



HKCRRT

*The Hong Kong College
of Radiographers and
Radiation Therapists*

Standards of Practice for Ultrasonography

By

Ultrasonography Faculty

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1. Brief information/background of ultrasonography

Ultrasound imaging is widely used in medical practice. It is regarded as the first-line of investigation when making medical diagnoses because it is non-invasive, radiation-free, relatively low cost, and versatile. Ultrasound scans are now performed by a wide range of medical practitioners, including radiologists, ultrasonographers, midwives, and medical doctors of different specialties.

Radiographers in Hong Kong have been performing ultrasound scans under the supervision of radiologists since the late 1980s. In the past 30 years, these dedicated ultrasonographers have put a great deal of effort into establishing the profession, and have worked closely with radiologists/clinicians to deliver reliable sonographic diagnoses.

However, ultrasound imaging is known to be highly operator dependent. The expertise of the ultrasonographer is therefore of the utmost importance. All practicing ultrasonographers must keep up-to-date with the latest developments in ultrasound technology and strive to maintain the highest professional standards. These can be attained by establishing a standard of practice (SOP) and advocating for continued medical education in the profession.

An SOP is important to the profession because it promotes and guides clinical practice. An SOP also provides an evaluation tool for each practitioner to ensure clinical proficiency and safety.

Every ultrasonographer should refer to the SOP as a professional model. They should strive to become professionally accredited so as to maintain a high-quality service.

2. Safety and precautions

Although diagnostic ultrasound imaging is known to be non-invasive and should not cause any harm to the patient, it is still possible for there to be thermal and cavitation hazards to human tissue during the course of ultrasound insonation. Guidance on the proper use of diagnostic ultrasound imaging by qualified practitioners is therefore necessary.

2.1 Diagnostic ultrasound imaging should be for medical diagnosis only. Courtesy cases of obstetric scanning should not be performed, such as souvenir videos, sonograms, or photographs.

2.2 Ultrasound equipment should only be operated by trained personnel. Ultrasonographers should have a full understanding of the following:

- 2.2.1 Potential thermal and mechanical bio-effects of ultrasound imaging. Always maintain minimal patient exposure to acoustic energy.
- 2.2.2 Maintain full awareness of machine power levels.
- 2.2.3 Output levels should be kept as low as reasonably achievable (ALARA) to produce useful results.

- 2.2.4 The examination duration should be kept as short as possible to produce diagnostic results.
- 2.3 Follow appropriate guidelines for cleaning and preparing ultrasound transducers, equipment, and rooms. Follow appropriate guidelines for the use of ultrasound coupling gel.
- 2.4 Maintain a safe environment for staff and patients. Adequate ventilation reduces air contamination and exposure to infection (e.g., COVID-19). Air conditioning systems equipped with high-efficiency particular air (HEPA) filters provide adequate protection. Disinfect the equipment and rooms according to the infection control regime after handling infectious cases.
- 2.5 The occupational safety and health (OSH) of ultrasonographers is of paramount importance. Work-related musculoskeletal disorders (WRMSD) are well known among ultrasonographers. OSH management should be applied in the workplace to ensure proper manual handling and the correct scanning posture of staff to avoid WRMSD. Below is a list of suggested good practices:
- ✓ Arm should not be abducted more than 15 degrees
 - ✓ Adjustable chair/table for scanning region at an appropriate height
 - ✓ Shoulder should be square to the hips, with head looking forwards
 - ✓ Monitor should be slightly below eye level (neck slightly flexed)
 - ✓ Appropriate patient handling techniques should be used

3. Role and responsibilities of ultrasonographers

Ultrasonographers work independently to perform ultrasound examinations and draft preliminary reports for radiologists' endorsement. On occasion, the ultrasonographer needs to collaborate with a clinician during interventional procedures. A competent ultrasonographer must recognize patient conditions and integrate their scientific knowledge, technical competence, and patient interaction skills to provide a safe and accurate ultrasound examination.

3.1 Data integrity

- 3.1.1 Understand the clinical management system (CMS), radiology information system (RIS), and picture archiving and communication system (PACS) workflow.
- 3.1.2 Avoid collecting inaccurate data.
- 3.1.3 Verify patient and study information before and after examination (e.g., time-out policy).
- 3.1.4 Ensure the necessary images are completely transferred to PACS.

3.2 Data privacy

- 3.2.1 Protect patient privacy
- 3.2.2 Keep all patient information confidential, except when it is necessary to facilitate

the medical procedures of the patient, or when legally obliged.

3.2.3 Patient data is retrieved on an as-needed basis.

3.3 Patient identification

3.3.1 Correct patient identification.

3.3.2 Use at least two different personal identifiers to verify a patient's identity (e.g., patient's name, ID-card number, date of birth, phone number, or residential address).

3.4 Application of the ALARA principle

3.4.1 The medical imaging examination should only be carried out if the benefit of the examination outweighs the risk.

3.4.2 Apply the principle of "as low as reasonably achievable" (ALARA) to minimize the possible thermal and cavitation hazard to the patient.

3.5 Explain examination procedure

Effective communication is essential to establish and maintain a good ultrasonographer–patient relationship to elicit the best outcome of the examination.

3.5.1 Communication should be based on the interests of the patient and well within the ultrasonographer's competencies.

3.5.2 Ensure that patients understand the examination procedure and associated risks.

3.5.3 Ensure the whole examination procedure meets the needs of specific cultures, languages, ages, hearing, and speech through trained translators or interpreters if necessary.

3.5.4 Ensure that translators and interpreters will keep patients' information confidential.

4. Requirements of ultrasonographers

4.1 Academic qualifications

4.1.1 Ultrasonographers must be locally-registered medical and health care professionals, and must hold a bachelor's degree in medical or health care Science.

4.1.2 Competent ultrasonographers should demonstrate clinical competence in a different specialty area(s). Specialty areas include the abdomen, breasts, obstetrics and gynecology, vascular, pediatric, musculoskeletal, and adult echocardiography. Only ultrasonographers who have completed the appropriate professional education and obtained active certification(s) awarded by either a recognized local or overseas institution should perform ultrasonography procedures in that specialty area(s).

4.2 Manner of patient care and handling patients/care takers

All patients expect and deserve optimal care. Ultrasonographers should follow the basic ethical principles below:

4.2.1 Manner of handling patients

- 4.2.1.1 Respect the rights and dignity of all individuals.
- 4.2.1.2 Serve all patients with equal respect, regardless of social status, culture, creed, politics, race, or nationality.
- 4.2.1.3 Be courteous, respectful, and compassionate; treat every patient as an individual and listen to his/her views with no prejudice.
- 4.2.1.4 To effectively obtain sufficient past and present relevant information for the examination and diagnosis, ultrasonographers should maintain a good relationship with the patient based on mutual trust and treat them as an equal.
- 4.2.1.5 When performing an intimate examination, ultrasonographers should respect the patient's rights to dignity and privacy.
- 4.2.1.6 A chaperone is required whenever appropriate.
- 4.2.1.7 Manage the optimal examination times, including waiting time, scanning time, and reporting time, etc., to provide services effectively.
- 4.2.2 Manner of patient care
 - 4.2.2.1 Do not perform sonographic procedures without a medical reason, except for educational purposes.
 - 4.2.2.2 Respect and co-operate with other ultrasonographers and members of related professions. Work collaboratively with multi-disciplinary health care teams in the interests of their patients.
- 4.2.3 Manner of handling care takers
 - 4.2.3.1 Carry out services to the best of his/her ability.
 - 4.2.3.2 Recognize the extent and limitations of his/her professional expertise. Provide services within his/her competence.
 - 4.2.3.3 Maintain the highest standards of professional competence and continually strive to update and extend his/her professional knowledge and skills to minimize risk to patients and other professionals.
 - 4.2.3.4 Respect the confidence imparted to him/her in his/her professional duties. Appropriate sharing of patient information is only allowed in multidisciplinary situations (i.e., providing direct care to patients) or when there is a legal obligation for disclosure.
 - 4.2.3.5 Act at all times in such a manner as to justify public trust and confidence; uphold and enhance the reputation of ultrasonography and serve the public interest.
 - 4.2.3.6 Ultrasonographers are legally and professionally accountable for their practice and must not be influenced by any form of discrimination.
 - 4.2.3.7 Accept responsibility for reporting illegal activities or unethical conduct to the appropriate authorities.

4.2.3.8 Ensure that those under his/her supervision or in his/her employ are knowledgeable and capable of performing their duties.

4.3 Collaboration

Quality patient care and effective services are provided when all members of the healthcare team communicate and collaborate efficiently. Ultrasonographers should:

4.3.1 Collaborate with clinicians in the performance of interventional procedures.

4.3.2 Promote a positive collaborative atmosphere and co-operate with multidisciplinary healthcare teams in the interests of patients.

4.3.3 Recognize the strengths of healthcare team members and use them appropriately in the interests of patients.

4.3.4 Share knowledge and expertise with colleagues, patients, students, and members of healthcare teams.

4.4 Training and education

Qualified ultrasonographers should strive to continue their professional education in order to maintain their competency and knowledge to international standards. Applicable professional certification and accreditation are encouraged.

4.4.1 Self-assessment

Self-assessment involves the evaluation of personal performance, knowledge, and skills, and is important for professional growth and development.

4.4.1.1 Recognize and apply personal and professional strengths to benefit patients, co-workers, and the profession in general.

4.4.1.2 Recognize weaknesses and limitations. Perform procedures only after educational and clinical training.

4.4.1.3 Personal work ethic, behavior, and attitude should be assessed.

4.4.2 Education

Ultrasonographers should undergo continuous training to stay up-to-date with the latest technical knowledge in response to changes in practice environments, advances in technology, and other emerging issues.

4.4.2.1 Ultrasonographers must undergo continued education and recertification, as required, to maintain the relevant standards for certification. In current practice, all ultrasonographers must obtain no less than 30 CME points or 30 hours of local or recognized overseas lectures/workshops related to ultrasonography in the course of three years.

4.4.2.2 All centers for ultrasound examinations (including both public hospitals or private clinics) must have their ultrasound examinations performed by relevant certified ultrasonographers; i.e., pediatric ultrasound examinations performed by certified pediatric ultrasonographers.

4.4.2.3 Ultrasonography students or trainees performing ultrasound examinations in

a new specialty area must always be supervised by a certified ultrasonographer or qualified healthcare provider.

4.5 Research and development

Advancement in the profession requires acquisition of additional knowledge and skills through research and development.

4.5.1 Ultrasonographers should take reasonable opportunities for educational and professional growth by:

4.5.1.1 Participating in activities held by professional societies and organizations; e.g., international conferences, webinars, or online courses, etc.

4.5.1.2 Advocating for and participating with vendors providing specific applications training for continuing professional development.

4.5.2 Update protocols, guidelines, policies, and procedures adopted by the profession and regulated by law.

4.5.3 Take on the responsibility of training ultrasonographers and students.

4.5.4 Deliver lectures to the public at various conferences or meetings.

4.5.5 Participate in research studies and give presentations at both local and overseas conferences/meetings.

5. Clinical applications

5.1 Abdominal ultrasound

5.2 Breast ultrasound

5.3 Obstetrics and gynecology ultrasound

5.4 Musculoskeletal ultrasound

5.5 Vascular ultrasound

5.6 Pediatric ultrasound

5.7 Adult echocardiography

5.8 Contrast-enhanced ultrasound

5.9 Volume navigation and fusion ultrasound

5.10 Ultrasound guided interventional procedure

6. Examination routines

Time duration of an ultrasound examination varies from 15 minutes up to an hour.

6.1 Pre-examination

6.1.1 Patient assessment and evaluation

6.1.1.1 Ultrasonographers should fully understand the explicit request from the referring clinician.

6.1.1.2 Ultrasonographers should ensure the requested ultrasound examination is relevant.

- 6.1.1.3 Ultrasonographers should understand the importance of the correlation between the ultrasound's findings and the patient's clinical history (including reports from other imaging modalities) in order to obtain an accurate differential diagnosis.
- 6.1.1.4 Ultrasound procedures should be performed in a comfortable and hygienic environment with necessary universal precautions observed.
- 6.1.1.5 Ultrasonographers should always respect patient privacy and avoid communication/discussion in open areas.
- 6.1.1.6 Ensure correct patient identity (verified with the patient's name and identification number, etc.).
- 6.1.1.7 Explain the examination procedure and provide clear instructions to patients prior and during examination.
- 6.1.1.8 Respect the patient's rights and always obtain his/her consent before examination commences.
- 6.1.1.9 Understand the patient's willingness and difficulties to tolerate the examination procedure.
- 6.1.1.10 Gain confidence and rapport from the patient while handling or touching the patient.
- 6.1.1.11 Evaluate the sufficiency of patient preparations.
- 6.1.1.12 Involve patients' relatives, friends, or care takers if applicable.
- 6.1.1.13 Ultrasonographers should be aware of their limitations and immediately seek expert advice if required; e.g., an experienced colleague or supervising radiologist(s).

6.2 Examination protocol

Implement an accurate and safe protocol to provide quality patient care.

- 6.2.1 Employ professional judgment to determine an examination protocol, then implement the protocol accordingly.
- 6.2.2 Good appraisal of image optimization techniques and their integration with the clinical examination.
- 6.2.3 Capable of manipulating the transducer and optimizing the settings to achieve the required images.
- 6.2.4 Recognize artifacts and modify image quality as required.
- 6.2.5 Implement protocol with modifications according to patients' conditions and different clinical settings; e.g., operating theatre, intensive care unit, or bedside.
- 6.2.6 Provide good patient management with regards to patient positioning and breathing control technique.
- 6.2.7 Perform STAR* (Scan patient, Take quality sonograms, Abnormality detection, image interpretation and Report preparation) using an appropriate scanning

technique. (**Ref: The training curriculum and requirements are based on the guidelines and recommendations of the Ultrasonography Panel of the Hospital Authority.*)

6.3 Post-examination

6.3.1 Evaluation of examination results

Evaluate the results to determine whether the goals of the action plan have been met.

6.3.1.1 Complete the evaluation in a timely, accurate, and comprehensive manner.

6.3.1.2 Review the procedures against established policies, protocols, and benchmarks.

6.3.1.3 Identify and document exceptions/limitations to the expected outcome.

6.3.1.4 Develop a revised action plan to achieve the intended outcome or suggest further investigation.

6.3.1.5 Communicate with the supervising radiologist(s) or related team members about a revised action plan or if immediate clinical attention is required.

6.3.2 Documentation

Ensure clear and precise documentation, including ultrasound images, ultrasound reports, and request forms.

6.3.2.1 Ensure correct patient identification, date of examination, and name of hospital/department is recorded.

6.3.2.2 Ensure timely, accurate, and complete documentation.

6.3.2.3 Provide verbal or written ultrasound examination findings to the supervising radiologist(s).

6.3.2.4 Discussing the sonographic findings or reports with the patient is not recommended.

6.3.2.5 Abbreviations are not recommended in the report to avoid potential confusion.

6.3.2.6 Clinical questions should be addressed in the reports.

6.4 Quality-control items

Ultrasonographers always have the responsibility to maintain a high standard of ultrasound equipment performance and scanning performance.

6.4.1 Ultrasound equipment performance

6.4.1.1 Perform regular quality assurance tests to ensure the equipment operates at the optimal level and for patient safety.

6.4.2 Ultrasonographer scanning performance

6.4.2.1 Continually participate in quality-assurance programs.

6.4.2.2 Follow the standards, policies, and established guidelines.

6.4.2.3 Professional judgment and discretion should be applied when performing

diagnostic studies or treatment.

6.4.2.4 Image quality, completeness of examinations, and adherence to protocols must be evaluated regularly.

6.4.2.5 Standards should be compared against external metrics such as accreditation criteria, evidence-based literature, and accepted guidelines.

6.4.2.6 Evaluate and update the scanning protocols regularly.

7. Declaration

The contents of this SOP serve as a reference for radiographers, radiation therapists, and related professionals. It should not be considered comprehensive information for any related examination or procedure. Further elaboration of this document is subject to the decision of the council of the Hong Kong College of Radiographers and Radiation Therapists.

8. References

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