

VIRGINIA COMMONWEALTH UNIVERSITY HEALTH SYSTEM  
MEDICAL COLLEGE OF VIRGINIA HOSPITALS AND PHYSICIANS  
POLICY AND PROCEDURE MANUAL

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SUBJECT:	POLICY NO.:	4565.00
	APPROVED DATE:	
USE OF X-RAY EQUIPMENT FOR DIAGNOSTIC & INTERVENTIONAL PROCEDURES	EFFECTIVE DATE:	
	REVIEWED DATE:	09/27/07
	SUPERSEDES NO.:	NEW

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I. PURPOSE:

To support patient safety by establishing staff and physician responsibilities and accountability for compliance with laws and regulations related to the safe use of X-Ray Equipment used for diagnostic or interventional procedures.

II. POLICY:

- A. It is the policy of VCU Health System (VCUHS) that X-Ray Equipment must be operated in a safe manner by appropriately trained and competent staff and physicians in compliance with state laws and regulations.
- B. All X-Ray Equipment at Virginia Commonwealth University Health System (VCUHS) will be registered with the Commonwealth of Virginia through the Radiation Safety Section of the VCU Office of Environmental Health and Safety.
- C. A Qualified Inspector will inspect all X-Ray Equipment at inspection frequency intervals in accordance with state regulations.
- D. All X-Ray Equipment will be monitored for safe use and any Radiation Exposure exceeding set Action Levels will be reported to the VCU/VCUHS Radiation Safety Committee (RSC) as described in this policy.
- E. This policy does not cover X-Ray Equipment used for treatment planning and verification or radiotherapeutic treatment by Radiation Oncology.

III. DEFINITIONS:

**Bone Densitometry** - a process for measuring bone mineral density by utilization of single x-ray absorptiometry (SXA), dual x-ray absorptiometry (DXA) or other technology that is substantially equivalent as determined by the board.

**Direct Supervision** - the supervising physician is in the direct sight of view and within normal speaking range of the staff being supervised.

**Mini C-ARM Fluoroscope** - a low dose, small field of view, fluoroscopic machine that is used for extremity imaging.

**Qualified Inspector** - staff qualified to inspect X-ray Equipment according to the requirements in state regulations, including staff from Radiation Safety, Radiation Physics & Biology, Radiation Oncology or any other individual listed on the State Private Inspector list.

**Radiation Exposure Action Levels** - radiation dose levels, based on patient and procedure dependent factors, at which action should be taken (Attachment A.)

**Radiologic Technologist** - individuals who have successfully completed training in radiology technology and are certified by the American Registry of Radiologic Technicians (AART), or are eligible for AART Certification.

**Staff** - Non-physician medical personnel trained and/or certified in the safe use of X-ray Equipment

**X-Ray Equipment** - radiographic and fluoroscopic equipment used for diagnostic or interventional procedures on patients.

IV. RESPONSIBILITIES/REQUIREMENTS:

- A. The responsibility for the safe operation of each piece of X-ray Equipment will be assigned to a specific physician. It will be that physician's responsibility to monitor compliance with all applicable requirements and regulations.
- B. Physicians must have completed RSC approved training, with demonstrated competencies and credentialing to perform radiologic and fluoroscopic imaging.
- C. Fluoroscopic imaging will only be performed by a physician with appropriate training, competency and credentials. The only exception will be for specially trained staff, with documented competency, who perform orthopedic cast fitting using a Mini C-Arm Fluoroscope.
- D. Staff assisting in the operation of fluoroscopic equipment under the Direct Supervision of a physician will have RSC approved training and competency documented in employee's departmental file.
- E. Radiologic Technologists are required to maintain certification through the AART and will have training, competency and certification documented in their employee departmental file.
- F. Radiologic Technologists may operate X-ray Equipment without the direct supervision of a physician only with a physician's order.
- G. Staff performing Bone Densitometry will have RSC approved training and competency documented in employee's departmental file.
- H. Departments are responsible for maintaining a list of staff and physicians with training and competency to use X-Ray Equipment. This list must be available for review by the Qualified Inspector on request.
- I. The RSC is responsible for reviewing the registration, use, and inspection of all X-ray Equipment to monitor compliance with this policy and state regulations.
- J. The Radiation Safety Officer (RSO) has the authority to refer notable compliance issues to both the VCUHS Administration and the RSC for action and resolution.

V. PROCEDURES:

- A. Before installation of any X-Ray Equipment the department or physician owner must:
  - 1. Notify Clinical Engineering for inclusion in the VCUHS Equipment Management Program; and
  - 2. Contact Radiation Safety to review the shielding, operational and personnel monitoring requirements.
  - 3. Provide a copy of the shielding reports to be kept on file in the Radiation Safety Office.
- B. Before the X-Ray Equipment is put in use in patient care areas:
  - 1. Managers, Directors or Department Chairs are responsible for obtaining documentation of staff and physicians' initial training and validation of competency to operate or assist in the operation of specific X-ray Equipment. **Note:** Ongoing competency will be assumed for staff regularly using this equipment unless performance improvement reports, adverse events or observation of performance indicate a need for reassessment of competency.
  - 2. This documentation will be kept on file in the employee's department file.
  - 3. Medical Staff Services may require documentation for the physician's credentialing file.
- C. A Qualified Inspector will survey the X-Ray Equipment within 30 days of installation for compliance with state regulations.
- D. A Qualified Inspector will perform routine inspections of Diagnostic X-Ray Equipment at the inspection frequencies specified by regulations.

E. Monitoring for and reporting of Radiation Exposures exceeding Action Levels:

1. In each specified high-risk area, procedures will be developed to monitor and record fluoroscopy time, air kerma or dose area product (DAP). The specified high-risk areas include:
  - i. Cardiac Catheterization Lab
  - ii. EP Lab
  - iii. Interventional Radiology
  - iv. C-arm use in Surgery
2. Any Fluoroscopy time, air kerma or DAP that exceeds the limit defined specifically for that equipment or meets Radiation Exposure Action Levels will be reported to the Radiation Safety Officer and the Patient Safety Officer.
3. An occurrence report will be entered as a Patient Safety Net report.
4. An investigation of any reported Radiation Exposure exceeding the Action Level will be initiated.

F. Investigation of Radiation Exposure exceeding Action Levels

1. An investigation of any reported fluoroscopic exposure above the assigned Radiation Exposure Action Level will include, but is not limited to; timeline of events, patient radiation exposure if available, reason for procedure and medical necessity for extended fluoroscopy time.
2. The patient will be contacted to determine if they have experienced any unusual or unexpected reddening or effect to their skin. If the patient indicates an unusual reaction, they will be scheduled to return for follow-up and receive any recommended medical treatment if required.
3. All investigations will be reported to the Radiation Safety Committee and the Quality Council via the Patient Safety Officer.
4. In the event that prolonged fluoroscopy with cumulative dose > 1,500 rad to a single field occurs, the Risk Management Director will be contacted and will initiate the Sentinel Event procedure.

VI. RESOURCES:

- A. Radiation Safety Officer, VCUHS - 828-5877
- B. Radiation Physics & Biology Division 828-7233
- C. Patient Safety Officer - 828-0506
- D. Director, Risk Management, Regulatory Affairs, and Guest Relations - 828-1413

VII. REFERENCES:

- A. Virginia Radiation Protection Regulations; Title 12 VAC 5 Chapter 481
- B. Virginia Board of Medicine; 18 VAC 85-101-10 et. seq.; Regulations Governing the Licensure of Radiologic Technologists and Radiologic Technologists - Limited; Revised February 7, 2007.
- C. VCU Radiation Safety Guide (Attachment A)
- D. VCUHS Policy 2152.01 Competency and Training
- E. VCUHS Policy 6300 Equipment Management Program: Introduction of Medical Equipment into VCUHS
- F. VCUHS Performance Improvement Plan; Sentinel Event Reporting, Policies and Procedures
- G. The Joint Commission - Comprehensive Accreditation Manual for Hospitals; Sentinel Events; March 2007

VIII. REVIEW REQUIREMENTS:

- A. VCU/VCUHS Radiation Safety Committee
- B. Patient Safety Officer

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- C. Department of Radiology, Radiation Physics & Biology Division
- D. Director, Risk Management, Regulatory Affairs, and Guest Relations

**APPROVED:**

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