Mobile Radiography Request Guidelines

Purpose

To provide appropriateness criteria for Physicians and Authorized Individuals to promote best practice for safe and appropriate use of Mobile (Portable) Radiography.

Site Applicability

This guideline is applicable to all Lower Mainland Medical Imaging (LMMI) departments within Fraser Health (FH), Providence Health Care (PHC), Provincial Health Services Authority (PHSA) and Vancouver Coastal Health (VCH).

Practice Level

MI Staff: Technologists
Referring practitioners

Need to Know

This guideline adheres to mandatory requirements set forth by:

- College of Physicians and Surgeons of British Columbia; Diagnostic Accreditation Program Accreditation Standards (DAP 2014):
  GM 1.2.2: Processes are in place to assess examination appropriateness.
- Health Canada Safety Code 35
- Recommendations from the American College of Radiology.

Mobile radiographic machines are deemed as an alternative or a secondary choice producing lower image quality compared to images attained using stationary radiographic systems within Medical Imaging (MI). As such, stationary radiographic systems in MI should be the primary choice for obtaining diagnostic information.

Guideline

Adherence to this guideline will ensure:

- The highest quality of diagnostic imaging possible
- Radiation usage consistent with patient clinical requirements
- Patient safety by minimizing retake examinations
- Increased safety and decreased possible radiation scatter dose to staff and other patients

For the poster, see Mobile Radiography Request Guideline Poster (Appendix D)

Steps

1. Professionals requesting mobile imaging ensure appropriateness is met prior to placing the request. These are guidelines, therefore clinical judgment and expertise should continue to determine patient care.
2. Mobile radiography should only be requested for patients who, due to severe, extensive, life threatening, medical conditions or current state of care, are unable to be transported to a stationary radiographic system in MI. Therefore, all x-ray imaging should be performed in MI department unless patient condition deems otherwise.
   - Exception: Neonatal Intensive Care Units

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3. Medical Imaging requires mobile examination requests to be submitted by an "**authorized individual**."
   The following groups are deemed as authorized individuals:
   1. **Physicians** accredited by the Province of British Columbia and the Health Authority,
   2. **Nurse practitioners (NP)** are authorized to request specific x-rays, ultrasound and other forms of imaging as per the College of Registered Nurses of British Columbia (CRNBC) as outlined in the MSP insured services.
   3. **Registered nurses (RN)** may request diagnostic x-ray examinations, including mobile radiographs if they have **attained** recognized credentials by the individual health authority. Example: A RN in **must** complete an online CCRS course to be able to request chest x-rays and an additional second CCRS course to order extremity x-rays. These courses are taken every 2 years to maintain certification.
4. Medical Imaging will continue the established practice of verifying all mobile radiography requests as Mobile radiography has lower image quality which may compromise patient care in situations where patients are able to be transported to MI for imaging. In addition, unjustified mobile radiography requests delay MI staff response to legitimate mobile radiography requests which could impair another patient's care.
5. If the MRT arrives to perform a mobile exam and the appropriateness criteria are questionable, the MRT may inquire whether the patient could be transported to the MI department to ensure the most appropriate exam is performed for the patient.
   See Appendices:
   - **Appropriate Request Criteria** (Appendix A)
   - **Inappropriate Request Criteria** (Appendix B)
   - **Criteria Required on a Requisition** (Appendix C)
6. It is the **responsibility of x-ray equipment operators to minimize radiation exposure to all patients**, **personnel and the general public** therefore excluding extenuating circumstances, all x-ray examinations should be performed in a controlled environment whereby the x-ray beam is contained within a single room.

   Risks of Mobile Radiography
   - Increased radiation dose to other patients and personnel due to scatter radiation
   - Increased radiation dose to patient is required to attain a comparable image to that acquired in the department using a lower dose
   - Poor penetration can obscure pathology such as in chest mobile radiography where the lung bases are frequently under penetrated
   - Lower image quality may be non-diagnostic and lead to repeat imaging, thus further increasing patient dose, delaying care and reducing medical imaging service efficiency

Education

Patient Image Quality

Stationary Radiographic suites incorporate Automatic Exposure Control (AEC). This technology terminates exposure after a predefined amount of radiation producing, consistent high quality images using the lowest dose to demonstrate major and minor pathology. (See *Figures 1-4)*

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Figure 1: Mobile Image



Figure 2: Departmental Image



Figure 3: Mobile Image



Figure 4: Departmental Image

Example: Chest Radiography: On the left (*Figure1)* is a mobile radiograph AP chest and on the right (*Figure 2)* is a department PA chest of the same patient, imaged within days or hours of each other. *Figures 3 and 4* provide a similar example.
Although technical factors are similar, the departmental image is of higher image quality as visualization of the subsegmental branches, mediastinum, intervertebral disc spaces and costophrenic angles are clearly superior to the mobile image. The mobile image is under exposed with poor image contrast. This is due to the lack of automatic exposure control on mobile examinations and the absence of an anti-scatter grid.

Evaluation

MI will conduct random audits to promote best practice for safe and appropriate use of mobile imaging.

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References

The College of Physicians & Surgeons of BC, Diagnostic Accreditation Program. https://www.cpsbc.ca/accredited-facilities/dap/accreditation-standards-DI

1) GM 1.2.2: Processes in place to assess examination appropriateness
2) DQI6.1.2: Processes are in place to assess modality and examination appropriateness.

College of Registered Nurses of British Columbia. "Scope of Practice for Nurse Practitioners: Standards, Limits and Conditions." College of Registered Nurses of British Columbia. https://www.bccnm.ca/RN/ScopePractice/part4/section6/Pages/ordering_application_energy.aspx

Health Canada. Safety Code 35: Safety Procedures for the Installation, Use and Control of X-ray Equipment in Large Medical Radiological Facilities https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-35-safety-procedures-installation-use-control-equipment-large-medical-radiological-facilities-safety-code.html

Excerpts from the Health Canada safety code 35:

- **Introduction:**
  patients should not be subjected to unnecessary radiographic procedures. This means that the procedures are ordered with justification, including clinical examination, and when the diagnostic information cannot be obtained otherwise.
- **Principle Objectives of the Safety code**
  to minimize patient exposure to ionizing radiation while ensuring the necessary diagnostic information is obtained and treatment provided;
- **1.3 X-ray Equipment Operator**
  9. strive to eliminate unnecessary radiographic procedures by reducing the number of retakes, and reducing all patient radiation exposures to the lowest practical values
- **1.5 Referring Physician/Practitioner: The referring physician/practitioner must:**
  3. prescribe an X-ray examination based on professional experience, judgement and common sense;
  4. give consideration to alternative, non-X-ray utilizing, examinations; and should:
  1. be confident that the procedure will improve the patient diagnosis and/or treatment sufficiently in comparison with alternate, non X-ray utilizing, methods of diagnosis and/or treatment;
  2. be aware of the risks associated with X-ray procedures.
- **3.0 procedures for Minimizing Radiation Exposure to Patients**
  The largest single contributor of man-made radiation exposure to the population is dental and medical radiography.
  In total, such use of X-rays accounts for more than 90 % of the total man-made radiation dose to the general population.
  For this reason, it is important to reduce the number of radiographs taken, the number of persons examined radiographically, and the doses associated with the examinations.

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- **Guidelines for the Prescription of X-ray Examinations**

  Unnecessary radiation exposures of patients can be significantly reduced by ensuring that all examinations are clinically justified.

  1. The prescription of an X-ray examination of a patient should be based on clinical evaluation of the patient and should be for the purpose of obtaining diagnostic information or patient treatment.
  2. X-ray examinations should not be performed if there has been no prior clinical examination of the patient.

4. The American College of Radiology and the Society for Pediatric Radiology. "ACR–SPR Practice Guideline for the Performance of Portable (Mobile Unit) Chest Radiography." 2011. American College of Radiology. https://www.acr.org/-/media/ACR/Files/Practice-Parameters/Port-Chest-Rad.pdf

Definitions

"**Authorized Individual**" according to the Diagnostic Accreditation program means a a physician or other designated health professional defined under relevant legislation as having the ability to request diagnostic imaging examinations

"Portable" means use of a mobile x-ray machine

Appendices

- Appendix A: Appropriate Request Inclusion Criteria
- Appendix B: Inappropriate Request Inclusion Criteria
- Appendix C: Criteria Required on a Requisition
- Appendix D: Mobile Radiography Request Guideline Poster

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Appendix A: Appropriate Request Inclusion Criteria

- ☐ Extenuating life threatening conditions
- ☐ Acute critically ill, medically unstable, or trauma patients, where leaving the unit may pose a significant risk to patient safety & health:
  - Unstable vital signs
  - Active bleeding
  - Hemodynamic instability, on inotropic agents
  - Unstable C-spine with high-risk airway
- ☐ Patients who require constant monitoring or observation:
  - Attached to life support devices and/or monitoring devices
  - Immediately post-operative recovering from anesthesia
  - Ventilated
  - Requiring frequent assisted coughs & suctioning (q30 mins – q1 hr) to maintain respiratory status
- ☐ Pediatric patients requiring oxygen
- ☐ Acute respiratory distress
- ☐ Patients on biPAP
- ☐ Traction on the bed that will not fit into an elevator

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Appendix B: Inappropriate Request Inclusion criteria

- ☐ Suspected malposition or malfunction of existing tubes, not including airways
- ☐ Airborne, contact or droplet Isolation
- ☐ Reverse isolation
- ☐ Fever
- ☐ Patient on low flow O_2
- ☐ Patient with multiple infusion pumps
- ☐ Patient cannot stand or weight bear
- ☐ Patient in restraints
- ☐ Patient agitated or combative
- ☐ Patient bariatric
- ☐ Physician preference
- ☐ Patient's nurse decided
- ☐ Medical rounds
- ☐ Order not entered
- ☐ Patient care area busy
- ☐ No porter available
- ☐ Nursing shortage
- ☐ Lack of stretchers

Reminder: This is a guideline and is not intended to replace clinical judgment and expertise.

The list of inclusion criteria is not exhaustive and in some cases the clinical criteria listed above may be deemed a valid Indication to warrant portable imaging.

Please include a specific reason for portable request as is required on all imaging requisitions

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Appendix C: Criteria Required on a Requisition

- ☐ Verbal requests are immediately followed by an authorized electronic or written request
- ☐ Authorized individuals requesting examinations are notified when examinations are cancelled By Medical Imaging and requestors alert Medical Imaging of same
- ☐ Patient's first and last name, unique identifier (PHN), date of birth, gender, date
- ☐ Name and contact information of authorized individual
- ☐ Names of other individuals who are to receive report copy
- ☐ Examination type
- ☐ **Pertinent clinical information including:**
  - ☐ **Relevant history (including known diagnoses)**
  - ☐ **Specific reason for mobile examination, provisional diagnosis**
  - ☐ **Any isolation precautions**

Intent: *Clinical information is required to ensure appropriate prioritization, timely response and interpretation of the examination. Inadequate clinical history leads to phone calls for clarification further delaying the exam, response time and also delays efficient response to legitimate requests, impairing other patients care.*

  - ☐ **Requests that lack the necessary clinical history or contain errors are returned prior to the examination**

Intent: *The clinical information must be sufficient to ensure the appropriate examination is performed. Provisional diagnosis is provided when applicable to assist in determining the most appropriate imaging examination. If pertinent clinical history is not included, this must be reconciled prior to examination.*

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Appendix D: Mobile Radiography Request Guideline Poster

STOP! Which image do you want?



Mobile Image



Department Image

Mobile X-ray Machine Facts:

1. Produces a less diagnostic image which will often result in repeat imaging in the x-ray department. Repeat imaging equals additional radiation exposure to the patient.
2. Uses higher radiation settings therefore exposes the patient to a higher radiation dose.
3. Cannot limit scatter radiation therefore increases radiation exposure to staff & other patients.
4. Limited number of images are able to be obtained therefore the exam is limited.
5. Delays MI staff response to more legitimate mobile requests which may impair another patient's care

TO ACHIEVE HIGH QUALITY IMAGING

Transport patients to Medical Imaging when safe and appropriate

Mobile X-ray Request Inclusion Criteria Examples

- Acute critically ill, medically unstable, or trauma patients, where leaving the unit may pose a significant riskto patient safety & health
- Extenuating life-threatening conditions
- Patients who require constant monitoring or observation
- Acute respiratory distress

Mobile X-ray Request Exclusion Criteria Examples

- Staff shortage, no porter
- Patient on O2, has IV, isolation precautions
- Patient too large, cannot stand
- Physician preference

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	1.0	01-FEB-2016	Initial Draft	Annemarie Budau, Rad RPL
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	3.0	27-FEB-2023	Reformatted to Guideline template, revised reference to NICU depts, updated hyperlinks	Annemarie Budau, Rad RPL TPelZaharik, QA Coordinator
	4.0	22-MAR-2023	Added Poster as an appendix Some rewording of poster for clarity Edited order to request in 'authorized individual' section	Annemarie Budau, Rad RPL TPelZaharik, QA Coordinator

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