British Society of Echocardiography

Accreditation in Adult Stress Echocardiography (SE) Information Pack

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

30 April 2026

This document supersedes all previous versions.

This document is a guide to completing BSE accreditation

Submission, assessment criteria and portal user guide are included

British Society of Echocardiography

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Welcome message from the 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, Sonographers and Scientists with the ultimate aim of achieving and maintaining a high standard of clinical stress echocardiography for the benefit of our patients.

The accreditation process is regulated to ensure high proficiency and professional standards. We aim to enable as many members as possible to achieve accreditation. A list of accredited members is maintained on the BSE website.

Please remember that we are here to support you throughout this process. If you need any assistance or have constructive feedback to offer the accreditation committee, please don't hesitate to let us know. We are committed to your success.

Good luck with your accreditation process.

Best wishes,

Michâel Purdon

Chair, BSE Accreditation Committee

Introduction & aims

- Accreditation is a service for BSE members and is not a compulsory or regulatory certificate of competence or excellence.
- Accredited members are expected to be able to perform and report stress echocardiographic studies unsupervised.
- The Accreditation process consists of a written theory examination and a practical assessment. This pack provides further instructions for both.
- Accreditation is a minimum requirement and cannot be regarded as a guarantee of competence.
- Stress echocardiography skills can only be maintained through continued education and practical involvement in the modality. This is underlined by limiting accreditation to five years, after which re-accreditation must be sought. Further details surrounding re-accreditation are available on the BSE website.
- Accredited members are expected to uphold the BSE code of conduct standards. Where concerns about an accredited member's stress echocardiography practice arise, they should be addressed locally in the first instance and escalated to the Accreditation Chair only if no improvement in stress echocardiography practice has been demonstrated.
- **Return-to-practice pathways** for reaccreditation are available for previously accredited members.
- **International candidates** working outside the United Kingdom must pass the logbook section of the practical examination before booking a place on a practical assessment day. This will help the Society manage capacity, and candidates manage their travel arrangements (including visas, where necessary) for overseas candidates.

Summary of process requirements

1. The candidate must be a member of the BSE and hold current **BSE or EACVI** Adult transthoracic echocardiography (TTE) accreditation.
2. Candidates must have a designated mentor to assist them through the accreditation process.
3. The accreditation process has two compulsory elements: a written theory examination and a practical assessment. **You must pass both elements to become an accredited member.**
4. The written theory exam comprises a single best answer theory section and a "best answer" image reporting section.
5. The practical assessment consists of a logbook, a practical scanning assessment, and a viva assessment of five patient case studies.
6. The candidate must pass the written assessment before registering to attend the practical assessment.
7. The logbook should be collected within 36 months of the written examination.

Any queries regarding the accreditation process should be directed to the BSE Accreditation Department; contact details and registration information are available at www.bsecho.org.

Tel: 0208 065 5794 (lines open from 09:00-17:00 Mon-Fri). Email: accreditation@bsecho.org.

Exam fees

A fee of £375 is charged for the complete accreditation process. This fee is payable upon registration for the written section of the examination and covers the practical assessment. There is a non-refundable booking fee of £50 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 £187.50 to re-sit this section. This reduced fee only applies to the second attempt if taken within 12 months of an unsuccessful first 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 £187.50.

Fee increases may occur annually.

Extensions

Extensions to the 36-month deadline may be granted. Extension request forms must be submitted **before the submission deadline**. Requests received after the case deadline may not be granted.

Less-than-full-time extensions are available for up to 24 months for candidates working less than full-time as stipulated by their contracted hours. Further information can be found on the BSE website's extension request page.

Appeals

Candidates can appeal the decision on a practical assessment result. **There is no appeals process for the written section of the examination**. Further information on applying for an appeal can be found on the practical assessment page of the BSE website.

Mentor

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

The mentor should understand the accreditation process, including the training syllabus (see Appendix 1) and all relevant assessment criteria.

The mentor must assess the candidate's ability to perform a stress echocardiogram proficiently. 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.

The accreditation process cannot be completed without the support of a mentor. Ongoing supervision is essential to the accreditation process. **Candidates should only pursue accreditation when they have a designated mentor.** Candidates may have more than one mentor if working between Hospitals.

Written Theory Examination

Appendix 1 contains the whole training syllabus for this accreditation process, and Appendix 3 includes a recommended reading list.

The written theory examination is held once a year, usually in the Autumn. It is held at various Pearson VUE centres across the UK, the Republic of Ireland, and some overseas locations. Registration dates are announced on the written assessment section of the BSE website. See Appendix 4 for registration guidance.

The written examination has two parts: a theory section consisting of a single best answer questions (single best answer from multiple options) and an image reporting section. To pass the written examination overall, it is necessary to pass both parts at the same exam sitting.

If the first attempt is unsuccessful, candidates may be eligible to retake the exam at a reduced rate.

Reduced rate: This only applies to a second attempt if it is taken within 12 months of the first attempt. If the second attempt is unsuccessful, the next attempt will be charged at the full fee.

There is no bar to re-sitting the written examination any number of times.

The pass mark for the MCQ is 70%, and the pass mark for the image reporting section is 60%. Following moderation, the Accreditation Chair may decide to vary these slightly.

Accreditation is awarded once a candidate has successfully completed the practical assessment. Satisfactory performance at the written assessment alone does not allow 'partial accreditation.'

Single best answer section

The theory section consists of 40 single best answer questions (40 marks total). Each question presents a realistic clinical scenario followed by 4-5 answer options. You must select the single most appropriate answer based on current evidence and guidelines.

Unlike the previous True/False format, you are required to identify the best answer from multiple plausible options, reflecting the clinical decision-making required in stress echocardiography practice.

Scoring:

- 1 mark for each correct answer
- 0 marks for incorrect or unanswered answers
- No negative marking
- Pass mark: 28/40 (70%)
- Candidates should attempt all questions

Time allowed: 60 minutes (approximately 1.5 minutes per question)

See Appendix 4 for some example questions.

Image reporting section

- Consists of 15 questions centred around 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 consist of relevant patient details and various echocardiographic images.
- For each case study, the candidate must answer five questions. Each question will have four possible answers; the candidate must select the best single answer. An example case study and questions are provided in Appendix 5.
- **The maximum possible mark is 15.**

Practical Assessment

The practical assessment is held up to twice a year (subject to candidate demand). Dates, locations and online registration instructions are announced on the practical assessment section of the 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 must attend an assessment within 38 months of starting the accreditation process (i.e., within two months of their case collection deadline). A two-month grace period gives the candidate time to review, prepare, and submit the logbook and five viva cases.

- Registration for the practical assessment should **ONLY** be sought after collecting the logbook and patient case studies.
- It is the candidate's responsibility to complete online registration forms and update personal information correctly.
- If you have any concerns about the information provided, you should contact the accreditation team for guidance and support.

Logbook submission

The logbook should demonstrate the candidate's ability to meet 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 36-month period. Up to 20 cases could be included where the candidate is either only the principal sonographer OR reporting sonographer.

The logbook format is a copy of the actual clinical report. The reports are to be uploaded and submitted via the BSE logbook portal. **Non-portal logbooks will not be accepted.**

Please see Appendix 8 for full details of what is expected in reports and how the logbook is marked.

Duplicate reports are not acceptable.

If a candidate is unable to collect 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.

The logbook should reflect the normal caseload of a general department:

- At least 40 cases should demonstrate ischaemia/viability.
  - Ischaemia cases should demonstrate ≥ 2 segments.
  - Viability cases where only contractile reserve is being assessed in presence of global hypokinesia is not a valid viability case. Include cases demonstrating either segmental scarring, where no viability has been demonstrated by a lack of contractility from a low dose dobutamine or low level of exercise; or cases demonstrating segmental viability where there is an increase in contractility from baseline and finally cases that show both segmental viability and ischaemia where there is a bi-phasic response.
- At least 20 cases should demonstrate structural heart disease.
  - This can include any number of cases demonstrating the assessment of LVOT obstruction, severity of mitral stenosis, mitral regurgitation, and aortic stenosis. Cases where there is an incidental finding of a structural abnormality is not valid, the indication for doing the study should be for the assessment of a structural abnormality.
- At least 50 cases should demonstrate the use of transpulmonary contrast.
- A maximum of 140 cases may be normal.

Please note, the study being performed, and the findings of the report should clearly be reflected in the indication for performing the test. For example, an incidental finding of non-viable myocardium during an aortic stenosis study does not fit the criteria of a viability study.

Cases should be a mixture of exercise and pharmacological stress. Depending on the case mix in a candidate's department, there may have a predominance of experience in one type of stressor. However, the type of stressor/protocol used should be appropriate for the assessment of any pathology present, for example, 2 stage exercise cannot be used to assess viability.

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

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 department's 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 exercise modality (supine bicycle or treadmill) prior to attending the practical assessment day. Only the BSE-recommended protocol for both apparatuses 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 at the candidate's request, but the candidate will be expected to obtain all images relevant to the stress echocardiogram. The candidate is not expected to be familiar with the equipment. The Assessor will alter the 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.

For full details of the viva case marking criteria, please see Appendix 11.

The viva cases must be presented as a PowerPoint presentation. The presentation should start with a summary slide outlining the relevant medical history and a clear indication for performing the study.

For patient case studies 1-4 a baseline TTE assessment must be present and be to a sufficient standard that demonstrates the candidate's 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). All real time images must play. Please note, this does not require a full TTE to be included.

For patient case study 5, a full TTE at baseline is required and should be in the presentation of this case.

The presentation must include a complete stress echocardiogram study. The image quality must be of a very high standard where no room for misinterpretation is created. The images must be displayed in a dual/quad screen and synchronised (not stand-alone individual AVI files). All the views at each stage should be displayed in this format, i.e. for a 3-stage ischaemia study, 4ch, 3ch, 2ch, PLAX, SAX at baseline, low dose and peak. At least one full cardiac cycle must be recorded, images must play automatically/continuously at a speed that can be interpreted by the assessor, where only systolic frames are chosen, display them at half speed. Each stage should clearly be annotated, heart rate values must be displayed where relevant, a good quality ECG should be displayed. Cases that do not meet these criteria may be classified as an unsuccessful attempt.

The presentation must conclude with a comprehensive report reflecting the patient case study being presented.

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

1. A normal Dobutamine stress echo study using contrast.
2. A normal exercise stress echo study (any modality) with or without contrast.
3. A reversible ischaemic response (any stressor/modality), showing 2 or more segments of ischaemia
4. A Dobutamine stress echo study showing a segmental non-viable, viable +/- ischaemia (bi-phasic response).
5. A stress study to evaluate structural heart disease (any stressor/modality).

Please refer to the logbook submission section for acceptable criteria for valid ischaemia, viability and structural cases. Viva cases should conform to the same criteria as logbook cases.

Other information regarding the patient case studies:

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

1. **Normal Dobutamine study:** Parasternal long axis, parasternal short axis, A4C, A3C and A2C views. At least 3 stages including baseline, low dose and peak dose (recovery is optional).
2. **Normal exercise study:** All 5 views as above. For treadmill exercise the protocol should include at least 2 stages, baseline and peak (recovery optional). For bicycle stress, according to departmental protocol 2, 3 or 4 stages.

3. **Reversible ischaemic response:** All 5 views as mentioned above. For dobutamine studies according to departmental protocol, at least 3 stages including baseline, low dose and peak (recovery optional but recommended). For treadmill exercise at least 2 stages (recovery is recommended but not required). For bicycle stress at least 3 stages (recovery is recommended, not required
4. **Non-viable or viable +/- ischaemic myocardium**: All 5 views as above. At least 3 stages including baseline, low dose and intermediate dose for viabiliy. Peak dose imaging is not required but must be included where reversible ischaemia is also being assessed.
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. Haemodynamic/doppler measurements must be displayed at each stage and transcribed into the report to clearly demonstrate any change.

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

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 guidelines 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
    iv. Assessment of contractile reserve in DCM
    v. Stress Echo for Haemodynamics
    vi. Valvular stenosis
    vii. Valvular regurgitation
    viii. Prosthetic valves
    ix. Pulmonary hypertension
    x. 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/Regadenoson
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, scientist, sonographer
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/Regadenoson
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 ≥ 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 backup 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 90 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
vii. Causes of false negative tests
viii. Single vessel disease
ix. "Mild" coronary stenosis
x. Left circumflex artery disease
xi. Inadequate stress
xii. Rapid recovery
xiii. Poor image quality
xiv. 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. Contrast specific imaging techniques (Pulse inversion, power modulation)
iv. Contrast destruction/refill analysis (qualitative and quantitative) for assessment of myocardial perfusion
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

Refer to “Contrast echocardiography: a practical guideline from the British Society of Echocardiography” (see reference list).

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.

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

Appendix 2: Curriculum-based competency tool

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

The competency tool is now required to be completed by the candidate's mentor via the BSE online logbook portal.

Competency	Date achieved
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.

Hampson, R., Senior, R., Ring, L., Robinson, S., Augustine, D.X., Becher, H., Anderson, N., Willis, J., Chandrasekaran, B., Kardos, A., Siva, A., Leeson, P., Rana, B.S., Chahal, N. and Oxborough, D. (2023) 'Contrast echocardiography: a practical guideline from the British Society of Echocardiography', *Echo Research and Practice*, 10, article 23.

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Praz, F., Borger, M.A., Lanz, J., Marin-Cuartas, M., Abreu, A., Adamo, M., Ajmone Marsan, N., Barili, F., Bonaros, N., Cosyns, B., De Paulis, R., Gamra, H., Jahangiri, M., Jeppsson, A., Klautz, R.J.M., Mores, B., Pérez-David, E., Pöss, J., Prendergast, B.D., Rocca, B., Rossello, X., Suzuki, M., Thiele, H., Tribouilloy, C.M. and Wojakowski, W. (2025) '2025 ESC/EACTS guidelines for the management of valvular heart disease', *European Heart Journal*, 46(44), pp. 4635–4736.

Senior, R., Lindner, J.R., Edvardsen, T. and Cosyns, B. (2021) 'Ultrasound contrast agent hypersensitivity in patients allergic to polyethylene glycol: position statement by the European Association of Cardiovascular Imaging', *European Heart Journal – Cardiovascular Imaging*, 22(9), pp. 959–960.

Steeds, R.P., Wheeler, R., Bhattacharyya, S., Reiken, J., Nihoyannopoulos, P., Senior, R., Monaghan, M.J. and Sharma, V. (2019) 'Stress echocardiography in coronary artery disease: a practical guideline from the British Society of Echocardiography', *Echo Research and Practice*, 6(2), pp. G17–G33.

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Protocols and the most up-to-date BSE guidelines are available under the Education tab of www.bsecho.org.

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

Appendix 4: Written Exam Single Best Answer example

Single best answer questions present realistic clinical scenarios followed by 4-5 answer options. You must select the single most appropriate answer based on current evidence and guidelines.

Unlike the previous True/False format, each question now requires you to select one best answer from multiple plausible options, reflecting real-world clinical decision-making.

Choose the single best answer from the following scenarios.

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

Q1

Scenario: A 67-year-old man presents to the cardiology clinic with a 2-week history of chest tightness occurring with minimal exertion and at rest. He has a history of hypertension and hyperlipidaemia. Resting ECG shows left bundle branch block. His symptoms are consistent with crescendo angina.

Question: What is the most appropriate next investigation?

Options:

a) Dobutamine stress echocardiography
b) Exercise stress echocardiography
c) Invasive coronary angiography
d) Myocardial perfusion imaging

Correct Answer: C (Invasive coronary angiography)

Rationale: *Crescendo angina represents acute coronary syndrome and requires urgent evaluation with invasive angiography, particularly given the very high pre-test probability. Stress testing is contraindicated in unstable angina. (This question integrates knowledge of indications, contraindications, and appropriate patient selection in a realistic clinical scenario).*

Q2

Scenario: You are performing a dobutamine stress echocardiogram on a 58-year-old woman being assessed for functional significance of coronary stenoses identified on CT angiography. At 30 mcg/kg/min dobutamine, her heart rate is 128 bpm (82% of age-predicted maximum), and her blood pressure has decreased from 138/82 mmHg at baseline to 126/76 mmHg. She develops mild chest tightness. Echocardiographic imaging demonstrates new hypokinesis of the inferior and inferolateral walls.

Question: What is the most appropriate next step?

Options:

a) Administer atropine to achieve target heart rate
b) Continue to 40 mcg/kg/min dobutamine dose
c) Obtain post-stress images and terminate the study
d) Repeat imaging at current dose for confirmation

Correct Answer: C (Obtain post-stress images and terminate the study)

Rationale: *New wall motion abnormality is an absolute endpoint for stress echocardiography regardless of whether target heart rate has been achieved. The study should be terminated immediately after obtaining post-stress images. Continuing the infusion or adding atropine would expose the patient to unnecessary risk. (This question tests understanding of safety protocols and clinical judgment in a realistic scenario where the operator must balance multiple factors).*

Appendix 5: Written exam image reporting questions example

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 spent 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.

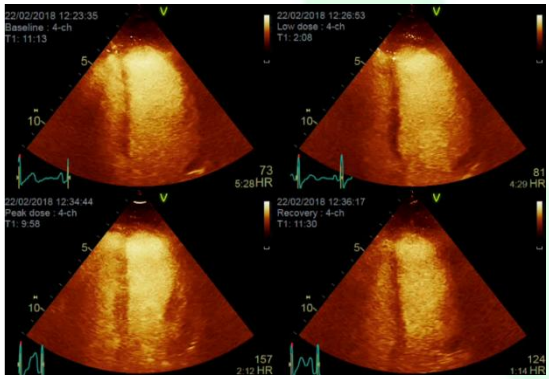
Data: LVEDV baseline: 66ml, peak stress: 50ml.

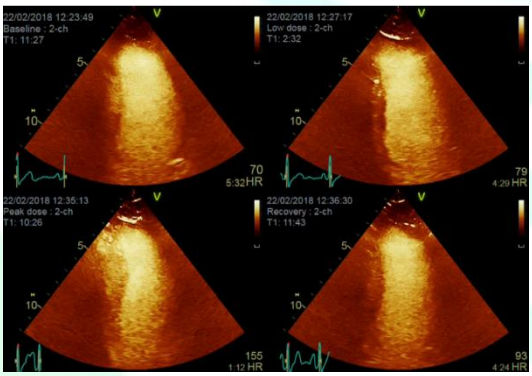
Baseline BP: 148/83mmHg. HR: 72bpm.

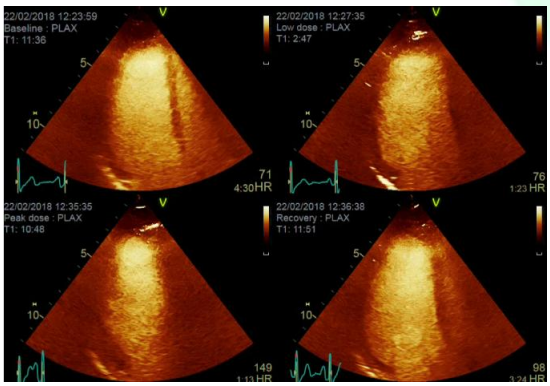
10mcg/min/kg: BP: 178/89mmHg, HR: 78bpm

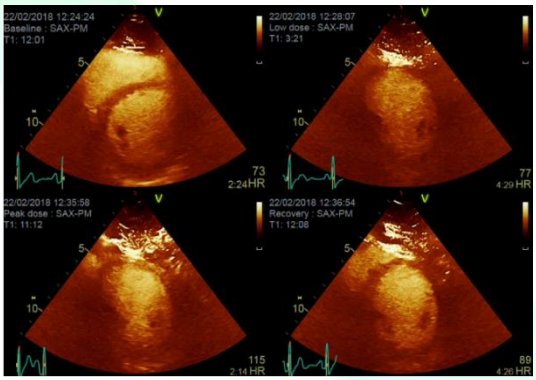
20mcg/min/kg: BP: 154/84mmHg, HR: 144bpm

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









Appendix 6: Written Examination Registration Guidance

BSE written exams are administered in collaboration with Pearson VUE testing services. Candidates can take the exam at local testing centres across the UK, the Republic of Ireland, and certain overseas locations.

- **Pre-registration (through the BSE website)**
  1. Candidates must have an active BSE membership (fully paid and up to date).
  2. Candidates must register their interest in taking the written exam by completing an **online pre-registration** form via the accreditation section of www.bsecho.org, during the pre-registration window specified online. **Candidates' registered names should match their photo identification. Pearson VUE follows a strict admission policy.**
  3. BSE will transfer your data and requirements to Pearson VUE, who will contact all pre-registered candidates with further information on confirming exam placements.

Delivery methods: Candidates can take the exam in two ways: in a **Test Centre (recommended)** or online proctored exam (OnVUE), which allows them to sit the exam from home (subject to system requirements).

Note: Candidates taking the exam from home accept full responsibility for technical issues like device updates, pop-up blocking, connection errors, and bandwidth. System checks before the exam may not catch all faults, which can still occur during the exam. Understand these risks.

- **Special accommodations**

Pearson VUE can provide special accommodations (reasonable adjustments) to candidates with official requirements, such as extra time, a reader, or medication during the examination.

All requests must be in writing and supported by documents from a healthcare professional/provider detailing the requirements and reason for the request. The BSE will approve requests at its discretion and **must be submitted within the pre-registration window**. To submit such requests, forward them to accreditation@bsecho.org.

- **Registration (through Pearson VUE)**

Pearson VUE will manage all registration and payments after the pre-registration stage. Some automated emails may end up in spam or junk mail. Pearson VUE may notify candidates of any changes to bookings; candidates must ensure that their contact information is accurate.

Cancellations made less than 7 days in advance 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. The instructions can also be accessed through Pearson VUE's online resources before the exam. Candidates will complete the exam on a computer at the test centre.

The exam already includes a basic calculator and a whiteboard application. The examining test centre will give candidates an erasable sheet.

If the candidate chooses to take the exam from home using online proctoring (OnVUE), a basic calculator and whiteboard are built into the exam as an online application for the candidate to use at their convenience. Therefore, **no form of stationery is permitted when taking the exam.**

Candidates are required to bring a government photo ID and another form of identification. Please ensure that the registration details match your photo ID exactly; otherwise, you will be refused entry. If denied entry, candidates should contact BSE immediately.

The test centre will not facilitate any last-minute requests for special accommodations.

- **Results**

Results are released 5-6 weeks after sitting the exam, and scores will be uploaded to BSE profiles. **Both sections must be passed for a complete pass.**

Pass: Candidates can request portal login details to upload logbook reports. The deadline appears under 'Practical submission deadline' after written exam scores in the 'Participation' tab of the BSE profile. This information is also emailed to the candidate (subject to account status).

Fail: candidates can register interest to sit in the next sitting of the exam.

- The reduced fee applies only to first-time, unsuccessful candidates who sit the exam physically. The second attempt must occur within 12 months. **Results cannot be appealed or remarked since 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-takers/Resources.aspx.

Pearson VUE has a strict admissions policy. Candidates' registered names should be exactly as they appear on their government-issued photographic ID.

Appendix 7: Logbook guidance and marking criteria

Marking of cases is based on the following questions to be answered by the examiner assessing the logbook.

Question	Yes or No	Comments
Fully anonymised		
Valid clinical indication and relevant clinical history which provides justification for the study		
Adequate description of baseline findings, for structural cases, detailed description of pathology.		
Is the stress protocol/procedure described adequately		
Duration/workload/exercise capacityfor exercise, , change in BP and HR, ECG changesand reason for stopping test.		
Are the findings at each imaging stage adequately described; segmental changes, LV changes and haemodynamic changes (structural), correlation with coronary artery territories made		
Are the findings clearly interpreted in the conclusion and is it focussed on the indication		
Are relevant recommendations made for abnormal findings.		
Pass?		

A comprehensive report should include:

1. A valid clinical indication for performing the test that was undertaken
2. Relevant clinical history which provides a justification for the study
3. Adequate description of the baseline findings.
    a. For ischaemia and viability, resting segmental and LV size/function. Where there is LV dysfunction at rest, serial quantitative measurements must be made at each stage to demonstrate any change.
    b. For structural cases, detailed description of pathology.
    c. Do NOT include a full TTE report
4. A clear description of the protocol that was followed.
    a. For pharmacological studies, the dose of drugs administered and the timing of each stage, atropine and contrast administration
    b. For exercise, the modality with all the stages performed, contrast administered

5. Changes in BP and HR should be reported, for exercise tests the exercise capacity/workload should be included, the reason for termination, symptoms, ECG changes where relevant.
6. Where there are multiple imaging stages, findings should be adequately described at each stage. Segmental and LV changes for ischaemia/viability and for structural cases this should include haemodynamic changes
7. The findings for ischaemia/viability should mention the individual segments involved and the degree of abnormality (hypokinetic, akinetic, dyskinetic), a diagram to illustrate the distribution of wall motion abnormality should be present.
    a. Avoid using unconventional or vague nomenclature to describe segments
    b. The abnormal segments must be correlated with relevant coronary artery territories
    c. An association between the number of abnormal segments and the ischaemic burden must be made
8. Where relevant a statement on the image quality should be made, non-diagnostic segments should be specified
9. A conclusion should correctly interpret the findings in a clinical context and should include a clear diagnosis (e.g. in the absence of viability there is evidence of a transmural infarct). The conclusion must focus on the indication for performing the study.
10. **Where there are abnormal findings, recommendations should be made to ensure patient safety.**

We have included examples of 5 cases, illustrating how the required content can be incorporated into a report

Logbook example 1: Ischaemia

ISCHAEMIA STUDY

British Society of Echocardiography
accredited department

Stress Echo Report

Patient name: **Patient ID:**
Date of birth: **NHS number:**
Age: **Gender:**
Allergies:

Procedure Staff

Reporting sonographer:

Procedure Information

Proc. sub type: Stress procedure: Exercise.

Procedure date/time:

Directorate: Cardiology
Source: OP
Hospital/Site:
Contrast Medium Given: Yes

Complications: No
Procedure consent: Verbal consent obtained

Indications

Chest pain.

Additional Indications

Worsening soboe and some chest tightness. Know significatn distal LMS/prox LAD disease, dicussed at JCC and for medical management at the time due to lack of symptoms.

Now worsening sob and chest tightness. Assess for ischaemia.

Risk Factors

Prior CABG, Diabetes and Hypertension.

Procedure Summary

Exercise stress echocardiogram with contrast for assessment of ischaemia.

Patient consented to procedure including receiving IV contrast.

Rest:
Normal sinus rhythm. Visually normal EF with no wall thickening abnormality.

Stress:
Patient exercised according to the Bruce Protocol (modified) for 6:25 min, achieved a workload of 6.7 METS and 74% of age predicted HR. No significant ischaemic ECG changes were seen. Patient experienced the onset of symptoms with sob and chest tightness, test was terminated at this point. An exaggerated BP response was seen (220/94mmHg).

Stress imaging showed akinesis in the apical septum, apical cap, apical lateral, apical inferior, apical anterior and mid anteroseptum with LV cavity dilatation and a mild reduction in LV systolic function.

Conclusion: Evidence of ischaemia in the LAD territory (6 segments), patient is symptomatic at a relatively low workload.

Recommendations:

Please refer patient for an urgent coronary angiogram.

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Procedure Medications

Medication Name	Prescribed by	Dosage	Dosage Unit	Batch Number	Batch Expiration Date	Delivery Date and Time	Delivered by
Sonovue		1	ml				

Rest

Resting HR:	59 bpm	Resting BP:	166 / 70 mmHg

Stress

		Max exercise:	6.7 METS
Peak HR:	108 bpm	HR/BP product:	23,760
Peak BP:	220 / 94 mmHg		
Predicted HR:	145 bpm		
% of predicted HR:	74		
Test duration:	6.42 min		
Reason for termination:	Chest pain		

Results

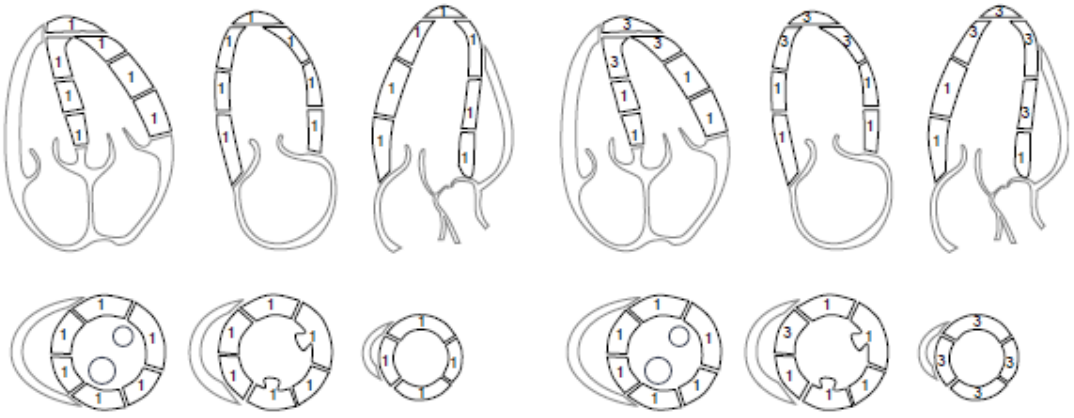
Global LVEF (rest): Normal (LVEF >50%)

Global LVEF (stress): Mildly depressed (LVEF 40-50%)

Wall Motion Scoring

Stage: Rest
Score: 1

Stage: Stress
Score: 1.71



0 - Non Visualized 1 - Normal 1' - Hyperkinesis 2 - Hypokinesis 3 - Akinesis 4 - Dyskinesis 5 - Aneurysm

Logbook example 2: Viability

British Society of Echocardiography
accredited department

Viability

Stress Echo Report

Patient name:
Patient ID:
Date of birth:
Gender:
Age:
Allergies:

Procedure Staff

Reporting sonographer:

Procedure Information

Proc. sub type: Stress procedure: Pharmacological.

Procedure date/time:

Directorate: Cardiology
Source: OP
Hospital/Site:
Contrast Medium Given: Yes

Complications: No
Procedure consent: Verbal consent obtained

Indications

Viability.

Additional Indications

Admitted with NSTEMI, coronary angiogram shows severe 3 vessels
disease, for assessment of viability for revascularization strategy prior to chemotheraphy (lung Ca).

Risk Factors

CKD, Diabetes and Hypertension.

Procedure Summary

Low dose Dobutamine stress echocardiogram with contrast for assessment of viability.

Patient consented to the procedure including receiving, dobutamine and contrast (Luminity).

Rest:
Sinus tachycardia. There is moderate LV dysfunction at rest, LV EF measures 35%. There is hypokinesia in the basal and mid inferoseptum, apical septum, apical anterior, basal and mid anterior segments. There is akinesia in the basal inferior, basal and mid inferolateral, apical lateral and mid anterolateral segments.

Low dose dobutamine (10mcg/kg/min):
All akinetic segments remain akinetic with increased contractility in all other segments. A small increase in LV EF to 45% indicating contractile reserve.

Intermediate dose of dobutamine (15mcg/kg/min):
At a peak dose of 15mcg/kg/min and a heart rate of 122bpm (73% THR) the akinetic segments remain akinetic with a deterioration in wall thickening of the mid inferior, apical anterior, basal and mid anterior segments. There is a decline in LV EF to 40%.

Interpretation: No evidence of viability in the akinetic segments with a biphasic response seen in the mid inferior and anterior segments

Conclusion: Moderate LV dysfunction with evidence of an infarct with no viability in the distal RCA and LCx territories. There is viability and reversible ischaemia in the D1 territory.

Recommendations:

For discussion at the MDT meeting.

Rest

Resting HR:	108 bpm	Resting BP:	165 / 99 mmHg

Stress

Peak HR:	122 bpm	HR/BP product:	18,910
Peak BP:	155 / 85 mmHg		
Predicted HR:	141 bpm		
% of predicted HR:	87		
Test duration:	7.22 min		
Reason for termination:	Completed		

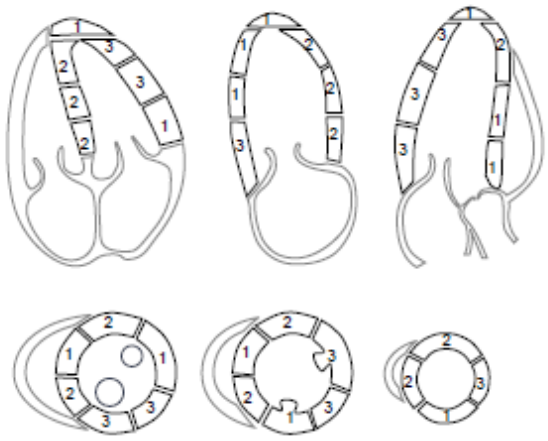
Results

Global LVEF (rest): Moderately depressed (LVEF 30-40%)

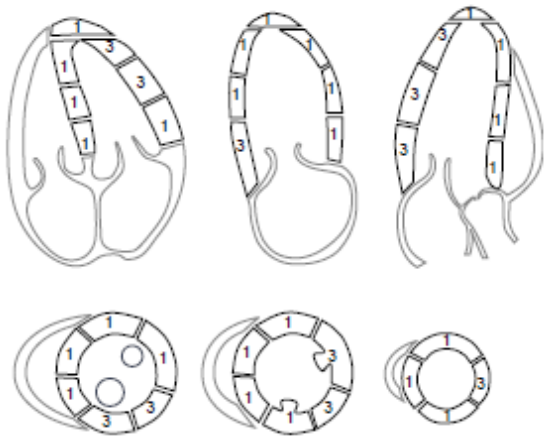
Global LVEF (stress): Moderately depressed (LVEF 30-40%)

Wall Motion Scoring

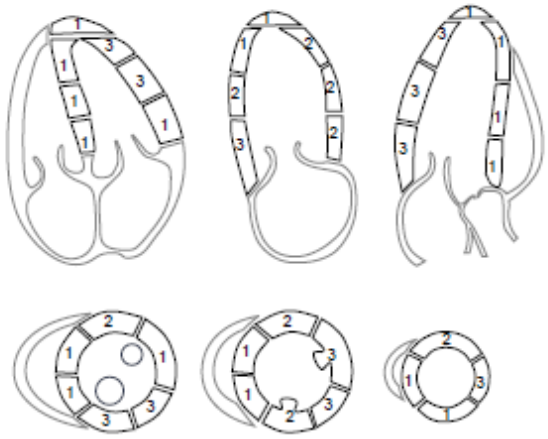
Stage: Rest
Score: 1.94



Stage: 1
Score: 1.59



Stage: 1
Score: 1.82



0 - Non Visualized 1 - Normal 1' - Hyperkinesis 2 - Hypokinesis 3 - Akinesis 4 - Dyskinesis 5 - Aneurysm

Logbook example 3: Mitral regurgitation

British Society of Echocardiography
accredited department

Stress Echo Report

Patient name:
Patient ID:
Date of birth:
NHS number:
Age:
Gender:
Allergies:

Procedure Staff

Reporting sonographer:

Procedure Information

Proc. sub type: Stress procedure: Exercise.

Procedure date/time:
Directorate: Cardiology
Source: OP
Hospital/Site:
Contrast Medium Given: No

Complications: No
Procedure consent: Verbal consent obtained

Indications

Mitral regurgitation.

Additional Indications

Moderate MR with no exertional symptoms. To assess symptoms and severity of MR on exercise.

Risk Factors

Additional comments: Persistent AF, moderate MR as a result of chordal rupture, HTN

Procedure Summary

Bicycle stress echo to assess symptoms and severity of MR.

Rest:
Atrial fibrillation. Normal LV function at rest with no wall thickening abnormality. Know MV chordal rupture with moderate MR, bi-atrial dilatation with at least moderate TR.
ERO measures 0.41cm sqr, regurgitant volume 77ml, SPAP = 28mmHg + RAP (these resting measurements are consistent with severe MR) (Transthoracic study reports moderate MR, patient denies symptoms).

Patient exercised according to the WHO Protocol for 6 min, achieved a workload of 75Watt and 112% THR, test was terminated due to limiting dyspnoea.

Peak:
Normal augmentation of the LV EF is seen with and increase in the ERO to 0.54 cm sqr, regurgitant volume is unchanged at 72ml and a significant increase in the SPAP = 62mmHg + RAP

Conclusion: There is evidence of heamodynamically significant, severe, symptomatic mitral regurgitation.

Recommendation: Please refer to valve MDT for potential intervention.

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Rest			
Resting HR:	98 bpm	Resting BP:	146 / 88 mmHg

Stress			
Peak HR:	171 bpm	HR/BP product:	31,977
Peak BP:	187 / 92 mmHg		
Predicted HR:	152 bpm		
% of predicted HR:	112		
Test duration:	6 min		
Reason for termination:	Dyspnea		

Logbook example 4: Aortic Stenosis

British Society of Echocardiography
accredited department

Stress Echo Report

Patient name:		**Patient ID:**	
Date of birth:		**Gender:**	
Age:		**BMI:**	29.4 kg/m²
Height:	174 cm	**BSA:**	2 m²
Weight:	89 kg		
Allergies:			

Procedure Staff

Reporting sonographer:

Procedure Information

Proc. sub type:	Stress procedure: Pharmacological.		
Procedure date/time:		**Directorate:**	Cardiology
		Source:	OP
		Hospital/Site:	Northwick Park Hospital
		Contrast Medium Given:	No
Complications:	No		
Procedure consent:	Verbal consent obtained		

Indications

Aortic stenosis.

Additional Indications

For the assessment of the true severity of AS in the presence of low flow. Patient awaiting hip surgery, previously reported as moderate AS.

Risk Factors

Prior cardiac surgery, Dyslipidemia and Hypertension.

Procedure Summary

Low dose dobutamine stress echo for assessment of AS severity.

Rest:
Sinus rhythm with normal LV function. Tri-leaflet aortic valve, severely calcified with reduced cusp separation. MPG 27mmHg, Velocity ratio 0.24, AVA 0.76cm sqr, Vmax 3.09m/s, flow rate 170ml/s (reduced).

Low dose dobutamine (10mcg/kg/min):
MPG 34mmHg, Velocity ration 0.25, AVA 0.8cm sqr, Vmax 3.83m/s, flow rate 200ml/s (reduced).

Intermediate dose (15mcg/kg/min):
Mean gradient 46mmHg, Velocity ratio 0.31, AVA 1.09 cm sqr, Vmax 4.2m/s, flow rate 290ml/s (normal).

Interpretation: With increased contractility at an intermediate dose of dobutamine the flow rate across the AV normalised with a subsequent increase in the velocity ratio to 0.31 and an increased valve area of 1.09cm sqr.

Conclusion: Findings are consistent with moderate aortic stenosis.

Recommendations:

Refer back to valve clinic for routine follow-up.

Rest			
Resting HR:	85 bpm	Resting BP:	162 / 98 mmHg

Stress			
Peak HR:	130 bpm	HR/BP product:	18,200
Peak BP:	140 / 86 mmHg		
Predicted HR:	122 bpm		
% of predicted HR:	107		
Test duration:	10 min		
Reason for termination:	Completed		

Appendix 8: Guidance for the removal of patient identifiable data

The duty of confidentiality arises from the common law of confidentiality, professional obligations and staff employment contracts. Breach of confidence may lead to disciplinary measures, 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

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:

a. **Patient's name**
b. **Address**
c. **Full post code**
d. **Date of birth**
e. **NHS number and local identifiable codes**

Key identifiable information may also include information that can be used to identify a patient directly or indirectly. For example, rare diseases, drug treatment, or statistical analyses involving 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 gender and age/year of birth.

Reports – Please use the BSE online portal and electronically delete all patient information except age and gender.

We advocate against using other electronic anonymisation methods as sometimes data is still present. If in doubt, manually remove patient identification information before use.

Video cases—We appreciate that removing patient IDs may be difficult. Therefore, it is advised that the video cases are specifically collected and the data inputs made relevant to your cases (E.g., the Patient Name could be 'BSE Case 1', and the Patient Number could be your membership number followed by the case number, '1111-1').

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

Appendix 9: 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	**P** if 3 unique identifiers are checked. **BP** if 2 unique identifiers are checked. **BF** if 1 unique identifier is checked. **F** 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	**P-** if high quality optimised image. **BP-** if clinically satisfactory image with limited optimisation. **BF** if unable to accurately acquire image although is able to identify remedial measures. **F** 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	**P** if clear communication of this is demonstrated. **BP** if able to identify if contrast required or not although limited knowledge of potential issues with contrast and why the decision has been made. **BF** if able to identify if contrast is required and demonstrates many short fallings in knowledge of why contrast could/should. **F** 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	**P** if appears competent and knowledgeable about stress protocols. **BP** if lacking some knowledge but appears competent. **BF** if lacking a lot of knowledge but still safe to perform a stress study. **F** 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	**P** if high quality optimised image. **BP** if clinically satisfactory image with limited optimisation. **BF** if unable to accurately acquire image although is able to identify remedial measures. **F** if unable to reproduce image which reflects the Assessors image acquisition in the model.	

Appendix 10: 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**
ECG Present throughout with good synchronisation		**ECG** Unstable or absent	
Optimisation Demonstrates good endocardial border definition with MI, gain, TGC controls		**Optimisation** Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete enough to allow for a complete assessment		**Incomplete study** Images are missing which are relevant to the assessment	
Report is complete and accurate 1.Comprehensive and accurate description of all LV segments 2. Correct interpretation of findings in the clinical context		**Report is incomplete or inaccurate** 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**
ECG Present throughout with good synchronisation		**ECG** Unstable or absent	
Optimisation Demonstrates good endocardial border definition with MI, gain, TGC controls		**Optimisation** Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete enough to allow for a complete assessment		**Incomplete study** Images are missing which are relevant to the assessment	
Report is complete and accurate 1.Comprehensive and accurate description of all LV segments 2. Correct interpretation of findings in the clinical context		**Report is incomplete or inaccurate** 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**
ECG Present throughout with good synchronisation		**ECG** Unstable or absent	
Optimisation Demonstrates good endocardial border definition with MI, gain, TGC controls		**Optimisation** Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete enough to allow assessment of ischaemia		**Incomplete study** Images are missing which are relevant to the assessment of ischaemia	
Report is complete and accurate 1.Comprehensive and accurate description of all LV segments 2.Correct segmental analysis 3.Correct correlation to coronary circulation		**Report is incomplete or inaccurate** 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**
ECG Present throughout with good synchronisation		**ECG** Unstable or absent	
Optimisation Demonstrates good endocardial border definition with MI, gain, TGC controls		**Optimisation** Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete enough to allow a complete assessment		**Incomplete study** Images are missing which are relevant to the assessment	
Report is complete and accurate 1.Comprehensive and accurate description of all LV segments 2.Correct segmental analysis 3.Correct correlation to coronary circulation		**Report is incomplete or inaccurate** 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**
ECG Present throughout with good synchronisation		**ECG** Unstable or absent	
Optimisation Demonstrates otpimisation of relevant pathology		**Optimisation** Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete enough to allow assessment of pathology		**Incomplete study** Images are missing which are relevant to the assessment	
Report is complete and accurate 1.Comprehensive and accurate description of the chosen pathology 2. Correct interpretation of findings in the clinical context		**Report is incomplete or inaccurate** 1.Partial and inaccurate description of the chosen pathology 2. Incorrect interpretation of findings in the clinical context	

Appendix 11: Mentor Statement & Declaration

The candidate must email a completed copy to accreditation@bsecho.org at the point of registration for a practical assessment.

I confirm that I have provided overall supervision and guidance for the following candidate, during the period in which they have performed and reported logbook studies and viva cases. ☐

I have reviewed the logbook and viva cases prior to the submission, and I am fully satisfied that the candidate has met the BSE submission criteria. ☐

I believe the candidate is ready to attend the practical assessment to present their work. ☐

Following the assessment, should the BSE wish to contact me for any information, I will be able to answer any questions the BSE may have regarding the candidate's performance.

Full name of mentor	
Mentor job title	
Mentor place of work	
Mentor email address	
Mentor phone number	
Name of candidate	
BSE ID of the candidate	
Candidate's place of work	

By signing this document, I declare that the information provided in this document is true and correct to the best of my knowledge.

Mentor signature:

Date:

Appendix 12: Appeal guideline and application

Appeal application process for all BSE accreditation specialities

The following information is provided by the British Society of Echocardiography (BSE) to assist a candidate who wishes to appeal the decision of their practical assessment for any of the BSE accreditation specialities. There is no appeals process for the written examination.

Please read the following information to ascertain if there are grounds for an appeal. The information below will also provide an overview of the appeal process from start to finish.

1. **Reasons for appeal**

An appeal for the following reasons is welcomed by the BSE Accreditation Committee:

- A decision to refuse to accredit a person
- A decision to request a resubmission of cases (logbook or/and video-case)
- A decision to impose a condition of accreditation
- A decision to revoke accreditation on retrospective review of submitted works for quality assurance purposes
- Any other decision that is not listed above, for which the candidate feels is relevant

2. **The Appeals Panel and role**

The appeals panel will consist of two senior assessors who have not been involved with the original assessment and who are not from the same centre as the candidate submitting the appeal.

The appeals panel role is to:

- Look at the information used by the assessor/person who made the initial decision
- Clear up any misunderstanding
- Correct any errors
- Make a final verdict on whether the initial decision should be upheld, varied or changed
- Provided a detailed response to the candidate informing them of the decision along with feedback as to why this decision has been reached.

3. **The appeals process**

Candidates submitting an appeal must complete and return the following to the accreditation operational team within **2 months** of the initial practical assessment.

- Complete appeal form (see below)
- Any relevant documentation (Assessor's mark sheets/comments)
- **Appeal fee £100** to be paid by BACS (see bank details below)-
  Bank Natwest- Account number:73699519, Sort code- 53-70-15, include **A-**followed by your **BSE ID** number as the payment reference.

Please note that if the appeal outcome changes from the original decision, the fee will be reimbursed.

Please send this form via email to **accreditation@bsecho.org**. If you have any supporting documents or case presentations, please request an upload link from the accreditation team.

4. **Appeal outcome**

The appeal panel appointed will review the appeal application. This will usually be at the next practical assessment day to ensure a fair hearing (please be mindful that assessors are volunteers of the BSE who have other work and life commitments and should not be expected to work above what is reasonable).

The panel will provide written feedback on the appeal outcome and any relevant feedback. This will be provided to the candidate who submitted the appeal within 28 days of the appeal being heard.

The review panel's decision is final. There is no appeal against the decision of the appeals panel.

APPEAL FORM

Applicant Details:

Title: ☐ Dr ☐ Mr ☐ Ms ☐ Mrs ☐ Miss ☐ Other (please specify): Click or tap here to enter text.

Membership number: Click or tap here to enter text.

Hospital/Company: Click or tap here to enter text.

Candidate postal address: Click or tap here to enter text.

Telephone: Click or tap here to enter text.

Email: Click or tap here to enter text.

Question 1: What decision are you appealing?

☐ A decision to refuse to accredit a person (go to Question 3).

☐ A decision to request a resubmission of cases (go to Question 3).

☐ A decision to request a resubmission of reports (go to Question 3).

☐ A decision to impose a condition of accreditation (go to Question 3).

☐ A decision to revoke accreditation on retrospective review of submitted works for quality ☐assurance purposes (go to Question 3).

☐ Other (go to Question 2).

Question 2: Please list the details of the condition or conditions, or any other decision, that you are appealing (after filling in the information, go to question 3).

Click or tap here to enter text.

Question 3: When did you receive notice of this decision? (After filling in the information, go to Question 4).

Click or tap here to enter text.

Question 4: What are your reasons for appealing the decision?

You may wish to attach additional documents to this form. Please ensure you detail which exact cases and which sections of marking you are querying. Please provide copies of the original cases and reports submitted if appropriate

Click or tap here to enter text.

By signing below, you confirm that you have read the guidelines and are aware of the timeframe required to provide a complete outcome for this appeal application.

Appeal fee £100 payment date: Click or tap to enter a date.

Signature: Click or tap here to enter text.

Date: Click or tap to enter a date.

End of form

Appendix 13: Terms and Conditions Written Exam

By registering for the written exam, the candidate agrees to the terms and conditions listed below.

1. **To pursue the written (theory) examination for BSE level II accreditation,** a candidate must:
    a. Have an active (paid) BSE membership.
    b. The membership account must be populated with the candidate's full name as it appears on their government photo identification.
    c. The membership account must include a complete postal address, contact telephone number and a current email address.
    d. The candidate is responsible for updating their BSE profile before registering interest to take the written exam.
    e. The candidate must read the relevant accreditation pack before registering for the exam.

2. **Pre-registration** is a **compulsory step** to register interest in taking the exam; this must be completed after becoming a paid BSE member and completing the online pre-registration form. Through pre-registration, the candidate grants the BSE permission to share personal data with Pearson VUE testing services.
    a. Pre-registration must be completed within the advertised registration period.
    b. Requests after registration closing dates will not be accepted.
    c. Payment is not expected at the point of pre-registration.

3. **Special accommodations:** additional time, nursing or relief breaks, could be permitted if the candidate:
    a. Provides documentation from a governing body to confirm the details and reasoning for the special accommodations.
    b. The documentation must be submitted within the pre-registration window to allow time for BSE to approve and for Pearson VUE to accommodate the request.
    c. The candidate must immediately contact the Accreditation department if a diagnosis has been made post-pre-registration.
    d. All queries will be directed to accreditation@bsecho.org, quoting the five-digit BSE ID number.

4. **Registration through Pearson VUE:** upon successfully transferring data to Pearson VUE, the candidate will receive automated messages to create a Pearson VUE account and then book the exam.
    a. Candidates must read the booking instructions and book the exam within the registration booking window.
    b. Late registrations will not be accepted.

5. **Fee payment:** the appropriate fee must be paid in full when booking the exam. The reduced rate only applies to candidates who have taken the second attempt after an unsuccessful first attempt (physical).

6. **Cancellations:** cancellations made less than 7 working days before the exam will not be eligible for a refund. Cancellations must be made more than 7 working days before the exam through Pearson VUE.

Appendix 14: Terms and Conditions- Practical assessment

Assessment eligibility:

The BSE Practical Assessment is available to Level II candidates who have successfully passed the written exam with a current membership.

Level 1 candidates with a current membership and a completed logbook are eligible to take the practical assessment.

A mandatory booking fee must be paid when registering for a practical assessment. This fee is non-refundable and cannot be transferred under any circumstances. Places for assessments are allocated on a first-come, first-served basis and depend on the successful submission of the logbook. Once a venue reaches its capacity, candidates' names will be added to the waiting list. Registration will close once the maximum capacity for the practical assessment is reached.

When registering for the waiting list, the candidate acknowledges that a logbook submission deadline is advertised on the registration page and that the candidate intends to submit their logbook by that deadline, even while on the waiting list.

BSE reserves the right to reject registrations that are not eligible for the assessment.

**Booking fee noted online and in the relevant accreditation pack. Fees are subject to annual increases*.

Cancellations:

Cancellations with less than one week's notice (7 calendar days or less) will be classed as a no-show and automatically fail.

Appeals may be considered by the Accreditation Committee in cases of extenuating circumstances.

All cancellations must be made in writing to accreditation@bsecho.org stating name, membership number, date and time of confirmed assessment and reason for cancellation.

Personal Property:

BSE accepts no liability for the loss of belongings at the assessment venue.

Candidates are allowed to bring a bottle of water, any device, and printed reports needed for their assessment. These items can be stored in a simple carrier for easy movement between stations.

Cloakroom facilities differ between venues; we advise candidates to pack their belongings appropriately. Candidates must keep their photographic identification with them at all times.

All items are left in designated areas at the owner's risk. Please do not bring any other valuables.

Logbook and Digital Cases

Logbook reports and digital cases must fulfil the requirements and timelines detailed in the relevant Accreditation pack. The logbook must be submitted by the date advertised on the event's practical registration page.

By registering for the practical assessment, you, as the candidate, have accepted the following:

1. You have read the accreditation pack and understand the requirements for achieving BSE accreditation.
2. You have paid the relevant fees and your membership is current.
3. You have passed the written exam, and your work is ready for submission on the date you registered.
4. Your logbook must be submitted by the deadline advertised on the registration page, unless an extension has been authorised by the BSE.
5. Failure to submit the logbook by the agreed deadline will result in the loss of your placement.
6. You understand that the exam and booking fees paid are non-transferable and non-refundable.

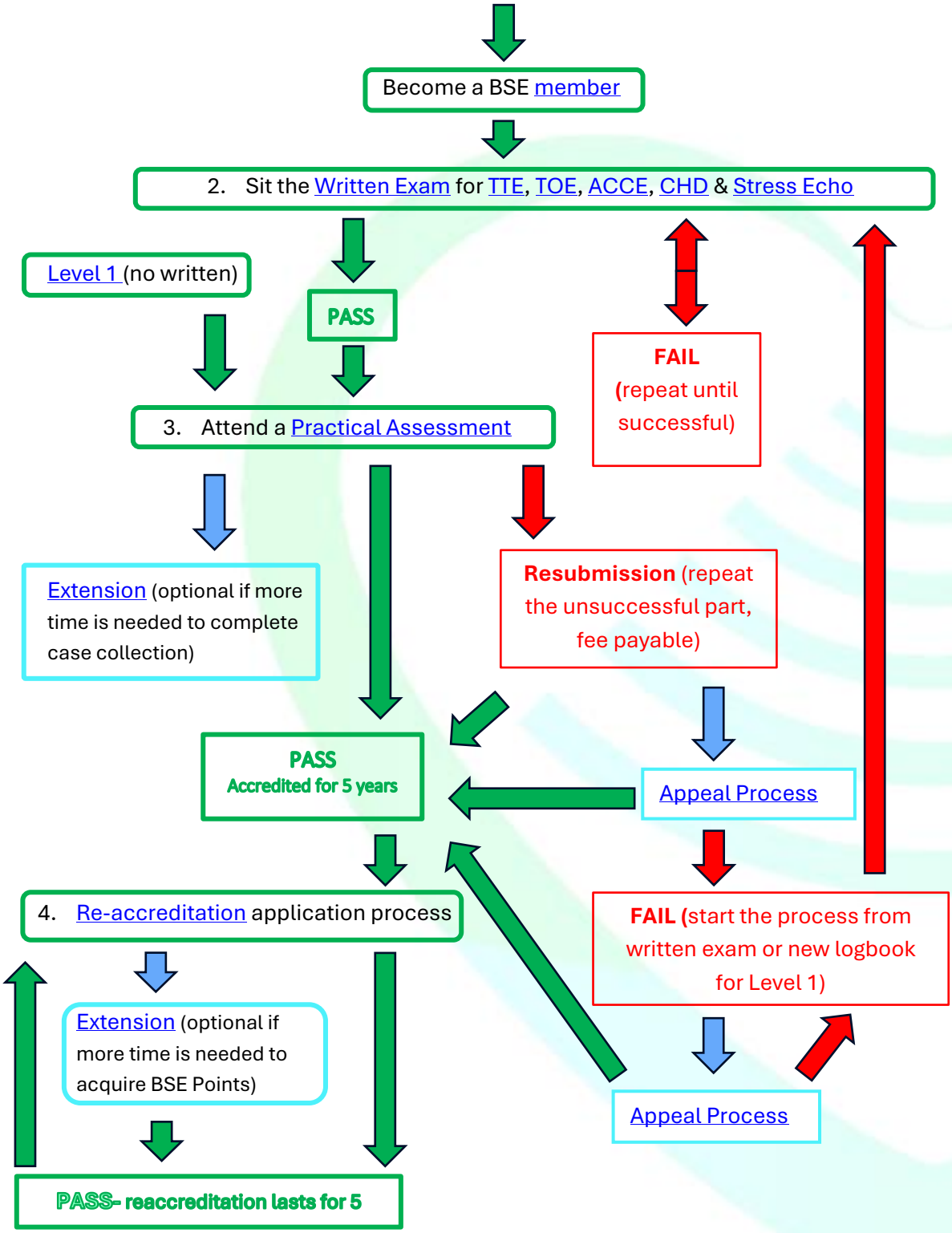
Accommodation and Travel:

All participants are responsible for their travel and accommodation if required.

Accreditation Process Overview

1. Read the Accreditation Pack and determine if you can meet the requirements.

Find a mentor to guide you through the accreditation process.



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Useful Links & Contacts

Click the following titles to link to areas of **www.bsecho.org**

- **Accreditation process**
- **Education resources (protocols & guidelines)**
- **Extension requests**
- **Logbook portal**
- **Pearson VUE Testing**
- **Practical assessments**
- **Re-accreditation**
- **Regional representatives map**
- **Written examination dates**

Join the Accreditation Clinics on the first Thursday of each month at 1 pm to ask questions about accreditation. These clinics are hosted by the Accreditation team, with support from a committee member involved in the assessment process.

Sign up for a 👉 Accreditation clinics

Contacts

- **All accreditation** queries (including exam registrations) and requests to access the portal should be made to **accreditation@bsecho.org**
- Membership questions should be sent to membership@bsecho.org
- Events, education and e-learning questions should be sent to events@bsecho.org
- Concerns or complaints should be directed to admin@bsecho.org
- Phone number for all areas: 0208 065 5794 (Mon-Fri 9 am-5 pm, excluding UK public holidays)