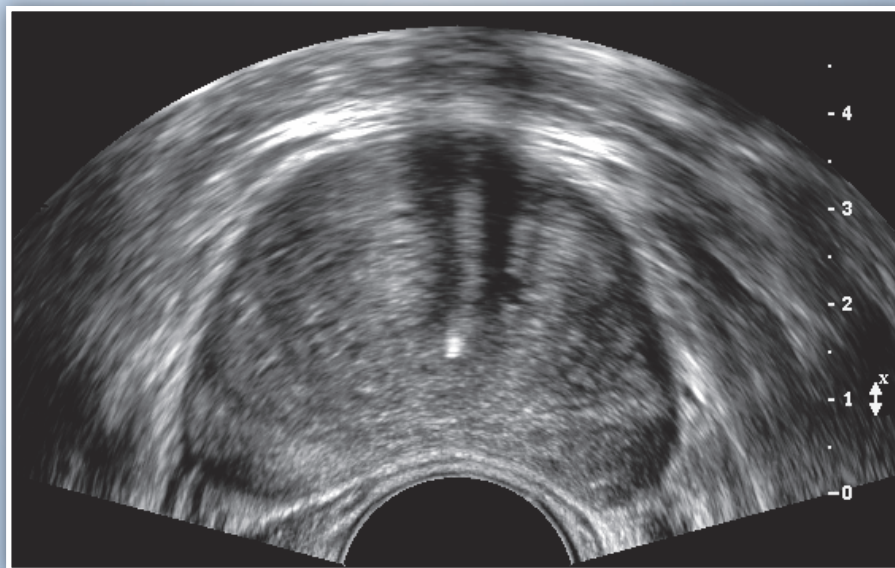


AIUM Practice Parameter for the Performance of an

Ultrasound Evaluation of the Prostate (and Surrounding Structures)

*Parameter developed in collaboration with the American College of Radiology
and the Society of Radiologists in Ultrasound.*



The association for medical ultrasound
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The American Institute of Ultrasound in Medicine (AIUM) is a multidisciplinary association dedicated to advancing the safe and effective use of ultrasound in medicine through professional and public education, research, development of parameters, and accreditation. To promote this mission, the AIUM is pleased to publish in conjunction with the American College of Radiology (ACR) and the Society of Radiologists in Ultrasound (SRU) this *AIUM Practice Parameter for the Performance of an Ultrasound Evaluation of the Prostate (and Surrounding Structures)*. We are indebted to the many volunteers who contributed their time, knowledge, and energy to bringing this document to completion.

The AIUM represents the entire range of clinical and basic science interests in medical diagnostic ultrasound, and, with hundreds of volunteers, this multidisciplinary organization has promoted the safe and effective use of ultrasound in clinical medicine for more than 50 years. This document and others like it will continue to advance this mission.

Practice parameters of the AIUM are intended to provide the medical ultrasound community with parameters for the performance and recording of high-quality ultrasound examinations. The parameters reflect what the AIUM considers the minimum criteria for a complete examination in each area but are not intended to establish a legal standard of care. AIUM-accredited practices are expected to generally follow the parameters with recognition that deviations from these parameters will be needed in some cases, depending on patient needs and available equipment. Practices are encouraged to go beyond the parameters to provide additional service and information as needed.



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I. Introduction

The clinical aspects contained in specific sections of this parameter (Introduction, Indications, Specifications of the Examination, and Equipment Specifications) were developed collaboratively by the American Institute of Ultrasound in Medicine (AIUM), the American College of Radiology (ACR), and the Society of Radiologists in Ultrasound (SRU). Recommendations for physician qualifications, written request for the examination, procedure documentation, and quality control vary among the three organizations and are addressed by each separately.

Ultrasound examination of the prostate and surrounding structures is used in the diagnosis of prostate cancer, benign prostatic enlargement, prostatitis, prostatic abscesses, congenital anomalies, and male infertility and for the treatment of prostatic cancer, abscesses, and benign prostatic enlargement.¹ Ultrasound-guided biopsy of the prostate is reserved for evaluating those patients who have abnormal digital rectal examinations or an abnormal serum prostate-specific antigen (PSA) level, and those in whom tissue diagnosis is needed for further management.

Ultrasound findings may be used to guide targeted or systematic biopsy of the prostate, which is performed to supplement the standard systematic biopsy protocol in order to improve the positive cancer yield of prostate biopsy.²⁻³ However, current ultrasound techniques using gray scale, color Doppler, and power Doppler imaging, elastography, and contrast-enhanced ultrasound are not sufficient to confirm or exclude the presence of prostate cancer, and they should not be used to preclude the performance of prostate biopsy.⁴⁻⁵

These parameters are intended to assist practitioners performing an ultrasound examination of the prostate. Ultrasound of the prostate and surrounding structures should be performed only when there is a valid medical reason, and the lowest possible ultrasonic exposure should be used to gain the necessary diagnostic information. In some cases, an additional and/or specialized examination may be necessary. While it is not possible to detect every abnormality, following this parameter will maximize the detection of abnormalities of the prostate.

II. Qualifications and Responsibilities of the Physician

See www.aium.org for AIUM Official Statements including *Standards and Guidelines for the Accreditation of Ultrasound Practices* and relevant Physician Training Guidelines.

III. Indications

Indications for prostate ultrasound include but are not limited to:

1. Guidance for biopsy in the presence of an abnormal digital rectal examination or elevated PSA⁶ or a suspicious prostatic lesion detected on magnetic resonance imaging (MRI). This includes use of transrectal ultrasound (TRUS) biopsy as part of the TRUS/MRI fusion technique.⁷
2. Assessment of prostate volume before medical, surgical, or radiation therapy⁸⁻⁹ and to calculate PSA density.¹⁰

3. Real-time guidance for the placement of brachytherapy seeds.¹¹
4. Assessment of lower urinary tract symptoms.¹²
5. Assessment of congenital anomalies.¹³
6. Infertility.
7. Hematospermia.
8. Evaluation for suspected recurrence in the prostatectomy bed in patients who have undergone prostatectomy.

IV. Written Request for the Examination

The written or electronic request for an ultrasound examination should provide sufficient information to allow for the appropriate performance and interpretation of the examination.

The request for the examination must be originated by a physician or other appropriately licensed health care provider or under their direction. The accompanying clinical information should be provided by a physician or appropriate health care provider familiar with the patient's clinical situation and should be consistent with relevant legal and local health care facility requirements.

V. Specifications of the Examination

The following parameters describe the examination of the prostate and surrounding structures:

A. Prostate

The transrectal approach to ultrasound of the prostate is the method of choice, as image quality is superior to transabdominal or transperineal examinations. In patients for whom the transrectal approach is not possible, a transperineal ultrasound examination may be used to direct a biopsy procedure.¹⁴ A transabdominal approach can be useful to obtain an estimate of prostate size in some settings.

The prostate should be imaged in its entirety in at least 2 orthogonal planes, sagittal and axial or longitudinal and coronal, from the apex to the base of the gland. An estimated volume is determined from measurements in 3 orthogonal planes (volume = length × height × width × 0.52).^{15–16} The volume of the prostate may be correlated with the PSA level. Alternatively, prostate volume can be calculated using prostate planimetry, which allows greater accuracy by accommodating individual variations in prostate shape.¹⁷

The gland should be evaluated for a focal mass, echogenicity, symmetry, and continuity of margins. Color and power Doppler sonography may be helpful in detecting areas of increased vascularity that can be used to select potential sites for biopsy.¹⁸ The periprostatic fat and neurovascular bundle should be evaluated for symmetry and echogenicity.

The course of the prostatic urethra should be documented, when possible, and asymmetry between left and right periurethral tissues as well as any effect on the base of the bladder should be noted.

B. Seminal Vesicles, Vasa Deferentia, and Perirectal Space

The seminal vesicles should be evaluated for size, shape, position, symmetry, and echogenicity from their insertion into the prostate via the ejaculatory ducts to their cranial and lateral extents. Particular attention should be given to the normal tapering of the seminal vesicle as it joins the prostate. In patients being evaluated for infertility, the vasa deferentia must be evaluated. The presence and size of seminal vesicle, ejaculatory, müllerian, or utricule cysts or evidence of seminal vesicle or ejaculatory duct obstruction should be noted. Inclusion of the anterior perirectal space, in particular the region that abuts the prostate and perirectal tissues, is important.

VI. Documentation

Adequate documentation is essential for high-quality patient care. There should be a permanent record of the ultrasound examination and its interpretation. Images of all appropriate areas, both normal and abnormal, should be recorded. Variations from normal size should be accompanied by measurements. Images should be labeled with the patient identification, facility identification, examination date, and side (right or left) of the anatomic site imaged. An official interpretation (final report) of the ultrasound findings should be included in the patient's medical record. Retention of the ultrasound examination should be consistent both with clinical needs and with relevant legal and local health care facility requirements.

Reporting should be in accordance with the *AIUM Practice Parameter for Documentation of an Ultrasound Examination*.

VII. Equipment Specifications

A. Equipment

Endorectal ultrasound of the prostate should be conducted with a transrectal (also termed endorectal) transducer using the highest clinically appropriate frequency (usually 6 MHz or higher), realizing that there is a trade-off between resolution and beam penetration. Both side-fire and end-fire transducers may be used. A lower frequency may be necessary for transabdominal and transperineal examinations, which may be performed with curvilinear or sector transducers.

Ultrasound-guided prostate biopsy can be performed with either side-fire or end-fire probe configuration, acknowledging that transducer selection may vary with specific anatomic considerations.¹⁹

B. Care of the Equipment

Transrectal probes, after ultrasound gel application, must be covered by a disposable sheath before insertion. After the examination and disposal of the sheath, the probe must be disinfected. The method of disinfection may vary with manufacturer recommendations and institutional practices. Disposable accessory items used during the study must be discarded after each examination.

VIII. Quality Control and Improvement, Safety, Infection Control, and Patient Education

Policies and procedures related to quality control, patient education, infection control, and safety should be developed and implemented in accordance with the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

Equipment performance monitoring should be in accordance with the *AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices*.

IX. ALARA Principle

The potential benefits and risks of each examination should be considered. The ALARA (as low as reasonably achievable) principle should be observed when adjusting controls that affect the acoustic output and by considering transducer dwell times. Further details on ALARA may be found in the AIUM publication *Medical Ultrasound Safety, Third Edition*.

Acknowledgments

This parameter was revised by the American Institute of Ultrasound in Medicine (AIUM) in collaboration with the American College of Radiology (ACR) and the Society of Radiologists in Ultrasound (SRU) according to the process described in the *AIUM Clinical Standards Committee Manual*.

Collaborative Committee

Members represent their societies in the initial and final revision of this practice parameter.

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