COLLEGE OF PHYSICIANS AND SURGEONS OF BRITISH COLUMBIA

Diagnostic Accreditation Program

ACCREDITATION STANDARDS

Bone Densitometry

Diagnostic Accreditation Program
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Introduction

In addition to the general standards, the discipline-specific standards for bone densitometry provides additional mandatory requirements and best practices.

Patient preparation

No.		Description	Risk	Reference	Change
					Revised
BD2.0		**BONE DENSITOMETRY PATIENT PREPARATION**			
BD2.2		**Pre-examination information is collected and assessed prior to commencing the examination.** *Guidance: See also global modality GM2.2.*			
BD2.2.1	**M**	Clinically relevant medical history (e.g. family history, prior fragility fractures, prior bone trauma/fractures, surgery, chronic illness, sex assigned at birth and relevant medications) is obtained and documented.	M	BD-AC-21	Revised
BD2.2.2	**M**	Examination interferences/contraindications are assessed and documented including recent barium (for spine measurements) or radionuclide studies are considered in scheduling.	M	BD-AC-21	
BD2.2.3	**B**	Examination interferences/contraindications are assessed and documented including severe arthritic or fracture deformity or other degenerative changes at the site to be measured.		BD-AC-21	
BD2.2.4	**M**	Examination interferences/contraindications are assessed and documented including radio-opaque implants in the measurement area, most commonly the hip.	M	BD-AC-21	
BD2.2.5	**B**	A qualified physician is involved in assessing any interferences or contraindications.		BD-AC-21	
BD2.2.6	**B**	When prior radiographs of anatomic areas are available, these are reviewed to determine if specific sites are to be excluded from the analysis.		BD-AC-21	
BD2.2.7	**M**	Patient height and weight are accurately measured at the time of the examination.	M	BD-AC-21	

Imaging procedures

No.		Description	Risk	Reference	Change
					Revised
BD3.0		**BONE DENSITOMETRY STANDARD OPERATING PROCEDURES/PROTOCOLS** *Guidance: See also global modality GM3.0 for additional requirements.*			
BD3.1		**There is a comprehensive process in place for protocol adoption and development.** *Guidance: See also global modality GM3.1.*			
BD3.1.1	**M**	Protocols are reviewed every one to three years by qualified individual(s).	M	BD-AC-21	
BD3.2		**Protocols contain all the information necessary to perform the examination.**			
BD3.2.1	**M**	Protocol information includes but is not limited to the equipment/supplies needed.	M	BD-AC-21	
BD3.2.2	**M**	Protocol information includes but is not limited to a description of patient positioning.	M	BD-AC-21	
BD3.2.3	**M**	Protocol information includes but is not limited to detailed instructions for acquiring and processing examinations. *Guidance: The protocols are to include parameters such as region of interest, bone tracing, rejection criteria, additional sites as required, and scan speed.*	M	BD-AC-21	
BD3.2.4	**M**	Protocol information includes the application of clinically relevant normative databases for the calculation of T-scores and Z-scores of transgender individuals, gender non-conforming individuals, and gender non-binary individuals. *Guidance: Refer to the latest International Society for Clinical Densitometry Official Position Statement – Adults, for protocol guidance at https://iscd.org/learn/official-positions/adult-positions/.*	M	ISCD-OP	Revised
BD3.3		**Examinations are performed following established protocols.**			
BD3.3.1	**M**	Protocols are readily available to staff performing the examination.	H	BD-AC-21	
BD3.3.2	**M**	Protocols are in place for the measurement of all skeletal sites used to determine BMD.	M	BD-AC-21	

No.		Description	Risk	Reference	Change
BD3.3.3	**M**	Pediatric protocols are documented and available to staff. *Guidance: BD3.3.3 is applicable only to pediatric facilities or bone densitometry services offering pediatric studies.*	M	BD-AC-21	
BD3.3.4	**M**	There is a consistent and accurate procedure to determine the patient's height and weight. *Guidance: Height is evaluated to determine possible vertebral compression fractures over the interval between examinations. Weight is evaluated to ensure that significant weight gain or loss is commented upon as a potential artifact and to ensure that the manufacturer's table limit is not exceeded.*	M	BD-AC-21	
BD3.3.5	**M**	Protocols are in place for when trabecular bone scores are obtained.	M	BD-AC-21	
BD3.3.6	**M**	Protocols are in place for when vertebral fracture assessment is performed.	M	BD-AC-21	
BD3.3.7	**M**	Protocols are in place for assessing fracture risk.	M	BD-AC-21	
BD3.4		**Protocols are in place for serial bone densitometry monitoring.**			
BD3.4.1	**M**	Serial examinations are performed with the same DXA system used for previous examinations. In situations where equipment has been changed or replaced, serial comparisons are only made after equipment cross-calibration has been performed.	H	BD-AC-21	
BD3.4.2	**B**	The reproducibility of BMD measurements is assessed after each serial examination.		BD-AC-21	
BD3.4.3	**M**	Examination imaging parameters are replicated for serial examinations where there is no significant patient weight loss or gain. *Guidance: The measured area of sequential examinations should be 2% or less, 90% of the time.*	M	BD-AC-21	
BD3.4.4	**M**	Examination processing parameters are replicated for serial examinations unless there are significant patient changes (e.g. new vertebrae fractures). *Guidance: Processing parameters include number of vertebrae, technique used to obtain regions of interest, etc.*	M	BD-AC-21	

No.		Description	Risk	Reference	Change
BD3.4.5	**M**	Precision assessments are performed for each technologist after basic scanning skills have been learned (e.g. applications training) and after having performed approximately 100 patient scans. *Guidance: Every attempt should be made to complete the 100 patient exams within a three-month period.*	M	BD-AC-21	
BD3.4.6	**M**	Precision assessments are performed for each technologist if a new DXA system is installed.	M	BD-AC-21	
BD3.4.7	**B**	Precision assessments are performed for each technologist once every three years or if a technologist's skill level has changed.		BD-AC-21	
BD3.4.8	**M**	Precision assessments are performed for each technologist if minimum acceptable precision criteria are not met. *Guidance: For an individual technologist, the minimum acceptable precision for the lumbar spine is 1.9%, total hip is 1.8% and femoral neck is 2.5%. Additional training is required if precision criteria are not met.*	M	BD-AC-21	
BD3.5		**Images are reviewed for diagnostic quality before the patient is released.** *Guidance: The process to accept or reject examinations includes verification of consistent and proper patient positioning using the positioning devices issued by the manufacturer. These devices should be excluded from the field of view.*			
BD3.5.1	**M**	Image review ensures the anatomic area of interest is in the scan field of view.	H	BD-AC-21	
BD3.5.2	**M**	Image review ensures the presence of artifacts and motion does not impact the diagnostic quality.	H	BD-AC-21	
BD3.5.3	**M**	Image review ensures consistent and accurate regions of interest.	H	BD-AC-21	

Medical records

No.		Description	Risk	Reference	Change
					Revised
BD7.0		**BONE DENSITOMETRY MEDICAL RECORD DOCUMENTATION** *Guidance: See also global modality GM7.0 for additional requirements.*			
BD7.1		**Images are labeled in a standardized way that allows for proper patient identification and annotations.** *Guidance: See also global modality GM7.1.*			
BD7.1.1	**M**	Examinations are labeled in a standardized way that includes the version of software.	M	BD-AC-21	
BD7.1.2	**M**	Examinations are labeled in a standardized way that includes the machine identifier.	M	BD-AC-21	
BD7.1.3	**M**	Examinations are labeled in a standardized way that includes the reference database.	M	BD-AC-21	
BD7.2		**Comprehensive examination details are recorded in the medical record.** *Guidance: See also global modality GM7.2.*			
BD7.2.1	**M**	Comprehensive examination details are recorded in the medical record that includes menopausal status. *Guidance: Further information may include menopause date or date of last menstrual period (LMP) when known by the patient, date of surgical menopause.*	H	BD-AC-21	
BD7.2.2	**M**	Comprehensive examination details are recorded in the medical record that includes clinically relevant medical history. *Guidance: Refer to bone densitometry BD2.2 for examples.*	H	BD-AC-21	
BD7.2.3	**M**	Comprehensive examination details are recorded in the medical record that includes measured height and weight at the time of the examination and quantitative changes. *Guidance: Weight changes in excess of ±10% may impact the determination or accuracy of bone density.*	H	BD-AC-21	
BD7.2.4	**B**	Comprehensive examination details are recorded in the medical record that includes for serial examinations, reproducibility recorded in grams/cm^2 for each measured site.		BD-AC-21	

Interpretation and reports

No.		Description	Risk	Reference	Change
					Revised
BD8.0		**BONE DENSITOMETRY INTERPRETATION AND REPORTS** *Guidance: See also global modality, GM8.0, for additional requirements.*			
BD8.2		**Reports contain sufficient information to assist in diagnosis.** *Guidance: See also global modality GM8.2.1.*			
BD8.2.1	**B**	The body of a first-time and/or serial (follow-up) report includes software version.		BD-AC-21	
BD8.2.2	**B**	The body of a first-time and/or serial (follow-up) report includes reference database.		BD-AC-21	
BD8.2.3	**M**	The body of a first-time and/or serial (follow-up) report includes machine identifier. *Guidance: The DXA brand and model are examples of machine identifiers.*	M	BD-AC-21	
BD8.2.4	**M**	The body of a first-time and/or serial (follow-up) report includes adult or pediatric diagnostic category (e.g. normal, low bone mass, osteoporosis, etc.).	M	BD-AC-21	
BD8.2.5	**M**	The body of a first-time and/or serial (follow-up) report includes a statement about ten-year fracture risk in adults over the age of 50 who are not currently on osteoporosis pharmacotherapy or were treated within two years.	M	BD-AC-21	Revised
BD8.2.6	**M**	The body of a first-time and/or serial (follow-up) report includes BMD data reported in g/cm^2 on all measured skeletal sites along with T- and Z- scores, where appropriate. *Guidance: See The International Society for Clinical Densitometry Official Positions - Adult at https://iscd.org/learn/official-positions/adult-positions/.*	M	BD-AC-21	Revised
BD8.2.7	**M**	The body of a first-time and/or serial (follow-up) report includes potential limitations.	M	BD-AC-21	
BD8.2.8	**M**	The body of a first-time and/or serial (follow-up) report includes the impression and/or comment section of the report. *Guidance: A narrative section on interpretation and implications of BMD results is provided. A recommendation for the necessity and timing of the next BMD study should be commented on.*	M	BD-AC-21	

No.		Description	Risk	Reference	Change
BD8.2.9	**B**	The body of a first-time and/or serial (follow-up) report includes definitions. *Guidance: Any terminology or abbreviations (e.g. T-score, Z-score, fracture risk, etc.) used in the report are defined.*		BD-AC-21	
BD8.2.10	**M**	The body of a serial (follow-up) report also includes changes in density in both g/cm^2 and percentage.	M	BD-AC-21	
BD8.2.11	**M**	The body of a serial (follow-up) report also includes least significant change (LSC) and statistical significance for each measured BMD skeletal site comparison. *Guidance: Each facility must determine precision error using the ISCD methodology and use this value when determining the significance of change in serial DXA determinations. Statistical significance is to be reported for each BMD skeletal site comparison, indicating whether the difference is considered significant at a 95% level of confidence. The LSC is stated in absolute values (g/cm2) for each skeletal site for which change is reported. See The International Society for Clinical Densitometry 2019 Official Positions - Adult at https://iscd.org/learn/official-positions/adult-positions/.* *The minimum acceptable least significant change for a facility is:* *Lumbar Spine: LSC =5.3%* *Total Hip: LSC = 5.0%* *Femoral Neck: LSC = 6.9%* *If a facility has more than one technologist, an average precision error combining data from all technologists should be used to establish precision error and LSC for the facility, provided the precision error for each technologist is within a pre-established range of acceptable performance. Please see BD3.4.8.*	M	BD-AC-21	
BD8.2.12	**M**	The body of a serial (follow-up) report also includes a statement regarding which previous or baseline study and ROI is being used for comparison, including the date of the previous or baseline study.	M	BD-AC-21	
BD8.3		**A timely and accurate final report is issued for all examinations.** *Guidance: See also global modality GM8.3.*			
BD8.3.1	**M**	If automatically generated reports are issued, the imported BMD data is validated to ensure the accuracy of the report.	M	BD-AC-21	

Equipment

No.		Description	Risk	Reference	Change
					Revised
BD11.0		**BONE DENSITOMETRY IMAGING EQUIPMENT AND ANCILLARY SUPPLIES**			
BD11.1		**The imaging service ensures that equipment is capable of achieving the desired image quality and complies with the requirements of the examination.**			
BD11.1.1	**M**	The service has a height measuring device to accurately measure patient height to the nearest 0.5cm. *Guidance: It is strongly recommended that the imaging service use a stadiometer for obtaining height measurements.*	M	BD-AC-21	
BD11.1.2	**M**	The service has a device to measure patient weight to the nearest 0.1kg.	M	BD-AC-21	
BD11.2		**The cross-calibration of bone densitometry equipment is performed according to standard protocols and prior to clinical use.**			
BD11.2.1	**M**	A protocol is in place for when a cross-calibration of the DXA system is required (e.g. when significant changes to hardware, technology and system(s) occur). The protocol should include procedures for performing cross-calibration and appropriately calculating LSC. *Guidance: Significant changes include, but are not limited to:* • *changes in hardware* • *system replacement* • *changes in technology*	H	BD-AC-21	
BD11.2.5	**M**	Comparisons to a prior DXA system cannot be made if a cross-calibration assessment is not performed when required. *Guidance: Inter-system quantitative and qualitative comparisons can only be made if a cross-calibration is performed for each skeletal site measured.*	H	BD-AC-21	

Acceptance testing

No.		Description	Risk	Reference	Change
					Revised
BD12.0		**ACCEPTANCE TESTING OF BONE DENSITOMETRY SYSTEMS** *Guidance: See also equipment and supplies DES2.0 for additional requirements.*			
BD12.1		**Acceptance testing is performed after purchase and prior to clinical use of bone densitometry systems.**			Revised
BD12.1.1	**M**	Acceptance testing of bone densitometry systems includes visual and functional testing of the mechanical properties.	H	BD-AC-21	Revised
BD12.1.2	**M**	Acceptance testing of bone densitometry systems includes visual and functional testing of the safety systems.	H	BD-AC-21	Revised
BD12.1.3	**M**	Acceptance testing of bone densitometry systems includes evaluation of the radiation scatter.	H	BD-AC-21	Revised
BD12.1.4	**B**	Acceptance testing of bone densitometry systems includes evaluation of the radiation dose.		BD-AC-21	Revised
BD12.1.5	**M**	Acceptance testing of bone densitometry systems includes evaluation of the baseline BMD values and quality control thresholds using phantom scans.	H	BD-AC-21	Revised

Quality assurance

No.		Description	Risk	Reference	Change
					Revised
BD13.0		**QUALITY CONTROL TESTING OF BONE DENSITOMETRY SYSTEMS** *Guidance: See also equipment and supplies, DES3.0, for additional requirements.*			
BD13.1		**Routine quality control procedures are established and used to monitor the performance of bone densitometry systems.** *Guidance: See also Equipment and Supplies DES3.0.*			Revised
BD13.1.1	**M**	Routine quality control testing of bone densitometry systems are completed and assessed before the first patient measurement of the day and after service interruption (e.g. power outage or equipment service).	H	BD-AC-21	Revised
BD13.1.2	**M**	Routine quality control testing of bone densitometry systems includes calibration, as per manufacturer's recommendations. *Guidance: Some systems require calibration daily while for other systems, continuous calibration is achieved automatically.*	H	BD-AC-21	Revised
BD13.1.3	**M**	Daily quality control testing of bone densitometry systems includes scanning a phantom. *Guidance: The results of the phantom scans are plotted and compared to established thresholds.*	H	ISCD-OP	Revised
BD13.1.4	**M**	Monthly quality control testing of bone densitometry systems includes an evaluation of the accuracy of height and weight measuring devices.	M	BD-AC-21	Revised

References

Abbreviation	Reference
BD-AC-21	2021-2025 DAP Bone Densitometry Advisory Committee Recommendation
ISCD-OP	ISCD: The International Society for Clinical Densitometry. 2019 ISCD Official Positions: Adults [Internet]. Middletown (CT): International Society for Clinical Densitometry; 2019. Available from: https://iscd.org/wp-content/uploads/2021/09/2019-Official-Positions-Adult-1.pdf