JETS JAG Endoscopy Training System

JAG training pathway and certification standards

Endoscopic ultrasound (EUS)

Part of the JAG programme at the RCP

JAG Joint Advisory Group on GI Endoscopy

Royal College of Physicians

Contents

Introduction

Background and aim

International endoscopy societies vary in their approach for credentialing individuals in endoscopic ultrasound (EUS) to enable independent practice, however there is no consensus in this or its implementation. In 2019, the Joint Advisory Group in GI Endoscopy (JAG) commissioned a working group to examine the evidence relating to this process for EUS. The aim of this was to develop evidence-based recommendations for EUS training and certification in the UK.

Methods

Under the oversight of the JAG quality assurance team, a modified Delphi process was conducted, which included major stakeholders from the UK and Republic of Ireland. A formal literature review was conducted, initial questions for study were proposed, and recommendations for training and certification in EUS were formulated after a rigorous assessment using the GRADE tool and subjected to electronic voting to identify accepted statements. These were peer-reviewed by JAG and relevant stakeholder societies before consensus on the final EUS certification pathway was achieved.

Results

Initially, 39 questions were proposed, of which 33 were deemed worthy of assessment and formed the key recommendations. The statements covered four domains: definition of competence (13 statements), acquisition of competence (10), assessment of competence (5) and post certification mentorship (5).

Key recommendations include:

1. minimum of 250 hands-on cases before an assessment for competency can be made
2. attendance at the JAG basic skills in EUS course
3. completing a minimum of one formative direct observation of procedural skills (DOPS) every 10 cases to allow the learning curve in EUS training to be adequately studied
4. competent performance in formative and summative DOPS assessments
5. a period of mentorship over a 12-month period is recommended as minimum to support and mentor new service providers.

Conclusions

An evidence-based certification pathway was commissioned by JAG to support and quality assure EUS training. This will form the basis to improve quality of training and safety standards in EUS in the UK and Ireland.

Certification criteria

Table 1. JAG EUS eligibility criteria

Certification standard	Evidence required
EUS lifetime procedure count	≥250
Lifetime pancreatic cases	≥125 cases
75 cases involving EUS FNA(B)	>85% competent for independent practice
50 of the EUS FNA(B) cases are pancreatic/solid lesion	≥85% competent for independent practice
Cases in last 3 months	≥15
Photo documentation of anatomical ultrasound landmarks	>90%
Physically unassisted	>85%
Rated competent in last five formative DOPS (none requiring maximum supervision)	>80%
DOPS – three cases of pancreas, bile ducts, ampulla of Vater	Three cases
DOPS – one case of oesophagogastric and posterior mediastinal/lymph node assessment	One case
Basic skills course	Attended
Reflections	Five

Recommended statements

In total, 33 recommendations statements were generated for the following domains:

1 definition of competence (13 statements)
2 acquisition of competence (10 statements)
3 assessment of competence (five statements)
4 post-certification mentorship (five statements).

Definition of competence in performing diagnostic endoscopic ultrasound (EUS)

During the review of evidence, it was agreed that auditable KPIs would act as a benchmark for competent independent practice and with time incorporated into the JAG Endoscopy Training System (JETS) to bring EUS in line with other endoscopy accreditation in the UK.

A full list of subsequent recommendations can be seen in Table 2.

Table 2. Summary of recommendations for training and certification in EUS

Definition of competence in performing diagnostic endoscopic ultrasound (EUS)	
1.1	Diagnostic EUS is described as the imaging modality of endoscopic ultrasound with and without tissue acquisition with fine-needle aspiration or fine-needle biopsy needles.
1.2	For a successful diagnostic endoscopic ultrasound study without biopsy, the endoscopist should be able to insert the echoendoscope to the desired level within the gastrointestinal tract dictated by the remit of the study, perform a structured station assessment and identify recognised anatomical landmarks specific to that study (supplementary file).
1.3	EUS competence requires both cognitive and technical abilities and should be defined as the ability to independently carry out effective diagnostic procedures across a spectrum of casemix and context with acceptable safety.
1.4	The endoscopist must be able to effectively identify and precisely describe the gastrointestinal wall layers and peri-lesional structures to demonstrate the likely origin of a submucosal mass for T-stage evaluation.
1.5	Comprehensive understanding of the anatomical landmarks is mandatory for safe EUS-guided tissue acquisition, including for non-gastrointestinal tumours (eg lung cancer, sarcoma etc) where understanding of relevant posterior mediastinal anatomical landmarks is necessary.
1.6	It is necessary to have a working knowledge of ultrasound, the ultrasound console, radiological descriptions of normal anatomy and radiological descriptions of pathological changes. The endoscopist must be able to acquire, optimise and capture ultrasound images.
1.7	Tissue acquisition: It is desirable that 75 EUS FNA/FNB (including 50 pancreatic lesions) are performed during training and the endosonographer will be required to demonstrate proficiency in the use of FNA/FNB EUS needles.
1.8	When performing tissue acquisition, the endoscopist should demonstrate the ability to document sampled area, needle sizes used, type of needle along with number of passes for audit and safety purposes. A tissue adequacy rate of 85% should be the aim for solid pancreas masses.
1.9	An overall 30-day case complication rate of <5% of the EUS caseload is expected.
1.10	The endoscopist must demonstrate ability to write a comprehensive, structured, and descriptive EUS report with a final provisional diagnosis. All stations and the abnormality should be reported in detail including size, location, echogenicity, TNM staging (if appropriate) as well as peri- and post-procedural complications.

1.11	The endoscopist is expected to photo-document ultrasonographic anatomical landmarks relevant to the focus of the examination (see supplementary file 4) in >90% of procedures and upload to PACS or appropriate software.
1.12	The endoscopist should photo-document ultrasonographic and endoscopic images of pathology identified using appropriate tools including Doppler, callipers to measure size and needle placement to upload to PACS or appropriate software
1.13	The endoscopist demonstrates a professional attitude toward procedural safety and patient care, including the practice of endoscopic non-technical skills of EUS (ie communication skills, situational awareness, leadership and judgement).
Acquisition of competence in EUS	
2.1	JAG accreditation in gastroscopy is desirable. The endoscopist should be sufficiently competent to safely insert a gastroscope to D2 independently.
2.2	Trainees should demonstrate their desire and commitment to perform independent practice in EUS at consultant level.
2.3	For EUS certification, UK trainees are required to attend a JAG-accredited basic EUS skills course, ideally in the early stages of their EUS training.
2.4	Trainees are recommended to use digital resources and attend live endoscopy courses and conferences to become familiar with EUS techniques and accessories.
2.5	Trainees are required to show evidence of attendance at multidisciplinary meetings.
2.6	Training should be delivered at specific levels which includes: 1 assessment of indications, risk assessment, consent and reviewing imaging 2 image acquisition and interpretation 3 formal hands-on training should utilise the EUS train the trainers (TTT) training ladder 4 accurate report writing 5 trainees are required to audit their own data and document complications with reflections.
2.7	Training in ultrasound should be an essential facet of acquiring competence in: 1 use of the ultrasound console 2 appropriate terminology, image optimisation, physics of ultrasound, image acquisition and labelling 3 contrast-enhanced ultrasound (this can be done post certification).
2.8	Trainers delivering training in EUS should have undertaken an endoscopy-specific TTT course (preferably in EUS).
2.9	Trainers should ensure that their trainees are empowered to give honest and critical feedback on their training. This is generic to all forms of endoscopy training and is a JAG requirement.
2.10	All trainees should have evidence of experience of a minimum of 250 EUS cases prior to assessment for certification.
Assessment of competence in EUS	
3.1	Formative EUS DOPS assessments should be performed at least every 10 training procedures to track progression and provide objective evidence of skills acquisition and targeted feedback. EUS DOPS should include ultrasound imaging and endoscopy, but also previous cross-sectional image evaluation, fulfilment of procedure indication and nontechnical skills.
3.2	Trainee should preferably log all training procedures onto the JETS ePortfolio.
3.3	Trainees must demonstrate the following key performance indicators to be eligible for summative assessment for certification in diagnostic EUS with/without tissue acquisition: 1 'competent for independent practice' overall in formative DOPS in 80% cases in last 3/12 (minimum of 10 cases)

	2 cases should include one case of oesophagogastric assessment, posterior mediastinal and lymph node assessment, or bile duct examination including the major papilla and three assessments of the pancreas as the focus for the examination 3 FNA / B diagnostic adequacy >85% of cases in last 3/12 (minimum of 10 cases).
3.4	Formative EUS DOPS and KPI should be used in conjunction with other supporting certification criteria including: • attending EUS basic skills course • trainee has completed 250 cases as a minimum before assessment.
3.5	For successful completion of the summative DOPS assessment, the trainee should be rated as ready for independent practice; in all items within two DOPS on pre-defined cases, by two different assessors, one of whom is not based at their current endoscopy unit.
Post certification mentorship	
4.1	Newly certified EUS practitioners should have a minimum period of mentorship lasting 1 year.
4.2	A JAG/UKIEUS defined list of mentors who can be approached by a mentee is desirable.
4.3	EUS practitioners should perform 100 cases per year, of an adequate casemix including FNA. They should regularly review their performance via audit of KPI, presentation at morbidity and mortality (M&M) meetings, 360 assessments and via the annual appraisal system.
4.4	In single operator practices, EUS practitioners should have the opportunity the join local networks and, if they do not exist, they should make efforts to form them.
4.5	Independent practice in therapeutic EUS will require specific training.

Discussion

EUS is a technically demanding modality that involves a steep learning curve, principally because it is an imaging modality. While there is an increasing number of therapeutic procedures achievable with EUS guidance, there is an imperative to ensure a solid grounding of knowledge to become consciously competent in necessary echoendoscope handling, coupled with skills in interpreting radiological ultrasound images for clinical diagnosis.

Moreover, during the procedure, the endosonographer must demonstrate good teamwork and leadership skills, show good knowledge and decision-making skills regarding ultrasound diagnosis and tissue acquisition, generate a report that answers the clinical question, and always ensure safety.

Getting to a definition of competency for EUS in comparison with, for example, ERCP or colonoscopy has been elusive. The latter studies have recognised quality performance indicators that can be assessed before/during and after the procedure while EUS historically does not; partly this relates to the varied examinations (remits) that can be undertaken in EUS, a lack of consensus on judging competency of ultrasound imaging for the trainee, and a focus on FNA sampling adequacy and diagnostic rates that practically may not be possible at the time of the procedure.

The Delphi group assessed a comprehensive number of published scientific papers to address key questions of diagnostic EUS training, including consensus on defining competence, the pathway of learning to achieve this and its assessment to allow trainees to credential for safe independent practice. Like ERCP, the group also examined the rationale for mentoring newly qualified practitioners. To reflect current practice and most service providers, there is an emphasis on linear echoendosonography.

While the Delphi group advocate a period of attendance at ultrasound and cross sectional abdominal and thoracic imaging lists in addition to a period of observation 'hands off', there is currently no evidence base on which to base a recommendation. However, we recommend 250 'hands on' procedures be performed and recorded on JETS prior to an assessment of competency. It is recognised that there is a spectrum of case numbers required to reach a level deemed ready for independent practice.

A syllabus divided into three domains is proposed:

1 The early novice phase of training in cases 0–75.
2 An intermediate phase of training for cases 76–150.
3 An advanced phase of training 151–250 prior to summative assessment to outline individuals' performance targets as they progress through specific milestones during the training programme.

The syllabus highlights defined categories to allow trainers and trainees to focus on milestones of learning. Categories within each domain include background knowledge, scope handling, ultrasound console, the study of EUS anatomy for normal and pathological lesions and, crucially, the interpretation or cognition of ultrasound images, FNA/B (domain 2 and 3) and, finally, bringing each domain section together under the EUS procedure. In advanced training the focus increases on arguably the most important skill to learn, which is 'hands off'.

The practice of clinical ultrasound involves real-time continuous imaging of a given study remit. There are limited studies in the teaching and assessment of this modality in the training of EUS. Trainers and authors have focused primarily therefore on teaching from static frozen images located at specific anatomical landmarks (so called 'stations'). The stations are discussed in detail in the supplementary files, with multiple examples of landmarks: for each station there is then a summary list of key images recommended for the trainee to develop competency in recognising and capturing.

Domains 1 and 2 focus primarily on a structured approach to anatomy teaching. Domain 3 highlights the importance of moving towards the ability of real-time continuous imaging, ie being able to 'follow the anatomy'. The Delphi group recommend all EUS procedures provide captured images that are annotated, to be stored on a picture archiving and communication system (PACS); endoscopic ultrasound is an imaging modality and as such should be in line with all imaging modalities. In time we envisage the recording of small video loops on PACS to allow real-time structural studies to become routinely available for the HPB, oesophagogastric and thoracic multidisciplinary teams (MDTs).

Historically international EUS training programmes have relied on set procedure numbers to attain competence.[1,2,6] The American Society of GI Endoscopy (ASGE) has recently advocated for standardisation of the assessment of procedures to individualize the number of procedures required for training.[3,5] The direction of travel, however, is towards competency-based training,[7] though the widespread practice of this by trainers still has a focus on procedure volume.[8] For competency-based training and certification, a systematic review from 2016 identified 30 studies regarding structured assessment of EUS competencies.[9] Certain technical skills were highlighted including pancreatic solid mass T-staging, EUS-guided fine-needle aspiration (EUS-FNA) procedure time, number of EUS FNA passes and puncture precision for EUS. An endoscopy trainers' course, such as the JAG Train the Trainers (preferably in EUS), can potentially highlight the importance of an EUS curriculum, the milestones or 'way points' in the path to learning, improving the different techniques of performance enhancing feedback and learning how to make objective and measurable assessments.[10]

Feedback is a two-way street: a recent survey of UK trainees highlighted specific areas of teaching that merit attention, such as improving the frequency of trainer feedback above the value of 75%

surveyed, specific learning points (50%) discussed by the trainer and only 57% of trainees felt they could give objective feedback to the trainer.[4] A recent Delphi process by gastroenterology trainees highlighted 10 competencies they value from the trainer in teaching endoscopy.[11]

Following the Shape of Training review commissioned by the GMC, the training of physicians is undergoing considerable change due to the implementation of shorter training times in gastroenterology from 5 to 4 years, which also impacts training in endoscopy.[12] Competency in specialties such as ERCP and EUS therefore may require post-CCT fellowships.

There are several limitations to our study. The group of invited participants were from the UK and Ireland to represent UKI EUS provision of service and training, thus, it may not be relevant to other international centres of EUS training. One clear limitation is the poor quality of many of the studies in literature. This has resulted in a necessary incongruity between the strength of the recommendations and the evidence quality. While this leaves recommendations open to criticism, it is our expectation that by setting these standards, high-quality research can be undertaken in the future to corroborate or refute our recommendations.

There are opportunities for future research using the competency framework outlined in this document. There is no previous evidence base on the facility of exposure to radiology lists and 'hands-off' cases for the first 50–100 procedures prior to hands-on EUS training. There is a need to develop an evidence base for training: performing a prospective study of the use of national JETS data learning curves to more accurately assess how trainees achieve EUS competency in the UK will further our knowledge. An appreciation of key interventions to 'accelerate' trainees up the learning curve including the use of intensive fellowships and simulation will also be important.

Conclusions

This document attempts to be specific in the training requirements desired for service providers to undertake high-quality endoscopic ultrasound examinations. This will enable training bodies to ensure adequate provision of high-quality, focused training (most likely through post-certification EUS fellowships), using the competency and training framework outlined in this document. Additionally, the training of mentors to support newly qualified service providers in their early career of EUS practice should be formalised. This will address the unmet need for EUS training and ultimately result in a high-quality service for patients.

Contact details

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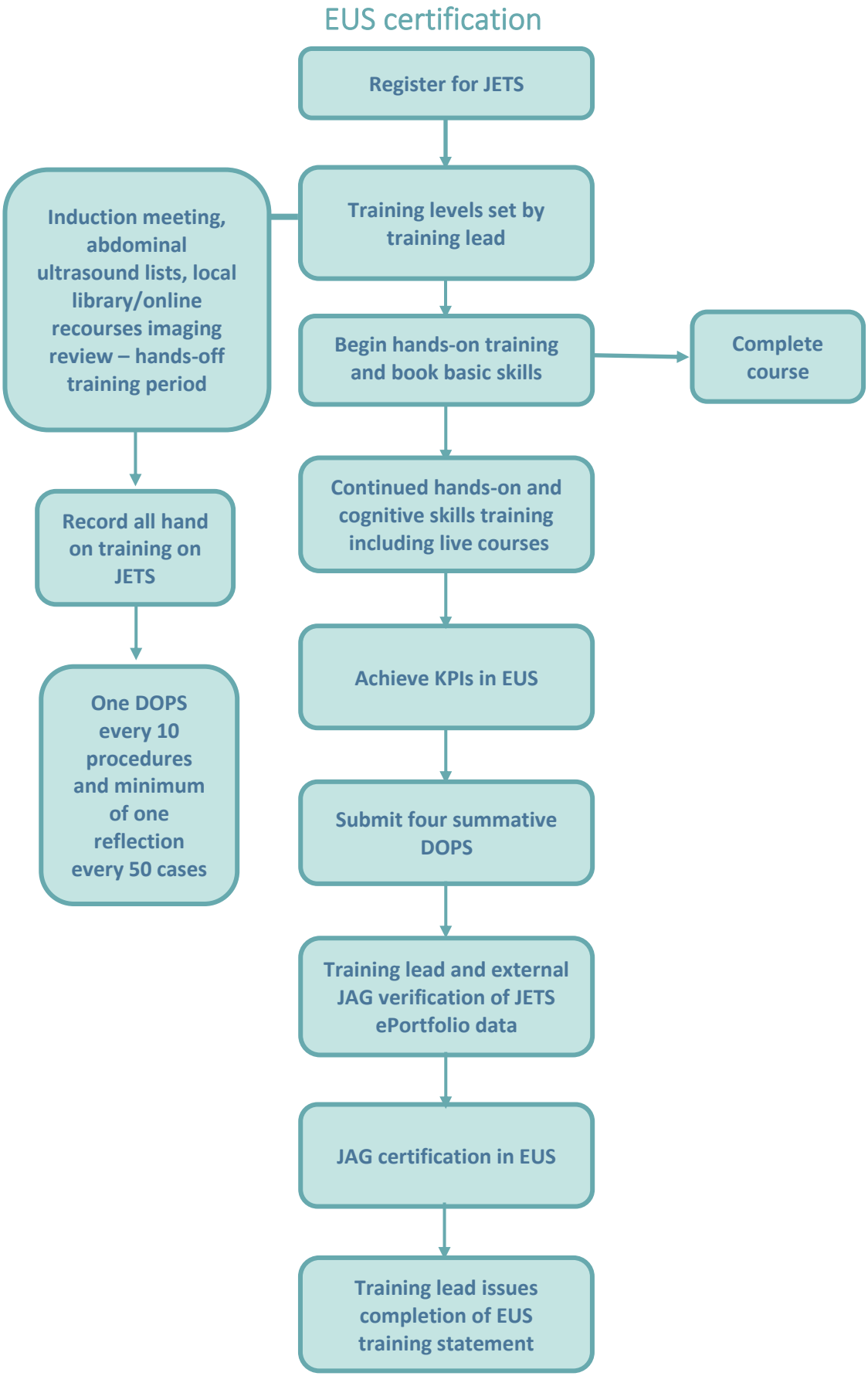
Appendices

Certification process

Figure 1. Proposed JAG training pathway for EUS certification in the UK and Ireland.



References

1. Meenan J, Harris K, Oppong K *et al*. Service provision and training for endoscopic ultrasound in the UK. *Frontline Gastroenterol* 2011;Jul;2:188–94.

2. Domagk D, Oppong KW, Aabakken L *et al*. Performance measures for endoscopic retrograde cholangiopancreatography and endoscopic ultrasound: A European Society of Gastrointestinal Endoscopy (ESGE) quality improvement initiative. *United Eur Gastroenterol J* 2018;Dec;6:1448–60.

3. Wani S, Keswani RN, Petersen B *et al*. Training in EUS and ERCP: standardising methods to assess competence. *Gastrointest Endosc* 2018;87:1371–82.

4. Ratcliffe E, Subramaniam S, Ngu WS *et al*. Endoscopy training in the UK pre-COVID-19 environment: a multidisciplinary survey of endoscopy training and the experience of reciprocal feedback. *Frontline Gastroenterol* 2022;13:39–44.

5. Wani S, Keswani RN, Han S *et al*. Competence in endoscopic ultrasound and endoscopic retrograde cholangiopancreatography, from training through independent practice. *Gastroenterology* 2018;155:14831494.e7.

6. Wani S, Wallace MB, Cohen J *et al*. Quality indicators for EUS. *Gastrointest Endosc* 2015;81:67–80.

7. Carraccio C, Englander R, Van Melle E *et al*. Advancing competency-based medical education: a charter for clinician-educators. *Acad Med J Assoc Am Med Coll* 2016;91:645–9.

8. Patel SG, Keswani R, Elta G *et al*. Status of competency-based medical education in endoscopy training: a nationwide survey of US ACGME-accredited gastroenterology training programs. *Am J Gastroenterol* 2015;110:956–62.

9. James PD, Antonova L, Martel M, Barkun A. Measures of trainee performance in advanced endoscopy: A systematic review. *Best Pract Res Clin Gastroenterol* 2016;30:421–52.

10. Waschke KA, Anderson J, Macintosh D, Valori RM. Training the gastrointestinal endoscopy trainer. *Best Pract Res Clin Gastroenterol* 2016;30:409–19.

11. Fuchs M, Sewell JL, Kumar NL. Best practices in teaching endoscopy according to a Delphi survey of gastroenterology trainees. *Gastroenterol Rep* 2021;9:600–2.

12. Clough J, FitzPatrick M, Harvey P, Morris L. Shape of Training Review: an impact assessment for UK gastroenterology trainees. *Frontline Gastroenterol* 2019;10:356–63.

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