTCA, CABG) prognosis
- e. Pre-op evaluation prior to non-cardiac surgery ESC/ESA guidelines (ref 4)
- f. Assessment of transplant CAD
- g. Myocardial Viability
  - i. Myocardial stunning
  - ii. Hibernating myocardium
  - iii. Myocardial scar or non-viable myocardium
- h. Assessment of contractile reserve in DCM
- i. Stress Echo for Haemodynamics
  - ii. Valvular stenosis
  - iii. Valvular regurgitation
  - iv. Prosthetic valves
  - v. Pulmonary hypertension
  - vi. Hypertrophic cardiomyopathy

### 3. Relative or true contraindications

- i. Unstable angina
- ii. Acute MI within 48hrs
- iii. Haemodynamic instability, eg hypotension, severe hypoxia
- iv. Hypertension- BP>200/110 at baseline
- v. Serious, uncontrolled arrhythmias
- vi. Mobile LV thrombus
- vii. Symptomatic severe aortic stenosis
- viii. Decompensated heart failure
- ix. Acute myo/pericarditis
- x. AV block and asthma (Adenosine)

### 4. Technical Aspects

- a. **Types of tests (pros and cons)**
  - i. Treadmill
  - ii. Bicycle

- iii. Pharmacological- Dobutamine/Dipyridamole/Adenosine
- iv. Adjunctive use of Atropine
- v. Role of pacing
- vi. Role of handgrip
- b. Consent**
  - i. Verbal vs written
  - ii. Patient information
- c. Staffing requirements**
  - i. Role of the physician, nurse, physiologist
  - ii. Training in TTE and stress echo
  - iii. Training in ALS/ILS
  - iv. Competency maintenance 100/operator/year (ref 5)
- d. Protocols**
  - i. Protocols for exercise- both treadmill and bicycle Protocols for Dobutamine/Dipyridamole/Adenosine
  - ii. Basic knowledge of the stressor pharmacokinetics
  - iii. Protocols for viability
  - iv. Use of beta-blockade
  - v. Use of Atropine/hand grip
- e. End-points**
  - i. Completion of protocol
  - ii. Target heart rate/workload
  - iii. Hypotension (BP <90)
  - iv. Hypertension (BP  $\geq$  220/120 mmHg)
  - v. Sustained arrhythmia
  - vi. Significant ischaemia including cavity dilation
  - vii. ST elevation on ECG if monitored
  - viii. Significant symptoms
- f. Side effects and complications**
  - i. Vasovagal reactions
  - ii. The occurrence of major complications (ref 6)
- g. Set-up/equipment/drugs**
  - i. Digital echocardiography machine with offline analysis package specific for SE
  - ii. Automated blood pressure machine with manual back up if needed.
  - iii. Continuous ECG monitoring
  - iv. Fully equipped resuscitation trolley with defibrillator
  - v. Oxygen supply and suction.
  - vi. Availability of trans pulmonary contrast when echo window is suboptimal
  - vii. Drugs to manage severe allergic reactions and anaphylactic shock. To include – IV adrenaline 1:1000, IV chlorphenamine, IV hydrocortisone, salbutamol nebuliser – in dose and preparation to meet current Resuscitation UK guidelines
  - viii. Cannulation equipment
  - ix. Exercise treadmill and/or semi-supine bike with protocol options
  - x. Dobutamine infusion and administration pump.
  - xi. IV Atropine - up to 1.2mg.
  - xii. IV beta-blockers, e.g. metoprolol
  - xiii. Aminophylline
- h. Image acquisition**
  - i. Baseline minimum dataset
  - ii. Commence with apical views- Ap4c, Ap2c +/- Ap 3C
  - iii. PLAX and SAX

- iv. Peak/post-peak imaging for exercise (suggested timing of post-peak images within 60 secs)
- v. 85% target vs 100% target HR
- vi. Role of recovery imaging
- vii. Imaging during symptoms

## 5. Interpretation

- a. **Quad screen display**
- b. **Assessment of wall thickness vs WMAs**
- c. **Patterns for ischaemia, hibernation, stunning and non-viability/scar**
- d. **Wall motion score index**
- e. **Nomenclature of 17 segment model**
- f. **Inter-observer variability and reproducibility**
- g. **Causes of false positive tests**
  - i. Non-ischaemic cardiomyopathy- mismatch without CAD
  - ii. Septal motion abnormalities (LBBB, post-CABG)- overcome by assessing wall thickness
  - iii. Basal inferior wall artefact
  - iv. Hypertensive response- usually preserved wall thickness
  - v. Poor image quality
  - vi. Interpreter bias
- h. **Causes of false negative tests**
  - i. Single vessel disease
  - ii. "Mild" coronary stenosis
  - iii. Left circumflex artery disease
  - iv. Inadequate stress
  - v. Rapid recovery
  - vi. Poor image quality
  - vii. Severe LVH
- i. **Accuracy**
  - i. Sensitivity and specificity
    - 1. Overall and in different coronary territories
    - 2. In single vs multi-vessel disease
    - 3. In the context of LVH and LBBB
    - 4. In viability assessment
  - ii. Comparisons with
    - 1. Exercise ECG
    - 2. Other functional imaging modalities
  - iii. Comparisons between
    - 1. Treadmill vs bicycle
    - 2. Exercise vs pharmacologic
    - 3. Comparison of various pharmacologic agents
    - 4. Contrast vs no contrast
    - 5. Perfusion vs WMA assessment
- j. Prognostic value of a negative vs positive test

## 6. Contrast Echocardiography & Tissue Harmonic Imaging

- a. **Bubble characteristics**
  - i. Composition
  - ii. Size

- iii. Stability
- iv. Administration (bolus vs continuous)
- v. Safety
- vi. Available agents in the UK

**b. Instrumentation for Contrast Agents**

- i. Mechanical Index
- ii. Fundamental vs Harmonic imaging
- iii. High (power Doppler) vs low power (Pulse inversion, power modulation) imaging
- iv. Contrast destruction/refill analysis (qualitative and quantitative)
- v. Signal to noise ratio improvement techniques (background subtraction, filtering)
- vi. Capture mode

**c. Capture mode**

- i. Continuous
- ii. Triggered (intermittent; gated)
- iii. Destruction/fill imaging
- iv. Sequential pulse imaging

**d. Clinical Applications**

- i. Endocardial border enhancement
- ii. Global and regional wall motion evaluation
- iii. Doppler signal enhancement
- iv. Myocardial perfusion

**e. Contraindications and warnings for contrast (guidance is for Sonovue, which is the main agent used in the UK- please see revised Bracco guidelines from October 2014, ref 7)**

- i. Contra-indicated in known hypersensitivity
- ii. Contraindicated in large right-left shunts
- iii. Contraindicated in severe pulmonary hypertension >90mmHg
- iv. Caution advised within 7 days of any cardiac decompensation
- v. "Not suitable" in ventilated patients
- vi. "Not suitable" in patients with unstable neurological disease
- vii. "Should not be administered" in pregnancy and lactation

**7. Basic knowledge of new technologies applied to stress echo**

- i. Real-time 3D echo
- ii. TDI and derivatives
- iii. Coronary flow reserve

The level of knowledge expected is that of a competent echocardiographer performing stress echo studies and sustaining knowledge through the BSE and other educational resources, including issues relevant to clinical scanning and practice raised in the BSE Newsletter.

## Appendix 2: Curriculum based competency tool

The following competency assessment tool should be used to ensure all knowledge and practical experience is covered during the candidates training period.

The competency tool is now required to be completed by the candidates mentor via the BSE [online logbook portal](#).

Competency	Date achieved
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**Knowledge base**

Ischaemic cascade and the differences between wall motion and perfusion imaging.  
 Differences between viability and ischaemia assessment  
 Coronary arteries and LV territories  
 Indications for different types of stress echo including exercise and pharmacological stress  
 Assessment of structural heart disease by stress echo, eg MR, HOCM, AS  
 Physics of transpulmonary contrast  
 Contra-indications and cautions for stressors and contrast  
 Side effects and complications  
 End-points for test completion  
 Treatment of complications including contrast reactions  
 Treatment of arrhythmias, eg beta blocker but also as per ILS/ALS guidelines  
 Knowledge of relevant guidelines, eg for chest pain or valvular heart disease testing  
 Knowledge of strengths and limitations of stress echo  
 Working knowledge of other functional imaging modalities as compared with stress echo

**Practical Competencies**

Interacts appropriately with patients and stress echo team  
 Able to obtain informed consent  
 Able to tease out relevant contra-indications from patient history  
 Recognises cautions and contra-indications from baseline study, eg thrombus, critical AS  
 Understands basic instrumentation  
 Cares for machine appropriately  
 Can obtain standard views at baseline and reproduce views during stress  
 Can carry out stress protocols according to guidelines (at least Dobutamine and bike/treadmill)  
 Able to use Atropine and handgrip at the appropriate time  
 Can optimise gain settings, sector width, depth, focus, Doppler settings or colour gain as appropriate  
 Can handle contrast and optimise machinery for contrast settings  
 Can recognise and correct for artefacts, eg lateral lung shadow, apical foreshortening, LVOT vs MR  
 Can use all appropriate tools for valve/LVOT/PA pressure assessments  
 Able to recognise signs and treat contrast allergy, vasovagal response, arrhythmias, prolonged ischaemia

**Interpretation competencies**

Able to recognise different responses – normal, ischaemic, biphasic etc  
 Able to report ischaemic burden in 16 or 17 segment models of LV  
 Able to recognise LV dilatation  
 Able to recognise artefacts, eg basal inferior wall  
 Able to assess contractile reserve in aortic stenosis  
 Able to assess the severity of valve disease, eg pseudo-severe AS



## Appendix 3: Reading list

The reading list is provided by the Accreditation Committee of the British Society of Echocardiography and represent only a handful textbooks that are available for candidate to learn from.

- ASE guidelines on performance, interpretation and application of stress echo; Pellikka et al. Journal of the American Society, September 2007.
- Contrast echocardiography: evidence-based recommendations by European Association of Echocardiography; Roxy Senior et al. European Heart Journal Cardiovascular Imaging; Volume 10: p194 – 212.
- Stress echocardiography expert consensus statement- EAE guidelines; Sicari et al; Circulation. 2010;121: p1756-1767.
- EACVI toolbox on contrast echo- Lead authors Roxy Senior and Benoy Shah.  
<https://www.escardio.org/Guidelines-&-Education/Practice-tools/EACVI-toolboxes/Contrast-Echo/Contrast-Echocardiography-Box>
- Chest pain of recent onset: Assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin. NICE guidelines 95. March 2010. [www.nice.org.uk](http://www.nice.org.uk)
- ESC guidelines on the management of stable coronary artery disease: the Task Force on the management of stable coronary artery disease of the European Society of Cardiology. Task Force Members. Eur Heart J 2013;34(38):2949-3003
- Guidelines on the management of valvular heart disease (version 2012): the Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS). Eur Heart J 2012;33:2451-96
- 2014 ESC/ESA Guidelines on non-cardiac surgery: cardiovascular assessment and management: The Joint Task Force on non-cardiac surgery: cardiovascular assessment and management of the European Society of Cardiology (ESC) and the European Society of Anaesthesiology (ESA). Eur Heart J. 2014 Sep 14;35(35):2383-431
- Bierig S, Ehler D, Knoll M, Waggoner A. American Society of Echocardiography minimum standards for the cardiac sonographer: a position paper. J Am Soc Echocardiogr 2006;19:471-4
- Incidence, Pathophysiology, and Treatment of Complications During Dobutamine-Atropine Stress Echocardiography, Marcel L. Geleijnse et al.; Circulation. 2010;121:1756-1767
- Bracco revised warnings for Sonovue, October 2014 [www.mhra.gov.uk/home/groups/comms-ic/.../con475311.pdf](http://www.mhra.gov.uk/home/groups/comms-ic/.../con475311.pdf)
- Picano, Eugene. Stress Echocardiography, Sixth edition, Springer 2015

Protocols and the most up to date BSE guidelines are available under the [Education](#) tab of [www.bsecho.org](http://www.bsecho.org).

Please note that only fully subscribed BSE members are granted full access to all education and exam content.

## Appendix 4: Written examination registration guidance

[BSE written exams](#) are delivered in partnership with Pearson VUE. Candidates will be able to sit the exam at local centres throughout the UK, Republic of Ireland, and some overseas areas.

### Pre-Registration (through BSE website)

- Candidates must register their interest to sit the written exam by completing an online pre-registration form via the accreditation section of [www.bsecho.org](http://www.bsecho.org). The pre-registration window is open for up to four weeks.
- Candidates registered names should appear the same as per their photo identification. Pearson Vue follows a strict admission policy.
- BSE will transfer your data and requirements to Pearson VUE, who will contact all pre-registered candidates with further information on confirming placements for the exam.
- Delivery methods: there are two ways candidates can take the exam- **Test Centre (recommended)** or Online proctored exam (OnVue), which allows candidates to sit the exam from home (subject to system requirement).

### Special accommodations

- Pearson Vue can provide [special accommodations](#) to candidates who have official requirements, such as extra time, a reader, or the need for medication during the examination.
- Further information on accommodations is available on the website.
- All requests must be put in writing with supporting documents to support claims for special accommodations. Requests will be approved at the discretion of the BSE. Forward such requests to [accreditation@bsecho.org](mailto:accreditation@bsecho.org).

### Registration (through Pearson Vue)

- All registration and payments will be managed by Pearson VUE after the stage of pre- registration.
- Candidates with special requirements or conditions should notify the BSE during the pre-registration stage.
- Cancellations made in less than 7 days do not qualify for a refund. All cancellations must be processed through Pearson Vue.

### On the day of the exam

- Instructions will be given on the day of the exam via a video tutorial at the test centre or [onVUE online proctored](#). Candidates will complete the exam on a computer at the test centre.
- A basic calculator is already built into the online exam. An erasable sheet will be given to candidates by the examining centre. If sitting the exam from home using online proctoring- a calculator and whiteboard are built into the exam.
- **Candidates are not required to bring any stationery to the exam.**
- **Candidates are required to bring a photo ID.** Please ensure that the registration details match your photo ID exactly as otherwise you will be refused entry. If denied entry, candidates should contact BSE immediately.
- **Any last-minute requests for special accommodations will not be facilitated by the test centre.**

## Results

- Results are released 5-6 weeks after sitting the exam. Scores will be uploaded to BSE personal profiles. Both sections must be passed to achieve a complete pass grade.
- **Pass:** candidates will be issued with login details to the portal to begin uploading cases. The submission deadline will appear at the 'Practical submission deadline' in the member profile.
- **Fail:** candidates can register interest to sit the next sitting of the exam.
- The reduced fee only applies to candidates who physically sat the exam and were unsuccessful; the next attempt must be taken at the next sitting (within 12 months).
- Results cannot be appealed or 'remarked' as the tests are computer-based.

Please watch the demo available via Pearson VUE; <http://www.pearsonvue.com/demo/>

## Additional Information

Candidates are advised to check the security procedures in the "What to expect section" of the Pearson VUE/BSE guide page; <https://home.pearsonvue.com/test-taker/security.aspx>

Pen Vue operates a strict admissions policy. Candidates registered names should be exactly as they appear on their government photographic ID.

## Appendix 5: Examples of written exam multiple choice questions

Answer 'True' (T) or 'False' (F) to each of the following.

There is no negative marking - one mark added for a correct answer, no mark deducted for an incorrect answer.

<b>Q1</b>	<b>The following are all acceptable indications for stress echocardiography:</b>	
a)	Assessment of the functional significance of a 60% lesion on CT angiography	T
b)	Determination of viability following inferior myocardial infarction with known right coronary occlusion	T
c)	Diagnosis of crescendo angina in a 67 year old male with a typical history and pre-test probability of 93%	F
d)	Determination of prognosis following anterior myocardial infarction	T
e)	Risk stratification prior to abdominal aortic aneurysm repair in a patient unable to exercise due to claudication	T

<b>Q2</b>	<b>The following are considered contra-indications for stress echocardiography:</b>	
a)	Presence of an LV thrombus	T
b)	Presence of symptomatic aortic stenosis	T
c)	Previous myocardial infarction >7 days ago	F
d)	Presence of atrial fibrillation	F
e)	Pacemaker insitu with intrinsic rhythm	F

<b>Q3</b>	<b>Regarding safety precautions for DSE studies:</b>	
a)	Patients with glaucoma are indicated to have atropine	F
b)	Patients with a resting of BP of 250/150mmHg are safe to continue with the DSE	F
c)	Only one member of staff is required to be present to undertake a DSE	F
d)	Medications for severe allergic reactions include 1:1000 IV/IM adrenaline and chlorphenamine	T
e)	A baseline echocardiography should be undertaken to exclude contra-indications prior to a DSE	T

<b>Q4</b>	<b>Which of the following are absolute end points for stress echo studies:</b>	
a)	New wall motion abnormality	T
b)	Progressive LV dilatation	T
c)	Drop in systolic BP >10mmHg from baseline without evidence of ischaemia	F
d)	ST elevation >1mm with symptoms	T
e)	Drop in systolic BP >10mmHg from baseline without symptoms	F

## Appendix 6: Examples of the written exam image reporting questions

A number of moving clips and stills will be included in each question. Although these can be viewed and replayed as many times as the candidate wishes, the candidate should be mindful of the time spend on each question.

The **SINGLE BEST ANSWER** should be selected.

There is no negative marking - one mark added for a correct answer, no mark deducted for an incorrect answer.

### Case 1

Request: male, 57 year old, exertional chest pain, type II DM, high cholesterol. ? inducible ischaemia.

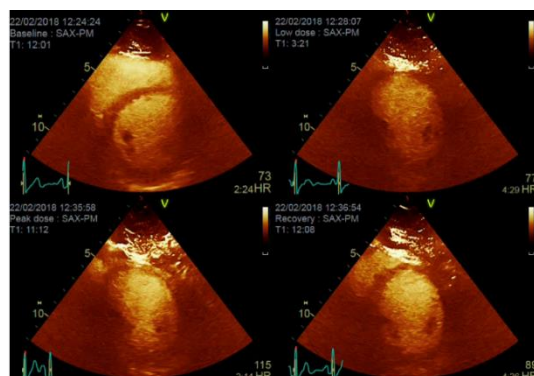
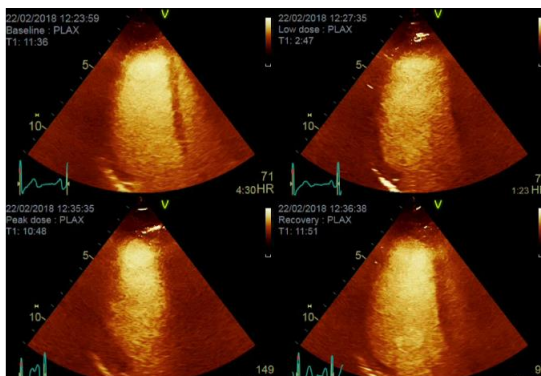
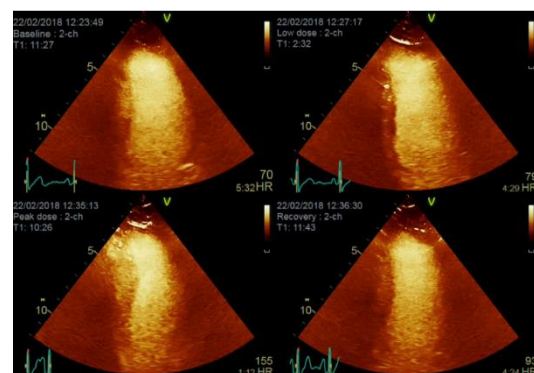
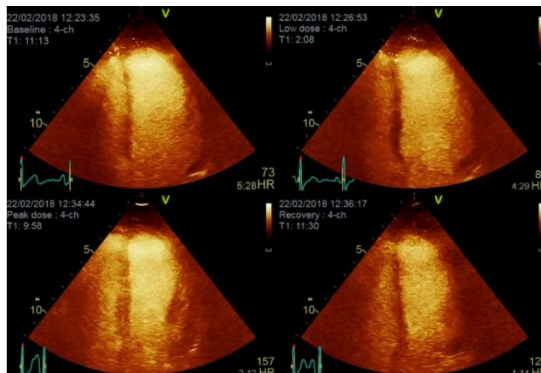
**Data:** LVEDV baseline: 66ml, peak stress: 50ml.

Baseline BP: 148/83mmHg. HR: 72bpm.

10mcg/min/kg: BP: 178/89mmHg, HR: 78bpm

20mcg/min/kg: BP: 154/84mmHg, HR: 144bpm

30mcg/min/kg: BP: 160/90mmHg, HR: 158bpm

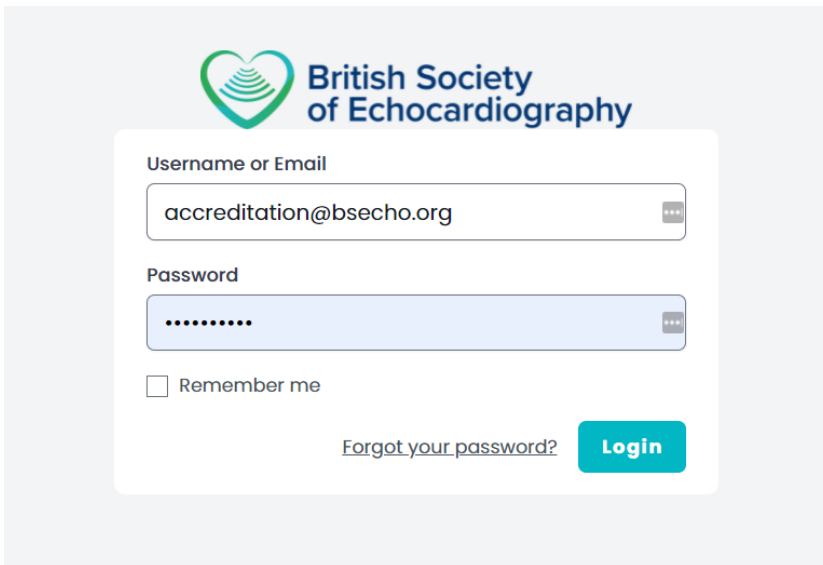


1.1	Regarding the stress echo findings:	Answer
a	Evidence of inducible ischaemia – likely LAD territory	T
b	Evidence of non-viable myocardium – likely LAD territory	
c	Evidence of inducible ischaemic – likely LCX territory	
d	Evidence of non-viable myocardium – likely LCX territory	

## Appendix 7: BSE logbook portal user guidance

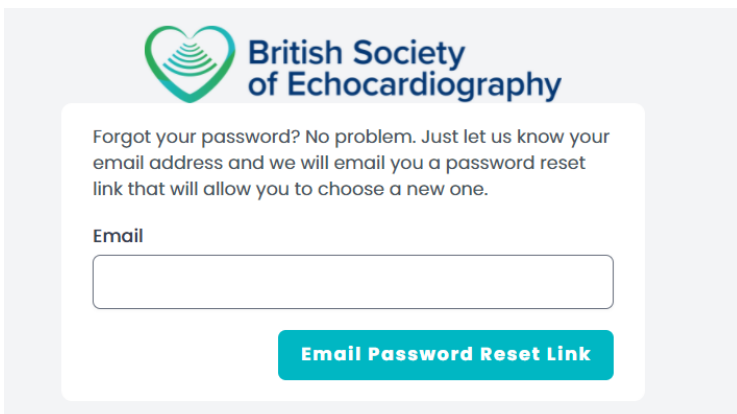
### 1. User Login Details:

- Request login details by emailing the accreditation team- [accreditation@bsecho.org](mailto:accreditation@bsecho.org).  
Provide your **BSE ID number**, the type of \*accreditation you are pursuing.  
Also, inform us of your mentor's name and email address- we will assign them to your logbook.
- An automated message from the portal will be emailed to you with your login details.
- Link to the portal: <https://logbook-v2.bsecho.org/login>



The screenshot shows the login page for the British Society of Echocardiography. At the top left is the logo, a green heart with a white echocardiogram pattern inside. To its right is the text "British Society of Echocardiography". Below the logo is a white login form with a light blue border. The form has two input fields: "Username or Email" containing "accreditation@bsecho.org" and "Password" containing ".....". Below the password field is a checkbox labeled "Remember me". At the bottom of the form is a link "Forgot your password?" and a blue "Login" button.

- a. If you have forgotten your password, please click the link titled [Forgot your password?](#)



The screenshot shows the password reset page for the British Society of Echocardiography. At the top left is the logo, a green heart with a white echocardiogram pattern inside. To its right is the text "British Society of Echocardiography". Below the logo is a white form with a light blue border. The form contains the text "Forgot your password? No problem. Just let us know your email address and we will email you a password reset link that will allow you to choose a new one." Below this text is an "Email" input field. At the bottom of the form is a blue button labeled "Email Password Reset Link".

### 2. Update your profile

- Click on your name, then '**Profile**' to update your name, email and password.



Candidate Dashboard

Mentor Dashboard

Assessor Dashboard

Admin Dashboard

Jo Vashishta

Manage Account

Profile

Logout

## Profile

### Profile Information

Update your account's profile information and email address.

#### Membership Number

BSE Staff

#### Username

thanjo

#### First Name

Jo

#### Surname

Vashishta

#### Email

jo@bsecho.org

Save

Enter new password and click 'save.'

### Update Password

Ensure your account is using a long, random password to stay secure.

#### Current Password

#### New Password

#### Confirm Password

Save

### Browser Sessions

Manage and logout your active sessions on other browsers and devices.

If necessary, you may logout of all of your other browser sessions across all of your devices. Some of your recent sessions are listed below; however, this list may not be exhaustive. If you feel your account has been compromised, you should also update your password.

Windows - Chrome  
[redacted] **this device**

Logout Other Browser Sessions

### 3. User dashboard (e.g. Candidate, Mentor or Assessor)

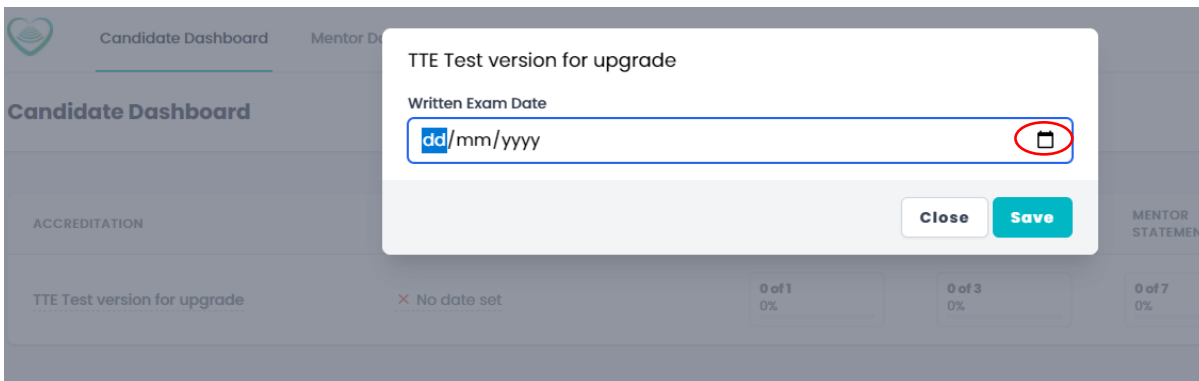
- Click on the visible heading to access your dashboard

**Candidate Dashboard**


ACCREDITATION	WRITTEN EXAM DATE	LOGBOOK	COMPETENCIES	MENTOR STATEMENTS	STATUS
<a href="#">TTE Test version for upgrade</a>	✗ No date set	0 of 1 0%	0 of 3 0%	0 of 7 0%	<b>In Progress</b> >

**a. Enter Written Exam Date**

- Click on [✗ No date set](#) to bring up the calendar and select the date you sat the written exam.



- b. Click the box under the Logbook title to begin uploading PDF reports. The portal will take only PDF uploads.**

 **Candidate Dashboard**
[Mentor Dashboard](#)
[Assessor Dashboard](#)
[Admin Dashboard](#)

**Candidate Dashboard**

ACCREDITATION	WRITTEN EXAM DATE	LOGBOOK
<a href="#">TTE Test version for upgrade</a>	<a href="#">10/11/2021</a>	0 of 1 0%

To add a new case, click on **'Add a new Case'**, give it a Title, enter the date of the case and Choose File.



Candidate Dashboard Mentor Dashboard Assessor Dashboard Admin Dashboard Jo Vashishta ▾

TTE Test version for upgrade > Case 1 Logbook Comments Case Comments [Red] [Green]

Case 1 View Annotate [Search] [Share] [Settings]

You haven't added any cases yet

Add a new Case



Candidate Dashboard Mentor Dashboard Assessor Dashboard

TTE Test version for upgrade > Case 1

Case 1 View Annotate [Search] [Share] [Settings]

You haven't added any cases yet

Add a new Case  
 Title   
 Date    
 Document  Choose File  
Cancel Save


- Explore the features and tools by hovering over the icons to find what they can do.
- To **save** your work, click , to **delete** click 

Candidate Dashboard Mentor Dashboard Assessor Dashboard Admin Dashboard Jo Vashishta ▾

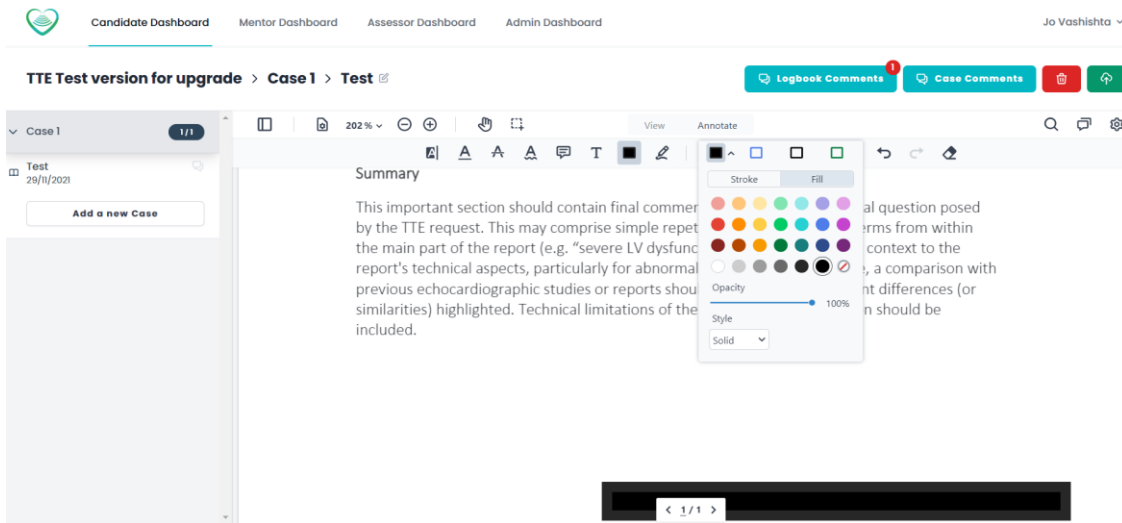
TTE Test version for upgrade > Case 1 > Test Logbook Comments 1 Case Comments [Red] [Green]

Case 1 View Annotate [Search] [Share] [Settings]

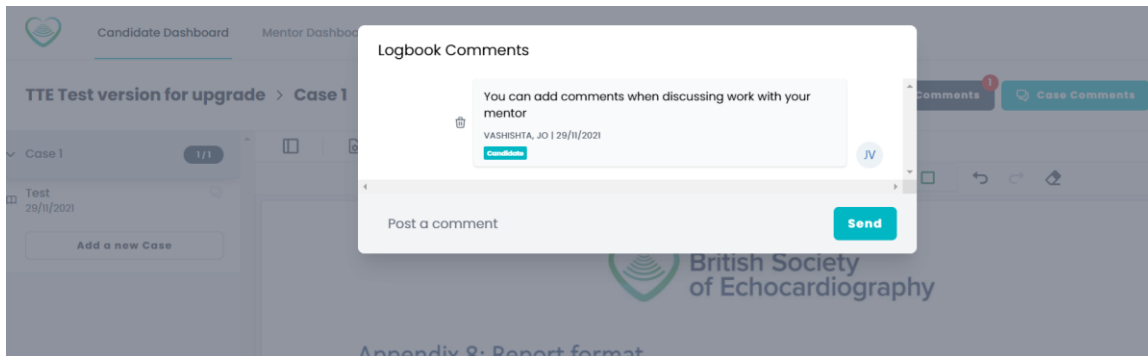
Test 29/11/2021


 British Society  
of Echocardiography  
  
**Appendix 8: Report format**  
  
 THIS IS A SUGGESTED FORMAT FOR A REPORT WITHIN THE WORKPLACE. PLEASE NOTE – ALL REPORTS SUBMITTED MUST BE ANONYMIZED AS PER [APPENDIX 15](#)  
  
 The report should comprise the following sections:  
  
 Demographic and other Identifying Information  
  
 Obligatory information < 1/1 >

The 'Rectangle' tool allows masking over unwanted data. Click the Save button to keep the anonymise changes.



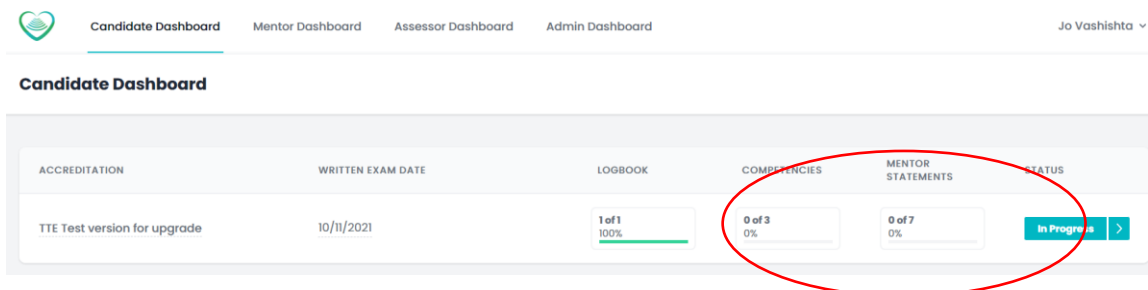
You can add logbook or case comments to share with your mentor only.



#### 4. Competencies

Your mentor will access your portal via their login and sign off each of the competencies.

Candidate can view the progress in the dashboard.



a. Mentor view:

The mentor clicks the sections below the 'DATE SIGNED OFF' header to sign off competencies by clicking on 'Sign off.'

#### TTE Test version for upgrade - Vashishta, Jo

COMPETENCY	SIGNED OFF BY	DATE SIGNED OFF
<b>Received correctly</b>		
<b>1a. Basic Echocardiography - Knowledge</b>		
a. Basic principles of ultrasound		<a href="#">Sign Off ✓</a>
b. Basic principles of spectral Doppler	Vashishta, Jo	29/11/2021 ✕
c. Basic principles of colour flow Doppler	Vashishta, Jo	29/11/2021 ✕

When mentor has completed competency sign off, they must do the same for the 'Mentor statement.'

1. I certify that the candidate has undergone a programme of training in echocardiography.	Vashishta, Jo	29/11/2021 ✕
2. I certify I have observed the candidate scanning and I am satisfied that he/she is competent at completing a full transthoracic echo study.	Vashishta, Jo	29/11/2021 ✕
3. I certify that the candidate has reached a standard of training to be able to independently perform and report a transthoracic echocardiographic study. He/she has reached all of the mandated competencies. I have signed off the candidate's competency sheet.	Vashishta, Jo	29/11/2021 ✕
4. I certify that the candidate above has performed and reported the cases included in the accompanying Log Book within a 24-month period (or the timeframe as agreed by the BSE).	Vashishta, Jo	29/11/2021 ✕
5. I certify that this is a demonstration of the logbook portal for testing purposes only and does not constitute BSE TTE accreditation and that this is understood by myself and the candidate.		<a href="#">Sign Off ✓</a>

## 5. Candidate logbook submission

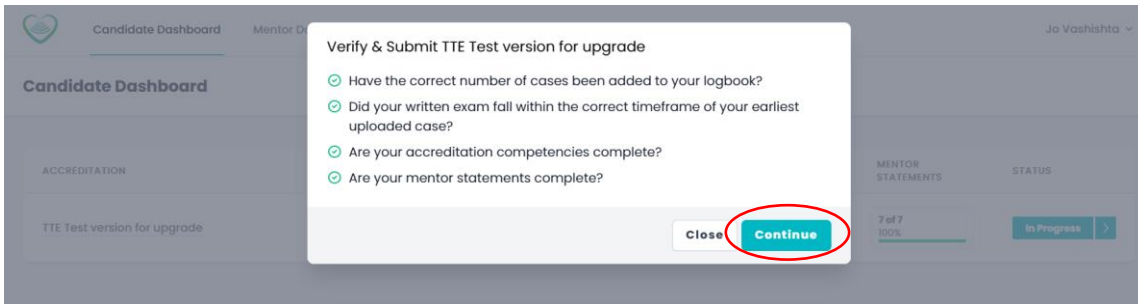
Candidate can check the progress of their logbook in the dashboard and click the arrow after 'In Progress'.

#### Candidate Dashboard

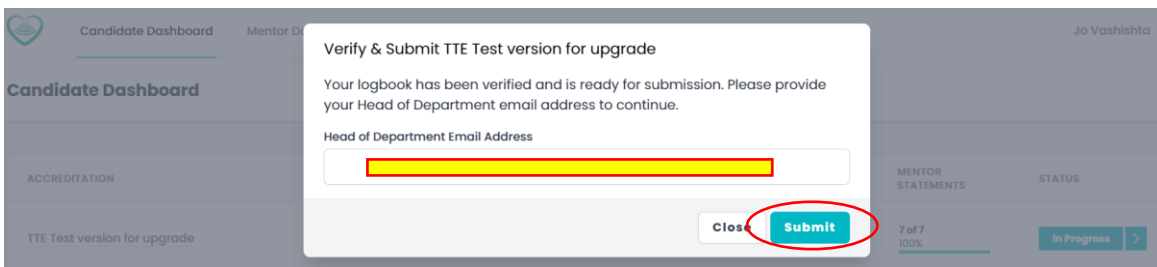
ACCREDITATION	WRITTEN EXAM DATE	LOGBOOK	COMPETENCIES	MENTOR STATEMENTS	STATUS
TTE Test version for upgrade	10/11/2021	1 of 1 100%	3 of 3 100%	7 of 7 100%	In Progress <a href="#">&gt;</a>

#### a. Verify and submit

Check you have completed the requirement before clicking 'Continue.'



b. Enter Head of Department Email Address and click submit:



c. Contact [accreditation@bsecho.org](mailto:accreditation@bsecho.org) to inform you have entered your HOD's email address and clicked submit.

#### Candidate Dashboard

ACCREDITATION	WRITTEN EXAM DATE	LOGBOOK	COMPETENCIES	MENTOR STATEMENTS	STATUS
TTE Test version for upgrade	10/11/2021	1 of 1 100%	3 of 3 100%	7 of 7 100%	Validating Head of Department

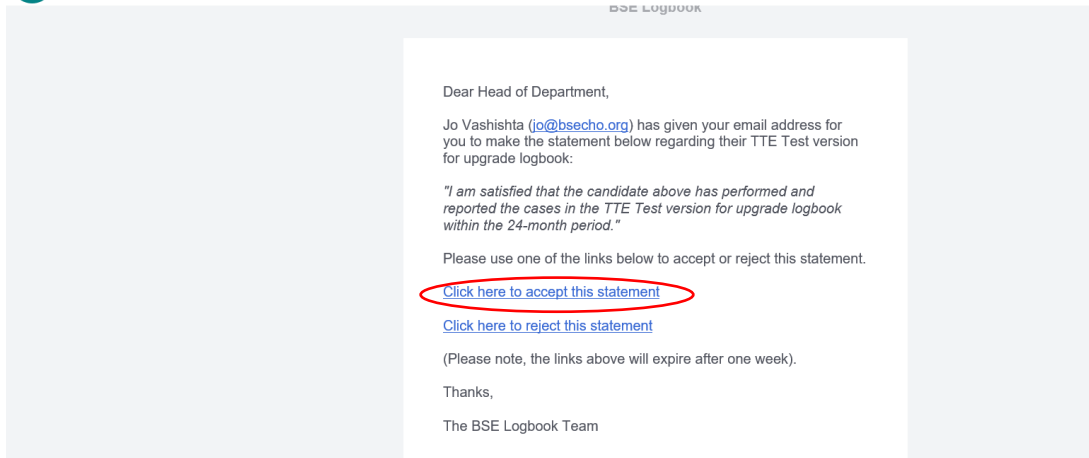
## 6. Validate logbook

Your Head of Department must click the link to accept the statement.

BSE Logbook - Head of Department Sign Off Request

BA BSE Logbook <accreditation@bsecho.org>  
To Jo Vashishta

Reply



#### a. Head of Department varified

After clicking the statement, the Head of Department receives the message below.



*Please note that some NHS emails may block messages from the logbook portal- [accreditation@bsecho.org](mailto:accreditation@bsecho.org). In this case, candidates should consider providing an alternative email address, e.g. non-NHS email addresses.*

#### 7. Logbook submitted

Once the logbook has been validated, it is ready for an assessor to mark.

### Candidate Dashboard

ACCREDITATION	WRITTEN EXAM DATE	LOGBOOK	COMPETENCIES	MENTOR STATEMENTS	STATUS
TTE Test version for upgrade	10/11/2021	1 of 1 100%	3 of 3 100%	7 of 7 100%	<a href="#">Submitted</a>

- No further action is required from this point.
- Candidates will be notified when marking is complete.

*Updated: JV- 29/11/2021*

End of guide.

## Appendix 8: Logbook guidance and marking criteria

### **A comprehensive report should include:**

1. The indication for the study
2. Details of stress technique used including the haemodynamic parameters during the test
3. Use of contrast
4. Symptoms occurring during the test, eg whether the patient had their typical symptoms during stress
5. Assessment of the 12 lead ECG findings if used.
6. Image quality: good/moderate/poor
7. LV size and function at rest and peak
8. Wall motion assessment/scoring at each stage
9. Interpretation and diagnosis including a conclusion regarding the risk stratification

## Logbook marking criteria

When marking a candidate's logbook, the Assessor will review a selection of reports in the candidate's logbook.

The following marking criteria is used when assessing each logbook report

Does the report meet the following criteria?	Yes / No (if no, state reasons why)
Indication given for stress echo	
Rhythm during test	
Comment on resting LV global and segmental function	
Type of stressor clear on the report	
For exercise: Duration/workload on the treadmill/bike and reason for stopping exercise	
For DSE: Peak dobutamine and Atropine dose (if used)	
The comment about LV global and segmental function at peak stress	
For structural- clear description of the relevant pathology	
Conclusion	

### Logbook outcomes include:

Satisfactory log-book for BSE accreditation OR Unsatisfactory at present and a resubmission is required.

If a logbook is unsatisfactory, the candidate will be asked for a resubmission which will be individualised to the candidate to address the concerns in the logbook.

To ensure consistency across logbook marking, all logbooks are discussed with the chief assessor prior to a resubmission being requested.



## Appendix 9: Guidance for the removal of patient identifiable data

The duty of confidentiality arises out of the common law of confidentiality, professional obligations and also staff employment contracts. Breach of confidence may lead to disciplinary measures, bring into question professional reputation and possibly result in legal proceedings.

Guidance is provided to Healthcare Professionals in the 'NHS Code of Practice on Confidentiality' (November 2003):

[http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_4069254.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4069254.pdf)

Patient information that can identify individual patients is confidential and must not be used or disclosed in any part of the submission required for this accreditation process. In contrast, anonymised information is not confidential and may be used.

**Key identifiable information includes:**

- Patient's name
- Address
- Full post code
- Date of birth
- NHS number and local identifiable codes

Key identifiable information may also include information that may be used to identify a patient directly or indirectly. For example, rare diseases, drug treatment or statistical analyses which have very small numbers within a small population may allow individuals to be identified.

### **Guidance to candidates submitting Logbooks and Cases for Accreditation**

The NHS Code of Practice on confidentiality means that evidence submitted for this accreditation process must have removed **ALL** patient identifiable information beyond that of gender and age/year of birth.

**Reports** – Please use the BSE [online portal](#) and electronically delete all patient information except age and gender.

We would advocate against the use of other electronic anonymisation as sometimes data is still present. If in doubt, manually remove patient identification information prior to use.

**Video cases** - We appreciate that the removal of patient ID may be difficult. Therefore advise that the video cases are specifically collected, and the data inputs are made relevant to your cases (E.g. Patient Name could be 'BSE Case 1', Patient Number could be your membership number followed by case number, '1111-1').

**The final decision remains at the discretion of the Chair of the Accreditation Committee.**

## Appendix 10: Practical scanning assessment:

The marking criteria used for the practical scanning assessment can be seen below.

The candidate will be asked prior to the assessment which stressor they wish to undertake the assessment on (treadmill or supine bicycle).

A volunteer will role play as a patient having an exercise stress echo for ischaemia testing.

The candidate should interact with the volunteer as they would be with a patient attending their stress echo list within their own department.

Performance Competency	Criteria	F	BF	BP	P	Weighting	Guidance	Max Score
Checks patient identity	Checks patient identity using 3 unique identifiers	0	1	2	3	3	<b>P</b> if 3 unique identifiers are checked. <b>BP</b> if 2 unique identifiers are checked. <b>BF</b> if 1 unique identifier is checked. <b>F</b> if no checks are made.	
Baseline Requirements	Pays attention to detail and is able to record baseline parameters including assessment of AV at rest	0	1	2	3	5	<b>P</b> if high quality optimised image. <b>BP</b> if clinically satisfactory image with limited optimisation. <b>BF</b> if unable to accurately acquire image although is able to identify remedial measures. <b>F</b> if unable to reproduce image which reflects the PLAX in the specific model.	
Contrast Requirement and Associated risks of using contrast	Pays attention to detail and is able to recognise good images.	0	1	2	3	5	<b>P</b> if clear communication of this is demonstrated. <b>BP</b> if able to identify if contrast required or not although limited knowledge of potential issues with contrast and why the decision has been made. <b>BF</b> if able to identify if contrast is required and demonstrates many short fallings in knowledge of why contrast could/should. <b>F</b> if unable to identify why contrast could be used and is not able to outline the potential risks of contrast.	
Leads the stress protocol	Is able to inform patient and demonstrate knowledge of stress protocols	0	1	2	3	5	<b>P</b> if appears competent and knowledgeable about stress protocols, <b>BP</b> if lacking some knowledge but appears competent, <b>BF</b> if lacking a lot of knowledge but still safe to perform a stress study, <b>F</b> if deemed unsafe.	
Acquisition of baseline Apical Images	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	3	<b>P</b> if high quality optimised image. <b>BP</b> if clinically satisfactory image with limited optimisation. <b>BF</b> if unable to accurately acquire image although is able to identify remedial measures. <b>F</b> if unable to reproduce image which reflects the Assessor's image acquisition in the model.	

## Appendix 11: Patient case studies viva marking criteria

The next few pages show the individual marking criteria for each of the patient video case studies.

All criteria must be met to a satisfactory standard in order for the patient case study to be passed.

A minimum of two patient case studies will be assessed. The British Society of Echocardiography reserves the right to assess all five patient viva cases.

### Video case 1. Normal Dobutamine stress echo using trans-pulmonary contrast

Competency		Satisfactory	Unsatisfactory	Comments
1	ECG			
2	Pre-stress safety checks, eg severe aortic stenosis			
3	Contrast optimisation			
4	Baseline- All views present			
5	Low- all views present			
6	Intermediate- all views present			
7	Peak- all views present			
8	Recovery (optional) views			
9	Synchronised Quad-screen display			
10	Report - accurate			

Adult Stress Echo Accreditation – Normal Dobutamine stress echo using trans-pulmonary contrast			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
<b>ECG</b> Present throughout with good synchronisation		<b>ECG</b> Unstable or absent	
<b>Optimisation</b> Demonstrates good endocardial border definition with MI, gain, TGC controls		<b>Optimisation</b> Frequent, repetitive optimisation errors which detract from the case conclusion	
<b>Complete study</b> Images are complete enough to allow for a complete assessment		<b>Incomplete study</b> Images are missing which are relevant to the assessment	
<b>Report is complete and accurate</b> 1. Comprehensive and accurate description of all LV segments 2. Correct interpretation of findings in the clinical context		<b>Report is incomplete or inaccurate</b> 1. Partial and inaccurate description of all LV segments 2. Incorrect interpretation of findings in the clinical context	

Video case 2. Normal exercise stress echo study

Competency		Satisfactory	Unsatisfactory	Comments
1	ECG			
2	Pre-stress safety checks, eg severe aortic stenosis			
3	Contrast optimisation (optional)			
4	Baseline- All views present			
5	Low- all views present (optional)			
6	Intermediate all views present (optional)			
7	Peak/post-peak- all views present			
8	Recovery views (optional)			
9	Synchronised multi-screen display			
10	Report - accurate			

Adult Stress Echo Accreditation – Normal exercise stress echo study with or without trans-pulmonary contrast			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
<b>ECG</b> Present throughout with good synchronisation		<b>ECG</b> Unstable or absent	
<b>Optimisation</b> Demonstrates good endocardial border definition with MI, gain, TGC controls		<b>Optimisation</b> Frequent, repetitive optimisation errors which detract from the case conclusion	
<b>Complete study</b> Images are complete enough to allow for a complete assessment		<b>Incomplete study</b> Images are missing which are relevant to the assessment	
<b>Report is complete and accurate</b>  1.Comprehensive and accurate description of all LV segments 2. Correct interpretation of findings in the clinical context		<b>Report is incomplete or inaccurate</b>  1.Partial and inaccurate description of all LV segments 2.Incorrect interpretation of findings in the clinical context	

Video case 3. Ischaemic stress echo study

Competency		Satisfactory	Unsatisfactory	Comments
1	ECG			
2	Pre-stress safety checks, eg severe aortic stenosis			
3	Contrast optimisation (optional)			
4	Baseline- All views present			
5	Low- all views present (optional)			
6	Intermediate (optional) all views present			
7	Peak/post-peak- all views present			
8	Recovery (optional) views			
9	Synchronised multi-screen display			
10	Report - accurate			

Adult Stress Echo Accreditation – Ischaemic stress echo study with or without trans-pulmonary contrast			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
<b>ECG</b> Present throughout with good synchronisation		<b>ECG</b> Unstable or absent	
<b>Optimisation</b> Demonstrates good endocardial border definition with MI, gain, TGC controls		<b>Optimisation</b> Frequent, repetitive optimisation errors which detract from the case conclusion	
<b>Complete study</b> Images are complete enough to allow assessment of ischaemia		<b>Incomplete study</b> Images are missing which are relevant to the assessment of ischaemia	
<b>Report is complete and accurate</b>  1.Comprehensive and accurate description of all LV segments 2.Correct segmental analysis 3.Correct correlation to coronary circulation		<b>Report is incomplete or inaccurate</b>  1.Partial and inaccurate description of all LV segments 2.Incorrect segmental analysis 3.Incorrect correlation to coronary circulation	

Video case 4. Viable or non-viable myocardium stress echo study

Competency		Satisfactory	Unsatisfactory	Comments
1	ECG			
2	Pre-stress safety checks eg severe aortic stenosis			
3	Contrast optimisation (optional)			
4	Baseline- All views present			
5	Low- all views present			
6	Intermediate- all views present			
7	Peak (if hybrid study) - all views present			
8	Recovery (optional) views			
9	Synchronised multi-screen display			
10	Report - accurate			

Adult Stress Echo Accreditation – Ischaemic stress echo study with or without trans-pulmonary contrast			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
<b>ECG</b> Present throughout with good synchronisation		<b>ECG</b> Unstable or absent	
<b>Optimisation</b> Demonstrates good endocardial border definition with MI, gain, TGC controls		<b>Optimisation</b> Frequent, repetitive optimisation errors which detract from the case conclusion	
<b>Complete study</b> Images are complete enough to allow a complete assessment		<b>Incomplete study</b> Images are missing which are relevant to the assessment	
<b>Report is complete and accurate</b>  1.Comprehensive and accurate description of all LV segments 2.Correct segmental analysis 3.Correct correlation to coronary circulation		<b>Report is incomplete or inaccurate</b>  1.Partial and inaccurate description of all LV segments 2.Incorrect segmental analysis 3.Incorrect correlation to coronary circulation	

Video case 5. Structural heart disease stress echo study

Competency		Satisfactory	Unsatisfactory	Comments
1	ECG			
2	Pre-stress study to show all TTE images relevant to pathology			
3	Image optimisation			
4	Baseline- All views present			
5	Low- all views present (if relevant to pathology)			
6	Intermediate- all views present (if relevant to pathology)			
7	Peak - all views present (if relevant to pathology)			
8	Recovery views (if relevant to pathology)			
9	Synchronised multi-screen display			
10	Report - accurate			

Adult Stress Echo Accreditation – Ischaemic stress echo study with or without trans-pulmonary contrast			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
<b>ECG</b> Present throughout with good synchronisation		<b>ECG</b> Unstable or absent	
<b>Optimisation</b> Demonstrates optimisation of relevant pathology		<b>Optimisation</b> Frequent, repetitive optimisation errors which detract from the case conclusion	
<b>Complete study</b> Images are complete enough to allow assessment of pathology		<b>Incomplete study</b> Images are missing which are relevant to the assessment	
<b>Report is complete and accurate</b>  1. Comprehensive and accurate description of the chosen pathology 2. Correct interpretation of findings in the clinical context		<b>Report is incomplete or inaccurate</b>  1. Partial and inaccurate description of the chosen pathology 2. Incorrect interpretation of findings in the clinical context	