# ISCD Facility Accreditation Glossary of Terms

ALARA – ALARA is an acronym for "as low as (is) reasonably achievable

Baseline DXA report – Statements about the DXA scan data. This report is used as a reference with which comparison to future scans are made

Baseline Scan (**GE Lunar pages**) – with second page (ancillary page) included to show BMD and area for all additional regions
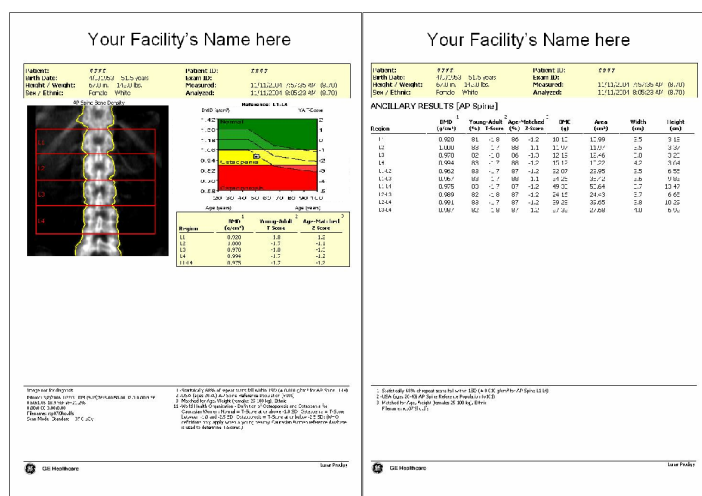
Baseline Scan (**Hologic**) – showing BMD and area for individual and total regions
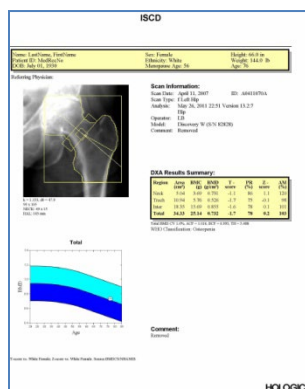
Coefficient of Variation (CV) – A unitless number which expresses the variability of a normal distribution. It is the ratio of the SD divided by the mean of the distribution. Also see Percentage Coefficient of variation(%CV).

Drift (calibration) – A gradual upward or downward trend in the measured value of a test object.

DXA Facility – United States based hospital, medical clinic, private medical office, research facility (performing standard DXA protocols on human subjects as a part of a research study only), mobile DXA centers, and free-standing densitometry centers performing dual energy x-ray absorptiometry (DXA) on human subjects.

DXA Interpreter (non-primary) – For the purpose of ISCD Facility Accreditation, a qualified clinician, researcher or scientist who reviews the acquired DXA scan image, ancillary data and analysis, but is not certified in bone densitometry.

DXA Technologist (non-primary) – For the purpose of ISCD Facility Accreditation, a qualified individual trained in DXA acquisition and analysis techniques in order to provide accurate, precise and appropriate bone density measurements, and is not certified in bone densitometry.

DXA Scan – Dual-energy x-ray absorptiometry; bone densitometry test; the gold standard technology for measuring bone density.

Essential Elements – Components of a quality DXA facility necessary for accreditation. The ISCD Facility Accreditation Program assesses compliance with these essential elements.
 ❖ DXA Personnel and Qualifications - Each facility primary interpreter and primary technologist must be certified in bone densitometry
  ❖ DXA Quality Assurance (QA) and Quality Control (QC) – For each DXA scanner, each facility submits routine QA/QC documentation. Each facility submits in-vivo precision values and Least Significant Change values.
  ❖ DXA Scan Acquisition and Analysis - Each Technologist provides a worksheet with credentials, and submits one baseline and one follow-up Spine and Femur Scan, and one Forearm scan.
  ❖ DXA Interpretation and Reporting - Each Interpreter provides a worksheet with credentials and submits one baseline and one follow-up interpretive report including scans, with comparison to baseline.

Follow-up DXA report –the DXA scan report following a baseline scan that measures significant change, if any.
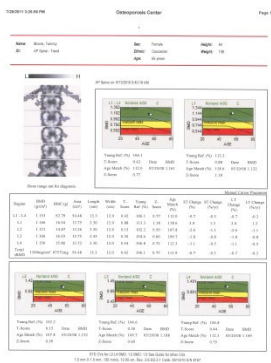
Follow-up (serial) Scan – **(GE Lunar pages)** shows change in BMD over time
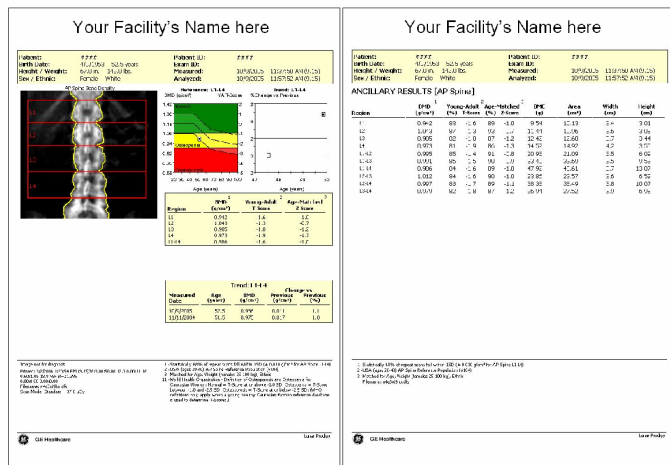
Follow-up (serial) Scan – **(Hologic)** with BMD, BMC and area values and Ancillary Rate of change reports
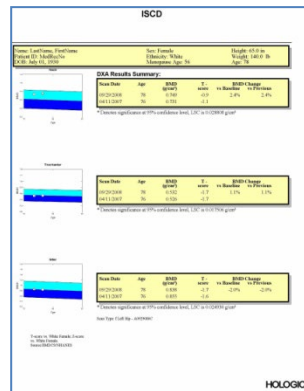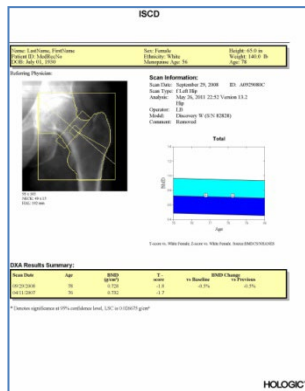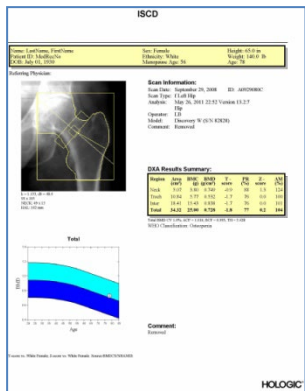
Norland Follow-up Scan

In-vivo Precision Assessment* – A procedure in which either a group of 15 individuals is scanned 3 times each OR a group of 30 individuals is scanned 2 times each within a short period of time (may be the same day if repositioning occurs between each scan). The purpose of precision assessment is (1) to test a technologist's ability to reproduce precise positioning and analysis and (2) to obtain the LSC values used by your DXA interpreter when reporting a comparison between a patient's baseline and follow-up scans. Also see ISCD Official Positions for Precision Assessment. FAQs answered at https://iscd.org/knowledge-base/precision-assessment-calculator-faqs/

ISCD Precision Assessment Calculator – A tool that allows the user to manually type in values measured during in-vivo precision assessment. The "recommended calculator" will give LSC values in g/cm^2 at the 95% confidence level for serial BMD testing and precision error (PE) values in g/cm^2 (also called RMS SD). The advanced calculator will additionally give %CV (coefficient of variation) values. To calculate a %LSC, take the mean BMD of the scanned population and use this formula: [CV% = 100 x (SD/mean)] Calculators can be found at https://iscd.org/learn/resources/calculators/

ISCD Facility Accreditation – **Granted to DXA facilities (not individuals) as a** recognition of compliance with the essential elements

ISCD – International Society for Clinical Densitometry – ISCD is a multidisciplinary, non-profit organization which was founded in June of 1993. ISCD provides a central resource for a number of scientific disciplines with an interest in the assessment of skeletal health. The Society was the first of its kind worldwide.

ISCD Official Positions – https://iscd.org/learn/official-positions/

ISCD Certification – Not to be confused with accreditation of an entire facility, certification is the attestation to successful completion of ISCD CCD, CDT, or CBDT certification requirements by an individual

Least Significant Change (LSC) – The least amount of BMD change that can be considered statistically significant (ISCD recommends calculating at the 95% confidence level which is done by multiplying the precision error by 2.77). For a change in a patient's BMD at follow-up to be considered significant, it must equal or exceed the LSC value

Mean – The arithmetic average of a set of numbers.

Percentage Coefficient of Variation (%CV) – The CV of a normal distribution expressed as a percentage (x 100).

Precision – The reproducibility of a measurement.

Precision Assessment – Also known as an in-vivo precision assessment. A method for calculating the in-vivo precision or reproducibility of measurements at various anatomic sites used to monitor changes in bone mineral density. It is accomplished by scanning a series of patients multiple times on the same day (short-term precision) or within a few days apart (near-term precision). These values are then used to determine the Least Significant Change (LSC). The minimum number of additional scans needed to estimate a precision error of reasonable statistical significance is 30 (30 degrees of freedom). Thirty patients in duplicate, or fifteen patients scanned in triplicate are the most common minimum series done in a clinical setting.

Precision error – The variability of a measurement subject to random errors. In bone densitometry, precision error is expressed as a standard deviation (SD) in g/cm2 in DXA or g/cm3 in QCT. It can also be expressed as a percentage coefficient of variation (CV%).

Primary DXA Interpreter – For the purpose of ISCD Facility Accreditation, any DXA interpreter that is a Certified Clinical Densitometrist (CCD) at your DXA facility.

Primary DXA Technologist – For the purpose of ISCD Facility Accreditation, any DXA technologist at your DXA facility that is a Certified Densitometry Technologist (CDT), Certified Bone Density Technologist (CBDT), or ARRT(BD) (within the last three years) If ARRT(BD) was passed more than three years ago, then technologist must submit 24 hours of continuing education within the last three years pertaining to metabolic bone disease/ DXA technology/ osteoporosis.

Quality Assurance Center or QA Center – A Quality Assurance Center is an outsourcing facility that provides quality assurance services to bone densitometry facilities such as scan analysis, phantom scanning on individual scanners, cross-calibration between scanners, and archiving. A QA Center does not provide diagnostic recommendations on scans.

Quality Control (Procedure) – A method or test to determine whether a procedure or process is in control.

Quality Assurance (QA) –Specific to bone densitometry, the review of Quality Control (QC) procedures that calibrate the system, monitor its ability of the machine and the operators to meet performance specifications, and acquire daily standard values which are used in the calibration of scan results.

Quality Control (QC) – Specific to bone densitometry, a test or procedure that measures some quality characteristic, such as instrument stability over time (phantoms) or calibration accuracy (calibration blocks) or in-vivo reproducibility (precision assessments), etc.

Region-of-Interest (ROI) – A portion of the skeletal site selected for bone density measurement, such as the femoral neck or total femur

Satellite Office – Satellite offices are subordinate operations at secondary locations with a different business address. They contain separate DXA machines and may employ separate personnel. In some facilities personnel are rotated between satellite offices. A disclosure of your satellite office(s) is required in the Facility Accreditation application.

Shift (calibration) – A sudden change in the measured mean value of a stable test object.

SOP (Standard Operating Procedures) – Your facility-specific DXA procedures related to scan acquisition, analysis, and quality control. A written set of rules describing a method or process, and includes well defined limits for normal operations and corrective actions when the method or process is no longer in control.

Spine Phantom Quality Control – QC test for the purpose of monitoring stability of the DXA machine using the same acquisition parameters as when scanning a patient

Spine Phantom – A test object of known densitometric properties that can be scanned on a bone densitometer using patient PA spine acquisition and analysis software. It is used as an independent check of machine calibration, cross-calibration of machines and to monitor long-term stability. Most manufacturers supply a unique spine phantom identified by a serial number with each bone densitometer. Several manufacturers also sell spine phantoms that are device independent and can be used on any brand bone densitometer.

Spine Phantom Scan –

GE Lunar Spine Phantom Scan
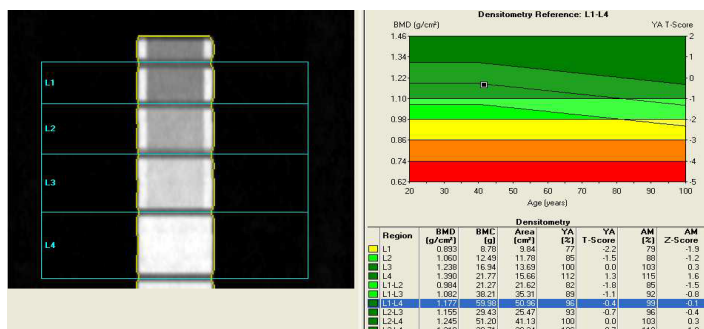
Hologic Spine Phantom Scan
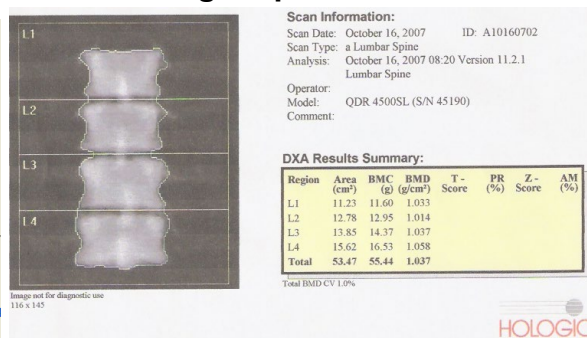
Some of the most common spine phantoms are given in the table below.

| Abbreviation	Description	Image
ESP	European Spine Phantom Aluminum simulated bone	
HOLX- ASP(v1)	Hologic Anthropomorphic Spine Phantom (Pre-2007) Hydroxyapatite plastic simulated bone	
HolxASP(v2)	Hologic Anthropomorphic Spine Phantom 2007-current, aluminum simulated bone	
GE-H$_2$0	GE-Lunar aluminum "gold bar" phantom for use in a water bath	
GE-ACR	GE-Lunar aluminum "gold bar phantom encased in acrylic resin	
Bio-Imaging BSP	Bio-Imaging "Bone-Fide" spine phantom. Hydroxyapatite plastic simulated bone	
Norland ASP	Norland Anthropomorphic Spine Phantom – Hydroxyapatite plastic simulated bone.	

Types of spine phantoms:

Encapsulated Anthromorphic Spine Phantom

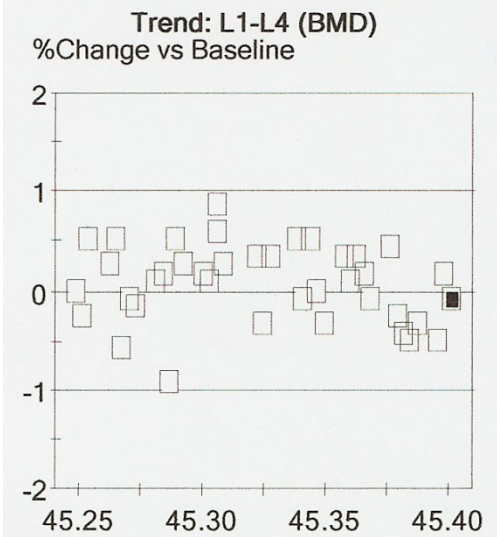## Metal Bar Spine Phantom in Water Bath

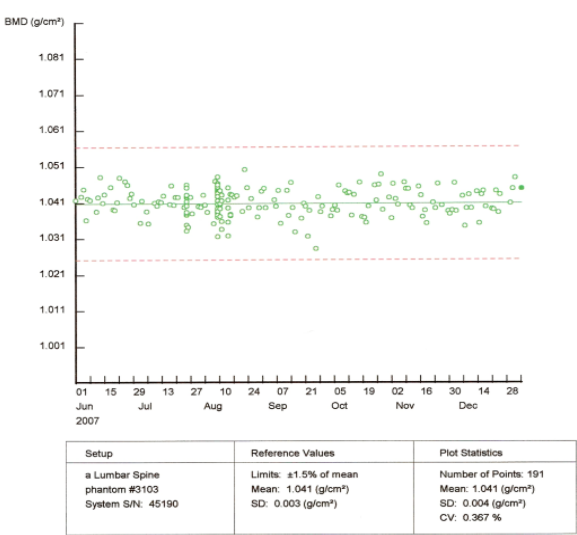## Encapsulated Metal Bar Spine Phantom
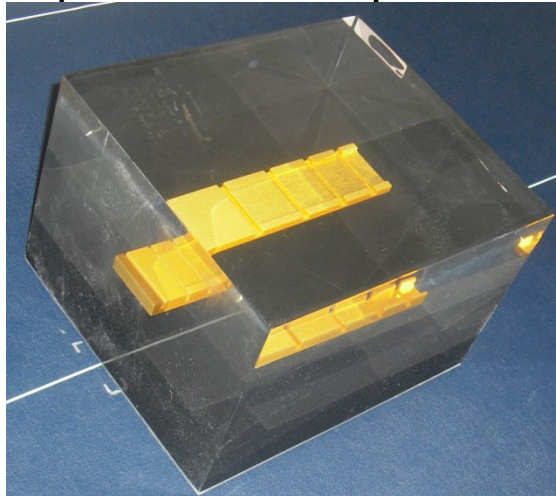
Spine Phantom Plot Graph – A trend graph plotting Spine Phantom BMD over time for the purpose of monitoring shifts, drifts, and fluctuations in DXA equipment over time

GE Lunar Spine Phantom Plot Graph:

Hologic Spine Phantom Plot Graph:

Standard Deviation (SD) – The measure of the width or spread of a normal probability distribution (bell-shaped curve) about the mean or average of the measurement. A range of +/- 1 SD will contain approximately 68% of all the measurements. A range of +/- 2SD will contain approximately 94.7% of all the measurements, and a range of +/- 3SD will contain approximately 99% of all the measurements. In bone densitometry, T-scores and Z-scores are values representing how many standard deviation units a value is from the mean (peak) of a bell-shaped distribution of a young normal or age-matched population respectively.