

Medical Disclaimer

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**Children’s Hospital and Health System
Safety Policy and Procedure**

This policy applies to the following entity(s):

- Milwaukee Hospital and Specialty Clinics
- Surgicenter

SUBJECT: Radiation Protection, General, Patient, and Staff (Radiation Protection)

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POLICY

Children’s Wisconsin will take all reasonable steps to ensure radiation exposure to the patients and employees will be kept within the ALARA principle (as low as reasonably achievable).

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Radiation Protection, General, Patient, And Staff (Radiation Protection); Process Owner: Imaging Manager- Quality, Education and Research



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Actions will be consistent with clinical objectives of the examination and in compliance with the State of Wisconsin regulations.

PROCEDURE

I. General Safety

- A. Only ARRT registry eligible or registered radiological technologists, nuclear medicine technologists, medical physicists, radiologists, radiology residents, radiology fellows, radiology physician assistants, cardiologists, cardiology fellows, Dentists, Dental hygienist, Dental resident, Dental assistants, clinical engineer, and Imaging Service contractors, are authorized to operate ionizing radiation emitting equipment.
- B. All Imaging room doors are clearly marked with a label indicating x-rays are in use. No one is to enter the room without authorization. Always knock before entering.
- C. Imaging room doors shall be closed during exposures.
- D. All imaging equipment that emits ionizing radiation is evaluated for radiation safety and applicable Wisconsin regulations annually by a qualified medical physicist.
- E. The medical physicist will calculate Entrance Skin Exposures (E.S.E.'s) annually for the most common x-ray procedures performed in each x-ray room and for each portable unit. The annual results will be maintained in the department.
- F. All lead aprons, thyroid shields, gonadal shields, and gloves, etc., will be inventoried and inspected every two years for lead integrity. If the integrity of the lead shielding is in question, the device will be removed from service. This survey will be documented and kept on file with Clinical Engineering. Please see Children's Wisconsin Safety Policy: Imaging Apron Inventory and Inspection for more details.
- G. All employees must report malfunctions, broken equipment or irregularities regarding the x-ray equipment to Clinical Engineering or a Supervisor/ Manager.

II. Patient Safety

- A. The useful beam should be limited to the smallest area of interest and consistent with the objectives of the radiological examination or treatment.
- B. The voltage, filtration, and source-skin distance (SSD) employed in medical radiological examinations should be as great as is practical and consistent with the diagnostic objectives of the study.
- C. Protection of the embryo or fetus during radiological examination or treatment of women or transgender males known to be pregnant will be given special consideration. The

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exam will be performed only if the exam risk/benefit ratio is discussed with patient, parent if appropriate, and ordering physician.

- D. Technique charts are provided in each radiographic/fluoroscopic room to be used as a basis for the selection of exposure factors.
- E. The patient's identification will be verified by confirming two acceptable patient identifiers. Once the patient's condition has been assessed, the order will be double-checked to verify the proper exam was ordered. If there are questions to the accuracy of the order, the referring physician will be contacted.
- F. Fluoroscopy should not be used as a substitute for radiography, but should be reserved for the study of dynamics or spatial relationships or guidance in spot film recording or critical details.
- G. Once the patient has been positioned properly, the technologist must verify that the proper technique is set. Prior to initiating the exposure, the technologist shall double-check the patient's proper position via the window.
- H. The technologist will inform patients and public before initiating exposure for portable exams.
- I. Use protective devices when exposure to personnel is necessary.
- J. Image repeat analysis is performed monthly and reviewed by imaging leadership. Image repeat rates should not exceed 5%.

III. Staff Safety

A. General

1. The operator of the x-ray equipment shall stand behind the protective barrier when acquiring an exposure and shall observe the patient during all imaging procedures.
2. The exposure switches of all stationary x-ray equipment shall be mounted in such a way that exposures are not possible from outside the protective barrier.
3. Holding of patients during radiographic exposures is not recommended. Mechanical restraints shall always be given first consideration. When it is necessary for an individual to hold a patient, that individual must wear a lead apron and a thyroid shield and be positioned outside the primary beam. A parent or guardian accompanying the patient will be asked first to hold the patient (no minors). If there are no parents or guardians available, a non-imaging worker will be given the next consideration (i.e. accompanying nurse). If a non-imaging worker is not available, an imaging worker will be used. No one person shall be routinely used to hold patients.

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4. Children's Wisconsin, in compliance with the State of Wisconsin regulations, has developed an online annual radiation education program. This education is provided to areas that have staff wearing radiation badges. Records of the annual safety review are to be maintained for a period of no less than three years.

B. Portable Radiographic Units

1. The radiologic technologist shall stand at least 6' from the x-ray tube when making an exposure and wear a lead apron.
2. The technologist shall inform the surrounding patients and general public they are about to make a radiographic exposure and allow them ample time to step back or leave the area prior to the exposure.
3. Anyone (including nearby patients and personnel) within six feet from the patient at the time of the exposure must wear a lead apron.
4. All portable radiographic units will be stored in an access-controlled location or the keys will be removed and kept in a secure location.

C. Stationary Fluoroscopy Units

1. All personnel not required in the room during fluoroscopy exposures and/or spot film, cine and Digital Subtraction Angiography (DSA) exposures should leave. If they must remain in the room, a lead apron of at least 0.25 mm lead equivalent must be worn and they shall be positioned so that no part of their body is in the useful beam.
2. All personnel in the room during radiation exposures must stand as far away from the patient/x-ray tube as possible.
3. The image intensifier carriage lead drape must remain on (where applicable) except when the clinical exam indicates otherwise.
4. Ancillary protective devices such as ceiling drop shields, rolling floor shields, etc., should be used when available and feasible to the exam.
5. Exposure time is kept to the minimum necessary, consistent with the needs of the procedure.

D. Portable Fluoroscopy C-Arms / O-arm

1. The technologist shall stand as far away from the patient/x-ray tube as possible while making c-arm / o-arm exposures.
2. All personnel required to be in the room during c-arm/o-arm exposures shall wear a lead apron of at least 0.25 mm lead equivalent and shall be positioned so that no part of their body is in the useful beam. Those personnel who will be gowned for the surgical procedure should put the lead apron on before beginning the surgical scrub.

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3. Where applicable, the technologist shall inform all persons within the vicinity that they are about to make a fluoroscopic exposure and allow them ample time to step back or leave the area prior to the exposure.
4. Ancillary protective devices such as rolling floor shields should be used when available and feasible to the exam.
5. All portable c-arms / o-arm will be stored in an access controlled location or the keys will be removed and kept in a secure location.
6. The mobile imaging intensifier is a portable x-ray fluoroscope. Fluoroscopic time should be kept as short as is possible, consistent with the needs of the procedure.

Resources:

Radiation Badge-Radiation Protection

Radiation Protection-Pregnancy, Patient

Radiation-Parent-Guardian Presence in Imaging Exams

Radiation Protection-Pregnant Women-Occupational Exposure

Approved by:

Imaging Policy and Procedure Committee February 25, 2020

Radiation Safety Officer February 17, 2020

Milwaukee Environment of Care Committee April 16, 2020

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