

Accreditation in Adult Critical Care Echocardiography

Information Pack

This pack is for the use of all candidates undergoing the accreditation process and becomes effective in January 2019.

This document supersedes all previous versions.

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Welcome message from Accreditation Chair

Dear Candidate

The process underlying Accreditation is set up to assist the echocardiographer in training and it is important that you read all the information carefully before commencing your specific specialty logbook. The Adult Critical Care Accreditation (ACCE) process represents a joint venture between the British Society of Echocardiography (BSE) and the Intensive Care Society (ICS).

The process is primarily offered as a service to the members of both these specialist societies. It is designed to accommodate the requirements of those working within the Critical Care environment. The written section of the ACCE Assessment is held annually. The Practical assessment will be held up to 4 times per year in a variety of locations. Full details and registration forms are available on the website www.bsecho.org.

We would encourage all individuals who use Echocardiography to help manage critically ill patients to become BSE members and to undertake the Accreditation process. The ultimate aim of Accreditation is the achievement and maintenance of high standards of clinical echocardiography for the benefit of patients.

Regulation of critical care echocardiography through this joint accreditation process will allow practitioners to operate at a standard of proficiency which protects patients. The process has to be regulated, and the standard of proficiency required for each specific Accreditation has to be set at a high enough level to command the respect of our professional colleagues. Subject to these constraints, we want to make it possible for as many members as possible to obtain Accreditation, and not to put any unnecessary barriers in their way. A list of Accredited members is maintained on the BSE website.

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

Good luck with your accreditation process.

Best wishes,



Dr Claire L Colebourn
Chair, BSE Accreditation Committee

Introduction and Aims

- Accreditation is run as a service for members of the British Society of Echocardiography and Intensive Care Society and 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.
- Accreditation is a minimum requirement and cannot be regarded as a guarantee of competence.
- The Accreditation process comprises a written exam (theory and case reporting sections), and a practical assessment comprising demonstration of selected echo views on a normal volunteer in an exam setting, review of the required log-book and a review of selected Viva echo cases performed to a high standard.
- Echo skills can only be maintained by continued education and practical involvement in echocardiography. The importance of this is underlined by limiting Accreditation to 5 years after which re-accreditation must be sought.

Summary of process requirements

- You must be a [member](#) of the British Society of Echocardiography
- You should address all queries regarding accreditation to:
BSE Accreditation Administrator, address details are available on www.bsecho.org. Tel: 020 7345 5185 (lines open 10am-4pm Mon-Fri), Email: accreditation@bsecho.org.
- You should register for the [written](#) and [practical](#) assessments by visiting the [accreditation](#) section of www.bsecho.org. This will advise the dates and location of the next examinations.
- You must pass the written assessment before attending the practical assessment.
- The practical assessment cases and logbook should be collected over a period of no more than 24 months from the written examination with the practical assessment being taken no later than two months after the end of the collection period. Therefore cases can be collected prior to the written exam, but the total time for cases to be collected remains 24 months.

You must submit:

- 5 full cases accompanied by reports signed by yourself
- A logbook containing 250 reports of a specific case mix with up to 50 of these reports being second-look scans related to a previous comprehensive echo (or 150 cases if you hold BSE or EACVI TOE Accreditation).
- Logbook Summary Sheet- [Appendix 9](#).
- The full mentor sheet – [Appendix 14](#).
- Final checklist- [Appendix 16](#).
- Extensions to the 24-month deadline may be granted only following periods of parental or extended sick leave or in exceptional circumstances. Extension requests forms must be submitted **before the case COLLECTION deadline**. Extension request forms can be obtained by visiting [FAQ section](#) of accreditation of www.bsecho.org. Requests received after the case

deadline may not be reviewed. We strongly advise that requests are supported by documents such as doctors letter or letter from employer confirming the reasons for an extension.

- **Extensions are not guaranteed.** A non-refundable charge of £100 will be made for each extension request regardless of the outcome.
- A fee of £250 is charged for the complete Accreditation process. This fee is payable, in advance upon registration for the written section of the examination and will also cover the Practical assessment.
- Candidates who are unsuccessful in the written section of the examination will be charged a reduced fee of £125 to re-sit this section. This reduced fee only applies to candidates who re-sit the examination within two sittings of the unsuccessful attempt. A re-attempt at the Practical assessment is also subject to a fee of £125.
- Candidates are entitled to one re-attempt at the practical assessment, after which the entire process.
- The full training syllabus is available in [Appendix 2](#).
- Appeals - Please see the [Appeal document](#) available on FAQs section of www.bsecho.org.

Details of Written Assessment and Practical Assessments

Written Section

- The written assessment is held up to two occasions each year. The Spring and Autumn examinations are held at various Pearson VUE centres (online) in the UK, Republic of Ireland, South Africa and Hong Kong.
- The written assessment is conducted under formal examination conditions. It is comprised of two parts: the theory section and the reporting section. The suggested reading list is available in [Appendix 1](#).
- Both parts of the examination will be computer marked - guidelines in [Appendix 5](#). In the written assessment it is necessary to pass both the multiple choice and imaging questions at the same exam sitting. The approximate pass mark for the theory section is 95/125 marks (76%) and for the reporting section 30/50(60%). These may vary slightly at the discretion of the Chief Examiner following moderation.
- There is no bar to re-sitting the written assessment any number of times.
- Accreditation will only be awarded once a candidate has also successfully completed the practical assessment. A satisfactory performance at the written assessment alone does not allow 'partial accreditation.'

Theory Section

- This consists of 25 questions which must be answered within 60 minutes. The questions test knowledge of critical care echocardiographic findings with some additional questions on basic cardiology and up to 5 questions on physics.
- The subject matter reflects the spectrum of clinical practice according to both frequency and technical complexity.
- 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.
- Each question comprises a brief statement followed by 5 questions relating to the statement. Candidates are required to say whether each question is 'true' or 'false'. Some example questions are provided in [Appendix 3](#).
- 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 125.

Reporting (imaging)

- This section of the exam is answered in 90 minutes.
- This will consist of 50 questions, typically 5 questions on each of 10 case studies. Each question will have 4 possible answers and candidates will be asked to select the best answer. These reflect the range of clinical material seen in critical care echocardiographic practice. Normal or near-normal studies may be presented.
- Each case will have 5 associated MCQ questions asking the candidate to select the best response from four answers (single best answer). The clips and stills can be viewed as the candidate wishes, and replayed as required.
- An example question is provided in Appendix 4. Each case is worth a total of 5 marks giving a total of 50.

Practical Assessment

- All candidates will be required to attend a practical assessment within 26 months of beginning to collect their cases (i.e. within two months of their case collection deadline). The written examination must have been passed at anytime during the collection period, before attending. The Practical assessment will be held up to five times per year.
- Dates and locations will be announced on the [Practical Registrations](#) section of www.bsecho.org. Candidates will need to select an available date and register online (full instructions provided on the [website](#)). Registrations will open at least three months before the assessment date. Upon a confirmed placement, candidates will be given an assessment time.
- **The assessment will consist of three sections:**
 - On attendance at the exam, your logbook portal reference will be activated for the examiners who will review your logbook whilst you attend Station 2. Feedback for Station 1 will be given after you have completed Stations 2 & 3.
 - **Logbooks and cases must be fully anonymised – please read the BSE Policy on the Non-Anonymisation of Patient data in [Appendix 15](#) breach of this policy will result in an automatic fail.**
 - Logbook submission: the logbook should be submitted in a ring binder folder (**do not use plastic pockets**) with the different categories separated by dividers or ideally via the [online logbook portal](#). Further details regarding the logbook submission can be found on page 8. **As of January 2020, we will not accept non-portal logbooks.**

- Station 2 will consist of a practical assessment. The candidate will be asked to acquire a number of views on a normal volunteer. The assessor will be present in the room and may help adjust the echo machine buttons as directed by the candidate if the machine is unfamiliar. This will be done in a specified timescale. On reaching a trigger score of 93, the candidate will proceed to Station 3.
- If unsuccessful at station 2, the candidate can still proceed to the following station for the purpose of summative examination. The chief examiner will discuss this with the candidate.
- Station 3 will be a Viva assessing the five video cases. Further details can be found on Page 7.
- **Logbook and viva submissions should be checked by an experienced echocardiographer prior to attendance at the Practical Assessment.**
- Following Station 3, the candidate will receive their logbook feedback. Accreditation is achieved if all three stations are passed. However, from March 2019, candidates unsuccessful at Stations 1, 2 or 3, need only re-sit stations at which they were unsuccessful at their next attempt.
- **Please note that only two attempts to pass the practical are allowed per successful sitting of the written exam.**

Logbook

- The Logbook should comprise details of 250 cases personally **performed and reported** by you during the specified period of 24 months (or 150 cases if you hold BSE or EACVI TOE Accreditation). Up to 50 of these cases may be second-look cases. It is not acceptable to include cases reported by you that have been performed by someone else.
- The format for the Logbook is a set of copies of actual clinical reports enclosed in a folder or binder, or submitted via the BSE [online logbook portal](#). Please note, as of January 2020, all logbooks must be submitted via the portal.
- The reports should ensure:
 - **All** patient data has been removed including: full date of birth, name or address. See [Appendix 15](#).
 - All cases have been collected in accordance with local requirements for data protection i.e. your trust policy.
 - Inclusion of cavity and Doppler measurements, objective observations and a comment - [Appendix 7](#).
 - The **signature (or e-signature)** and full name of the candidate is included. At least the final 150 cases should be reported primarily by the candidate alone although they may be checked by another operator. In some cases, Trust Policy dictates that reports are signed by Accredited Echocardiographers only. In this case, reports signed by the supervising echocardiographer may be included in the logbook but should be counter-signed by both the candidate and the supervising echocardiographer to confirm that the trainee has produced the report.

- The different categories of echoes should be separated by dividers. This is done under separate tabs within the [portal](#).
 - A tally of the primary diagnosis assigned to each case must be entered on the appropriate enclosed summary sheet - [Appendix 9](#).
 - If possible there should be one or more examples of unusual diagnoses such as myxoma. More than one candidate from the same institution is permitted to study the same patient if the diagnosis is unusual but each candidate must independently scan and do their own report.
 - If you have problems finding enough specific cases, discuss this with your mentor who may consider arranging for you to attend a larger centre.

Viva Case Submission

- Five full studies with reports must be brought to the practical assessment. The cases **must** be anonymised. This is the section that is often done least well and is where many candidates fail.

It is worth spending extra time doing this to make sure the submission is as good as it can be. Remember that it is assumed you will submit your best cases, so we will expect the studies to be complete and of a high standard. The following diagnoses and minimum criteria are required:

- Up to three studies may be performed **outside** the critical care setting:
 - A substantially normal and comprehensive study, demonstrating appropriate use of machine settings for optimal imaging and correct use of standard views as per BSE minimum dataset (parasternal, apical, subcostal, suprasternal), M Mode (minimum Ao/LA, MV, LV) and 2D, CW, PW and Colour Doppler to assess chambers and valves.

It is essential to demonstrate accurate measurement of the LV dimensions (minimum IVSd, LVEDd, PWd and LVEDs) in at least one case. This would normally be in this case but if this is not possible it is acceptable to provide this in at least one of the other cases.

- Two cases of other significant pathology for example:
 - a) at least moderate valvular dysfunction
 - b) significant pericardial fluid
 - c) intracardiac mass
 - d) significant structural abnormality such as severe LVH or HOCM.

The remaining two studies **must** be performed in a critical care setting:

- A study demonstrating assessment of volume status and fluid responsiveness.
- A study showing assessment of cardiogenic shock (any cause).

In order to ensure that your cases play properly and remain anonymised it is recommended that you bring your own laptop to the centre having checked that the cases play on this.

Please ensure that each clip plays automatically on click and loops continuously.

- The studies must demonstrate all appropriate echocardiographic views and must show the methods of measuring all dimensions on M-mode or 2D and all parameters on Doppler echocardiography.
- **All** cases must have patient data removed. Some machinery cannot do this post-examination so please ensure due care is taken to put 'case 1' instead of patient's name or patient's personal details. Alternatively, you may wish to use descriptions of pathology such as "aortic stenosis". It does not matter so long as it is very clear to the marker.
- Please ensure that each case and its accompanying report are clearly labelled in the same manner so that the assessor is able to easily match the case with the report.
- Reports should include quantitative measurements, observations and a conclusion or summary.
- The candidate must demonstrate the appropriate use of standard Doppler equations.
- The cases must be submitted as digital loops and stills within a PowerPoint presentation. Do not label the views or include text.

Any inotropic and ventilator support should be documented in the report and included in your interpretation of the echo findings within the clinical context.

- A guide to getting the cases right is available in [Appendix 12](#).
- Cases that are of high quality may be copied to be used in subsequent [BSE written exams](#).

Outcomes and process for re-attempts

If you are successful at all three stations, you will be deemed to have passed the accreditation process and will receive your certificate prior to leaving the assessment.

- If you are unsuccessful at any station, you will be deemed to have been unsuccessful at this sitting of the practical assessment. You will be provided with constructive feedback to facilitate a re-attempt, and offered the opportunity to continue on to the next station.
- Any parts of the exam passed at that sitting **do not** need to be re-attempted at the next attempt.
- This only applies to two attempts at the practical within a reasonable time-frame.
 - Please note feedback on unsuccessful stations is for guidance only and does not necessarily represent the opinion of the deciding assessor at your next attempt. To re-attempt, you will need to attend another practical assessment and begin at the station at which you were unsuccessful and complete all outstanding stations successfully.
 - The timescale allowed for re-attempts will depend on which stations were not passed and the number of Viva cases required to be resubmitted. This will be discussed with you in the assessment.

A second attempt at the practical assessment is subject to a fee of £125. Candidates are entitled to one re-attempt at the practical assessment, after which the entire process must be undertaken again.

Appendix 1: Suggested reading list

Authoritative textbooks (starting with the simpler texts as a suggestion)

Echo made Easy Sam Kaddoura Churchill Livingstone 2001 ISBN 0443061882

Echocardiography: Guidelines for reporting – a practical handbook Helen Rimington and John Chambers Taylor & Francis 1998 ISBN 1850700117

Cardiac Ultrasound Leonard M Shapiro & Antoinette Kenny Manson Publishing 1999 ISBN 1874545081

Feigenbaum's Echocardiography H. Feigenbaum Lippicott, Williams & Wilkins 2004 ISBN 0781731984

Textbook of Clinical Echocardiography Catherine Otto W. B. Saunders 2004 ISBN 0721607896

Echocardiography: The Normal Examination and Echocardiographic Measurements. Second Edition Bonita Anderson MGA Graphics, Australia 2007 ISBN-13 9780646468631 ISBN-10 0646468634

Hemodynamic Monitoring Using Echocardiography in the Critically Ill. DeBacker, Cholley, Slama, Vieillard-Baron, Vignon. Springer 2011. ISBN-13 9783540879541 ISBN-10 3540879544

Newton J, Sabharwal N, Myerson S et al. Oxford Specialist Handbooks in Cardiology: Valvular Heart Disease. Oxford University Press, Oxford, 2011.

Useful articles:

BSE minimum dataset for transthoracic echocardiography:
http://bsecho.azurewebsites.net/media/71250/tte_ds_sept_2012.pdf.

Accreditation for critical care echocardiography: On behalf of the joint BSE and ICS committee for critical care echocardiography and committee for Focused Intensive Care Echocardiography. S Bruemmer-Smith, C Colebourn, N Fletcher: *JICS* 13 (3) July 2012.

Consensus of circulatory shock and haemodynamic monitoring. Task force of the European Society of Intensive Care Medicine. Maurizio Cecconi, Daniel De Backer et al. *Intensive Care Med* DOI 10.1007/s00134-014-3525-z

The introduction of intensive care-led echocardiography into a tertiary care unit. SR Alam, A Docherty, I Mackle, MA Gillies. *JICS* 14(1) January 2013.

The accuracy of diagnostic and haemodynamic data obtained by transthoracic echocardiography in critically ill adults: a systematic review. CL Colebourn, V Barber, JB Salmon, JD Young. *JICS* 9(2) July 2008.

Measuring and monitoring quality in satellite echo services within critical care: an exploration of best practice. T Thomas, C Colebourn *Echo Res Pract* June 2015 2:57-64; published April 15, 2015, doi:10.1530/ERP-14-0098

Echocardiographically derived parameters of fluid responsiveness. J Gerstle, S Shahul, F Mahmood. *International Anaesthesiology Clinics* 2010:48(1);37-44.

Echocardiographic measurement of fluid responsiveness. C Charron, V Caille, F Jardin, A Vieillard-Baron. *Curr Opin Crit Care* 2006 12;249-254.

Shape and movement of the interatrial septum predicts change in pulmonary capillary wedge pressure. CF Roysse, PF Soeding, DW Blake. *Ann Thoracic Cardiovasc Surg.* 2001:7(2);79-83.

Can transthoracic echocardiography be used to predict fluid responsiveness in the critically ill patient? A systematic review. J Mandeville, C Colebourn. *Crit Care Res Pract.* 2012;2012:513480.

Predicting fluid responsiveness in the critically ill adult. J Mandeville, C Colebourn. *British Journal of Intensive Care* 05/2013;23(1):20.

Assessing left ventricular systolic function in shock: evaluation of echocardiographic parameters in intensive care. Bergenzaun et al. *Critical care* 2011, 15 R:200.

Evaluation of left ventricular systolic function revisited in septic shock. *Critical Care*, 2103 17(4) 164.

Septic cardiomyopathy. Vieillard Baron, *Annals of Intensive Care Medicine* 2011 1:6.

Nagueh SF, Appleton CP, Gillebert TC, Marino PN, Oh JK, Smiseth OA, Waggoner AD, Flachskampf FA, Pellikka PA, Evangelisa A: Recommendations for the evaluation of left ventricular diastolic function by echocardiography. *European journal of echocardiography : the journal of the Working Group on Echocardiography of the European Society of Cardiology* 2009, 10(2):165-193.

Moschietto S, Doyen D, Grech L, Dellamonica J, Hyvernats H, Bernardin G: Transthoracic Echocardiography with Doppler Tissue Imaging predicts weaning failure from mechanical ventilation: evolution of the left ventricle relaxation rate during a spontaneous breathing trial is the key factor in weaning outcome. *Critical care (London, England)* 2012, 16(3):R81.

Aurigemma GP, Gaasch WH: Clinical practice. Diastolic heart failure. *The New England journal of medicine* 2004, 351(11):1097-1105.

Vignon P, Allot V, Lesage J, Martaille JF, Aldigier JC, Francois B, Gastinne H: Diagnosis of left ventricular diastolic dysfunction in the setting of acute changes in loading conditions. *Critical care (London, England)* 2007, 11(2):R43.

Jacques DC, Pinsky MR, Severyn D, Gorcsan J, 3rd: Influence of alterations in loading on mitral annular velocity by tissue Doppler echocardiography and its associated ability to predict filling pressures. *Chest* 2004, 126(6):1910-1918.

Guidelines for the Echocardiographic Assessment of the Right Heart in Adults: A Report from the American Society of Echocardiography. *J Am Soc Echocardiogr* (2010);23:685-713 .

2014 ESC Guidelines on the diagnosis and management of acute pulmonary embolism *European Heart Journal* (2014);35:3033–3080.

Echocardiographic assessment of the right ventricle and associated hemodynamics. Karas MG, Kizer JR. *Progress in Cardiovascular Diseases* (2012);55:144–160.

Role of Echocardiography in the assessment of right heart disease: Update 2013. Tan TC, Curr JH. *Cardiovasc Imaging Rep* (2013);6:486–497.

Imaging the failing right ventricle. Mitoff PR, Beauchesne L, Dick AJ, Chow BJ, Beanlands RS , Haddad H, Mielniczuk LM.. *Curr Opin Cardiol* (2012);27:148 – 153 .

Right ventricular responses to massive and submassive pulmonary embolism. C Castillo, VF Tapson. *Cardiol Clin.*2012 30:233-241.

Fibrinolysis for patients with Intermediate-Risk Pulmonary Embolism. G Meyer, E Vicaut, T Danays. *NEJM.* 2014;370:1402-11.

Modern protective ventilation strategies: impact upon the right heart. CGT Morris, SA Burn, SB Richards *JICS* 2014 15(1):28-33.

Otto, C, Prendergast B. Aortic-valve stenosis - from patients at risk to severe valve obstruction. *N Engl J Med* 2014;371:744-56.

Wunderlich, N, Beigel, R, Siegel, R. Management of Mitral Stenosis using 2D and 3D Echo-Doppler imaging. *JACC: Cardiovascular imaging* 2013; 6(11):1191-1205

Carabello B. The current therapy for mitral regurgitation. *J Am Coll Cardiol* 2008; 52:319–26.

Bhattacharyya S, Khattar R, Chahal N, Senior R. Dynamic mitral regurgitation: review of evidence base, assessment and implications for clinical management. *Cardiol Rev.* 2015 May-Jun; 23(3):142-7.

Consensus on circulatory shock and haemodynamic monitoring. Task force of the European Society of Intensive Care Medicine. M Cecconi, D De Backer, M Antonelli et al. *Intensive Care Med* 2014 DOI 10.1007/s00134-014-3525-z.

Transthoracic echocardiography in obstetric anaesthesia and obstetric critical illness. AT Dennis. *Int J Obstet An* 2011 Apr;20(2):160-8.

Transthoracic Echocardiography with Doppler Tissue Imaging predicts weaning failure from mechanical ventilation: evolution of the left ventricle relaxation rate during a spontaneous breathing trial is the key factor in weaning outcome. Moschietto S, Doyen D, Grech L, Dellamonica J, Hyvernat H, Bernardin G. *Crit Care.* 2012;16(3):R81. doi: 10.1186/cc11339.

Appendix 2: Training syllabus for BSE ACCE Accreditation

Topics that may be included in the multiple choice examination.

1. The role of TTE in the critically ill patient

- Awareness of the potential for TTE to guide first-line management of the critically ill
- Awareness of important pathology that can be missed by TTE
- Awareness of specific indications for TOE examination
- Appropriate action and *in*action in relation to clinical findings
- Awareness of indications for immediate expert assistance
- Knowledge of common indications in acute/critical care
- Knowledge of the relationship between TTE, TOE and other methods of assessing cardiac status (e.g. MRI)
- Knowledge of the potential hazardous biological effects of ultrasound eg. heating/resonance

1.1 Service design and provision

- Awareness of mechanisms for safe devolution of critical care echocardiography
- Awareness of how to design a service to suit local need
- Awareness of the importance of linking cardiology and critical care services
- Appreciation of service costs: outlay and ongoing
- Awareness of issues surrounding staff training
- Knowledge of the importance of quality control within devolved echo services
- Awareness of equipment maintenance including infection control

1.2 Professional relationships

- Awareness of providing patient explanation relevant to the clinical setting
- Awareness of maintaining professional interdepartmental relationships with colleagues

1.3 Reporting and Documentation

- Knowledge of standard report structure
- Awareness of accurate documentation of cardiorespiratory support at the time of the study
- Awareness of the distinction and importance of both a technical and clinical report
- Awareness of the Data Protection Act with respect to echocardiography reporting
- Awareness of the need for appropriate storage systems for echocardiograms
- Awareness of digital acquisition and storage systems, scan converters and digital memories

2. Imaging Physics & Instrumentation

2.1 Concepts and Terminology

- Knowledge of compression wave definitions: frequency, wavelength, propagation velocity and their units of measurement
- Knowledge of the differences between audible and ultrasound frequencies

2.2 Propagation of ultrasound through tissues

- Knowledge of the speed of sound in different body tissues
- Knowledge of the frequency range used for diagnostic imaging
- Knowledge of the distinction between specular reflection and backscatter
- Knowledge of the principles of attenuation and scattering

2.3 Ultrasound Transducers

- Knowledge of the piezo-electric effect
- Knowledge of the structure of the 2D ultrasound beam including far (Fraunhofer) and near (Fresnel) zones and the importance of side lobes
- Knowledge of beam steering methods: mechanical vs electronic
- Knowledge of focusing methods including dynamic receive focusing
- Knowledge of appropriate focus position and use of dual focus

2.4 Imaging physics

- Knowledge of appropriate imaging frequencies in adults
- Knowledge of the effect of harmonics on imaging quality
- Knowledge of B mode and M Mode imaging methods
- Knowledge of the relationship between pulse repetition frequency, frame rate, lines per frame, field of view, and imaging depth.
- Awareness of 'parallel processing' and influence on frame rate and image quality
- Knowledge of the grey scale and dynamic range
- Knowledge of optimisation of resolution: axial, lateral and temporal
- Knowledge of reverberation artefacts
- Knowledge of factors limiting detection of small targets

2.5 Echo Instrumentation

- Knowledge of machine controls: overall gain, time gain compensation, reject, and logarithmic compression
- Knowledge of signal processing, dynamic range, pre-processing and post processing
- Knowledge of correct imaging optimisation including transducer frequency, scan angle, spatial and temporal smoothing

2.6 Optimising Images

- Awareness of the importance of optimal patient positioning
- Appreciation of the importance of the use of echo gel and the relevant infection risk
- Knowledge of all standard views
- Awareness of the potential and pitfalls for the use of non-standard views

3. Doppler physics & fluid dynamics

3.1 Basic Fluid Dynamics

- Knowledge of fluid flow: significance of peak and mean velocities
- Knowledge of determination of volumetric flow using the continuity equation
- Knowledge of laminar and turbulent flow: Reynolds' equation (qualitative)
- Knowledge of the transition from laminar to turbulent flow: inlet jet Bernoulli equation

3.2 Principles of Doppler

- Knowledge of the generation of the Doppler effect by red blood cells and ultrasound waves
- Knowledge of the Doppler equation and factors influencing the magnitude of Doppler shift
- Knowledge of the concept of spectral analysis: fast Fourier transform (qualitative)
- Knowledge of the spectral Doppler display: mean, modal and peak velocities
- Awareness of the limitation of CW Doppler caused by lack of depth discrimination
- Knowledge of the audible range of Doppler shift frequencies
- Knowledge of the effect of beam angle errors on Doppler velocities
- Knowledge of the concept of aliasing including cause and clinical manifestation
- Knowledge of the Nyquist limit
- Knowledge of the influence of transducer frequency/sample depth/beam angle on aliasing
- Awareness of high pulse repetition frequency PW Doppler and range ambiguity
- Awareness of the advantages and disadvantages of CW, PW and HPRF modes
- Knowledge of the concept of colour flow imaging as multi-sampled PW
- Knowledge of the effect of aliasing when using colour Doppler
- Appreciation of the effect of packet size/colour mode/sector size on frame rate and aliasing
- Awareness of the principles of pulse wave tissue Doppler

4. Doppler instrumentation

4.1 Spectral Doppler Instrumentation

- Awareness of the appropriate use of the 'stand-alone' Doppler probe
- Knowledge of the spectral display: positive/negative velocities, scale and baseline controls
- Awareness of the effect of high and low pass filter and intensity threshold ('reject') settings
- Knowledge of setting pulsed Doppler sample volume: influence of gate length and distance
- Awareness of representation of signal strength by image intensity
- Awareness of how aliasing manifests on the spectral display

4.2 Colour Flow Instrumentation

- Knowledge of the colour display: 'BART' convention
- Knowledge of the use of colour maps to show velocity scales
- Knowledge of the relationship between velocity and power (signal amplitude) displays
- Awareness of the principles of Tissue Doppler Imaging

5. Deformation Analysis

5.1 Principles of myocardial deformation

- Awareness of the concepts of myocardial displacement, velocity, strain and strain rate

6. Cardiac Anatomy and Physiology

6.1 Anatomy of the thorax

- Knowledge of thoracic anatomy including vascular structures

6.2 Gross anatomy of the heart

- Knowledge of basic relevant cardiac embryology
- Knowledge of the nomenclature of the cardiac chambers and valves
- Knowledge of the relationships between the cardiac chambers, valves and blood vessels
- Knowledge of the pericardial reflections

6.3 Cardiac anatomy and physiology as demonstrated by echocardiography

- Knowledge of echocardiographic anatomy: chambers/valves/great vessels/pericardium
- Knowledge of normal variants in standard echocardiographic planes
- Knowledge of the phases of atrial function: reservoir/conduit/contractile phases
- Knowledge of the effect of AF on the appearance of cardiac function
- Knowledge of cardiac remodelling in response to chronically elevated preload /afterload
- Knowledge of the effects of vasoactive drugs and positive pressure ventilation on cardiac physiology

6.4. Coronary anatomy and relationship to LV function

- Knowledge of the anatomy of the major coronary arteries
- Knowledge of the derived regional blood supply to the cardiac walls
- Knowledge of the nomenclature for describing myocardial segments: 16 and 17 segment models
- Knowledge the definitions of segmental systolic myocardial function:
 - normal
 - hypokinesia
 - Akinesia
 - dyskinesia

6.5 The Cardiac Cycle

- Knowledge of the temporal relationships of the ECG/chamber pressures/valve movements
- Knowledge of typical values for intracardiac pressures
- Knowledge of the relationship of valve movements to heart sounds
- Knowledge of valve opening and closure signals on Doppler recordings
- Knowledge of the timing of aortic valve closure as a marker of end-ejection in M-mode
- Knowledge of the effect of spontaneous unsupported ventilation on the cardiac cycle

7. Cardiac functional parameters

7.1 General measurements and calculations

- Knowledge of on-screen measurement of length/slope/area/volume/time interval
- Knowledge of measurement significance in 2-D/M-mode/spectral Doppler displays
- Awareness of the effect of off-axis images on area and volume measurements
- Knowledge of geometric assumptions in estimation of chamber volumes with M mode/2D
- Awareness of the limitation of single plane measurements of atrial size
- Knowledge of standard M-mode measurements including LV wall thickness

7.2 Methods for determining systolic function and cardiac work

- Awareness of the importance of overall visual assessment of LV function
- Appreciation of technique limitations/selection for assessing LV function
- Application of the following measures of LV function/ejection fraction where appropriate:
 - LV fractional shortening
 - LV volume measurements: biplane area/area-length/Simpson's methods
 - Doppler velocity time integral calculation of stroke distance/stroke volume/cardiac output
 - M-mode assessment of annular function: TAPSE/MAPSE
- Awareness of the influence of volume status/vasoactive medication on the above

7.3. Methods for determining diastolic function

- Appreciation of the importance of diastolic function
- Knowledge of the four progressive stages of diastolic dysfunction
- Knowledge of the characteristic transmitral and tissue Doppler patterns, and pulmonary venous flow patterns associated with each stage
- Knowledge of accurate assessment of E/A velocity and ratio and deceleration time
- Awareness of pseudonormal transmitral filling
- Awareness of the effect of significant mitral regurgitation on transmitral flow patterns
- Appreciation of the potential effects of ventilation/vasoactive medication/sepsis on diastolic function
- Appreciation of the complexities of interpretation of diastology during critical illness

7.4 Methods for determining fluid status/responsiveness

- Knowledge of the normal patterns of IVC movement on inspiration in
 - unsupported spontaneous respiration
 - patient triggered positive pressure ventilation
 - mandatory positive pressure ventilation
- Knowledge of percentage IVC collapse with respiratory cycle indicating fluid responsiveness
- Knowledge of the use of inter-atrial septal motion as an indicator of filling status
- Knowledge of trans-mitral/aortic velocity variation as an indicator of fluid responsiveness
- Knowledge of the clinical definition of fluid responsiveness
- Awareness of the use of serial targeted studies to assess the effects of vasoactive medication/fluid challenges

8. Contrast Studies

- Awareness of the significance of spontaneous echo contrast
- Knowledge of indications for a bubble contrast study:
 - diagnosis of intracardiac shunts and PFO
 - diagnosis of left sided SVC
 - assessment of unexplained hypoxaemia
- Knowledge of the technique for performing a hand-agitated contrast study:
 - optimal injection site injection
 - timing
 - use of valsalva to accentuate right to left shunts
- Knowledge of the effects of positive pressure ventilation on intra-cardiac shunts
- Awareness of the interaction between ultrasound and encapsulated contrast agents
- Awareness of the main indications for LV and RV opacification

9. Mitral valve

9.1 Normal Mitral Valve

- Knowledge of the 2D, M-mode and Doppler characteristics of the normal mitral valve

9.2 Mitral stenosis

- Recognition of valvular appearance in rheumatic mitral stenosis
- Recognition of valvular and subvalvular calcification in degenerative valve disease
- Measurement of orifice area by planimetry
- Measurement of mean/end-diastolic gradient using CW Doppler
- Measurement of 'pressure half-time': technique and limitations

9.3 Mitral regurgitation

- Recognition of functional regurgitation related to LV chamber size or wall ischaemia
- Recognition of bowing of the leaflets, mitral valve prolapse, flail leaflet, Barlow leaflets
- Recognition of calcified annulus and retracted calcified leaflets
- Recognition of the features of a rheumatic valve
- Recognition of features of infective endocarditis
- Assessment of severity
 - Colour jet size in relation to LA
 - Assessment of regurgitant fraction
 - CW Doppler: shape and density of contour of Doppler signal
 - Vena contracta width
 - PISA and effective regurgitant orifice area
 - Pulmonary vein flow patterns
 - Indirect effects on LV and LA
 - Awareness of the influence of volume status/ inotropes/ventilation on severity
- Awareness of the echocardiographic indications for TOE assessment of the mitral valve

10. Aortic Valve

10.1 Normal Aortic Valve

- Knowledge of the 2D, M-mode and Doppler characteristics of the normal aortic valve

10.2 Aortic stenosis

- Recognition of valvular appearance in senile degenerative aortic stenosis
- Recognition of the features of a bicuspid aortic valve
- Recognition of the appearance in rheumatic aortic valve disease
- Recognition of subvalvular and supra-annular obstruction
- Planimetry of the valve area
- Assessment of peak and mean gradients using CWD
- Awareness of cross-checking peak gradient using right parasternal/suprasternal windows
- Measurement of valve area using the continuity equation

10.3 Aortic regurgitation

- Recognition of functional regurgitation related to ectasia of the aortic root
- Recognition of AR related to bicuspid valve
- Recognition of flail leaflet
- Recognition of the features of a rheumatic valve
- Recognition of features of infective endocarditis including aortic root abscesses
- Appreciation of the relevance of TOE where root abscess is suspected
- Assessment of severity
 - Colour jet size in relation to the LV and LVOT
 - CW Doppler: shape and density of contour of Doppler signal
 - PHT of the CWD signal
 - Vena contracta width
 - Diastolic flow reversal in the descending aorta
 - Indirect effects on LV size
 - Measurement of the EROA
 - Awareness of the influence of volume status/ inotropes/ventilation on severity

11. Tricuspid Valve Disease

11.1 Normal Tricuspid valve

- Knowledge of the 2D, M-Mode and Doppler characteristics of the normal tricuspid valve

11.2 Tricuspid stenosis

- Recognition of valve appearance and increased transvalvular peak gradient

11.3 Tricuspid regurgitation

- Recognition of functional regurgitation related to dilatation of the RV
- Recognition of artefact TR in association with trans-tricuspid wires
- Recognition of TR related to endocarditis
- Recognition of the features of a rheumatic/carcinoid valve
- Assessment of severity
 - Colour jet size in relation to RA size
 - CW Doppler: shape and density of contour of Doppler signal
 - Vena contracta width
 - Diastolic flow reversal in the hepatic veins
 - Awareness of the influence of volume status/ inotropes/ventilation on severity

12. Pulmonary Valve Disease

12.1 Normal Pulmonary valve

- Knowledge of the 2D, M-Mode and Doppler characteristics of the normal tricuspid valve

12.2 Pulmonary stenosis

- Recognition of valve appearance and increased transvalvular peak gradient

12.3 Pulmonary regurgitation

- Recognition of common functional jet vs pathological jets
- Assessment of severity
 - Colour jet size in relation to the PA size
 - CW Doppler: shape and density of contour of Doppler signal
 - Awareness of the influence of preload/inotropes/ventilation on severity

13. Infective endocarditis

- Knowledge of risk factors for infective endocarditis
- Knowledge of pathological patterns: right vs left sided vegetations
- Recognition of typical echocardiographic appearance of vegetations
- Recognition of anterior aortic root abscess
- Recognition and awareness of 'kissing' lesions
- Recognition of acute valvular dysfunction or wall perforation
- Recognition of vegetations on intracardiac foreign objects e.g. pacing wires
- Knowledge of the indications for TOE in suspected endocarditis

14. Prosthetic Valves

14.1 Normally functioning prosthetic valves

- Knowledge of the appearance of a well-seated normally functioning prosthetic valve
 - Tilting Disc
 - Bi-leaflet
 - Ball & cage
 - Bioprostheses: stented and stentless
- Appreciation of echo artefacts resulting from prosthetic valves
- Knowledge of where to source normal range values for transvalvular gradients
- Knowledge of normal pattern of washing jets according to different valve type

14.2 Prosthetic valve stenosis

- Knowledge of assessment using 2D, m-mode and CWD assessment
- Knowledge of the use of the continuity equation in prosthetic valve assessment

14.3 Prosthetic valve regurgitation

- Knowledge of the appearance of abnormal para-valvular leaks using colour Doppler
- Knowledge severity assessment using CWD

15. Cardiomyopathies

15.1 Dilated cardiomyopathy

- Recognition of the key echocardiographic features of DCM
- Knowledge of the causes of DCM
- Recognition of intra-cardiac thrombus

15.2 Hypertrophic cardiomyopathy

- Knowledge of diagnostic wall thickness ratio in HCM
- Recognition of systolic anterior motion of the mitral valve using 2D and M-mode imaging
- Assessment of mid-cavity flow acceleration for detection of obstruction
- Awareness of the effect of inotropes on mid-cavity gradients
- Awareness of the differential diagnosis and features of an athletic heart

15.3 Restrictive cardiomyopathy

- Awareness of potential diagnosis of restrictive cardiomyopathy with:
 - moderate to severe diastolic dysfunction
 - preserved systolic function

15.4 Non-compaction

- Recognition of the main features of LV non-compaction
- Knowledge of the clinical manifestations of non-compaction

15.5 Takotsubo cardiomyopathy

- Recognition of the classical appearance of a Takotsubo's cardiomyopathy
- Knowledge of the clinical causes of Takotsubo's cardiomyopathy

16. Myocardial ischaemia

16.1 Acute myocardial ischaemia

- Recognition of acute regional wall motion abnormalities
- Knowledge of the coronary anatomy relevant to those wall motion abnormalities
- Recognition of acute valve dysfunction due to acute ischaemia

16.2 Early post-infarction complications

- Recognition of post-infarction complications
 - LV dysfunction
 - Papillary muscle rupture and flail mitral valve leaflet
 - Acute VSD
 - Free wall perforation and tamponade
 - True and pseudo-aneurysm formation
 - Dresslers syndrome

17. Intracardiac Masses

- Recognition of intracardiac thrombus in typical locations and the relevant causes
- Recognition of a typical atrial myxoma

18. Pericardial Disease

18.1 Echocardiographic features of pericardial fluid

- Recognition of a pericardial effusion as distinct to a pleural effusion
- Measurement and categorisation of volume of pericardial fluid

18.2 Features of tamponade

- Recognition of the progressive signs of cardiac tamponade
 - Collapse of the RA
 - Diastolic and then systolic collapse of the RV free-wall
 - Exaggerated interdependence of tricuspid/mitral/aortic Doppler velocities
 - Splinting of the IVC
 - Awareness that cardiorespiratory support may distort the classical echocardiographic features of tamponade
 - Awareness that cardiovascular compromise may occur in the critically ill without classical features of tamponade

18.3 Features of pericardial constriction

- Recognition of an abnormal thickened and bright pericardium
- Awareness of how to distinguish pericardial constriction from restrictive cardiomyopathy

19. Assessment for pulmonary hypertension

- Knowledge of aetiologies:
 - Acute:
 - tricuspid valve destruction/dysfunction due to all motion abnormalities
 - pulmonary embolism
 - physiological pulmonary vasoconstriction
 - Chronic
 - primary
 - secondary to chronic lung disease/pulmonary emboli
 - left heart lesions
- Knowledge of RV size and functional assessment by
 - visual assessment
 - fractional area change
 - TAPSE
- Appreciation of the effect on septal motion of volume and pressure overload including
 - 'D' deformity
 - paradoxical septal motion

20. Diseases of the aorta

- Knowledge of normal aortic sizes
 - Ascending
 - Arch
 - Descending limb
- Awareness of the features of Marfans syndrome
- Recognition of a dissection flap and associated findings

21. Grown-up congenital heart disease

- Recognition of atrial septal defects
- Recognition of ventricular septal defects
- Recognition of aortic coarctation
- Knowledge of the shunt calculation

• **22. The post cardiac arrest patient**

- Awareness of the technical considerations inherent in peri-arrest echocardiography
- Knowledge of the relationship between peri-arrest echo and the ALS algorithm
- Knowledge of the process and role of focused peri-arrest echocardiography in excluding:
 - Cardiac tamponade
 - Gross left ventricular overload and failure
 - Gross hypovolaemia
 - Massive pulmonary embolus
 - Gross RV impairment
- Limitations of the technique

23. Assessment of the hypotension/shock/acute breathlessness

- Awareness of the order in which life-threatening pathology should be sought and remedied
- A full study should be undertaken following exclusion and remedy of abnormalities in the following hierarchy
 - Pericardial fluid
 - Aortic dissection
 - Severe hypovolaemia
 - Evidence of massive pulmonary embolism
 - LV dysfunction: causes and sequelae
 - RV dysfunction: causes and sequelae
 - Acute valvular pathology

24. LV assessment in sepsis

- Knowledge of the potential effects of sepsis on ventricular function
- Awareness that functional status during sepsis is poorly reflective of baseline function
- Knowledge of how echocardiography findings should influence:
 - volume resuscitation and maintenance
 - inotrope/vasopressor selection and dosing
 - decisions regarding further cardiovascular support
- Awareness of the need for re-assessment following changes in therapy
- Awareness of the need for re-assessment following resolution sepsis

25. Assessment in blunt and penetrating cardiac trauma

- A full study should be undertaken following exclusion and remedy of abnormalities in the following hierarchy
 - Pericardial fluid
 - Aortic dissection
 - LV dysfunction: causes and sequelae
 - RV dysfunction: causes and sequelae
 - Acute valvular pathology

- Recognition of the need for urgent TOE in the presence of:
 - a wide mediastinum on CXR and normal TTE findings
 - any other clinical findings that do not correlate with TTE findings

26. Assessment in failure to wean from mechanical ventilation

- Recognition of the need for a full standard echocardiographic assessment with particular focus on:
 - search for unexpected vegetations
 - consideration of the presence of intracardiac shunts
 - consideration of unexpected pulmonary emboli
 - assessment of observed fluid balance compared with cumulative volume status

27. Assessment post cardio-pulmonary by-pass/surgical and obstetric intervention

- Awareness of the transient effects of cardio-pulmonary by-pass on ventricular function
- Awareness of the need for frequent re-assessment in this setting
- Awareness of unusual causes of LV dysfunction following surgical intervention including:
 - regional tamponade: the need for TOE to visualise posterior collections
 - thromboembolism
 - fat embolism
 - amniotic fluid embolism
 - peri-anaesthetic myocardial ischaemia
 - fluid overload
 - intrathoracic pressure effects on cardiac chambers
 - intrathoracic pressure causing graft occlusion

28. Findings/clinical settings in the critically ill which should trigger expert help

- Echo windows insufficient to answer the clinical question
- Greater than moderate valvular dysfunction
- Any concern regarding prosthetic valve function
- Post myocardial infarction complications
- Suspected takotsubo cardiomyopathy
- Suspected hypertrophic cardiomyopathy
- Moderate to severe diastolic dysfunction: to exclude restrictive cardiomyopathy
- Suspected or impending cardiac tamponade
- Abnormal appearance of the pericardium: to exclude constrictive pericarditis
- Intracardiac mass
- Suspected congenital heart disease
- Unusual intracardiac devices such as TAVI, Mitraclips or LVAD

Appendix 3: Written examination: example theory questions

Each answer is either True or False.

There is therefore no negative marking.

A question left blank does not gain any marks.

Q1	In an ultrasound imaging system:	
a).	Sector width, sector depth and frame rate can all be controlled independently	F
b)	Frame rate falls as sector width increases	T
c)	Using a lower frequency transducer improves the frame rate	F
d)	The frame rate increases as sector depth increases	F
e)	Using Colour Flow Doppler reduces the frame rate	T
Q2	In assessing Tricuspid Regurgitation:	
a)	Pulmonary systolic pressure (PAP) can be calculated using the formula $PAP = 4 \times (\text{Peak TR Velocity})^2$	F
b)	Presence of proximal flow acceleration indicates at least moderately severe TR	T
c)	Both apical and parasternal views should be used to view the colour jet	T
d)	In very severe ('free') regurgitation, the calculation of pulmonary pressure is invalid	T
e)	Additional information can be obtained from flow patterns in the SVC and IVC	T
Q3	In a patient with significant hypovolaemia:	
a)	LV appears hyperdynamic with increased contractility and reduced end-systolic cavity size	T
b)	LV fractional shortening and ejection fraction may be normal	T
c)	E/A and E/E' ratios may be normal	T
d)	Non-collapsible dilated IVC is a common finding	F
e)	Early diastolic free wall collapse is seen	F

Appendix 4: Written examination: example case reporting questions

SELECT THE SINGLE BEST ANSWER.

There is no negative marking.

Case 1

48-year-old male admitted to the Intensive Care Unit

Mitral E wave velocity varies from 0.77 m/s to 1.36 m/s with respiration

1. Which phrase best describes the key abnormality?

a.	There is a large pleural effusion present	
b.	There is a posterior pericardial effusion only present	
c.	There is a large global pericardial effusion present	X
d.	There is a large anterior pericardial effusion only present	

2. The pericardial effusion is likely to be of haemodynamic significance because:

a.	The maximum depth is more than 2 cm	
b.	There is diastolic collapse of the right atrium	
c.	There is an increase in mitral inflow of more than 40% with inspiration	
d.	There is a decrease in mitral inflow of more than 40% with inspiration	X

3. Regarding the left ventricle:

a.	Systolic function appears hyperdynamic	X
b.	There is apical akinesis	
c.	There is marked LVH with good contraction	
d.	None of the above is true	

4. The pericardial effusion in this case is secondary to:

a.	Aortic dissection	
b.	Myocardial infarction	
c.	Ventricular rupture	
d.	There is insufficient information to determine aetiology	X

5. The right ventricle:

a.	Appears dilated and impaired consistent with blunt trauma	
b.	Demonstrates frank diastolic collapse	X
c.	Is dilated consistent with acute pulmonary embolism	
d.	Appears normal in structure and function	

Appendix 5: [Pearson VUE](#) guidance notes

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 in South Africa. Each candidate will have their own monitor and will be able to replay videos during the examination. Full instructions will be provided on the day of the exam.

Pre-Registration

- Candidate must register their interest to sit the [written exam](#) by completing an online pre-registration form via accreditation section of www.bsecho.org. 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.
- 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.

On the day of the exam

- Instructions will be given on the day of the exam via a video tutorial at the test centre. Candidates will complete the exam on a computer at the test centre.
- A basic calculator is already built in to the online exam. An erasable sheet will be given to candidates by the examining centre.
- Candidates are required to bring photo ID that reflects on the registration as booked.
- Candidates are not required to bring any stationery to the exam.
- Any last-minute requests of special accommodations will not be facilitated by the test centre.

Part 1 Theory Section

A. Time

The theory section will last 60 minutes.

B. Format

The theory section will consist of multiple choice questions.

C. Answers

A column for answers is provided on the question sheet but final answers must be selected as instructed.

For one part the answers will be either TRUE or FALSE

There will be NO negative marking for this section – each correct answer will receive a score of 1. Incorrect or unanswered questions/stems will receive a score of 0.

Part 2 Digital Reporting Section

A. Time

The reporting section will last 90 minutes

B. Format

The section will consist of 10 cases, each with 4 single best answer questions relating to it

C. Answers

For each question there is only one correct answer, a choice of A B C or D

There will be NO negative marking for this paper – each correct answer will receive a score of 1. Incorrect or unanswered questions/stems will receive a score of 0.

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

D. 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>

Appendix 6: ACCE Curriculum based competency assessment tool.

(This may also be completed in digital form on the [online logbook portal](#))

- The following competency statements relate to the ACCE syllabus given in Appendix 2.
- At each hospital where you train in echocardiography you must have a mentor who is experienced in Echocardiography, preferably with BSE Accreditation, who has personally observed you scanning. He or she should sign the competencies shown below when he or she is satisfied that you are competent and can perform and report each unsupervised.
- This competency checklist should be submitted with your logbook.
- The competency assessment should ideally demonstrate progress over the entire period of your echocardiographic training and is therefore intended to be formative not summative.

Principles of using TTE in the critically ill	Date	Signed
Demonstrates theoretical knowledge of the role of TTE in the critically ill patient		
Makes appropriate timely use of abbreviated or specific echo protocols according to the clinical context for example: Cardiac arrest Shock Trauma Sepsis Acute breathlessness		
Demonstrates good clinical practice with respect to repeating or completing abbreviated studies in a timely fashion		
Can accurately and systematically report echo findings describing all parts of the heart and including and interpreting the context of the patient's illness and organ support		
Is familiar with and strives to achieve the BSE minimum dataset for each study		
Is aware of Caldicott principles of patient confidentiality and uses them in day to day practice		
Relays clinical findings to the critical care team in an appropriate and timely manner		
Demonstrates consistent and appropriate referral of echo findings requiring expert help		
Imaging physics and instrumentation		
Demonstrates theoretical knowledge of ultrasound physics to allow full and accurate use of imaging equipment		
Knows how to and routinely optimizes all images in accordance with this		
Principles of Doppler physics and fluid dynamics		
Demonstrates understanding of the appropriate use of PWD including colour flow and TDi, CWD		
Describes the Nyquist limit and how this affects clinical practice		
Doppler instrumentation		
Demonstrates accurate use of colour Doppler with attention to: Box size and position, gain setting, scale and baseline		
Demonstrates accurate and appropriate use of PWD and TDi with attention to clear spectral optimization		
Demonstrates accurate and appropriate use of CWD with attention to clear spectral optimization		
Anatomy and physiology		
Demonstrates knowledge and use of standard nomenclature for describing the 17 left ventricular segments		
Demonstrates accurate description of the motion of each individual region		

Measurements and calculation		
Measures 2D distances from point to point accurately		
Measures M-mode distances from leading edge to leading edge accurately		
Demonstrates accurate qualitative assessment of ventricular performance		
Accurately measures ejection fraction using fractional shortening or volume measurements		
Accurately measures stroke volume and cardiac output		
Demonstrates accurate assessment and interpretation of the components of diastolic function within the clinical context		
Demonstrates accurate measurement and interpretation of assessments of fluid status and responsiveness in the ventilated and non-ventilated patient		
Valve pathologies		
Demonstrates full and accurate assessment of the stenotic valve within the clinical context		
Demonstrates full and accurate assessment of the regurgitant valve within the clinical context		
Recognises features of infective endocarditis and can accurately assess the functional consequences		
Can recognise and assess normal and pathological function in the common types of prosthetic valves		
Cardiomyopathies		
Recognises and assesses cardiomyopathy including interpretation and reassessment according to the clinical context		
Myocardial infarction		
Distinguishes acute from chronic cardiac ischaemia		
Recognises and assesses the severity of acute ischaemia		
Recognises and assesses the consequences of sub-acute and chronic ischaemia		
Pericardial disease		
Can recognise and accurately assess the haemodynamic effects of abnormal pericardial fluid		
Recognises and refers possible cases of constrictive pericarditis		
Pulmonary hypertension		
Demonstrates recognition of acute versus chronic pulmonary hypertension		
Accurate assesses pulmonary hypertension using all qualitative and quantitative features		
Aortic disease		
Can recognise acute dissection of the aortic root and knows when to refer for TOE		
Congenital Heart Disease		
Can recognise the features of common presentations of grown up congenital heart disease		

Appendix 7: Suggested format for reports

This is a basic framework for a Critical Care Echo report. Guidelines are also available on the BSE website.

PLEASE ENSURE ALL CASES SUBMITTED IN THE LOG BOOK ARE FULLY ANONYMISED.

Demographic and other Identifying Information:

Referral information

Indications for echo

Inotropic support

Ventilatory support

Rate and rhythm

Date of study

Patient's age

A report should have a section for objective M-mode or 2D dimensions and Doppler measurements. There should be a section for describing observations and a short conclusion.

Measurements section:

Measurements of intracardiac dimensions can be useful in monitoring, disease progression.

These can be made using M-mode or 2D and must be interpreted in the light of the size and sex of the patient. Many pragmatic normal ranges are outdated and modern data based on large populations include upper dimensions previously regarded as abnormal. Doppler measurements should be listed (See normal valves chart on BSE website)

Description of all parts of the heart:

This should include a description of observations made in a logical order. The order will vary for the operator and the study. The most important feature might be described first. Alternatively, each anatomical region might be discussed in turn. Interpretation should not be a part of this section and even minor abnormalities are best described. These can be put into context in the conclusion.

It is not advisable to describe each modality in turn or to describe findings at each window. This is confusing since small differences can emerge between different windows or repetitions occur. Integrate descriptions from all available windows and all modalities. Normal findings should also be stated. Diagnostic appearances should also be stated where appropriate for example: appearances of rheumatic valve disease.

Failure to image a feature or obtain a view normally considered essential to the case should also be mentioned. This gives the reader the confidence that a systematic study has been undertaken rather than a study focused only on a region of interest.

Conclusions:

This should summarize the whole study and be **easily understood** by a non-echocardiographer. It should identify key abnormalities, their cause and any secondary effect. Key normal information should also be included. No interpretation should be offered that is not derived from the recorded study. This important section should contain final comments that address the clinical question within the clinical context. Differences from repeated studies and technical difficulties should be mentioned here.

Appendix 8 – Report Format

THIS IS A SUGGESTED FORMAT FOR A REPORT WITHIN THE WORKPLACE. PLEASE NOTE – ALL REPORTS SUBMITTED IN THE LOGBOOK AND ACCOMPANYING THE CASES MUST BE ANONYMISED AS PER APPENDIX 14

The report should comprise the following sections:

Demographic and other Identifying Information

Obligatory information

Patient's name

Medical record number, NHS number or other unique identifier

Age

Gender

Indications for test

Referring clinician identification

Interpreting echocardiographer identification

Date of study

Additional, optional information

Location of the patient (e.g. outpatient, inpatient, etc.)

Location where study was performed

Study classification (routine, urgent, emergency)

Date on which the study was requested, reported

Height and weight

Blood pressure

Videotape or disk number/identifier)

Echocardiographic study

This covers the main content of the report. For each cardiac structure, the report is divided as follows:

- Descriptive terms: phrases that are used to construct the text content of a report, describing morphology (e.g. mitral leaflet -thickened tips) and function (e.g. mitral leaflet –reduced mobility of the PMVL) of cardiac structures.
- Measurements/analysis: (e.g. peak gradient, mean gradient, MVA) – recommended measurements and calculations are included in Section 3 of this document (also, please refer to BSE Minimum Dataset2)
- Diagnostic statements: phrases that add echocardiographic interpretation to descriptive terms (e.g. appearance of rheumatic mitral valve disease, suitable for commissurotomy)

Summary

This important section should contain final comments that address the clinical question posed by the TTE request. This may comprise simple repetition of key descriptive terms from within the main part of the report (e.g. “severe LV dysfunction”). It may add clinical context to the technical aspects of the report, particularly with respect to abnormal findings. Where possible, comparison with previous echocardiographic studies or reports should be made and important differences (or similarities) highlighted. Technical limitations of the study or its interpretation should be included.

Appendix 9: Log-book summary sheet

Complete this sheet and place it at the front of your Logbook when attending your practical assessment if submitting via paper copy.

Name:..... Membership No.....

Date of passing Critical Care Written Examination.....

Case collection period.....

Summarise the **primary** diagnosis assigned to each case in your Logbook (Note the target guidelines for case mix)

Only one diagnosis can be assigned to each study.

Primary Diagnosis	Number of Cases
Assessment of the shock state > 25	
Assessment of valve function >25	
Assessment of right ventricular function>10	
Pericardial disease/effusion >5	
Assessment of volume status and volume responsiveness >15	
Diseases of the aorta >3	
Suspected endocarditis >3	
Refractory hypoxaemia/difficult to wean >10	
Complications of acute MI >3	
ICU Reassessment studies (≤ 50)	
No Significant Cardiac Abnormality (≤ 50)	
Other pathology	
Total Cases (250)	

Appendix 10 - Examples of Station 1 Practical Assessment Mark Sheets

Logbook	YES	NO	Comments
Logbook submitted in one ring binder /file with dividers			
All cases collected within 24-month period			
250 TTE reports performed and reported by the candidate			
150 cases reported by the candidate as 1 st operator (can be countersigned)			
All cases fully anonymised			
Correct case mix			
All reports with full name and signature			
Summary sheet present			
Supervisor/Mentor statement present			
Final check list present			

Reports	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Comments
Fully Anonymised																
Indication for echo present																
2D /M Mode Measurements present																
Appropriate measurements/Doppler calculations present																
Do measurements/ Doppler Calculations match descriptions																
All parts of heart described																
Descriptions complete																
Appropriate to request																
Conclusion present																
Pass or fail																

Appendix 11 - Examples of Station 2 Practical Assessment Sheets

Station 2, Timeframe chart

Each candidate assessment will last for 30 minutes.

20 Minutes:	You will have 2 minutes to obtain and acquire each of the 10 images.
5 Minutes:	You will be given an additional 5 minutes to repeat any of the views they wish to. In the event of them doing this the 1st image will be ignored and the 2nd acquisition will be marked.
5 Minutes:	The remaining 5 minutes will be used to enter details into the U/S system at the start of the scan and save images

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	Checks the correct patient identity. Award P if 3 unique identifiers are checked, BP if 2 unique identifiers are checked, BF if 1 unique identifier is checked and F if no checks are made.	
2D PLAX	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	5	Acquisition of good quality 2D image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. 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.	
2D SAX LV	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	5	Acquisition of good quality 2D image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the SAX LV in the specific model.	

2D modified SAX aorta demonstrating main PA	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	3	Acquisition of good quality 2D image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the SAX at Aortic level identifying Main PA in the specific model.
PW pulmonary valve (1cm proximal to the PV in the RVOT)	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	1	Acquisition of good quality PW Doppler image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the PW Doppler in RVOT in the specific model.
2D Apical 4 Chamber	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	5	Acquisition of good quality 2D Apical 4 Chamber Image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the Apical 4chamber in the specific model.
PW mitral valve In the Tips of the MV leaflets	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	1	Acquisition of good quality PW Doppler image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the PW Doppler in the MV leaflet tips in the specific model.
2D Apical 2 Chamber	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	5	Acquisition of good quality 2D Apical 2 Chamber Image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the Apical 2 chamber in the specific model.

2D A4C modified to show RV, with colour Doppler, demonstrating TR if present	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	3	Acquisition of good quality 2D modified Apical 4 Chamber Image demonstrating Colour Doppler assessment of TR if present within required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the 2D modified Apical 4 Chamber Image chamber in the specific model.
2D Sub Costal 4 Chamber	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	3	Acquisition of good quality 2D image in required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the 2D Sub Costal 4 Chamber image in the specific model.
Blind CW descending aorta	Pays attention to detail and is able to recognise/acquire a good image	0	1	2	3	3	Acquisition of good quality CW Doppler profile utilizing the Blind/Pencil Probe within the required timeframe. Award P if high quality optimised image. BP if clinically satisfactory image with limited optimization. BF if unable to accurately acquire image although is able to identify remedial measures. F if unable to reproduce image which reflects the CW Doppler profile utilizing the Blind/Pencil Probe in the specific model.
Modification of patient position to optimise image quality	Pays attention to detail and is able to consider manipulation of the patient either positional or with the aid of respiratory manoeuvre's	0	1	2	3	5	Demonstration of manoeuvre's to assist in securing high quality echocardiography images in required timeframe. Award P if high quality optimised image. F if unable to demonstrate skills of manipulation in the specific model.

Appendix 12: Getting the Viva cases right

- This section of the submission will be reviewed in great detail by your assessors.
- Candidates are most often failed at this stage of the process.
- The five cases are assumed to be your **best work**.
- Do not choose patients who are poorly echogenic!
- Don't choose an over-complicated case: just aim to comprehensively and simply demonstrate the pathology asked for.
- Each case should be a full study performed to the BSE minimum dataset and not a focused study.

Keys to passing the practical assessment:

- Images must not display any patient data: please label the case with either the pathology or as 'Case 1' etc.
- Optimize **each** image: pay attention to depth, width, focus and gain on **each** image.
- Where Doppler is used ensure the signal is correctly aligned and the cursor placed correctly. Optimize gain, scale, and sweep speed.
- Minor optimisation abnormalities on a few images do not affect the overall quality of the case but repetitious optimisation mistakes can potentially add up to failure.
- Only include loops and stills that you wish to be assessed.
- Ensure that loops and stills with measurements shown **match** the parameters quoted in the report.
- Ensure that any M-mode used is correctly aligned. If the cut is off-axis and will alter measurements use 2D images and measurements instead. You can justify this to your examiner during your practical assessment. However, it is a minimum criterion to provide a demonstration of accurate M-mode measurement of the left ventricular dimensions in at least one case.
- Use the examiner's mark sheets to guide you. They clearly state what features the examiner will be looking at in each case. See [Appendix 10](#).
- Be prepared to discuss how to perform the common Doppler equations in your practical assessment.
- You will not fail if one less important image is absent because it could not be located in the patient. You may however fail if a core or vital image is missing such that the case appears incomplete or the pathology cannot be fully assessed.
- Each case should be accompanied by a full and comprehensive report. This should include a summary that can be understood by any non-echocardiographer.
- Allow yourself enough time to collect your five Viva cases: it often takes more than one attempt to get each case right.

GOOD LUCK.

Appendix 13: Example of Station 3 Practical Assessment Mark Sheets

ACCE: Fluid responsiveness case: this case must be performed on a critically ill patient			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
ECG Largely present throughout without 2D image interference		ECG Unstable or frequently absent making timings inaccurate	
Optimisation Infrequent, non-repetitive optimisation errors which do not detract from the case conclusion		Optimisation Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete to enable full assessment of fluid responsiveness		Incomplete study Images are incomplete and do not enable full assessment of fluid responsiveness	
2D measurements/M-mode Accurate throughout with minor errors only		2D measurements/M-mode Frequent inaccuracies or isolated inaccuracies that change the description of fluid responsiveness	
Colour Doppler Accurate box size, gain, scale and baseline settings demonstrating anatomy clearly		Colour Doppler Frequent inaccuracies of box size, gain, scale and baseline settings which prevent clear demonstration of the anatomy	
Spectral Doppler Accurate use with good cursor alignment and optimised waveforms		Spectral Doppler Inaccurate use with poor cursor alignment or waveform optimisation altering pathology assessment	
Assessment of Fluid Responsiveness (FR) Ventilated: <ol style="list-style-type: none"> Inferior vena cava (IVC) diameter and reactivity is correctly measured and interpreted Stroke volume variation or aortic Vmax variation with respiration is correctly measured and interpreted Velocity time integral (Vti) response to passive leg raise or fluid bolus is correctly measured and interpreted Non-ventilated: <ol style="list-style-type: none"> IVC diameter and reactivity is correctly measured and interpreted Vti response to passive leg raise or fluid bolus is correctly measured and interpreted 		Assessment of Fluid Responsiveness (FR) Evidence of fluid responsiveness is incomplete such that assessment cannot be made There are significant errors in the measurement of fluid responsiveness	
Report is complete and accurate <ol style="list-style-type: none"> Comprehensive accurate description of all parts of the heart Correct interpretation of evidence of fluid responsiveness Correct contextualisation of fluid responsiveness 		Report is incomplete or inaccurate <ol style="list-style-type: none"> Incomplete description of all parts of the heart Incorrect interpretation of evidence of fluid responsiveness Incorrect clinical contextualisation of fluid responsiveness 	

ACCE: Cardiogenic shock case: this case must be performed on a critically ill patient			
Practice must be satisfactory in all areas to pass			
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice	Tick
ECG Largely present throughout without 2D image interference		ECG Unstable or frequently absent making timings inaccurate	
Optimisation Infrequent, non-repetitive optimisation errors which do not detract from the case conclusion		Optimisation Frequent, repetitive optimisation errors which detract from the case conclusion	
Complete study Images are complete to enable full assessment of ejection fraction and cardiac output		Incomplete study Images are incomplete and do not enable full assessment of ejection fraction and cardiac output	
2D measurements/M-mode Accurate throughout with minor errors only		2D measurements/M-mode Frequent inaccuracies or isolated inaccuracies that change the categorisation of cardiac function or cause >10% inaccuracy in measurement of cardiac output	
Colour Doppler Accurate box size, gain, scale and baseline settings demonstrating anatomy clearly		Colour Doppler Frequent inaccuracies of box size, gain, scale and baseline settings which prevent clear demonstration of the anatomy	
Spectral Doppler Accurate use with good cursor alignment and optimised waveforms		Spectral Doppler Inaccurate use with poor cursor alignment or waveform optimisation altering pathology assessment	
Assessment of Ejection Fraction (EF) and Cardiac Output (CO) EF is correctly measured using Simpsons measurement And Correlated with visual impression and other methods CO is correctly and accurately measured using LVOT diameter and LVOT Vti Or Simpsons method		Assessment of Ejection Fraction (EF) and Cardiac Output (CO) Simpsons is measured inaccurately and changes the categorisation of the reported EF CO is incorrectly or inaccurately measured (> 10% error)	
Report is complete and accurate 1. Comprehensive accurate description of all parts of the heart 2. Correct categorisation of EF and CO 3. Correct interpretation of EF and CO in the clinical context		Report is incomplete or inaccurate 1. Inaccurate or incomplete description of the heart 2. Incorrect categorisation of EF and CO 3. Incorrect interpretation of EF and CO in the clinical context	

ACCE: Non-FR/CO case: these cases may or may not be performed in a critical care setting		
NB: if Aortic stenosis is chosen as pathology the stand-alone probe is <i>not</i> required (ACCE only).		
Practice must be satisfactory in all areas to pass		
Evidence of satisfactory practice	Tick	Evidence of unsatisfactory practice
	Tick	Tick
ECG Largely present throughout without 2D image interference		ECG Unstable or frequently absent making timings inaccurate
Optimisation Infrequent, non-repetitive optimisation errors which do not detract from the case conclusion		Optimisation Frequent, repetitive optimisation errors which detract from the case conclusion
Complete study Images are complete enough to allow full assessment of the selected pathology		Incomplete study Images are missing which are relevant to the accurate assessment of the selected pathology
2D measurements/M-mode Accurate throughout with minor errors only		2D measurements/M-mode Frequent inaccuracies or isolated inaccuracies that change the categorisation of the chosen pathology
Colour Doppler Accurate box size, gain, scale and baseline settings demonstrating anatomy clearly		Colour Doppler Frequent inaccuracies of box size, gain, scale and baseline settings which prevent clear demonstration of the anatomy
Spectral Doppler Accurate use with good cursor alignment and optimised waveforms		Spectral Doppler Inaccurate use with poor cursor alignment or waveform optimisation altering pathology assessment
Pathology assessment No images missing which are key to pathology assessment No measurements significantly inaccurate that are key to pathology assessment		Pathology assessment Images missing which are key to pathology assessment Measurements key to pathology assessment significantly inaccurate and change the categorisation of the pathology
Report is complete and accurate 1. Comprehensive and accurate description of all parts of the heart 2. Correct categorisation of chosen pathology 3. Correct interpretation of findings in the clinical context		Report is incomplete or inaccurate 1. Partial and inaccurate description of parts of the heart 2. Incorrect categorisation of chosen pathology 3. Incorrect interpretation of findings in the clinical context

Appendix 14: Mentor statement to accompany the Practical Assessment

Candidate's name: _____

	Initial
I certify that the candidate has undergone a programme of training in echocardiography	
I certify I have observed the candidate scanning and I am satisfied that he/she is competent in completing a full transthoracic echo study.	
I certify that the candidate has reached a standard of training to be able to independently perform and report a transthoracic echocardiographic study in the Critical Care environment. He/she has reached all of the mandated competencies. I have signed off the candidate's competency sheet.	
I certify that the candidate above has performed and reported the 250 cases (or 150 cases if BSE Adult TTE/TOE Accreditation held) included in the accompanying Log Book within a 24-month period.	
I certify that all cases are fully anonymised (no patient's personal details such as names, full date of births or addresses)	
I certify that all cases are signed with name printed of the candidate	
I certify that these cases are being handed in as per Trust Policy Guidelines	

Mentor's name: _____

Signature: _____ Date: _____

I am satisfied that the candidate above has performed and reported the requisite number of cases included in the accompanying Log Book within a 24-month period and the five Viva cases are also the candidates own work.

Head of Echocardiography/ Clinical Lead for Critical Care: Name: _____

Signature: _____ Date: _____

Notes The Head of Echocardiography is usually the lead clinician or consultant cardiologist with overall responsibility for echocardiography. The mentor is the person with immediate responsibility for training and directing the candidate.

Appendix 15: BSE Policy on the Non-Anonymisation of Patient Data

Introduction

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 NHS staff 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 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;
Anything else 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.

Anonymisation requires the removal of such information from all reports and images.

For accreditation purposes, BSE Administrators and BSE Assessors must not be able to identify the patient from the detail or combination of details given.

Speakers presenting on behalf of the BSE at meetings and speakers on courses/meetings awarded BSE re-accreditation points must ensure that all presentation material is anonymised.

Guidance to candidates submitting Logbooks and Cases for Accreditation

The NHS Code of Practice on confidentiality means that evidence submitted for the practical part of the Accreditation process must have all patient identification removed.

In order for evidence to be considered to have been anonymised, BSE Administrators and BSE Assessors must not be able to see any of the identifiers listed above. As age is relevant to the assessment either the age or year of birth must be provided however a full date of birth must not be shown.

Reports

Please note that correction fluid may still allow data to be visible if you look at the back of the page, as does placing a sticker over the patient data. Marker pen often fades so that data may be correctly disguised at the point of anonymisation but not when brought to a Practical Assessment session

We therefore advise:

Submitting via the online logbook portal with all patient details except age and gender electronically removed

Or: cutting out the patient data

Or: Deleting data electronically prior to printing

Or: Using corrective fluid or marker pen, then photocopying the sheet

Cases

In order for cases to be classed as anonymous BSE Administrators and BSE Markers must not be able to gain personal information about the patient that is not directly relevant to the echocardiogram. This means that name, address, NHS/Hospital number and full date of birth must not be visible on the report that is enclosed with the images nor on the images themselves. If the age is not given separately the year of birth must be left visible on the report.

Please see the notes above about correctly removing patient ID from the paper report that is enclosed with the cases.

We appreciate that the removal of patient ID from cases may be difficult depending on the machine being used, we therefore advise that the cases are specifically collected for the BSE and the data inputs are made relevant to your cases.

E.g. Patient Name could be 'BSE Case 1' or 'Aortic Stenosis', Patient Number could be your membership number followed by case number, '1111-1'

Explanatory notes for the inclusion of patient identifiable data in any medium are NOT acceptable. Breach of NHS Code of Practice on Confidentiality

Major breach:

One or more examples of detailed patient demographics (e.g. name and address) OR

One or more examples of patient data sufficient to allow a patient to be traced in any way

Minor breach:

Examples of patient identifiable information found within the logbook. These might include, for example, first name or date of birth but insufficient information to identify the patient.

In the event of a major breach:

The candidate will automatically fail and candidate will be informed of the fail and notified of the reason for it. The Chair of the Accreditation Committee will be notified of all major breaches and will make the decision as to whether the Head of Information Governance at the candidate's place of employment should be informed.

In the event of a minor breach:

The candidate will be informed of the breach and notified of the reason for it. This will be taken into account in the marking scheme.

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

Appendix 16 – Final Checklist for candidates

Please complete and bring to your Practical Assessment

App	YES	NO	Comments
Logbook submitted in one ring binder /file with dividers: must be via portal from January 2020.			
All cases collected within a 24-month period.			
250 TTE reports performed and reported by the candidate All reports with full name and signature or e-signature.			150 if holding previous TOE BSE/EACVI Accreditation.
All cases fully anonymized			
Correct case mix			
Curriculum based assessment (Appendix 6)			
Summary sheet present (Appendix 9)			
Mentor statement Present (Appendix 14) and signed			