

Radiographs (X-rays): Nurse Requisitioning of Upper and Lower Extremity (Pediatric age 5 to 16 years of age)

Site Applicability

VCH and PHC:

- Emergency Departments (ED)
- University of British Columbia Urgent Care Centre (UCC)
- Health Care Centres (HCC):
 - Pemberton Health Centre
 - Whistler Health Care Clinic

Practice Level

Regulated Profession	Practice Area	Specialty Trained Basic Competencies	Advanced Competency (requiring additional education)
RN	<ul style="list-style-type: none"> • Emergency • UBC Urgent Care Centre • Health Care Centres (Pemberton & Whistler) 	<p>With advanced specialty education¹ and where the following activities are core competencies and expectations of the role:</p> <ul style="list-style-type: none"> • Advanced emergency nursing assessment framework /skills, urgency determination and diagnostic reasoning • Key trauma concepts including mechanisms of injury 	<p>Nurse Independent Activities (NIAs):</p> <ul style="list-style-type: none"> • n/a
			<p>Nurse Initiated Protocols (NIPs):</p> <p>VCH and PHC approved NIPs for the purpose of triage of trauma related extremity injury include:</p> <ul style="list-style-type: none"> • Radiographs for upper extremity: <ul style="list-style-type: none"> ○ Elbow, forearm, wrist, scaphoid hand, finger(s) • Radiographs for lower extremity: <ul style="list-style-type: none"> ○ Knee, ankle (including very distal tibia/fibula), foot, toes <p>Limitations</p> <ul style="list-style-type: none"> • Clients 16 years of age and under (See Radiographs (X-rays): Nurse Requisitioning of Upper and Lower Extremity (Pediatric 5 years to 16 years of age) • Body parts not within the scope of this protocol

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			<ul style="list-style-type: none"> Alert Physician/NP (provider) to assess and determine diagnostic imaging required, if nursing physical assessment identifies : <ul style="list-style-type: none"> neurovascular compromise or diminished pulses or obvious dislocations/severe deformities to the extremity open fractures Requester (nurse) uncertainty of need or type of radiograph required <p>Note: Confirmed or suspected pregnancy is not a limitation for upper and lower extremity radiographs but if the client and/or the requester have concerns regarding the radiation risk, consult with the provider</p>
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1. formal program of study in Emergency Nursing or Combined Emergency & Critical Care Nursing (e.g. BCIT specialty education course or equivalent)

Education

- Completion of [required education](#)
- Performance of a Nurse Initiated Protocol (NIP) (see [Nurse Independent Activities \(NIA\) and Nurse-Initiated Protocols \(NIP\) Policy](#)) is an advanced skill requiring [additional education](#).
- Learning has been [certified](#) by appropriate clinical support person (Emergency Nurse Educator/Clinician)

Requirements

It is within scope of this protocol for nurses to request upper and lower radiographs on clients 5 years of age to 16 years of age **after** a physical assessment has been performed **and** there are no identified neurovascular compromise, diminished pulses or obvious dislocations/severe deformities, or open fractures to the extremity.

- Radiograph requests for the upper extremity include:
 - elbow
 - forearm
 - wrist +/- scaphoid
 - hand
 - finger (s)
- Radiograph requests for the lower extremity:
 - knee
 - ankle (including very distal tibia/fibula)
 - foot

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- toe(s)
- RN competency to be maintained **by re-certification** of learning by appropriate clinical support person **every one to two years** and will include:
 - Clinical testing (three patients for the upper extremity body parts within the scope of this protocol and three patients for the lower extremity body parts within the scope of this protocol) where a ED Registered Nurse performs an extremity assessment, identifies x-ray needs and reports to an appropriate clinical support person (e.g. Emergency Nurse Educator/Clinician, Emergency Physician, Nurse Practitioner)
 - Repeat of the online education "[Nurse Initiated X-ray requests for extremities](#)" testing knowledge of anatomy, history and physical examination associated with injuries of extremities (i.e. finger, hand, scaphoid, wrist, forearm, elbow, foot (including calcaneus, metatarsals/tarsals, toes), ankle (including very distal tibia/fibula), and knee every two years or as required.
 - Sign off on the "Certificate of Competency for Requesting Upper and Lower Extremity Radiographs" document (See [Appendix C](#))
 - The clinical nurse educator of the ED/UCC/HCC will maintain records of instruction, certification and re-certification.
 - Certification and re-certification records will be kept in the employee's personnel file and online education profile.
 - Sites to review volume of use of this NIP as per site protocol.

Algorithm(s)

- [Upper Extremity Injury – Emergency RN Initiated Orders Clinical Decision Support Tool: Extremity X-ray Guidelines](#)
- [Lower Extremity Injury – Emergency RN Initiated Orders Clinical Decision Support Tool: Extremity X-ray Guidelines](#)

Need to Know

RNs who have completed the required education and certification to independently request the extremity radiographs (x-rays) in accordance with the decision support provided in this guideline, support the reduction of time for providers to diagnose and treat select clients presenting to the EDs/UCCs/HCCs. This reduction in wait time can increase client, family, and staff satisfaction.

Note: Approximately 20% of children who seek attention for injury, do have a fracture with the most commonly involve sites being the distal radius, hand, and elbow. The risks of ionizing radiation are higher for children than for adults therefore it is essential that pediatric x-rays only be performed if there is a proper indication.

Protocol

1. Review health history including: when injury occurred, if this is new or a chronic injury, previous injury to the same joint, identify mechanism of injury, and a pain assessment

2. Ask client if they have had a radiograph recently to assess the current chief complaint

3. A physical assessment will be performed and will include:

- comparison to unaffected limb (undress both limbs)
- colour of affected limb, movement, circulation, sensation, and warmth
- pain
- point of tenderness
- swelling
- bruising
- impaired range of motion
- pulses distal to the injury
- deformity
- right/left
- ability to weight bear

Note:

- If indicated, RN should perform a comprehensive pain assessment. If pain is mild to moderate, refer to [Pain Management: Acute Mild \(Pediatric age less than 17 years\)](#)
- If assessment identifies neurovascular compromise including diminished pulses, obvious dislocation/severe deformity, or open fracture notify the EP/NP to perform assessment and identify diagnostic imaging required.

4. Use [upper extremity algorithm](#) or [lower extremity algorithm](#) to determine if radiographs can be appropriately requested by the RN. If appropriate, radiographs should be requested by RNs both at triage and within the emergency department/urgent care centre.

Upper Extremities Radiographs (as per Algorithm , clients only need to meet one of the listed criteria.	Lower Extremities Radiographs (as per Algorithm , clients only need to meet one of the listed criteria.
<p>Finger</p> <ul style="list-style-type: none"> • Presence of tenderness over any of the phalanges • Obvious deformity of the digit • Severe pain with injury • Injury involves single finger <p>Hand</p> <ul style="list-style-type: none"> • Presence of tenderness over the MCP joint • A suspected injury proximal to the MCP joint • Obvious deformity and/or swelling that extends from the hand into the wrist joint • Severe pain with injury • Injury involves multiple fingers <p>Wrist 3 views</p> <ul style="list-style-type: none"> • Obvious deformity and/or swelling in the wrist joint only • Severe pain with injury <p>Add Scaphoid View</p> <ul style="list-style-type: none"> • Tenderness in the anatomical snuffbox <p>Forearm 2 views</p> <ul style="list-style-type: none"> • Severe pain with injury • Obvious deformity and/or swelling/tenderness/crepitus to the mid-shaft forearm (not isolated to the distal radius/ulna – this is a wrist x-ray) <p>Elbow 2 to 3 views</p> <ul style="list-style-type: none"> • Obvious swelling of the elbow joint, tenderness of the olecranon, radial head, and/or supracondylar areas following an injury • Inability to fully extend arm at elbow following an injury • Severe pain with injury 	<p>Knee 2 to 3 views</p> <ul style="list-style-type: none"> • Tenderness of patella or head of fibula • Inability to weight bear both immediately post injury and in the ED • Inability to flex to 90 degrees • Severe pain with injury <p>Ankle 2 to 3 views</p> <ul style="list-style-type: none"> • Inability to weight bear both immediately post injury and in the ED • Bony tenderness over either the malleolus or bone of the fifth metatarsal <p>Foot 2 to 3 views</p> <ul style="list-style-type: none"> • No calcaneal or back pain and screens positive for the Ottawa Ankle and Foot Rules • Point tenderness over the base of the fifth metatarsal, and/or the navicular • Normally walks but has inability to weight bear both immediately post injury and in the ED <p>Toe</p> <ul style="list-style-type: none"> • Rotated, deformed toe • Suspected great toe fracture

Intervention

5. RN to request radiograph as per [upper extremity algorithm](#) or [lower extremity algorithm](#) and provide appropriate documentation.
6. Discuss with client/family the purpose and rationale of the radiograph.
7. Follow-up of Emergency RN Initiated Radiograph request which includes:
 - Ensuring RN initiated radiograph has been entered and documented appropriately.
 - RN informing the provider (EP/NP) that a radiograph has been requested for the client.
 - Ensuring x-ray results are followed up by the client's provider (EP/NP) as per usual ED practice.

See [Related Documents](#) for Radiographer Assessment and Follow up.

8. Clients [Left Without Being Seen \(LWBS\)](#):
 - If any client leaves the ED without being assessed by the provider, the nurse will inform the most-responsible physician/NP that radiographs were requested and completed and need to be reviewed to determine if client needs to be contacted regarding the results.
9. Follow up of abnormal x-ray results will be the responsibility of the EP or NP.

Documentation

1. **On Emergency Department/Urgent Care Centre/Health Care Centre Nursing Assessment:**
 - Initial extremity assessment, on-going nursing treatments and response to treatment
 - Any protocol or NIA followed
 - If applicable, pain assessment scale score per pain site for initial and ongoing pain assessment
 - Ongoing patient/family teaching
 - Discharge teaching/instructions provided as applicable
 - Follow up re: Discharge instructions/referrals with any HCP for ongoing pain management
2. **RN to complete nurse initiated protocol (NIP) for extremity radiograph ordering including:**
 - Date and time
 - Name of radiograph
 - Site and Side
 - Clinical history or criteria (e.g. Client fell 10 feet,? Right ankle fracture)
 - Nurse first and last name printed (automatically present if online order entry)
 - Nurse signature and designation (automatically present if online order entry)
 - MRP (most responsible provider) first and last name printed to receive the radiograph report

3. **NIA/NIP Documentation** (in the Orders section of the client chart) – will be in accordance with Health Authority NIA/NIP Policy: [Nurse Independent Activities \(NIA\) and Nurse-Initiated Protocols \(NIP\)](#)

Patient and Family Education

When appropriate, explain rationale for the radiograph being requested and possible outcomes if the client/family refuses the X-Ray to diagnose the source of pain. Instruct client/family about the importance of and method of communicating change in symptoms.

Related Documents

Radiographer Assessment and Follow-up:

Note: A Radiographer will review all radiographs requested, and if they have questions about the request or feels that a different radiographic view may be required, they will call the emergency department and speak to the nurse who referred the client.

Radiographers review all radiograph requests, interview patients, look at injured area and document patients comments and any key observations of the injured part for the radiologists in the radiology patient history section. If during this assessment the radiograph request based on their imaging and anatomical expertise does not align with patient's clinical presentation and verbal history given, the radiographer will call the ED or urgent care center and request to review the findings with the patient's primary nurse and together agree on the most appropriate request.

Related Policies

- [Pain Management: Acute Mild \(Pediatric age less than 17 years\)](#)
- [BCCNP Scope of Practice for Registered Nurses](#)

Guidelines/Procedures/Forms

- [Lower Mainland Medical Imaging Clinical Practice: Mobile Radiography Request Guidelines](#)
- [Lower Mainland Medical Imaging Mobile Radiography Request Quick Reference Poster](#)

References

Bachmann, L., Kolb, E., Koller, M.T., Steurer, J., Riet, G. (2003). Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot; systematic review. *BMJ*, 326, (7386): 417. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMG149439/>

Burnaby Orthopaedic Source Inc. (2011). The Right Knee. Retrieved May 27, 2017 from <http://www.aclsolutions.com/anatomy.php>

British Columbia College of Nursing Professionals. (2017). Scope of Practice for Registered Nurses: Standards, Limits, Conditions. British Columbia: BCCNP. Accessed on May 15, 2019 from https://www.bccnp.ca/Standards/RN_NP/RNScopePractice/Pages/Default.aspx

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Davies, J. (1994) No problem! Establishing a nurse requested X-ray service. *Accident and emergency nursing*. 1994, 2:54-56.

Finlayson BJ, Lindley-Jones M. (2000). Triage nurse requested x rays – the results of a national survey. *J Accid Emerg Med* 2000; 17:108-10.

Gwilym SE, Aslam N., Ribbans, JJ., Holloway, V. (2003). The impact of ordering the Ottawa ankle rules on ankle radiography requests in the A&E. *International journal of clinical practice*. 2003; 57(7); 625-27.

Hunter, D. (2010). Triage nurse x-ray protocols for hand and wrist injuries. *Emerg Nurse* 2010; 17(9), 20-24.

Mcrae (2005). *Orthopedics and Fractures*, Churchill Livingstone, Oxford.

Ottawa Hospital Research Institute: Ottawa Ankle Rules. Retrieved May 27, 2017 from www.ohri.ca/emerg/cdr/docs/cdr_ankle_poster.pdf

Patel, H., Celenza, A., Watters, T. (2012). Effect of Nurse-Initiated X-rays of the lower limb on patient transit time through the emergency department. *Australasian Emergency Nursing Journal* 2012, 15(4), 229-234. Retrieved on May 27, 2017 from [www.aenjournal.com.au/article/S1574-6267\(12\)00066/fulltext?cc=y](http://www.aenjournal.com.au/article/S1574-6267(12)00066/fulltext?cc=y)

Rosmulder, R.W., Krabbendam, J.J., Kerkhoff, A.H., Schinkel, E.R., Beenen, L.F., Luitse, J.S. (2009). Advanced triage improves patient flow in the emergency department without affecting the quality of care. *Netherlands tijdschrift voor geneeskunde*. 2009: 154, A1109.

Schweich, P. (2020). Proximal fractures of the forearm in children. Retrieved from: https://www.uptodate.com/contents/proximal-fractures-of-the-forearm-in-children?search=diminished%20pulses%20neurovascular%20compromise&source=search_result&selectedTitle=3~150&usage_type=default&display_rank=3

Streppa, J., Schneidman, V., Biron A.D. (2014). Requesting wrist radiographs in emergency department triage: Developing a training program and diagnostic algorithm. *Adv Emerg Nurse*, (2014), 36(1); 62-77. Retrieved on May 27, 2017 from <http://www.ncbi.nlm.nih.gov/pubmed/24487265>

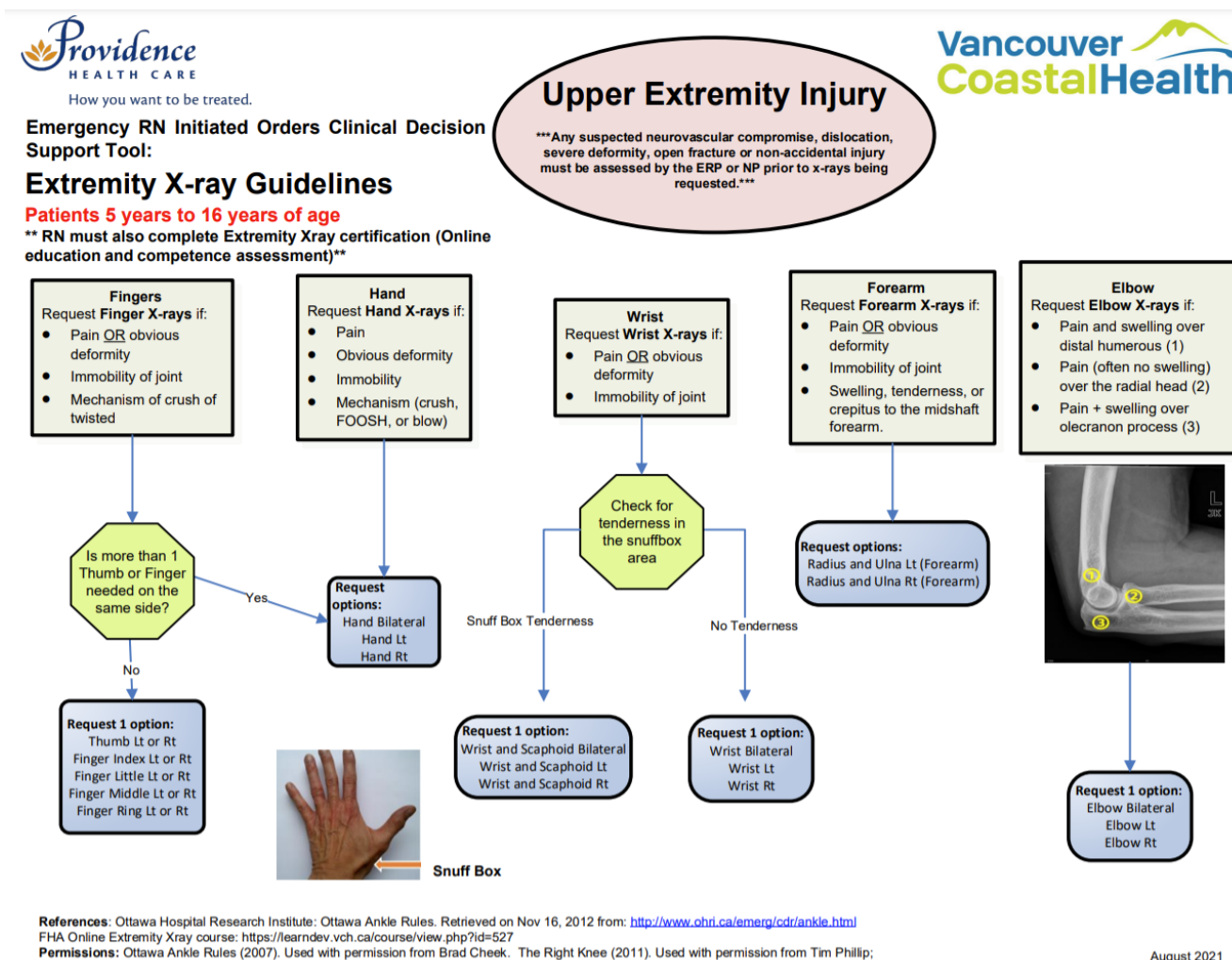
World Health Organization (2016). Communicating radiation risks in paediatric imaging: information to support health care discussions about benefit and risk. Retrieved on August 18, 2021 from http://apps.who.int/iris/bitstream/handle/10665/205033/9789241510349_eng.pdf;jsessionid=7E9F173281C2BB0517B0353BA63CA564?sequence=1

Definitions

Left Without Being Seen: Refers to a client who has left the health care facility without being examined or assessed by an Emergency Department/Urgent Care Centre/Health Care Centre provider (EP/NP).

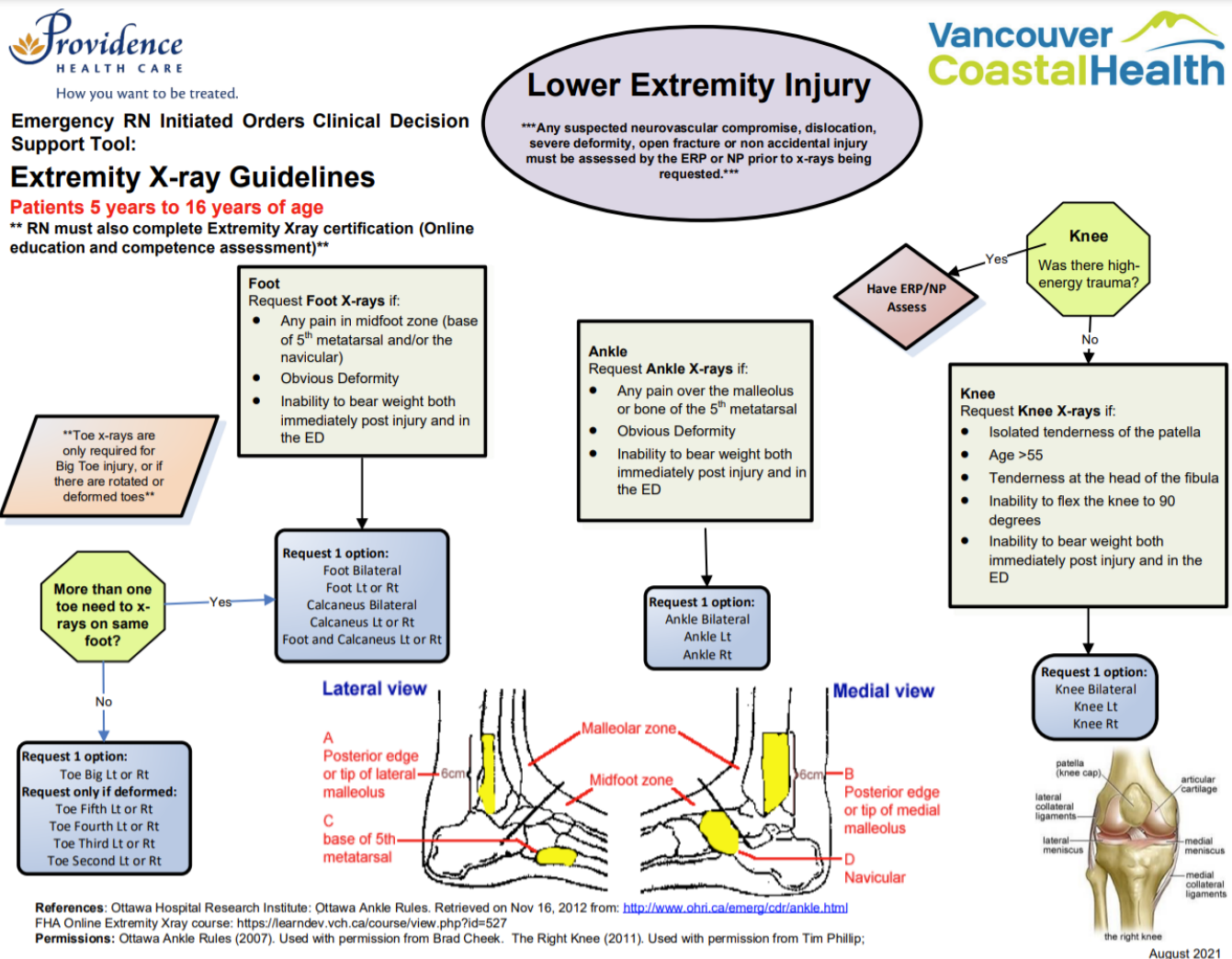
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Appendix A: Upper Extremity Injury – Emergency RN Initiated Orders Clinical Decision Support Tool: Extremity X-ray Guidelines



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Appendix B: Lower Extremity Injury – Emergency RN Initiated Orders Clinical Decision Support Tool: Extremity X-ray Guidelines



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Appendix C: Extremity X-ray Certification

Certification for Ordering Upper and Lower Distal Extremity X-rays

Name: _____ Employee ID: _____ has successfully completed the Educational component including:

- Nurse Initiated X-ray Requests for Extremities online module:
- Review of [Nurse Independent Activities \(NIA\) and Nurse-Initiated Protocols \(NIP\)](#)

Clinical testing (three patients) where the ED Registered Nurse performs an extremity assessment, identifies x-rays needs, and reports to Provider (Emergency Physician/Nurse Practitioner) or appropriate clinical support person (Emergency Nurse Educator/Clinician).

- Date: _____ EP/NP/Clinical support: _____
- Date: _____ EP/NP/Clinical support: _____
- Date: _____ EP/NP/Clinical support: _____

Please return completed form to the Clinical Educator

Date completed: _____

Signature: EP/NP/Clinical Support Person _____

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Owners: <i>(optional)</i>	PHC and VCH	
	Developer Lead: <ul style="list-style-type: none"> Regional Program Planning Lead – Emergency and Trauma Services, VCH/PHC Practice Initiatives Lead, Professional Practice, VA Emergency Department Clinician, VGH Nurse Educator, Emergency Department, SPH Nurse Educator, Emergency Department, MSJ Associate Medical Director, Regional Emergency Services Program Clinical Nurse Educator, STS Clinical Educator, Emergency Department, RH Emergency Clinician, Emergency Department, VGH Clinical Services Coordinator, WHCC/PHCC Clinical Educator, Emergency Department, RH Critical Care Coordinator, PRGH Nurse Educator, Emergency Department. LGH Clinical Educator, Urgent Care Centre, UBCH 	

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