RADT-2670: MAMMOGRAPHY QUALITY CONTROL

Cuyahoga Community College

Viewing: RADT-2670 : Mammography Quality Control

Board of Trustees:
March 2023

Academic Term:
Fall 2023

Subject Code
RADT - Radiography

Course Number:
2670

Title:
Mammography Quality Control

Catalog Description:
Discusses minimum standards set forth by regulatory agencies that closely monitor a facility's Quality Assurance (QA) and Quality Control (QC) programs. Accreditation process and preparation for Food and Drug Administration (FDA)/Mammography Quality Standards Act (MQSA) inspection, as it relates to a breast imaging center.

Credit Hour(s):
1

Lecture Hour(s):
1

Requisites

Prerequisite and Corequisite
RADT-2610 Fundamentals of Mammography.

Outcomes

Course Outcome(s):
Describe a quality management program for mammography digital equipment.

Essential Learning Outcome Mapping:
Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):
a. Recognize and explain the purpose of accreditation.

Course Outcome(s):
Discuss and identify personnel within a mammography quality management program.

Essential Learning Outcome Mapping:
Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):
a. Discuss the role of the physician, mammographer, QC technologist and medical physicist within a quality management program.

Course Outcome(s):

Understand and describe the quality control tests required for mammography accreditation.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

a. Discuss routine safety checks on mammography equipment and accessories.
b. Identify and understand the quality control tests required for the American College of Radiology, the Mammography Quality Standards Act and digital accreditation inspection.

Methods of Evaluation:

a. Participation and discussion
b. Written assignments
c. Case studies
d. Exams
e. Quizzes
f. Other methods deemed appropriate by department

Course Content Outline:

a. Quality Management Program for Digital Equipment
    i. Mammography equipment
        1. Laser imager QC
            a. Accreditation requirements
            b. Use for interpretation
        2. Workstation QC (including test pattern, e.g. SMPTE, AAPM TG-18)
            a. Radiologist workstation
            b. Acquisition workstation
        3. Monitor
            a. Cleanliness
            b. Calibration
        4. Phantom images
        5. Detector calibration
        6. Flat field and artifacts
        7. Viewing conditions
        8. Viewboxes, if applicable
        9. Signal-to-noise ratio (SNR), contrast-to-noise ratio (CNR), and modulation transfer function (MTF)
        10. Compression force
        11. Repeat analysis
        12. Visual checklist
        13. Review medical physicist's annual survey report
        14. Photostimulable storage phosphor (PSP) erasure
    ii. Reporting system
    iii. PACS
b. FDA/MQSA Requirements
    i. Mammography equipment
        1. Dedicated
        2. Gantry assembly motion
            a. Rigidly fixed
            b. Rotation requirements
            c. Visual indication of gantry angle
        3. Image Detectors
            a. Classification of sizes
            b. Grids
                i. Grid motion impedence
                ii. Magnification devices (removable grids)

4. Compression
5. Technical factor display
6. Focal spot selection
7. Beam limitation and light fields
    a. Alignment of light field to x-ray field
    b. Illumination requirements
    c. Exposure interlock systems
8. Source-to-image receptor distance
    a. Minimum requirements
    b. Visual indication of selected SID
9. Dose limitations
10. Infection control
    a. Non-alcohol cleaners
    b. MSDS
    c. Manufacturer recommendations

c. Facility Quality Assurance
    i. QA program
        1. MQSA EQUIP requirements
            a. Inspection questions
            b. Tracking mechanism
            c. Compliance
    ii. Maintenance log
    iii. Phantom images
    iv. Clinical image monitoring
    v. Clinical image interpretation
    vi. Physicist surveys
    vii. Medical records

d. Additional Quality Assurance Procedures
    i. Medical physicist's annual survey
    ii. General QC tests
        1. Unit assembly
        2. Collimation assessment
        3. System resolution
        4. AEC performance
        5. Uniformity of screen speed
        6. Artifact evaluation
        7. Image quality evaluation
        8. kVp accuracy and reproducibility
        9. Beam quality assessment (HVL)
        10. Breast entrance exposure, glandular dose, radiation output
        11. Viewbox luminance and room illuminance
        12. Compression paddle alignment
        13. Assessing QC program

Resources

American College of Radiology. ACR Mammography Manual.

American Registry of Radiologic Technologists (ARRT). (Current) *Content Specifications for Mammography*, St. Paul, MN. https://www.arrt.org/docs/default-source/discipline-documents/mammography/mammography-content-specifications.pdf?sfvrsn=8a6303fc_8

American Society of Radiologic Technologists (ASRT). (Current) *Mammography Curriculum* , Albuquerque, NM. https://www.asrt.org/docs/default-source/educators/curriculum/mammography/2018-adopted-mammography-curriculum.pdf

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Cardenosa, Gilda. (2017) *Breast Imaging Companion*, Philadelphia: Wolters-Kluwer.

FDA: U.S. Food & Drug Administration. *Policy Guidance Help System*, https://www.fda.gov/Radiation-EmittingProducts/MammographyQualityStandardsActandProgram/Guidance/PolicyGuidanceHelpSystem/default.htm

Lille, Shelly L. Marshall, Wendy. (2019) *Mammographic Imaging--A Practical Guide*, Philadelphia: Wolters-Kluwer.

Peart, Olive. (2018) *Lange Q and A: Mammography Examination*, New York: McGraw-Hill.

Peart, Olive. (2018) *Mammography and Imaging Prep: Program Review and Exam Prep*, New York: McGraw-Hill.

Resources Other

Quality Control Manuals for General Electric, Hologic and Siemens equipment. Current editions.

U. S. Department of Health and Human Services. Q*uality Determinants of Mammography Clinical Practice Guidelines*.

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