



Clinical Audit in Ultrasound: Guidance Document

Produced by the British Medical Ultrasound Society

Professional Standards Group

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Clinical audit is a cornerstone of high-quality ultrasound service delivery, confirming that imaging practices are accurate, compliant with national standards, and consistently delivered. It is pivotal for ensuring safe, effective, and reliable patient care.

Key motivations for audit include:

- Improving patient outcomes through verification of diagnostic accuracy and consistency.
- Ensuring compliance with professional and national guidelines, reducing unwarranted variation.
- Driving continuous quality improvement by identifying gaps and implementing changes.
- Ensuring compliance with diagnostic safety guidance, equipment performance, image optimisation and infection, prevention and control.

Examples include:

- Diagnostic Accuracy Audits: Comparing ultrasound findings with histopathology, surgical results, or cross-sectional imaging (e.g., CT, MRI) to ensure high accuracy in detecting lesions such as thyroid nodules.
- Compliance Audits: Assessing adherence to national guidance or departmental protocols, such as surveillance intervals, structured reporting standards, or infection-control practices.
- Image and Reporting Quality Audits: Reviewing scan completeness, image clarity, and report structure against internal or external benchmarks using the BMUS peer review audit.
- Safety and Hygiene Audits: Ensuring probe decontamination and infection control measures meet local and national standards.
- Safety and Exposure to Ultrasound Audits: Ensuring local practice is compliant with the key principles for the safe use of ultrasound (e.g. BMUS guidelines).
- Professional Development Audits: Tracking consistency between sonographer impressions and radiologist reports to identify training needs.

Roles and Responsibilities:

Audit is a shared professional responsibility that underpins safe and effective clinical practice. The overall accountability for ensuring that audits are undertaken lies with the clinical governance framework of the organisation and the departmental leadership (e.g. clinical lead radiologist or ultrasound service lead). Clarifying responsibilities ensures accountability, efficiency, and engagement across the multidisciplinary team.

Role	Responsibility
Audit Lead (Sonographer / Radiologist)	Oversees the audit, defines scope, liaises with governance, steers methodology, and drives action planning.
Sonography Practitioners	Contribute practice insights, assist with data collection, and engage in discussions around findings and improvements.
Clinical Governance / Audit Team	Registers and monitors the audit, ensures compliance with governance policies.
Histopathology / Surgical Teams	Provide comparator data (pathology or operative findings), verify results, contribute to inter-departmental review.
Data Manager / Analyst	Extracts, collates, and analyzes audit data (e.g., sensitivity, specificity, compliance rates).
Clinical Leads / MDT Chairs	Review findings, endorse actions, promote learning within clinical teams.
Education & Training Coordinators	Address identified training gaps, arrange CPD, support structured reporting improvements.
Clinical Scientist (ultrasound physics)	Reviews findings of audits on exposure, equipment performance and image optimisation to promote compliance with national guidelines and identify/support training gaps.

Guidance for setting up an ultrasound audit

The following instructions provide a structured framework for undertaking a clinical audit in ultrasound. They are designed to guide practitioners through each stage of the audit cycle, from identifying a relevant topic to implementing improvements and re-auditing. By following these steps, audit teams can ensure that their process is systematic, transparent, and aligned with national standards of clinical governance.

These instructions are not only intended to set out what needs to be done, but also why each stage matters. This dual focus helps practitioners understand the purpose of each step, ensuring that audits are used as a meaningful quality improvement tool that enhances patient outcomes, supports professional development, and drives continuous service improvement.

1. Title

Purpose: The title clearly defines the focus of the audit and helps others quickly understand its scope. A well-defined title avoids ambiguity and ensures the audit is easily identifiable in governance records.

- Example: *“Audit of Ultrasound Accuracy in Detecting Hepatocellular Carcinoma Against Histopathology”* or *“Audit of Ultrasound Surveillance Outcomes for HCC Compared with National Guidelines”*.
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2. Background & Rationale

Purpose: Provides context and justification for the audit. It ensures that the audit is clinically relevant and addresses an important aspect of service delivery. A strong rationale links the audit to patient outcomes and national standards.

- Summarise the clinical role of ultrasound in the chosen context.
 - State why the audit is required (diagnostic accuracy, guideline compliance, quality of patient care).
 - Reference national/international guidance (NICE, EASL, ACR, RCR, or local policy).
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3. Aims & Objectives

Purpose: The aim sets the overarching goal of the audit, while objectives define the specific, measurable steps to achieve it. Clear objectives guide data collection and analysis.

- **Aim:** Broad statement of intent (e.g., *To evaluate the accuracy of ultrasound in detecting HCC*).
- **Objectives:**
 - Compare ultrasound findings with histopathology/surgical outcomes.

- Assess adherence to surveillance protocols (e.g., 6-monthly scans).
 - Measure detection rates of early-stage HCC against national benchmarks.
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4. Standards / Criteria

Purpose: Establishes what the audit will measure performance against. Without standards, it is not possible to judge whether practice is acceptable or needs improvement.

- **Diagnostic accuracy audits (US vs. histopathology/surgery):**
 - Sensitivity, specificity, PPV, NPV.
 - False positive and false negative rates.
 - **Guideline compliance audits (e.g., HCC surveillance):**
 - Proportion of patients scanned at recommended intervals.
 - Detection of HCC at early stages (per national targets).
 - Quality of reporting (lesion size, number, vascularity, structured format).
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5. Methodology

Purpose: Ensures the audit is reproducible, systematic, and robust. A clear methodology also enhances credibility and allows findings to be trusted by stakeholders.

- **Audit type:** Retrospective or prospective.
 - **Sample selection:** Define inclusion/exclusion criteria (e.g., all patients undergoing liver ultrasound for HCC surveillance within last 12 months). Determine sample size.
 - **Data sources:** RIS, PACS, histopathology reports, surgical notes, MDT records.
 - **Data points to collect:**
 - Patient demographics.
 - Indication for ultrasound.
 - US findings (lesion presence, size, LI-RADS if used).
 - Comparator results (histology/surgery/MDT consensus).
 - Compliance with reporting standards.
 - Surveillance intervals.
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6. Data Analysis

Purpose: Provides insight into performance and highlights areas needing improvement. Analysis allows comparison with benchmarks and demonstrates whether standards are being met.

- Calculate diagnostic performance (sensitivity, specificity, PPV, NPV).
- Benchmark local results against national standards.
- Identify trends in false negatives/positives.

- Analyse compliance with surveillance intervals.
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7. Results Presentation

Purpose: Clear presentation ensures results are understandable and accessible to all stakeholders. Visuals help highlight trends and problem areas.

- Present results in tables, graphs, and percentages.
 - **Diagnostic accuracy audits:**
 - Confusion matrix (TP, TN, FP, FN).
 - Sensitivity/specificity calculations.
 - **Surveillance audits:**
 - % patients scanned within recommended timeframe.
 - % of early-stage HCCs detected.
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8. Discussion

Purpose: Interprets the results, providing meaning beyond numbers. This section identifies strengths, weaknesses, and contextual factors that influence outcomes.

- Interpret results relative to national standards.
 - Highlight strengths and deficiencies.
 - Identify contributing factors (equipment, operator dependency, documentation).
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9. Action Plan / Recommendations

Purpose: Translates findings into practical steps for improvement. An audit is only useful if it leads to meaningful change.

- Propose specific, measurable changes:
 - Structured reporting templates.
 - Scheduling reminders for surveillance.
 - Double-reading for equivocal cases.
 - Identify training/CPD needs.
 - Feed back findings in MDTs and governance meetings.
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10. Re-Audit Plan

Purpose: Reinforces the cyclical nature of audit. Re-auditing ensures that changes made are effective and that improvements are sustained.

- Define timeframe for re-audit (6–12 months typical).
 - State how improvements will be measured.
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11. Governance & Ethics

Purpose: Ensures that the audit is compliant with institutional requirements, legally sound, and ethically appropriate.

- Register the audit with local audit/clinical governance team.
 - Confirm classification as audit/service evaluation (no patient consent required if anonymised).
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Suggested areas for audit in your department may include:

- HCC surveillance ultrasound accuracy and compliance with 6-monthly scanning protocols.
- Thyroid nodule ultrasound reporting against U-score/T-RADS guidelines.
- Transvaginal or general gynaecological scan completeness and reporting quality.
- Non-obstetric ultrasound practitioner image and report quality.
- Probe cleaning and infection-control compliance in high-use areas.
- Safe use of ultrasound equipment against national guidance (e.g. user quality assurance, output power/examination times, image optimisation)

Embedding these examples helps teams identify feasible, impactful audit topics relevant to service improvement and patient safety.

Selected Published Ultrasound Audit Studies

1. Obstetric Ultrasound: Fetal Anomaly Detection Audit (NHS Case Example)
 - Scope: Targets detection rates of fetal anomalies in obstetric ultrasound within the UK NHS.
 - [Wiley Online Library](#)
2. Large-Scale Audit of Fetal Anatomy Scans: Quality Improvement Cycle
 - Scope: Retrospective audit of scan completeness and image quality over two consecutive years on over 100,000 images.
 - [PubMedPMC](#)
3. Non-Obstetric Sonographer Examination Quality Audit
 - Scope: Rolling audit of 3,700+ non-obstetric ultrasound cases over 11 years.
 - [PubMed](#)
4. Transvaginal Ultrasound Re-Audit in Gynaecology Clinic
 - Scope: Closed-loop audit assessing compliance with guidelines in TV ultrasound.
 - [PubMed](#)
5. Audit of Thyroid Nodule Ultrasound Reporting

- Scope: Audit against British Thyroid Association's U-scoring guidelines for thyroid nodule ultrasound.
- clinicalradiologyonline.net
- 6. Emergency Ward Ultrasound Disinfection Audit
 - Scope: Multicentre audit of ultrasound probe decontamination practices across emergency departments in Northern France.
 - BioMed CentralSpringerLink
- 7. RCR Template: Non-Obstetric Ultrasound Practitioner Reporting Audit
 - Scope: Royal College of Radiologists template for internal audit of image/report quality among non-radiology practitioners.
 - The Royal College of Radiologists
- 8. Generalist Ultrasound Audit Among Sonographers in Canada
 - Scope: Agreement between sonographer impressions and radiologist reports.
 - SAGE Journals
- 9. Audit of compliance to national guidelines on safe use of ultrasound
 - Scope: Adherence to BMUS guidelines for neonatal and Obstetric scanning
 - <https://journals.sagepub.com/doi/abs/10.1179/174313408X353828>
 - <https://journals.sagepub.com/doi/full/10.1177/1742271X231225057>
- 10. Audit of ultrasound imaging equipment performance
 - Scope: Identify poor and inaccurate equipment performance trends
 - <https://journals.sagepub.com/doi/full/10.1177/1742271X13511805>

Summary Table of Audit Examples

Audit Type	Focus	Key Outcome
Obstetric anomaly detection	Fetal anomaly detection in obstetric US	Highlights need for improved detection rates and staff training
Fetal anatomy image quality	Scan completeness and image quality	Demonstrated significant improvements via feedback and re-audit
Non-obstetric image/report quality	Quality of sonographer-led scans over time	Sustained high standards and professional development
Transvaginal scan compliance	Compliance with gynaecological ultrasound protocol	Showed rapid gains post-intervention
Thyroid nodule scoring	Reporting using U-score per BTA guidelines	Led to teaching and practice changes to reduce unnecessary FNACs
Probe disinfection	Infection-control audit in ER ultrasound	Ensured safe practice and adherence to hygiene protocols

Audit Type	Focus	Key Outcome
Practitioner reporting	Image/report accuracy per RCR template	Provides structured QA mechanism for non-radiologist practitioners
Generalist sonographer audit	Agreement between sonographer & radiologist	Encourages audit-led professional dialogue and internal review
Safety indices audit	Mechanical Index, neonatal scanning, Adherence to BMUS guidelines	Advise on compliance, amend presets.
Safety indices audit	Thermal Index, Obstetric scanning, Adherence to BMUS guidelines	Advice on compliance, amend presets.
Equipment Quality assurance audit	Adherence to BMUS guidance	Ensure QA programmes implemented

Disclaimer

The British Medical Ultrasound Society produces recommendations and guidelines as an educational aid to inform safe practice. They offer models and pathways associated with established clinical imaging techniques and best professional practice, based on published evidence.

BMUS recommendations and guidelines are designed to inform local protocols issued by employers, but are not intended to be inflexible or prescriptive. Therefore, the choice of imaging examination and subsequent management of all patients is ultimately a local decision based on agreed schemes of work, the clinical information provided, and the ultrasound practitioner's professional judgement.