

TRAUMA GUIDELINE



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ABBREVIATIONS

ACR	American College of Radiology
AGREE-II	Appraisal of Guidelines for Research & Evaluation Instrument
AI	Artificial Intelligence
CATCH	Canadian Assessment of Tomography for Childhood Head injury
CAR	Canadian Association of Radiologists
CCHR	Canadian CT Head Rule
CT	Computed Tomography
CTA	Computed Tomography Angiograph
EAST	Eastern Association for the Surgery of Trauma
EP	Expert Panel
EtD	Evidence to Decision
GCS	Glasgow Coma Scale
GRADE	Grading of Recommendations Assessment, Development and Evaluation
MRI	Magnetic Resonance Imaging
Nexus II	National Emergency X-Ray Utilization Study
NICE	National Institute for Health and Care Excellence
OPG	Orthopantomography
PECARN	Pediatric Emergency Care Applied Research Network
RCR	Royal College of Radiologists
US	Ultrasound
WSES	World Society of Emergency Surgery
XR	Radiograph



INTRODUCTION

The diagnostic imaging referral recommendations from the Canadian Association of Radiologists (CAR) were last published in 2012 (<https://car.ca/patient-care/referral-guidelines/>), and were made up of 13 sections, including Trauma.

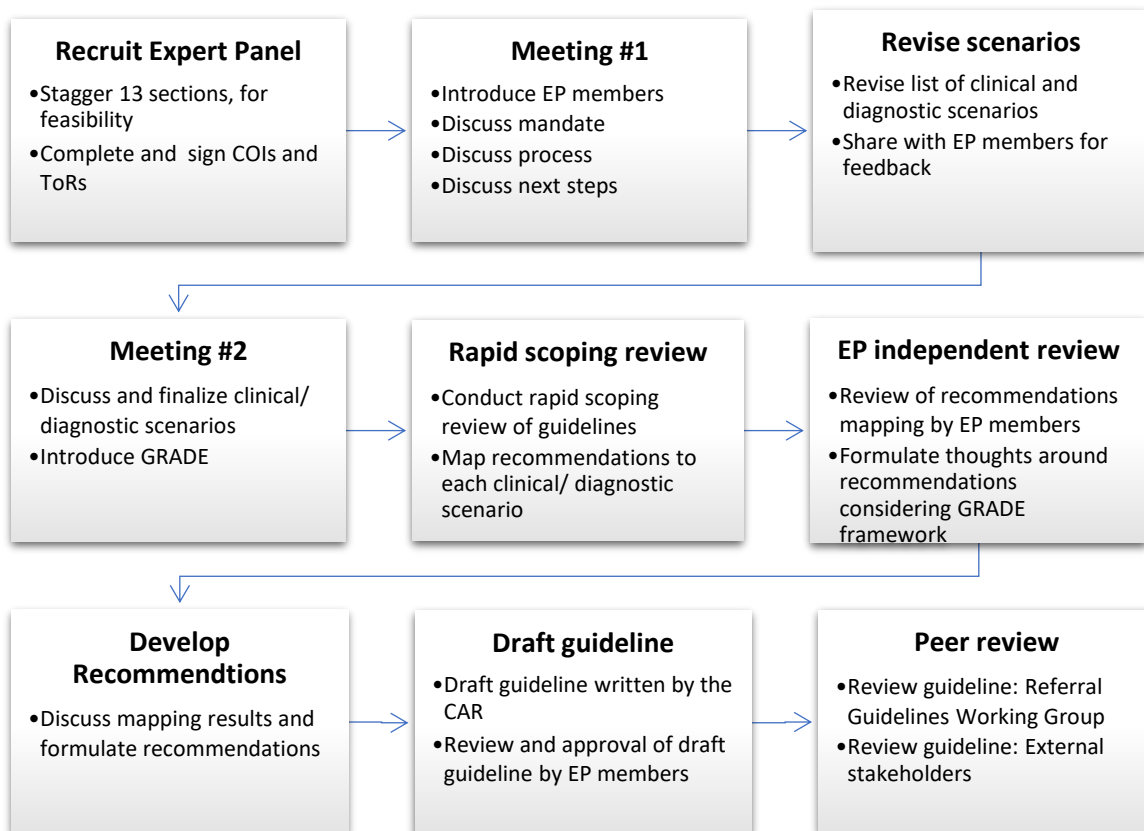
In 2020, the CAR, funded by the Canadian Medical Association (CMA), developed a plan to create new CAR diagnostic imaging referral recommendation using a rapid guideline development approach. The protocol for the guideline process is available in *CMAJ Open* [1]. The general guideline development process is presented in **Figure 1**.

The project mandate is to develop a comprehensive set of evidence-based diagnostic

imaging referral guidelines suited for integration into clinical decision support (CDS) systems.

An Expert Panel (EP), made up of emergency and trauma radiologists, referring physicians, a patient representative, and an evidence review/guideline methodologist, from across Canada met over eight meetings from March to November 2021.

The 29 clinical/diagnostic scenarios in the 2012 CAR recommendations were used as the starting point for discussions. After a review and update of these scenarios, a list of 21 clinical/diagnostic scenarios was created, which informed the systematic search strategy and systematic rapid scoping review.



Abbreviations: CAR = Canadian Association of Radiologists; COI = Conflict of Interest; EP = Expert Panel; GRADE = Grading of Recommendations Assessment, Development and Evaluation; ToR = Terms of Reference

Figure 1 - Guideline development process

WHO ARE THESE RECOMMENDATIONS FOR?

These recommendations are primarily for referring clinicians (e.g., physicians, nurse practitioners); however, they may also be used by radiologists, patients, and/or patient representatives.

These recommendations can apply to both adult and pediatric populations, unless otherwise specified. In the context of these recommendations, acute trauma is defined as physical trauma resulting from the transfer of kinetic energy (blunt or penetrating) to the body from an outside force.

Scope

The guideline recommendations address choice of imaging modality, not the management of individual patients in contexts where modalities are not available. Imaging should not delay definitive management. Imaging should not delay definitive management.

DISCLAIMER

These recommendations are not intended to stand alone. Medical care should be based on evidence, a clinician's expert judgment, the patient's circumstances, values, and preferences, and resource availability.

We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors.

METHODS OF THE RAPID SCOPING REVIEW

The conduct of the systematic rapid scoping review was guided by empirical review guidance: the Joanna Briggs Institute scoping review guidance [2], the Cochrane Handbook [3], and the rapid review interim guidance from the Cochrane Rapid Review Methods Group [4].

Inclusion Criteria

Publications were included if they met the following criteria:

Guidelines: Providing diagnostic imaging recommendations for one or more of the clinical/diagnostic scenarios identified by the Trauma Expert Panel (EP).

Note: Only guidelines were included, systematic reviews and primary studies were not considered for inclusion.

Study design: Guidelines that were produced satisfying three criteria in the Appraisal of Guidelines for Research & Evaluation Instrument (AGREE-II) assessment tool [5,6]:

- (1) Systematic methods were used to search for evidence: Searched and named at least one electronic database using an electronic search strategy (e.g., Medline, Embase, PubMed, CENTRAL);
- (2) The criteria for selecting the evidence are clearly described: Described a formal process for study selection; AND reported the inclusion and exclusion criteria; OR if it is based on a systematic review even if it does not provide explicit methods; and
- (3) The strengths and limitations of the body of evidence are clearly described: Performed critical appraisal on the included studies (e.g., risk of bias, describe study limitations); OR if it is based on a systematic review and GRADE is performed.

Interventions: We included any diagnostic imaging modality (e.g., radiograph [XR], magnetic resonance imaging [MRI], computed tomography [CT], ultrasound [US]).

We elected to exclude point of care ultrasound (POCUS), as it forms part of the initial clinical assessment in some contexts.

Date of publication: We included guidelines that were published or updated in 2016 onward, to identify the most recent guidelines, which would contain the most recently published primary studies, and for feasibility.

Language of publication: English, for feasibility.

Search

An experienced information specialist, in consultation with the guideline methodologist, developed a systematic search strategy (**Appendix 1**) using the list of clinical/diagnostic scenarios identified by the Trauma EP members. The search was run in Medline and Embase on May 1st, 2021, and updated and rerun on June 21st, 2021 to include non-accidental trauma guidelines, with an additional supplemental search to capture pediatric guidelines on June 22nd, 2021. The search was limited to publications from 2016 onward. There was no language restriction in the search. Supplemental searching included searching the following national radiology and/or guideline groups: the American College of Radiology (ACR), the National Institute for Health and Care Excellence (NICE), and the Royal College of Radiologists (RCR) 8th Edition (2017).

Title/abstract screening

Using a standardized form in DistillerSR, an online systematic review software [7], one senior reviewer screened the records in prioritized order, using the artificial intelligence (AI) re-ranking tool in DistillerSR. A stop-screening approach was implemented once 95% of the predicted included studies were identified [8,9].

The AI reviewer tool in DistillerSR excluded the remaining records. The AI audit tool was run to identify any records that were excluded that had a high score for inclusion (i.e., a prediction score of 0.85 and above). These records were rescreened to ensure that they should have been excluded. A second reviewer verified a random sample of 10% of the included records and 20% of the excluded records, without knowledge of the inclusion or exclusion decision by the first reviewer. Any disagreements were resolved through discussion. The AI audit tool was rerun, and any records with a prediction score of ≥ 0.85 were rescreened.

Full text screening

Using a standardized form in DistillerSR, one senior reviewer evaluated the full texts of the guidelines against the eligibility criteria described above in the Inclusion Criteria.

Mapping

One senior reviewer extracted recommendations from all included guidelines and presented these in tabular form for each clinical/diagnostic scenario. The senior reviewer produced a synopsis (i.e., condensed version of the evidence table) for each clinical/diagnostic scenario based on the information in the evidence tables. These synopses highlighted the main recommendations across guidelines, with a focus on guidelines that used Grading of Recommendations Assessment, Development and Evaluation (GRADE), and highlighted any discordant recommendations. EP members used these to help guide discussion when formulating the recommendations.

Critical appraisal

Each guideline was assessed for the level of quality using the AGREE-II instrument [5]. This was performed by one reviewer with a quality control check on a random sample of 10% of the guidelines.

FORMULATING RECOMMENDATIONS

Over a series of five virtual meetings (Sept-Nov 2021), the Expert Panel members discussed each of the clinical/diagnostic scenarios using the information in the synopses as a guide. When required, the full evidence tables (**Appendix 2**) were consulted for additional information.

NOTE: Details have been removed from Appendix 2 to comply with copyright protection. For additional information on these recommendations, please access the full publications.

The focus of these recommendations was to provide the recommendation for the initial imaging modality. Certain scenarios provide a recommendation for the next imaging modality or an alternative to the first imaging modality, in situations where the first imaging modality is negative, non-diagnostic, or may not be available.

The GRADE for Guidelines framework [10,11] was used as a guide to determine the strength (i.e., strong, conditional) and direction (i.e., for, against) of the recommendation. As the GRADE methodology requires an Evidence to Decision (EtD) framework for each recommendation, this would not have been feasible as:

- (i) We used recommendations from existing guidelines as our evidence base, thereby not allowing for full assessment of each outcome within the primary studies, including the five GRADE domains to evaluate the certainty of the evidence: risk of bias, indirectness, imprecision, inconsistency, and publication bias [12]. Therefore, this information was inferred by the level and strength of the evidence provided in the included guidelines.
- (ii) We covered 21 clinical/diagnostic scenarios in the Trauma section, which could have included several diagnostic imaging modality

comparisons. This would have resulted in a minimum of 21 EtD frameworks, but realistically many more, as we would have had to create an EtD for each comparison (e.g., XR vs MRI, MRI vs CT, XR vs US) within each clinical/diagnostic scenario.

Therefore, in addition to the diagnostic imaging recommendations presented by each included guideline, and the clinical expertise of the EP members, additional criteria were considered specific to the Canadian healthcare context:

- Certainty of the evidence (as presented in the included guidelines)
- Consideration of benefits and harms (e.g., ionizing radiation exposure)
- Values and preferences
- Equity, accessibility, and feasibility
- Resource use and costs

The strength and direction of the recommendations are represented by arrow directions and colours. Using GRADE as a guide [10], these can be interpreted as:

- **Strong recommendation (“recommend”), for (↑↑):** All or almost all informed people would want/ recommend this intervention and only a small proportion would not. If this intervention is not offered, the patient or patient representative should request a discussion.
- **Conditional recommendation (“suggest”), for (↑):** Most informed people would choose/ recommend this intervention, but a substantial number would not. This may be conditional upon patient values and preferences, the resources available or the setting in which the intervention will be implemented.
- **Conditional recommendation (“suggest”), against (↓):** Most informed people would not choose/ recommend this intervention, but a substantial number would. This may be

conditional upon patient values and preferences, the resources available or the setting in which the intervention will be implemented.

- **Strong recommendation (“recommend”), against (↓↓):** All or almost all informed people would not want/ recommend this intervention, but a small proportion would.

When there were no guidelines to support recommendations, the EP formulated recommendations based on their clinical expertise while considering values and preferences, resources, cost, equity, and accessibility. These recommendations are denoted with (EP consensus).

The recommendations for each clinical/ diagnostic scenario are presented below, with reference to the guidelines that were included for that scenario. Recommendations are also summarized in tabular form in **Appendix 3**.

INCLUDED GUIDELINES

A total of 3311 unique records were identified through the electronic database. After reviewing 1337 records, the AI reviewer excluded the remaining records (n=1974), as 98% of the predicted included records had been identified and the likelihood for inclusion of the remaining records was low (highest remaining prediction score of 6.29%). A second reviewer screened a set of randomly selected records (n=574) for verification. Among these, there were eight conflicts, all between the two human screeners. These conflicts were resolved through discussion. An additional 12 records were added from the supplemental searching. A total of 190 records were further evaluated. The full text for four records were not retrievable, and 29 records were non-English publications (**Appendix 4**). Among the remaining 107 full texts that were screened for eligibility, 67 were not guidelines providing recommendations for

trauma imaging, 23 did not use systematic methods or sufficiently describe the methods used in the formulation of the guideline, and 17 were excluded for ‘other’ reasons. A list of excluded records with reasons is available upon request. Recommendations from 50 guidelines were included (**Figure 2 - PRISMA flow diagram**).

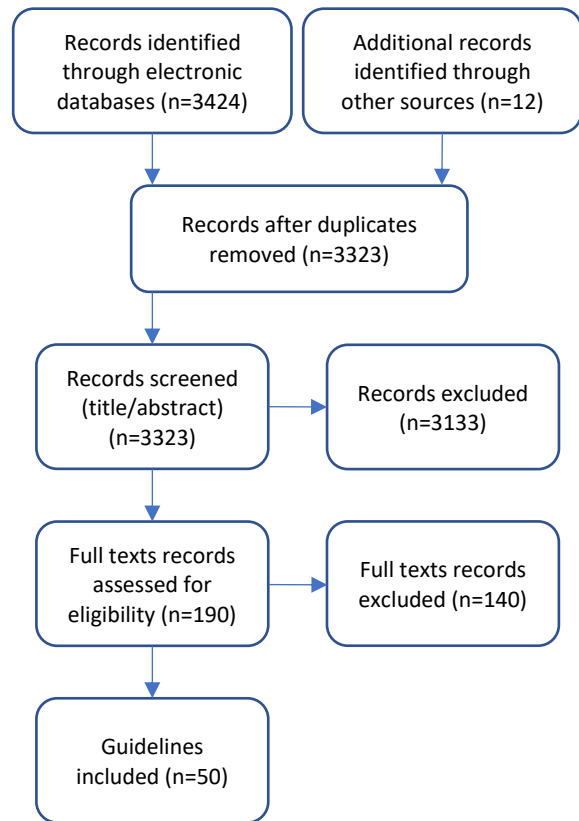


Figure 2 - PRISMA flow diagram

The number of guidelines included per clinical/diagnostic scenario ranged from 2 to 9. Where available, the certainty of the evidence in guidelines that used the GRADE framework are highlighted to provide a sense of the certainty of the evidence of the included primary studies.

Most guidelines were rated as moderate or high quality, using the AGREE-II tool (**Appendix 5**). Often, reasons for rating an item down were due to a lack of reporting.

LIMITATIONS OF THE RAPID SCOPING REVIEW

As the unit of inclusion for the rapid scoping review was guidelines, the recommendations were extracted as presented in the guidelines. We also extracted the level/ certainty of the evidence based on the criteria presented in the completed guidelines. There were several tools/methods used to assess the level/certainty of the evidence, for example GRADE [12], the Oxford Centre for Evidence-based Medicine [13], Level of Appropriateness (American College of Radiologists), the American Academy of Pediatrics Classifying Recommendations for Clinical Practice [14], consensus, or an adaptation/modification of one or more methods. For feasibility, primary studies were not reviewed, and the level/certainty of the evidence was taken at face value from the guideline.

IONIZING RADIATION EXPOSURE

We have elected to not include any effective dose values (mSv), related metrics, or qualitative descriptors of radiation risk (e.g., symbol, risk level, approximate equivalent background radiation, lifetime additional risk of cancer induction/exam) for several reasons:

- 1) The Expert Panel members have considered the risks of ionizing radiation (i.e., GRADE for Guidelines benefits and harms) when formulating the recommendations.
- 2) The levels of ionizing radiation in modern medical imaging equipment should not unduly influence patient decision-making. The anticipated benefits of imaging to the patient, if a test is clinically indicated are likely to outweigh any potential small risks [15].
- 3) Per the following points, effective dose values and related metrics such as equivalent background radiation have very

large uncertainties, and their utility is thus limited:

- There is uncertainty in the relative values of the effective dose for a reference patient with variation in the standard error [16];
- Effective doses are measured using reference phantoms with population, age and sex-averaged tissue weighting factors [16], therefore these should not be considered as the doses received by specific individuals;
- The publications providing data used to estimate the effective dose per scan (e.g., International Commission on Radiological Protection (ICRP) 1990 [17], 2007[18]) are occasionally updated and may impact the effective dose values;
- There is variation in the average dose from natural background radiation by geographic location. For example, in Canada, the average is 1.8 mSv/year, which ranges from 1.3 mSv/year in Vancouver to 4.1 mSv/year in Winnipeg [19]; and
- There are variables around the equipment (e.g., age) and facility (e.g., protocol) that may impact the actual amount of ionizing radiation exposure used for any particular exam.

EXTERNAL REVIEW

This guideline and its recommendations have been externally reviewed by the CAR Diagnostic Imaging Referral Guidelines Working Group (**Box 1**), Dr. Michael Woo (Department of Emergency Medicine, The Ottawa Hospital), Dr. Paul Hannam (deceased), and Dr. Blair McDonald (Emergency and Trauma Radiology, The Ottawa Hospital).

Dr. Hannam provided external peer-review for this guideline. He passed away before the work was completed.

FUTURE RESEARCH IN THIS AREA

This guideline will be updated upon the emergence of new evidence that may change the validity of the recommendations.

We plan on developing Patient Friendly Summaries for some of the clinical/diagnostic scenarios covered in this guideline. The selection of scenarios will be dependent on a prioritization exercise, as well as funding. These summaries will be made available on the CAR website (www.car.ca).

Box 1. CAR Diagnostic Imaging Referral Guideline Working Group Members

Ryan Margau (co-chair), North York General Hospital, ON
Paul Pageau (co-chair), The Ottawa Hospital, ON

Other members listed alphabetically:

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Noel Corser, Hinton Medical Clinic, AB

Nicolas Dea, Vancouver Spine Surgery Institute, BC

Naila Kassam, Western University, Department of Family Medicine, ON

Cathy MacLean, University of Saskatchewan, Department of Academic Family Medicine, SK

Nicolas Murray, Vancouver General Hospital, BC

Mary-Lynn Watson, Dalhousie University, Department of Emergency Medicine, Halifax Infirmity Site, NS

Charlotte Yong-Hing, BC Cancer, Vancouver, BC

Kaitlin Zaki-Metias, Trinity Health Oakland Hospital, USA

Italicized names are WG members who were also members of the Trauma Expert Panel.

TRAUMA CLINICAL/DIAGNOSTIC SCENARIOS

[T1. Acute head trauma in adults](#)

[T2. Acute head trauma in children](#)

[T3. Acute facial trauma](#)

[T4. Acute orbital trauma](#)

[T5. Suspected cervical spine trauma in adults](#)

[T6. Suspected cervical spine trauma in children](#)

[T7. Suspected head and neck vascular injury, including penetrating injury](#)

[T8. Suspected thoracolumbar fracture](#)

[T9. Acute hip and pelvic trauma](#)

[T10. Acute shoulder trauma](#)

[T11. Acute elbow trauma](#)

[T12. Acute hand and wrist trauma](#)

[T13. Acute knee trauma](#)

[T14. Acute ankle trauma](#)

[T15. Acute foot trauma](#)

[T16. Superficial soft tissue foreign body](#)

[T17. Acute chest trauma in adults](#)

[T18. Acute chest trauma in children](#)

[T19. Acute abdominal trauma in adults](#)

[T20. Acute abdominal trauma in children](#)

[T21. Non-accidental trauma](#)

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

RECOMMENDATIONS

T01. Acute head trauma in adults

Recommendations

1. In adults who have sustained an acute head injury who meet criteria for imaging according to a clinical decision rule (e.g., CCHR, NEXUS II, etc.), we recommend **CT head** as the initial imaging modality (↑↑).
2. In adults who have sustained an acute head injury, we recommend **against XR**, except as a problem-solving tool (e.g., gunshot wounds) (↓↓).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Head trauma guideline [21], the NICE Head injury guideline [22], the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T01**).

The NICE Head injury guideline [22] used GRADE to evaluate the certainty of the evidence. Depending on the decision tool evaluated (e.g., Canadian CT Head Rule [CCHR], New Orleans Criteria [NOC], National Emergency X-Ray Utilization Study [NEXUS II]) and the cohort of patients included in the evaluation (e.g., medium risk, high risk), the certainty of the evidence ranged from VERY LOW to HIGH (see Table 8 in the NICE Head Injury guideline [22]).

Examples of clinical decision rules/tools

CCHR [24]	NEXUS II [25]
<p>Head CT is required for patients with minor head injuries¹ if ANY of the following are present:</p> <p><i>High risk (for neurological intervention)</i></p> <ol style="list-style-type: none"> 1. GCS < 15 at 2 hours after injury 2. Suspected open or depressed skull fracture 3. Any sign of basal skull fracture² 4. Vomiting ≥ 2 episodes 5. Age ≥ 65 years <p><i>Medium risk (for brain injury on CT)</i></p> <ol style="list-style-type: none"> 6. Amnesia before impact > 30min 7. Dangerous mechanism: pedestrian struck by vehicle; occupant ejected from motor vehicle; fall from elevation > 3 feet or 5 stairs 	<p>Head CT is required if ANY of the following are present:</p> <ol style="list-style-type: none"> 1. Age ≥65 years 2. Evidence of significant skull fracture (basilar or depressed) 3. Scalp hematoma 4. Neurologic deficit (cranial nerve, cerebellar, gait or motor deficit) 5. Altered level of alertness (GCS ≤14, somnolent, disoriented) 6. Abnormal behavior (agitated, uncooperative, violent) 7. Coagulopathy (hemophilia, hepatic insufficiency, meds) 8. Recurrent or forceful vomiting

1 Minor head injury is defined as witnessed loss of consciousness, definite amnesia, or witnessed disorientation in a patient with a GCS score of 13-15.

2 Hemotympanum; ‘raccoon’ eyes; cerebrospinal fluid otorrhea/rhinorrhea; Battle’s sign

CCHR: Canadian CT Head Rule; **CT**: Computed Tomography; **GCS**: Glasgow Coma Scale; **NEXUS**: National Emergency X-Ray Utilization Study

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We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

T02. Acute head trauma in children

For recommendations around non-accidental trauma, see [T21. Non-accidental trauma](#).

Recommendations

1. In children who have sustained an acute head injury who meet criteria for imaging according to a clinical decision rule (e.g., PECARN, CATCH), we recommend **CT head** as the initial imaging modality (↑↑).
2. In children who have sustained an acute head injury, we recommend **against XR**, except as a problem-solving tool (e.g., gunshot wounds, non-accidental trauma) (↓↓).

Recommendations from five guidelines were used during the discussions and formulation of these recommendations: the ACR Appropriateness Criteria® Head trauma-child guideline [26], the Centers for Disease Control and Prevention Guideline on the diagnosis and management of mild traumatic brain injury among children [27], the NICE Head injury guideline [22], the Italian guideline on the assessment and management of pediatric head injury in the emergency department [28], and the Scandinavian guidelines for minor and moderate head trauma in children [29] (**Appendix 2: Table T02**).

The NICE Head injury guideline [22] used GRADE to evaluate the certainty of the evidence. Depending on the decision tool evaluated (e.g., NEXUS II, Pediatric Emergency Care Applied Research Network [PECARN], Canadian Assessment of Tomography for Childhood Head injury [CATCH]), the certainty of the evidence ranged from LOW to HIGH (see Tables 9-10 in the NICE Head Injury guideline [22]). The Scandinavian guidelines [29] evaluated the certainty of the evidence of predictive factors (e.g., seizures, amnesia, irritability), with a range of certainty from VERY LOW to LOW depending on the predictive factor (see Additional file 6, Table S6 in the Scandinavian guidelines [29]).

Examples of clinical decision rules

PECARN [30]	CATCH [31]
<p>CT head is recommended in children who meet the following criteria:</p> <p><2 years old:</p> <ol style="list-style-type: none"> 1. GCS=14 or other signs of altered mental status¹, or palpable skull fracture 2. Occipital or parietal or temporal scalp haematoma, or history of loss of consciousness ≥5 sec, or severe mechanism of injury², or not acting normally per parent <p>≥2 to 18 years old:</p> <ol style="list-style-type: none"> 1. GCS=14 or other signs of altered mental status¹, or signs of basilar skull fracture 2. History of loss of consciousness, or history of vomiting, or severe mechanism of injury², or severe headache 	<p>Head CT is required for children with minor head injury³ if ANY one of the following findings:</p> <p><i>High risk (need for neurologic intervention)</i></p> <ol style="list-style-type: none"> 1. GCS < 15 at two hours after injury 2. Suspected open or depressed skull fracture 3. History of worsening headache 4. Irritability on examination <p><i>Medium risk (brain injury on CT scan)</i></p> <ol style="list-style-type: none"> 5. Any sign of basal skull fracture⁴ 6. Large, boggy hematoma of the scalp 7. Dangerous mechanism of injury⁵

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We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

PECARN [30]	CATCH [31]
For #2 for both age groups, observation may be selected over CT on the basis of other clinical factors (see full publication for details [30]).	

1 Agitation, somnolence, repetitive questioning, or slow response to verbal communication

2 Motor vehicle crash with patient ejection, death of another passenger, or rollover; pedestrian or bicyclist without helmet struck by a motorised vehicle; falls of more than 0.9 m (3 feet) [for <2 years] or >1.5 m (5 feet) [for 2+ years]; or head struck by a high-impact object

3 Minor head injury is defined as injury within the past 24 hours associated with witnessed loss of consciousness, definite amnesia, witnessed disorientation, persistent vomiting (> 1 episode) or persistent irritability (in child < 2 years of age) in a patient with a GCS score of 13–15.

4 For example, hemotympanum, "raccoon" eyes, otorrhea or rhinorrhea of the cerebrospinal fluid, Battle's sign

5 For example, motor vehicle crash, fall from elevation ≥ 3 ft [≥ 91 cm] or 5 stairs, fall from bicycle with no helmet

CATCH: Canadian Assessment of Tomography for Childhood Head injury; **GCS:** Glasgow Coma Scale; **PECARN:** Pediatric Emergency Care Applied Research Network

T03. Acute facial trauma

Recommendations

1. In patients with facial trauma, we recommend **CT** as the initial imaging modality (↑↑).
2. In patients with isolated facial trauma*, we recommend **against XR** (↓↓).
 - ↳ *2.1 In patients with suspected mandibular fracture, we suggest **OPG** if CT is not available (↑).

OPG: orthopantomograph

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20] and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T03**).

T04. Acute orbital trauma

Recommendations

1. In patients with orbital trauma, we recommend **CT** as the initial imaging modality (↑↑).
2. In patients with orbital trauma, we recommend **against XR**, except when the clinical question is exclusion of retained metallic foreign body (↓↓).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Orbits and Vision and Visual Loss guideline [32], and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T04**).

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We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

T05. Suspected cervical spine trauma in adults

Recommendations

1. In adults who have suspected cervical spine injury who meet criteria for imaging according to a clinical decision rule (e.g., Canadian C-Spine), we recommend a **cervical spine CT** as the initial imaging modality (↑↑).
 - ↳ **1.1** In low-risk patients, in settings where CT is not readily available, we suggest **XR** as the initial imaging modality (↑).
2. In adults with normal CT of the cervical spine who have persistent suspicion of significant ligamentous or spinal cord injury, we recommend **MRI** (↑↑).

Recommendations from seven guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Suspected Spine Trauma guideline [33], the NICE Spinal injury guideline [34], the NICE Head injury guideline [22], the 2017 RCR iRefer recommendations [23], the Spinal Cord Society position statement [35], and the World Federation of Neurosurgical Societies Spine Committee Recommendations [36] (**Appendix 2: Table T05**).

The NICE Head Injury guideline [22] used GRADE to evaluate the certainty of the evidence. Depending on the decision tool evaluated (e.g., Canadian C-spine, NEXUS) and the age group evaluated (e.g., all ages, <65 years, ≥65 years), the certainty of the evidence ranged from LOW to HIGH (see Table 18 in the NICE Head Injury guideline [22]). The NICE Spinal Injury [34] used GRADE to evaluate the certainty of the evidence in studies that compared imaging modalities. Depending on the comparison (e.g., X-ray vs MRI, X-ray vs composite outcomes, CT vs discharge diagnosis), the certainty of the evidence ranged from VERY LOW to MODERATE (see Tables 28-35 in the NICE Spinal Injury guideline [34]).

Canadian C-Spine Rule [37]

XR is required in adults who meet the following criteria:

1. Any high-risk factor that mandates radiography:
 - Age ≥ 65 years; OR
 - Dangerous mechanism¹; OR
 - Paresthesias in extremities
2. If patient was in a simple rear-end motor vehicle collision² OR sitting position in the emergency department OR ambulatory at any time OR delayed onset of neck pain³ OR absences of midline C-Spine tenderness BUT unable to rotate neck (45 degrees left and right)

1 Fall from a height of greater than 1 metre/5 stairs; Axial load to the head (e.g., diving); High-speed motor vehicle collision (>100 km/h), rollover, ejection; Accident involving motorized recreational vehicles; Bicycle collision

2 Pushed into oncoming traffic; Hit by bus/large truck; Rollover; Hit by high-speed vehicle

3 Not immediate onset of neck pain

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

T06. Suspected cervical spine trauma in children

Recommendations

1. In children with cervical spine trauma where clinical exam and/or mechanism of injury suggest high likelihood of fracture, OR if child is difficult to assess clinically (e.g., young age, distracting injuries), OR child would undergo head or chest CT for other injuries, we recommend **CT** as the initial imaging modality (↑↑).
2. In children with cervical spine trauma who do not meet the patient population in recommendation 1, but may require imaging (e.g., with other risk factors for cervical spine injury), we recommend **XR** as the initial imaging modality (↑↑).
 - ↳ **2.1** In situations where XR is non-diagnostic and there is persistent clinical concern for cervical spine injury, OR if XR is abnormal, OR if there is clinical-radiologic discrepancy, we recommend **CT** as the next imaging modality (↑↑).
3. In children with normal CT of the cervical spine who have persistent suspicion of significant ligamentous or spinal cord injury, we recommend **MRI** (↑↑).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the ACR Appropriateness Criteria® Suspected Spine Trauma-Child guideline [38], the NICE Spinal injury guideline [34], the NICE Head injury guideline [22], and the Pediatric Cervical Spine Clearance Working Group guideline [39] (**Appendix 2: Table T06**).

The NICE Head Injury guideline [22] used GRADE to evaluate the certainty of the evidence. Depending on the decision tool evaluated (e.g., NEXUS, PEDSPINE), the certainty of the evidence ranged from LOW to MODERATE (see Table 19 in the NICE Head Injury guideline [22]). The NICE Spinal Injury [34] used GRADE to evaluate the certainty of the evidence in studies that compared imaging modalities. Depending on the comparison (e.g., X-ray vs CT, X-ray vs discharge diagnosis), the certainty of the evidence ranged from VERY LOW to MODERATE (see Tables 47-51 in the NICE Spinal Injury guideline [34]).

T07. Suspected head and neck vascular injury, including penetrating injury

Recommendations

1. In patients with suspected head and neck vascular injury, we recommend **CT angiogram*** as the initial imaging modality (↑↑).
 - ↳ ***1.1** In patients where there is suspicion of significant/management-altering venous injury, we recommend including **CT venogram** (↑↑).

Recommendations from five guidelines were used during the discussions and formulation of these recommendations: the ACR Appropriateness Criteria® Head trauma guideline [21], the ACR Appropriateness Criteria® Penetrating Neck Injury guideline [40], the Eastern Association for the Surgery of Trauma (EAST) guideline on Blunt Cerebrovascular Injury (BCVI) [41], the NICE Head

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

injury guideline [22], and the World Federation of Neurological Societies (WFNS) Spine Committee recommendations on Subaxial Cervical Spine Injuries [42] (**Appendix 2: Table T07**).

The EAST guideline [41] used GRADE to evaluate the certainty of the evidence. Studies comparing screening computed tomography angiograph (CTA) vs no screening CTA in patients with high risk and low risk cervical spine injuries to detect BCVI had VERY LOW certainty (see Figure 3B in the EAST guideline [41]).

T08. Suspected thoracolumbar fracture

Recommendations

1. In patients with suspected thoracolumbar spine fracture without neurological deficits, we recommend **XR*** as the initial imaging modality (↑↑).
 - ↳ *1.1 If CT of the chest, abdomen, and pelvis has been performed for other indications, given that the thoracic and lumbar spine have been included, **XR** are not recommended for initial spine assessment (EP consensus).
2. In patients with suspected thoracolumbar spine fracture with neurological deficits, we recommend **CT** as the initial imaging modality (↑↑).

Recommendations from nine guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Suspected Spine Trauma guideline [33], the ACR Appropriateness® Suspected Spine Trauma – Child [38], the Congress of Neurological Surgeons guideline [43,44], the Korean Society of Radiology and National Evidence-Based Healthcare Collaborating Agency guideline [45], the NICE Spinal injury guideline [34], the 2017 RCR iRefer recommendations [23], the Spinal Cord Society position statement [35], and the German Society for Orthopaedics and Trauma recommendations [46] (**Appendix 2: Table T08**).

The NICE Spinal Injury [34] used GRADE to evaluate the certainty of the evidence in studies that compared imaging modalities. Depending on the comparison and outcome (e.g., CT vs MRI for disc herniation, X-ray vs CT for thoracolumbar fractures), the certainty of the evidence ranged from VERY LOW to HIGH (see Tables 26, 37-45 in the NICE Spinal Injury guideline [34]).

T09. Acute hip and pelvic trauma

Recommendations

1. In patients with acute hip and/or pelvic trauma, we recommend **XR** as the initial imaging modality (↑↑).
 - ↳ 1.1 In situations where XR is negative and there is persistent clinical concern for hip and/or pelvic fracture, we recommend **CT** as the next imaging modality (↑↑).

Recommendations from six guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Acute hip pain suspected fracture guideline [47], the NICE Hip Fracture guideline [48], the NICE Fracture (complex) guideline [49], the 2017 RCR iRefer recommendations [23], and the World Society of Emergency Surgery (WSES) Pelvic trauma guideline [50] (**Appendix 2: Table T09**).

The guideline recommendations address choice of imaging modality, not the management of individual patients in contexts where modalities are not available. Imaging should not delay definitive management.

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

The NICE Hip Fracture [48] guideline used GRADE to evaluate the certainty of the evidence around hip fracture. Depending on the comparison evaluated (e.g., US vs MRI for occult hip fracture), the certainty of the evidence ranged from VERY LOW to LOW/MODERATE (discordant certainty of evidence in table and text) (see Tables 5-6 to 5-9 in the NICE Hip Fracture guideline [48]). The NICE Fracture (complex) guideline [49] used GRADE to evaluate the certainty of the evidence around pelvic fracture. Comparing XR vs expert review of imaging and clinical findings, the certainty of the evidence was VERY LOW in adults (see Tables 84-85 NICE Fracture (complex) guideline [49]) and LOW in children (Table 86 NICE Fracture (complex) guideline [49]).

T10. Acute shoulder trauma

Recommendations

1. In patients with acute shoulder trauma, we recommend **XR*** as the initial imaging modality. If a dislocation is identified, **post-reduction XR** should also be performed (↑↑).

**We suggest a 4-view series that includes a frontal, glenoid, trans-scapular-Y, and axillary (modified if necessary) (↑).*

- ↳ **1.1** In situations where XR is negative or non-diagnostic and there is persistent clinical concern for bony injury, we suggest **CT** as the next imaging modality (↑).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Shoulder pain - traumatic [51], and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T10**).

T11. Acute elbow trauma

Recommendations

1. In patients with acute elbow trauma, we recommend **XR** as the initial imaging modality. If a dislocation is identified, **post-reduction XR** should also be performed (↑↑).

- ↳ **1.1** In skeletally mature patients, in situations where XR is negative or non-diagnostic and there is persistent clinical concern for bony injury, we suggest **CT** as the next imaging modality (↑).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the European Society of Musculoskeletal Radiology guidelines [52], and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T11**).

The guideline recommendations address choice of imaging modality, not the management of individual patients in contexts where modalities are not available. Imaging should not delay definitive management.

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

T12. Acute hand and wrist trauma

Recommendations

1. In patients with acute hand and/or wrist trauma, we recommend **XR*** as the initial imaging modality. If a dislocation is identified, **post-reduction XR** should also be performed (↑↑).

**If a scaphoid injury is suspected, we recommend a dedicated scaphoid view (↑↑).
If fractures of other carpal bones are suspected, we recommend the appropriate dedicated radiographic views (EP consensus).*

- ↳ **1.1** In skeletally mature patients, in situations where XR is negative or non-diagnostic and there is persistent clinical concern for bony injury, we suggest **CT** or **MRI** as the next imaging modality (↑).
- ↳ **1.2** If scaphoid fracture is suspected and CT or MR is not available, we recommend immobilization and **repeat XR** in 10-14 days (↑↑).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Acute hand and wrist trauma guideline [53], the NICE Fractures (non-complex) guideline (Suspected Scaphoid Fracture) [54], and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T12**).

The NICE Fractures (non-complex) guideline [54] used GRADE to evaluate the certainty of the evidence. Depending on the comparison (e.g., early MRI vs delayed X-ray among those with indeterminate X-ray findings, X-ray vs MRI, CT vs MRI), the certainty of the evidence ranged from VERY LOW to MODERATE (see Tables 48, 50, and 51 in the NICE Fractures (non-complex) guideline [54]).

T13. Acute knee trauma

Recommendations

1. In patients with acute knee trauma who meet the criteria in the *Ottawa Knee Rule*, we recommend **XR*** as the initial imaging modality (↑↑).

**Lateral view cross-table positioning is preferred to the upright weight-bearing lateral view (EP consensus). The sunrise view of the patella is recommended if there is clinical suspicion of patellar dislocation (↑↑).*

- ↳ **1.1** In situations where XR is negative or non-diagnostic and there is persistent clinical concern for bony injury, we suggest **CT** as the next imaging modality (↑).

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

Recommendations from six guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Acute trauma to the knee [55], American Association for the Surgery of Trauma–World Society of Emergency Surgery guidelines on diagnosis and management of peripheral vascular injuries [56], the European Society for Sports Traumatology, Knee Surgery and Arthroscopy [57], the NICE Fracture (non-complex) guideline (Suspected Knee Fractures) [54], and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T13**).

The NICE Fracture (non-complex) guideline (Suspected Knee Fractures) [54] used GRADE to evaluate the certainty of the evidence. Depending on the decision tool evaluated (e.g., Ottawa Knee rule, Pittsburgh, Bauer), the certainty of the evidence was VERY LOW for adults (see Tables 36, 38, and 39 in the NICE Fracture (non-complex) guideline [54]). Only the Ottawa Knee rule was evaluated in children, and the certainty of the evidence was LOW (see Table 37 in the NICE Fracture (non-complex) guideline [54]).

Ottawa Knee Rule [58]

Patients ≥ 18 years of age with acute knee pain should have knee radiographs if they meet any of the following criteria:

- Are 55 years of age or older,
- Have palpable tenderness over the head of the fibula,
- Have isolated patellar tenderness,
- Cannot flex the knee to 90°,
- Inability to bear weight both immediately after the injury and in emergency department (4 steps).

T14. Acute ankle trauma

Recommendations

1. In patients with acute ankle trauma who meet the *Ottawa Ankle Rule*, we recommend **ankle XR** as the initial imaging modality (↑↑).

↳ **1.1** In situations where XR is negative or non-diagnostic and there is persistent clinical concern for bony injury, we suggest **CT** as the next imaging modality (↑).

Recommendations from five guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Acute Trauma to the Ankle [59], the European Society for Sports Traumatology, Knee Surgery and Arthroscopy–Ankle and Foot Associates [60], the NICE Fracture (non-complex) guideline (Ankle fracture) [54], and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T14**).

The NICE Fracture (non-complex) (Ankle fracture) [54] used GRADE to evaluate the certainty of the evidence. Depending on the outcome being evaluated (i.e., number with X-rays, length of stay, patient satisfaction), the certainty of the evidence was VERY LOW to MODERATE (see Table 44 in the NICE Fracture (non-complex) guideline [54]).

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

Ottawa Ankle Rule [61,62]

An ankle X-ray series is only necessary if there is pain near the malleoli and any of these findings:

- Inability to bear weight both immediately after the injury and in emergency department (4 steps) OR
- Bone tenderness over the distal 6 cm of the posterior edge or tip of either malleolus

T15. Acute foot trauma

Recommendations

1. In patients with acute foot trauma in whom fracture is suspected, we recommend **foot XR** as the initial imaging modality (↑↑).

- ↳ **1.1** In situations where XR is negative or non-diagnostic and there is persistent clinical concern for bony injury, we suggest **CT** as the next imaging modality (↑).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Acute Foot Trauma [63], and the 2017 RCR iRefer recommendations [23], (**Appendix 2: Table T15**).

T16. Superficial soft tissue foreign body

Recommendations

1. In patients with suspected superficial soft tissue foreign body, we recommend **XR** as the initial imaging modality (↑↑).

- ↳ **1.1** In situations where no foreign body is detected on XR and there is persistent clinical concern for foreign body, we recommend **US** as the next imaging modality (↑↑).

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20] and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T16**).

T17. Acute chest trauma in adults

Recommendations

1. In adults with minor chest trauma with a low suspicion of clinically significant injury, we suggest **no imaging** (↓).

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

2. In adults with moderate to severe chest trauma, we recommend **XR** as the initial imaging modality, proceeding to **CT** if there is any clinical or radiological concern (↑↑).

Recommendations from six guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriate Criteria® Rib fractures [64], the ACR Appropriateness Criteria® Blunt Chest Trauma – Suspected Cardiac Injury guidelines [65], the NICE Major Trauma guideline [66], the 2017 RCR iRefer recommendations [23], and the WSES Esophageal Emergencies guideline [67] (**Appendix 2: Table T17**).

The NICE Major Trauma guidelines [66] used GRADE to evaluate the certainty of the evidence. Depending on the comparison and outcome being evaluated (e.g., US vs CT for detecting pneumothorax, X-ray vs CT/surgery for detecting haemothorax), the certainty of the evidence was VERY LOW to MODERATE (see Tables 25, 27-29, 31, 32, 34, 35, 37-38 in the NICE Major Trauma guideline [66]).

T18. Acute chest trauma in children

Recommendations

1. In children with minor chest trauma and/or where there is low suspicion of clinically significant injury, we suggest **no imaging** (↓).
2. In children with moderate to severe chest trauma, we recommend **XR** as the initial imaging modality, proceeding to **CT** if there is any clinical or radiological concern (↑↑).

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the NICE Major Trauma guideline [66] and the 2017 RCR iRefer recommendations [23] (**Appendix 2: Table T18**).

The NICE Major Trauma guideline [66] used GRADE to evaluate the certainty of the evidence. One study compared X-ray vs CT for detecting pneumothorax and had LOW certainty (see Tables 29 in the NICE Major Trauma guideline [66]).

T19. Acute abdominal trauma in adults

Recommendations

1. In adults who have sustained abdominal trauma, in whom internal injury is suspected, we recommend **CT** as the initial imaging modality (↑↑).
 - ↳ **1.1** In the specific clinical context where CT is not available, we suggest that **US** be used, while considering its significant limitations (↑).
2. In adults with suspected bladder injury, following clinical examination and initial abdominal and pelvic CT, we suggest **CT cystography** (↑).

Recommendations from nine guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Penetrating Trauma – Lower Abdomen and Pelvis guideline [68], the EAST traumatic diaphragmatic injuries recommendations [69], the EAST blunt force bladder injuries guideline [70], the French

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We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

We did not include point of care ultrasound (POCUS) in these recommendations, as it forms part of the initial clinical assessment in some contexts.

severe abdominal trauma guidelines [71], the 2017 RCR iRefer recommendations [23], the WSES-ASST duodeno-pancreatic and extrahepatic biliary tree trauma recommendations [72], the WSES splenic trauma guidelines [73], and the WSES liver trauma guidelines [74] (**Appendix 2: Table T19**).

Two guidelines used GRADE to evaluate the certainty of the evidence. The EAST traumatic diaphragmatic injuries guideline [69] compared laparoscopy to CT to diagnose diaphragm injury in left sided thoracoabdominal stab wounds, which resulted in VERY LOW certainty (see Figure 2 in the guideline [69]). The EAST blunt force bladder injuries guideline [70] compared CT cystography vs no radiography, which resulted in VERY LOW certainty (see Figure 3 in the guideline [70]).

T20. Acute abdominal trauma in children

Recommendations

1. In children who have sustained abdominal trauma, in whom internal injury is suspected, we recommend **CT** as the initial imaging modality (↑↑).
 - ↳ **1.1** In the specific clinical context where CT is not available, we suggest that **US** be used, while considering its significant limitations (↑).
2. In children with suspected bladder injury, following clinical examination and initial abdominal and pelvic CT, we suggest **CT cystography** (↑).

Recommendations from five guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the 2017 RCR iRefer recommendations [23], the WSES-ASST duodeno-pancreatic and extrahepatic biliary tree trauma recommendations [72], the WSES splenic trauma guidelines [73], and the WSES liver trauma guidelines [74] (**Appendix 2: Table T20**).

T21. Non-accidental trauma

Recommendations

1. In children with suspected non-accidental trauma, we recommend **skeletal survey XR** as the initial imaging modality (↑↑).
2. If there is suspicion of non-accidental head trauma, especially in very young children, we suggest **CT head** (↑). For older children, please refer to [T02. Acute head trauma in children](#).

Recommendations from five guidelines were used during the discussions and formulation of these recommendations: the 2012 CAR recommendations [20], the ACR Appropriateness Criteria® Suspected Physical Abuse – Child [75], the German Child Protection guidelines [76], the Pediatric Cervical Spine Clearance Working Group guideline [39], and the 2017 RCR iRefer recommendations [23,77] (**Appendix 2: Table T21**).

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APPENDIX 1. SEARCH STRATEGIES

2021 May 1. Ovid Multifile

Database: Embase Classic+Embase <1947 to 2021 April 30> , Ovid MEDLINE(R) ALL <1946 to April 30, 2021>

Search Strategy:

1 "Wounds and Injuries"/ (242670)
2 Multiple Trauma/ (28792)
3 (multiple adj3 (trauma* or injur* or wound?)).tw,kf. (31700)
4 (polytrauma* or poly-trauma*).tw,kf. (11455)
5 exp Wounds, Nonpenetrating/ (67709)
6 ((injur* or trauma* or wound?) adj3 (blunt or nonpenetrat* or non-penetrat*)).tw,kf. (53778)
7 "Bone and Bones"/in [injuries] (1619)
8 exp Fractures, Bone/ (538671)
9 ((break* or damag* or diastas* or fractur* or injur* or trauma* or wound?) adj3 (bone? or bony or skeleton* or skeletal*)).tw,kf. (100083)
10 (fracture? adj3 (avulsion or dislocat* or closed or comminute* or compound or compression* or crush* or fatigue or insufficiency or march or micro or multiple or open or spontaneous* or sprain* or stress*)).tw,kf. (105434)
11 (microfracture* or micro-fracture*).tw,kf. (4644)
12 Accidental Falls/ (63888)
13 ((fall* or slip*) adj3 accident*).tw,kf. (7393)
14 exp Head/in [injuries] (5856)
15 exp Skull/in [injuries] (12522)
16 Facial Injuries/ (12036)
17 exp Maxillofacial Injuries/ (93211)
18 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (head or heads or face or faces or facial* or maxillofacial* or maxillo-facial* or globe? or globe* or skull? or orbital* or blow out? or blowout? or frontal* or ethmoidal* or lacrimal* or sphenoid*)).tw,kf. (151196)
19 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (jaw or jaws or jawbone* or mandib* or mylohyoid groove* or mylohyoid ridge* or maxilla* or chin or chins or mentum or hard palate* or nasal* or nose or noses or orbit or eye socket? or turbinate* or vomer? or zygoma* or cheek or cheeks or jugal bone? or malar bone?)).tw,kf. (29393)
20 exp Neck Injuries/ (23969)
21 exp Cervical Vertebrae/in [injuries] (8043)
22 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (neck or necks or cervical vertebra* or cervical spin* or cervical atlas* or arcuate foramen* or C1 vertebra* or C2 vertebra* or C3 vertebra* or C4 vertebra*

or C5 vertebra* or C6 vertebra* or C7 vertebra*)).tw,kf. (49123)
23 exp Torso/in [injuries] (3458)
24 exp Spine/in [injuries] (14947)
25 exp Back Injuries/ (2612023)
26 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (back or backs or lumbar or lumbosacral or lumbo-sacral spine or coccygeal or sacrococcygeal or sacro-coccygeal or spine? or spinal* or vertebra*)).tw,kf. (187691)
27 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (rib or ribs or coccyx or tailbone* or tail bone* or intervertebra* or inter-vertebra* or sacra or sacral or sacrum or pelvis* or pelvic)).tw,kf. (34193)
28 exp Upper Extremity/in [injuries] (5642)
29 exp "Bones of Upper Extremity"/in [Injuries] (10033)
30 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (upper limb? or upper extremit* or shoulder? or clavicle? or collar bone? or scapula* or arm or arms or forearm? or humeral* or humerus or radius or ulna? or elbow? or wrist* or scaphoid* or navicular* or hand? or carpal* or metacarpal* or finger? or thumb? or phalange*)).tw,kf. (104101)
31 exp Lower Extremity/in [injuries] (3443)
32 exp "Bones of Lower Extremity"/in [Injuries] (19234)
33 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (lower limb? or lower extremit* or leg or legs or tibia* or fibula* or thigh? or thighbone* or hip or hips or coxa or intertrochanteric* or inter-trochanter* or subtrochanter* or sub-trochanter* or trochanter* or femur? or femoral* or knee? or kneecap* or patella* or foot or feet or ankle or ankles or malleolus or tarsal or metatarsal* or meta-tarsal* or toe or toes)).tw,kf. (209074)
34 exp Thoracic Injuries/ (122419)
35 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (chest or chests or thorax* or thoracic* or pneumothora* or pneumo-thora*)).tw,kf. (38949)
36 exp Esophagus/in [injuries] (2484)
37 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (esophag* or airway* or air way*)).tw,kf. (14957)
38 exp Abdominal Injuries/ (207498)
39 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 abdom#n*).tw,kf. (33178)
40 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (bladder* or urethra* or kidney* or renal*)).tw,kf. (187529)
41 exp Abdomen/ and Wounds, Penetrating/ (625)

Appendix 1. Search Strategies

- 42 exp Musculoskeletal System/in [Injuries] (95576)
43 ((musculoskeletal* or musculo-skeletal* or muscle?)
adj3 (damag* or disorder? or fractur* or inflam* or injur*
or ruptur* or tear* or torn or trauma*)).tw,kf. (94084)
44 exp Joint Dislocations/ (44065)
45 ((joint? or shoulder?) adj3 (damag* or dislocat* or
displac* or inflam* or injur* or subluxation?)).tw,kf.
(70349)
46 exp "Sprains and Strains"/ (2605972)
47 sprain*.tw,kf. (13699)
48 strain*.tw,kf. (1663362)
49 exp Tendon Injuries/ (51078)
50 (tendon* adj3 (damag* or disorder? or inflam* or
injur* or ruptur* or tear* or torn)).tw,kf. (28538)
51 (tendinitis or tendinos#s or tendonitis or tendonos#s
or tendonopath* or tenosynovit#s).tw,kf. (18263)
52 (ligament* adj3 (damag* or disorder? or inflam* or
injur* or ruptur* or tear* or torn)).tw,kf. (32935)
53 ((achilles* or lumbar or fascia? or hamstring? or
rotator cuff? or rotatorcuff?) adj3 (damag* or disorder? or
inflam* or injur* or ruptur* or tear* or torn)).tw,kf.
(30019)
54 ((bicep? or quadricep? or tricep?) adj3 (damag* or
disorder? or inflam* or injur* or ruptur* or tear* or
torn)).tw,kf. (4175)
55 exp Soft Tissue Injuries/ (15547)
56 (soft tissue? adj3 (damag* or disorder? or inflam* or
injur* or ruptur* or tear* or torn)).tw,kf. (20117)
57 Foreign Bodies/ (56221)
58 (foreign adj (body or bodies or object?)).tw,kf.
(83271)
59 or/1-58 [TRAUMA] (5298308)
60 Diagnostic Imaging/ (245004)
61 dg.fs. [diagnostic imaging] (1244346)
62 (diagnos* adj3 (image? or imaging)).tw,kf. (112124)
63 (x-ray* or xray*).tw,kf. (856334)
64 Image Interpretation, Computer-Assisted/ (88407)
65 exp Imaging, Three-Dimensional/ (192303)
66 ((3D or 3-D or 3-dimension* or three dimension*) adj
(image? or imaging)).tw,kf. (40498)
67 exp Ultrasonography/ (1301122)
68 (ultrasound* or ultrasonograph* or ultra-sonograph*
or ultrasonic* or ultra-sonic*).tw,kf. (981945)
69 (echograph* or echo-graph* or echotomograph* or
echo-tomograph* or echosonograph* or echo
sonograph*).tw,kf. (25026)
70 exp Radiography/ (2470127)
71 (radiograph* or radiographic imag* or
roentgenograph* or roentgeno-graph*).tw,kf. (575034)
72 (fluoroscop* or fluoro-scop*).tw,kf. (80291)
73 exp Radionuclide Imaging/ (422214)
74 ((radionuclide* adj2 imag*) or (radio-nuclide* adj2
imag*) or (radionuclide* adj2 scan*) or (radio-nuclide*
adj2 scan*) or (radioisotope* adj2 imag*) or (radio-
isotope* adj2 imag*) or (radioisotope* adj2 scan*) or
(radio-isotope* adj2 scan*) or scintigraph* or scinti-graph*
or scintiphotograph* or scinti-photograph*).tw,kf.
(132279)
75 exp Tomography/ (2956614)
76 (tomograph* or tomo-graph*).tw,kf. (1007570)
77 (CAT scan* or CT scan* or PET scan* or PET imag* or
PT scan* or PT imag*).tw,kf. (352824)
78 (SPECTCT or SPECT CT or "SPECT/CT").tw,kf. (14824)
79 (magnetic resonance imag* or MRI or MRIs or fMRI
or fMRIs or NMR imag* or chemical shift imag* or
magnet#ation transfer contrast imag* or spin echo imag*
or zeugmatograph* or zeugmato-graph*).tw,kf. (1081732)
80 (cineradiograph* or cine-radiograph* or
cinefluorograph* or cine-fluorograph* or
radiocinematograph* or radio-cinematograph*).tw,kf.
(4215)
81 Nuclear Medicine/ (42481)
82 nuclear medicine*.tw,kf. (42390)
83 or/60-82 [IMAGING] (7414440)
84 59 and 83 [TRAUMA - IMAGING] (907290)
85 (exp Child/ or exp Infant/ or Adolescent/) not exp
Adult/ (4515814)
86 84 not 85 [18 & UNDER POPULATIONS REMOVED]
(809747)
87 exp Animals/ not Humans/ (16983779)
88 86 not 87 [ANIMAL-ONLY REMOVED] (583284)
89 (case reports or case series or address or
autobiography or bibliography or biography or comment
or dictionary or directory or editorial or "expression of
concern" or festschrift or historical article or interactive
tutorial or lecture or legal case or legislation or news or
newspaper article or patient education handout or
personal narrative or portrait or video-audio media or
webcast or (letter not (letter and randomized controlled
trial))).pt. (6428964)
90 88 not 89 [OPINION PIECES REMOVED] (514869)
91 exp Guidelines as Topic/ (769037)
92 exp Clinical Protocols/ (281091)
93 Guideline.pt. (16385)
94 Practice Guideline.pt. (28577)
95 standards.fs. (745532)
96 Consensus Development Conference.pt. (11994)
97 Consensus Development Conference, NIH.pt. (793)
98 (consensus or guideline* or guidance? or standards
or recommendation*).ti,kf. (441747)
99 (expert consensus or consensus statement* or
consensus conference* or clinical guideline? or practice

Appendix 1. Search Strategies

- guideline? or treatment guideline? or practice parameter* or position statement* or policy statement* or CPG or CPGs).tw,kf. (261810)
- 100 or/91-99 [CPG FILTER - BALANCED] (2024937)
- 101 90 and 100 [TRAUMA - IMAGING - CPGS - BALANCED] (14135)
- 102 limit 101 to yr="2016-current" (6628)
- 103 102 use medall [MEDLINE RECORDS] (1491)
- 104 injury/ (477100)
- 105 multiple trauma/ (28792)
- 106 (multiple adj3 (trauma* or injur* or wound?)).tw,kw. (32055)
- 107 (polytrauma* or poly-trauma*).tw,kw. (11807)
- 108 exp blunt trauma/ (29099)
- 109 ((injur* or trauma* or wound?) adj3 (blunt or nonpenetrat* or non-penetrat*)).tw,kw. (54222)
- 110 exp bone injury/ (354509)
- 111 exp fracture/ (349275)
- 112 ((break* or damag* or diastas* or fractur* or injur* or trauma* or wound?) adj3 (bone? or bony or skeleton* or skeletal*)).tw,kw. (100920)
- 113 (fracture? adj3 (avulsion or dislocat* or closed or comminute* or compound or compression* or crush* or fatigue or insufficiency or march or micro or multiple or open or spontaneous* or sprain* or stress*)).tw,kw. (106062)
- 114 (microfracture* or micro-fracture*).tw,kw. (4743)
- 115 falling/ (68884)
- 116 ((fall* or slip*) adj3 accident*).tw,kw. (8212)
- 117 head injury/ (78233)
- 118 exp skull injury/ (195089)
- 119 face injury/ (9246)
- 120 maxillofacial injury/ (8853)
- 121 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (head or heads or face or faces or facial* or maxillofacial* or maxillo-facial* or globe? or global* or skull? or orbital* or blow out? or blowout? or frontal* or ethmoidal* or lacrimal* or sphenoid*)).tw,kw. (152205)
- 122 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (jaw or jaws or jawbone* or mandib* or mylohyoid groove* or mylohyoid ridge* or maxilla* or chin or chins or mentum or hard palate* or nasal* or nose or noses or orbit or eye socket? or turbinate* or vomer? or zygoma* or cheek or cheeks or jugal bone? or malar bone?)).tw,kw. (29539)
- 123 "head and neck injury"/ (1411)
- 124 exp neck injury/ (23969)
- 125 exp cervical vertebra/ and injury/ (101)
- 126 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (neck or necks or cervical vertebra* or cervical spin* or cervical atlas* or arcuate foramen* or C1 vertebra* or C2 vertebra* or C3 vertebra* or C4 vertebra* or C5 vertebra* or C6 vertebra* or C7 vertebra*)).tw,kw. (49206)
- 127 abdominal injury/ (31073)
- 128 exp spine injury/ (53307)
- 129 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (back or backs or lumbar or lumbosacral or lumbo-sacral spine or coccygeal or sacrococcygeal or sacro-coccygeal or spine? or spinal* or vertebra*)).tw,kw. (189652)
- 130 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (rib or ribs or coccyx or tailbone* or tail bone* or intervertebra* or inter-vertebra* or sacra or sacral or sacrum or pelvis* or pelvic)).tw,kw. (34295)
- 131 arm injury/ (12969)
- 132 elbow injury/ (2269)
- 133 forearm injury/ (2787)
- 134 hand injury/ (20773)
- 135 shoulder injury/ (6823)
- 136 wrist injury/ (11171)
- 137 finger injury/ (15400)
- 138 thumb injury/ (919)
- 139 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (upper limb? or upper extremity* or shoulder? or clavicle? or collar bone? or scapula* or arm or arms or forearm? or humeral* or humerus or radius or ulna? or elbow? or wrist* or scaphoid* or navicular* or hand? or carpal* or metacarpal* or finger? or thumb? or phalange*)).tw,kw. (103866)
- 140 exp leg injury/ (258156)
- 141 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (lower limb? or lower extremity* or leg or legs or tibia* or fibula* or thigh? or thighbone* or hip or hips or coxa or intertrochanteric* or inter-trochanter* or subtrochanter* or sub-trochanter* or trochanter* or femur? or femoral* or knee? or kneecap* or patella* or foot or feet or ankle or ankles or malleolus or tarsal or metatarsal* or meta-tarsal* or toe or toes)).tw,kw. (209640)
- 142 thorax injury/ (15289)
- 143 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (chest or chests or thorax* or thoracic* or pneumothora* or pneumo-thora*)).tw,kw. (38833)
- 144 exp esophagus injury/ (13104)
- 145 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (esophag* or airway* or air way*)).tw,kw. (15035)
- 146 abdominal injury/ (31073)
- 147 abdominal contusion/ (14)
- 148 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 abdom#n*).tw,kw. (32949)

Appendix 1. Search Strategies

- 149 ((break* or damag* or diastas* or fractur* or injur* or trauma*) adj3 (bladder* or urethra* or kidney* or renal*)).tw,kw. (188424)
- 150 ((musculoskeletal* or musculo-skeletal* or muscle?) adj3 (damag* or disorder? or fractur* or inflam* or injur* or ruptur* or tear* or torn or trauma*)).tw,kw. (95242)
- 151 exp dislocations/ (66610)
- 152 ((joint? or shoulder?) adj3 (damag* or dislocat* or displac* or inflam* or injur* or subluxation?)).tw,kw. (70447)
- 153 sprain*.tw,kw. (14030)
- 154 strain*.tw,kw. (1665693)
- 155 exp tendon injury/ (51078)
- 156 (tendon* adj3 (damag* or disorder? or inflam* or injur* or ruptur* or tear* or torn)).tw,kw. (28674)
- 157 (tendinitis or tendinos#s or tendonitis or tendonos#s or tendonopath* or tenosynovit#s).tw,kw. (18834)
- 158 (ligament* adj3 (damag* or disorder? or inflam* or injur* or ruptur* or tear* or torn)).tw,kw. (33162)
- 159 ((achilles* or lumbar or fascia? or hamstring? or rotator cuff? or rotatorcuff?) adj3 (damag* or disorder? or inflam* or injur* or ruptur* or tear* or torn)).tw,kw. (30254)
- 160 ((bicep? or quadricep? or tricep?) adj3 (damag* or disorder? or inflam* or injur* or ruptur* or tear* or torn)).tw,kw. (4208)
- 161 exp soft tissue injury/ (15547)
- 162 (soft tissue? adj3 (damag* or disorder? or inflam* or injur* or ruptur* or tear* or torn)).tw,kw. (20272)
- 163 exp foreign body/ (105848)
- 164 (foreign adj (body or bodies or object?)).tw,kw. (83408)
- 165 or/104-164 [TRAUMA] (3884731)
- 166 diagnostic imaging/ (245004)
- 167 (diagnos* adj3 (image? or imaging)).tw,kw. (114774)
- 168 (x-ray* or xray*).tw,kw. (872219)
- 169 computer assisted tomography/ (777463)
- 170 computer assisted diagnosis/ (65112)
- 171 exp three-dimensional imaging/ (192303)
- 172 ((3D or 3-D or 3-dimension* or three dimension*) adj (image? or imaging)).tw,kw. (41493)
- 173 exp echography/ (1301122)
- 174 (ultrasound* or ultrasonograph* or ultrasonograph* or ultrasonic* or ultra-sonic*).tw,kw. (998275)
- 175 (echograph* or echo-graph* or echotomograph* or echo-tomograph* or echosonograph* or echo sonograph*).tw,kw. (25373)
- 176 exp radiography/ (2470127)
- 177 (radiograph* or radiographic imag* or roentgenograph* or roentgeno-graph*).tw,kw. (567207)
- 178 (fluoroscop* or fluoro-scop*).tw,kw. (80954)
- 179 exp scintiscanning/ (203575)
- 180 ((radionuclide* adj2 imag*) or (radio-nuclide* adj2 imag*) or (radionuclide* adj2 scan*) or (radio-nuclide* adj2 scan*) or (radioisotope* adj2 imag*) or (radio-isotope* adj2 imag*) or (radioisotope* adj2 scan*) or (radio-isotope* adj2 scan*) or scintigraph* or scinti-graph* or scintiphotograph* or scinti-photograph*).tw,kw. (133732)
- 181 exp tomography/ (2956614)
- 182 (tomograph* or tomo-graph*).tw,kw. (1027138)
- 183 (CAT scan* or CT scan* or PET scan* or PET imag* or PT scan* or PT imag*).tw,kw. (355359)
- 184 (SPECTCT or SPECT CT or "SPECT/CT").tw,kw. (15049)
- 185 (magnetic resonance imag* or MRI or MRIs or fMRI or fMRIs or NMR imag* or chemical shift imag* or magneti#ation transfer contrast imag* or spin echo imag* or zeugmatograph* or zeugmato-graph*).tw,kw. (1113887)
- 186 (cineradiograph* or cine-radiograph* or cinefluorograph* or cine-fluorograph* or radiocinematograph* or radio-cinematograph*).tw,kw. (4265)
- 187 nuclear medicine/ (42481)
- 188 nuclear medicine*.tw,kw. (43194)
- 189 or/166-188 [IMAGING] (7344840)
- 190 165 and 189 [TRAUMA - IMAGING] (629659)
- 191 exp juvenile/ not exp Adult/ (2662018)
- 192 190 not 191 [18 & UNDER POPULATIONS REMOVED] (584799)
- 193 exp animal/ or exp animal experimentation/ or exp animal model/ or exp animal experiment/ or nonhuman/ or exp vertebrate/ (55437768)
- 194 exp human/ or exp human experimentation/ or exp human experiment/ (43060103)
- 195 193 not 194 (12379533)
- 196 192 not 195 [ANIMAL-ONLY REMOVED] (540436)
- 197 (conference abstract or editorial or letter).pt. (7682765)
- 198 case report/ or exp case study/ or directory/ (5000127)
- 199 196 not (197 or 198) [CONFERENCE ABSTRACTS AND OPINION PIECES REMOVED] (332139)
- 200 exp practice guideline/ (630152)
- 201 (consensus or guideline* or guidance? or standards or recommendation*).ti,kw. (467888)
- 202 (expert consensus or consensus statement* or consensus conference* or clinical guideline? or practice

Appendix 1. Search Strategies

guideline? or treatment guideline? or practice parameter* or position statement* or policy statement* or CPG or CPGs).tw,kw. (265615)

203 or/200-202 [CPG FILTER - BALANCED] (1121003)

204 199 and 203 [TRAUMA - IMAGING - CPGS - BALANCED] (7515)

205 limit 204 to yr="2016-current" (2712)

206 205 use emczd [EMBASE RECORDS] (2096)

207 103 or 206 [BOTH DATABASES] (3587)

208 remove duplicates from 207 (2977) [TOTAL UNIQUE RECORDS]

209 208 use medall [MEDLINE UNIQUE RECORDS] (1482)

210 208 use emczd [EMBASE UNIQUE RECORDS] (1495)

Non-Accidental Trauma – Guidelines

2021 Jun 21. Ovid Multifile

Database: Embase Classic+Embase <1947 to 2021 June 18> , Ovid MEDLINE(R) ALL <1946 to June 18, 2021>

Search Strategy:

1 ((abusive* or abuse-related or non-accidental* or nonaccidental* or conscious* or deliberate* or intend* or intentional* or inflict* or knowing* or purposeful* or "on purpose" or willful*) adj3 (harm* or hurt* or injur* or trauma* or maltreat* or mistreat* or neglect* or violent* or wound*)).tw,kf. (25363)

2 (NAT and trauma*).tw,kf. (346)

3 Domestic Violence/ (16379)

4 (domestic* adj3 (harm* or hurt* or injur* or trauma* or maltreat* or mistreat* or neglect* or violent* or wound*)).tw,kf. (17023)

5 Child Abuse/ (54948)

6 ((baby or babies or infant? or newborn? or neonat* or p?ediatric? or toddler? or child* or teen? or teenage* or teen-age* or youth? or son or sons or daughter?) adj3 (abus* or violent*)).tw,kf. (58933)

7 Elder Abuse/ (4224)

8 ((aged or elder* or geriatric* or gerontolog* or senior*) adj3 (abus* or violent*)).tw,kf. (5129)

9 (older adj2 (adult* or female? or male? or man or men or patient? or person? or people? or population? or resident? or wom#n) adj3 (abus* or violent*)).tw,kf. (1094)

10 ((aged or elder* or geriatric* or gerontolog* or senior*) adj3 batter*).tw,kf. (358)

11 (older adj2 (adult* or female? or male? or man or men or patient? or person? or people? or population? or resident? or wom#n) adj3 batter*).tw,kf. (157)

12 Spouse Abuse/ (19862)

13 ((husband* or mate or mates or partner* or spous* or wife or wives or wom#n) adj3 (abus* or violent*)).tw,kf. (35706)

14 ((husband* or mate or mates or partner* or spous* or wife or wives or wom#n) adj3 batter*).tw,kf. (2174)

15 (physical* adj3 (abus* or batter* or maltreat* or mistreat* or neglect* or violent*)).tw,kf. (35873)

16 Battered Child Syndrome/ (1942)

17 ((baby or babies or infant? or newborn? or neonat* or p?ediatric* or toddler? or child* or teen? or teenage* or teen-age* or youth? or son or sons or daughter?) adj3 batter*).tw,kf. (5157)

18 Shaken Baby Syndrome/ (1714)

19 (shaken adj (baby or babies or infant? or newborn? or neonat*)).tw,kf. (1661)

20 or/1-19 [NON-ACCIDENTAL TRAUMA] (181109)

21 Diagnostic Imaging/ (246511)

22 dg.fs. [diagnostic imaging] (1262854)

23 (diagnos* adj3 (image? or imaging)).tw,kf. (112977)

24 (x-ray* or xray*).tw,kf. (860366)

25 Image Interpretation, Computer-Assisted/ (88587)

26 exp Imaging, Three-Dimensional/ (193506)

27 ((3D or 3-D or 3-dimension* or three dimension*) adj (image? or imaging)).tw,kf. (40820)

28 exp Ultrasonography/ (1307083)

29 (ultrasound* or ultrasonograph* or ultra-sonograph* or ultrasonic* or ultra-sonic*).tw,kf. (985932)

30 (echograph* or echo-graph* or echotomograph* or echo-tomograph* or echosonograph* or echo sonograph*).tw,kf. (25017)

31 exp Radiography/ (2474539)

32 (radiograph* or radiographic imag* or roentgenograph* or roentgeno-graph*).tw,kf. (576578)

33 (fluoroscop* or fluoro-scop*).tw,kf. (80803)

34 exp Radionuclide Imaging/ (422821)

35 ((radionuclide* adj2 imag*) or (radio-nuclide* adj2

imag*) or (radionuclide* adj2 scan*) or (radio-nuclide*

adj2 scan*) or (radioisotope* adj2 imag*) or (radio-

isotope* adj2 imag*) or (radioisotope* adj2 scan*) or

(radio-isotope* adj2 scan*) or scintigraph* or scinti-graph*

or scintiphotograph* or scinti-photograph*).tw,kf.

(131942)

36 exp Tomography/ (2972864)

37 (tomograph* or tomo-graph*).tw,kf. (1013747)

38 (CAT scan* or CT scan* or PET scan* or PET imag* or PT scan* or PT imag*).tw,kf. (354380)

39 (SPECTCT or SPECT CT or "SPECT/CT").tw,kf. (14964)

40 (magnetic resonance imag* or MRI or MRIs or fMRI

or fMRIs or NMR imag* or chemical shift imag* or

magneti#ation transfer contrast imag* or spin echo imag*

or zeugmatograph* or zeugmato-graph*).tw,kf. (1089277)

41 (cineradiograph* or cine-radiograph* or

cinefluorograph* or cine-fluorograph* or

radiocinematograph* or radio-cinematograph*).tw,kf.

(4189)

42 Nuclear Medicine/ (42502)

43 nuclear medicine*.tw,kf. (42464)

44 or/21-43 [IMAGING] (7446138)

45 20 and 44 [NON-ACCIDENTAL TRAUMA - IMAGING] (9483)

46 exp Animals/ not Humans/ (16926461)

47 45 not 46 [ANIMAL-ONLY REMOVED] (7507)



Appendix 1. Search Strategies

- 48 (case reports or case series or address or autobiography or bibliography or biography or comment or dictionary or directory or editorial or "expression of concern" or festschrift or historical article or interactive tutorial or lecture or legal case or legislation or news or newspaper article or patient education handout or personal narrative or portrait or video-audio media or webcast or (letter not (letter and randomized controlled trial))).pt. (6432637)
- 49 47 not 48 [OPINION PIECES REMOVED] (6255)
- 50 exp Guidelines as Topic/ (769625)
- 51 exp Clinical Protocols/ (281977)
- 52 Guideline.pt. (16410)
- 53 Practice Guideline.pt. (28768)
- 54 standards.fs. (749327)
- 55 Consensus Development Conference.pt. (12039)
- 56 Consensus Development Conference, NIH.pt. (793)
- 57 (consensus or guideline* or guidance? or standards or recommendation*).ti,kf. (444023)
- 58 (expert consensus or consensus statement* or consensus conference* or clinical guideline? or practice guideline? or treatment guideline? or practice parameter* or position statement* or policy statement* or CPG or CPGs).tw,kf. (263537)
- 59 or/50-58 [CPG FILTER - BALANCED] (2033123)
- 60 49 and 59 [NON-ACCIDENTAL TRAUMA - IMAGING - GUIDELINES] (293)
- 61 limit 60 to yr="2016-current" (148)
- 62 61 use medall [MEDLINE RECORDS] (48)
- 63 ((abusive* or abuse-related or non-accidental* or nonaccidental* or conscious* or deliberate* or intend* or intentional* or inflict* or knowing* or purposeful* or "on purpose" or willful*) adj3 (harm* or hurt* or injur* or trauma* or maltreat* or mistreat* or neglect* or violent* or wound*)).tw,kw. (25702)
- 64 (NAT and trauma*).tw,kw. (344)
- 65 domestic violence/ (16379)
- 66 (domestic* adj3 (harm* or hurt* or injur* or trauma* or maltreat* or mistreat* or neglect* or violent* or wound*)).tw,kw. (17869)
- 67 child abuse/ (54948)
- 68 ((baby or babies or infant? or newborn? or neonat* or p?ediatric? or toddler? or child* or teen? or teenage* or teen-age* or youth? or son or sons or daughter?) adj3 (abus* or violent*)).tw,kw. (60282)
- 69 elder abuse/ (4224)
- 70 ((aged or elder* or geriatric* or gerontolog* or senior*) adj3 (abus* or violent*)).tw,kw. (5253)
- 71 (older adj2 (adult* or female? or male? or man or men or patient? or person? or people? or population? or resident? or wom#n) adj3 (abus* or violent*)).tw,kw. (1099)
- 72 ((aged or elder* or geriatric* or gerontolog* or senior*) adj3 batter*).tw,kw. (362)
- 73 (older adj2 (adult* or female? or male? or man or men or patient? or person? or people? or population? or resident? or wom#n) adj3 batter*).tw,kw. (158)
- 74 partner violence/ (17079)
- 75 ((husband* or mate or mates or partner* or spous* or wife or wives or wom#n) adj3 (abus* or violent*)).tw,kw. (36022)
- 76 ((husband* or mate or mates or partner* or spous* or wife or wives or wom#n) adj3 batter*).tw,kw. (2296)
- 77 (physical* adj3 (abus* or batter or batters or battered or battering or maltreat* or mistreat* or neglect* or violent*)).tw,kw. (30879)
- 78 battered child syndrome/ (1942)
- 79 ((baby or babies or infant? or newborn? or neonat* or p?ediatric* or toddler? or child* or teen? or teenage* or teen-age* or youth? or son or sons or daughter?) adj3 batter*).tw,kw. (5245)
- 80 shaken baby syndrome/ (1714)
- 81 or/63-80 [NON-ACCIDENTAL TRAUMA] (175953)
- 82 diagnostic imaging/ (246511)
- 83 (diagnos* adj3 (image? or imaging)).tw,kw. (115647)
- 84 (x-ray* or xray*).tw,kw. (876258)
- 85 computer assisted tomography/ (775803)
- 86 computer assisted diagnosis/ (65129)
- 87 exp three-dimensional imaging/ (193506)
- 88 ((3D or 3-D or 3-dimension* or three dimension*) adj (image? or imaging)).tw,kw. (41815)
- 89 exp echography/ (1307083)
- 90 (ultrasound* or ultrasonograph* or ultra-sonograph* or ultrasonic* or ultra-sonic*).tw,kw. (1002247)
- 91 (echograph* or echo-graph* or echotomograph* or echo-tomograph* or echosonograph* or echo sonograph*).tw,kw. (25371)
- 92 exp radiography/ (2474539)
- 93 (radiograph* or radiographic imag* or roentgenograph* or roentgeno-graph*).tw,kw. (568760)
- 94 (fluoroscop* or fluoro-scop*).tw,kw. (81471)
- 95 exp scintiscanning/ (202507)
- 96 ((radionuclide* adj2 imag*) or (radio-nuclide* adj2 imag*) or (radionuclide* adj2 scan*) or (radio-nuclide* adj2 scan*) or (radioisotope* adj2 imag*) or (radio-isotope* adj2 imag*) or (radioisotope* adj2 scan*) or (radio-isotope* adj2 scan*) or scintigraph* or scinti-graph* or scintiphotograph* or scinti-photograph*).tw,kw. (133377)
- 97 exp tomography/ (2972864)
- 98 (tomograph* or tomo-graph*).tw,kw. (1033258)
- 99 (CAT scan* or CT scan* or PET scan* or PET imag* or PT scan* or PT imag*).tw,kw. (356929)
- 100 (SPECTCT or SPECT CT or "SPECT/CT").tw,kw. (15192)
- 101 (magnetic resonance imag* or MRI or MRIs or fMRI or fMRIs or NMR imag* or chemical shift imag* or magneti#ation transfer contrast imag* or spin echo imag* or zeugmatograph* or zeugmato-graph*).tw,kw. (1121529)
- 102 (cineradiograph* or cine-radiograph* or cinefluorograph* or cine-fluorograph* or radiocinematograph* or radio-cinematograph*).tw,kw. (4239)
- 103 nuclear medicine/ (42502)
- 104 nuclear medicine*.tw,kw. (43269)

Appendix 1. Search Strategies

105 or/82-104 [IMAGING] (7371075)
106 81 and 105 [NON-ACCIDENTAL TRAUMA - IMAGING]
(8867)
107 exp animal/ or exp animal experimentation/ or exp
animal model/ or exp animal experiment/ or nonhuman/
or exp vertebrate/ (55523672)
108 exp human/ or exp human experimentation/ or exp
human experiment/ (43169403)
109 107 not 108 (12356143)
110 106 not 109 [ANIMAL-ONLY REMOVED] (8664)
111 (conference abstract or editorial or letter).pt.
(7693834)
112 case report/ or exp case study/ or directory/
(5003849)
113 110 not (111 or 112) [CONFERENCE ABSTRACTS AND
OPINION PIECES REMOVED] (5099)
114 exp practice guideline/ (630138)
115 (consensus or guideline* or guidance? or standards
or recommendation*).ti,kw. (470017)
116 (expert consensus or consensus statement* or
consensus conference* or clinical guideline? or practice
guideline? or treatment guideline? or practice parameter*
or position statement* or policy statement* or CPG or
CPGs).tw,kw. (267340)
117 or/114-116 [CPG FILTER - BALANCED] (1124007)
118 113 and 117 [NON-ACCIDENTAL TRAUMA -
IMAGING - CPGs - BALANCED] (196)
119 limit 118 to yr="2016-current" (79)
120 119 use emczd [EMBASE RECORDS] (61)
121 62 or 120 [BOTH DATABASES] (109)
122 remove duplicates from 121 (91) [TOTAL UNIQUE
RECORDS]
123 122 use medall [MEDLINE UNIQUE RECORDS] (48)
124 122 use emczd [EMBASE UNIQUE RECORDS] (43)

APPENDIX 2. EVIDENCE TABLES

Levels and Grades of evidence

2012 CAR and 2017 RCR Grades

[A] Any of the following:

- (1) High-quality diagnostic studies in which a new test is independently and blindly compared with a reference standard in an appropriate spectrum of patients;
- (2) Systematic review and meta-analyses of such high-quality studies.

[B] Any of the following:

- (1) Studies with a blind and independent comparison of the new test with the reference standard in a set of non-consecutive patients or confined to a narrow spectrum of patients;
- (2) Studies in which the reference standard was not applied to all patients;
- (3) Systematic reviews of such studies.

[C] Any of the following:

- (1) Studies in which the reference standard was not objective;
- (2) Studies in which the comparison of the new test with the reference standard was not blind or independent;
- (3) Studies in which positive and negative test results were verified using different reference standards;
- (4) Expert opinion.

Oxford Centre for Evidence-based Medicine 2009 Levels of Evidence

<https://www.cebm.ox.ac.uk/resources/levels-of-evidence/oxford-centre-for-evidence-based-medicine-levels-of-evidence-march-2009> [Accessed March 21, 2022]

Oxford Centre for Evidence-based Medicine 2011 Levels of Evidence

<https://www.cebm.net/wp-content/uploads/2014/06/CEBM-Levels-of-Evidence-2.1.pdf> [Accessed March 21, 2022]

Table T01. Acute head trauma in adults

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; CTA: computed tomography angiography; MRI: magnetic resonance imaging; US: ultrasound; SXR: skull radiograph	
CAR 2012 [20]	<p>J01. Head injury</p> <ul style="list-style-type: none"> - CT: Indicated [A]: CT is indicated in all patients with a severe head injury (GCS <13). In patients with a minor head injury (GCS 13-15 and witnessed loss of consciousness or disorientation or definite amnesia) CT is indicated to rule out an injury requiring neurosurgical intervention if there is: GCS <15 2 hours after the injury; Suspected open or depressed skull fracture; Any sign of a basal skull fracture; Two or more episodes of vomiting; Age > 65 years. To rule out any other clinically significant intracranial injury, the following additional risk factors justify obtaining CT: Amnesia for before the impact lasting > 30 minutes; Dangerous mechanism of injury (motor vehicle accident or fall from > 3 feet or 5 stairs or more). - CTA: Specialized Investigation [B]: CTA should be performed with presentation of high energy transfer mechanism or if associated with any of the following: Displaced mid-face fracture; Basilar skull fracture with carotid canal involvement; Focal neurological deficit; Cervical vertebral body or transverse foramen fracture; Fracture at C1-C3; Clothesline type injury or seat belt abrasion with significant swelling/ pain; Altered mental status - SXR: Not indicated [B]: There is poor correlation between the presence of a skull fracture and a clinically significant head injury. The only indications for skull x-rays in the setting of trauma are suspected open or depressed skull fractures, if CT is not available and suspected child abuse.
ACR 2016 [21] Moderate quality	<p>Head trauma</p> <ul style="list-style-type: none"> ▪ Variant 1: Minor or Mild Acute Closed Head Injury (GCS Score ≥ 13), Imaging Not Indicated by NOC or CCHR or NEXUS II Clinical Criteria. Initial Study ▪ Variant 2: Minor or Mild Acute Closed Head Injury (GCS Score ≥ 13), Imaging Indicated by NOC or CCHR or NEXUS II Clinical Criteria. Initial Study ▪ Variant 3. Moderate or severe acute closed head injury (GCS score <13). Initial Study ▪ Variant 4. Short-term follow-up imaging of acute traumatic brain injury; no neurologic deterioration
NICE 2019 [22] High quality	<p>Head injury: assessment and early management</p> <ul style="list-style-type: none"> - CT head: Scenario 1 (Recommendation 26), Scenario 2 (Recommendation 27), Scenario 3 (Recommendation 28) - MRI - X-ray
RCR 2017 [23] High quality	<p>Head injury (T01)</p> <ul style="list-style-type: none"> - CT [B] - MRI [C] - SXR [C]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; CCHR: Canadian CT Head Rule; GCS: Glasgow Coma Scale; NEXUS: National Emergency X-Ray Utilization Study; NICE: National Institute for Health and Care Excellence; NOC: New Orleans Criteria; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T02. Acute head trauma in children

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; SPECT: Single-Photon Emission Computerized Tomography; US: ultrasound; XR: radiograph	
CAR 2012 [20]	This scenario was not addressed in the 2012 CAR guidelines.
ACR 2020 [26] Moderate quality	<p>Head trauma – child</p> <ul style="list-style-type: none"> ▪ Variant 1. Child. Minor acute head trauma. Very low risk for clinically important brain injury per PECARN criteria. Excluding suspected abusive head trauma. Initial imaging. ▪ Variant 2. Child. Minor acute blunt head trauma. Intermediate risk for clinically important brain injury per PECARN criteria. Excluding suspected abusive head trauma. Initial imaging. ▪ Variant 3. Child. Minor acute blunt head trauma. High risk for clinically important brain injury per PECARN criteria. Excluding suspected abusive head trauma. Initial imaging. ▪ Variant 4. Child. Moderate or severe acute blunt head trauma (GCS ≤13). Excluding suspected abusive head trauma. Initial imaging. ▪ Variant 5. Child. Subacute blunt head trauma with cognitive or neurologic signs.
Centers for Disease Control and Prevention 2018 [27] High quality	<p>Diagnosis and management of mild traumatic brain injury among children</p> <ul style="list-style-type: none"> - CT: Recommendations 1A, 1B, 1C - MRI: Recommendation 2 - CT (SPECT): Recommendation 3 - Skull radiographs: Recommendations 4A and 4B
NICE 2019 [22] High quality	<p>Head injury: assessment and early management</p> <ul style="list-style-type: none"> - CT: Scenario 1 (Recommendation 29), Scenario 2 (Recommendation 30), Scenario 3 (Recommendation 31), Scenario 4 (Recommendation 28) - X-ray
Italian guidelines 2018 [28] High quality	<p>Assessment and management of pediatric head injury in the emergency department</p> <ul style="list-style-type: none"> - Head CT - Skull radiograph - US: Trans-fontanelle, Point-of-care - Near-infrared spectroscopy
Scandinavian guidelines 2016 [29] High quality	<p>Minor and moderate head trauma in children</p> <p>In children <18 years, Recommendations around head CT for three scenarios:</p> <ul style="list-style-type: none"> - Children with an ED admission GCS score ≤13 after head trauma (Evidence grade: very low, Recommendation: strong) - Children with (a) neurological deficit related to the trauma, (b) post traumatic seizure, or (c) clinical signs of skull base or depressed skull fracture (Evidence grade: very low, Recommendation: strong) - Children with (a) GCS score 14, (b) loss of consciousness for > 1 min after head trauma or (c) children with coagulation disorders or with anticoagulation therapy (Evidence grade: very low, Recommendation: strong)

Appendix 2. Evidence Tables

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; ED: Emergency department; GCS: Glasgow Coma Scale; NICE: National Institute for Health and Care Excellence; PECARN: Pediatric Emergency Care Applied Research Network



Table T03. Acute facial trauma

Guideline Group Agree-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; OPG: orthopantomography; SXR: skull radiograph; US: ultrasound; XR: radiograph	
CAR 2012 [20]	<p>J02. Nasal trauma</p> <ul style="list-style-type: none"> - CT: Specialized Investigation [B]: CT may be indicated if requested by a referral service to plan for management. - XR nasal bones: Not Indicated: XRs are unreliable in diagnosing/ characterizing nasal bone fractures and do not alter management. <p>J05. Middle-third facial injury</p> <ul style="list-style-type: none"> - CT Facial Bones: Indicated [A]: Patient cooperation is essential to obtain views of diagnostic quality. Consider delay if patient is uncooperative. Should be considered in setting of abnormal XR, suspected fracture, foreign body, or hematoma, and acute diplopia. - XR facial bones: Indicated [C]: Discuss with maxillofacial surgeon, who may request low dose CT at an early stage in management of complex injuries. Although plain x-rays have had a historical role, CT with reformats provides superior evaluation and should be the imaging modality of choice when available. <p>J06. Mandibular trauma</p> <ul style="list-style-type: none"> - CT: Indicated [A]: CT with reformats should be performed where available for superior fracture detection. - XR mandible or OPG: Indicated [C]: Panoramic XR is not appropriate in uncooperative or multiply injured patients. CT should be performed when available.
RCR 2017 [23] High quality	<p>T02. Nasal trauma</p> <ul style="list-style-type: none"> - SXR/XR facial bones/XR nasal bones [B]

Abbreviations: CAR: Canadian Association of Radiologists; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T04. Acute orbital trauma, including blunt and penetrating injury

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; US: ultrasound; XR: radiograph	
CAR 2012 [20]	<p>J03. Blunt orbital trauma</p> <ul style="list-style-type: none"> - CT: Indicated [A]: CT is indicated when an orbital fracture or globe injury is suspected. - XR Orbits: Indicated in special circumstances [A]; May be used if CT is not available <p>J04. Penetrating orbital injury</p> <ul style="list-style-type: none"> - CT: Indicated [A]: CT is indicated when an orbital fracture or globe in jury is suspected. CT is also indicated when XR does not show a foreign body but one, which may not be metallic, is strongly suspected, when multiple foreign bodies are present, or when it is not certain whether a foreign body is intraocular. - XR orbits: Indicated [A]: XR is the only imaging required to exclude a metallic foreign body - US: Indicated [C]: US can also be used for radiolucent foreign bodies or where XR is difficult.
ACR 2018 [32] Moderate quality	<p>Orbits and Vision and Visual Loss</p> <ul style="list-style-type: none"> ▪ Variant 1. Orbits Vision and Visual Loss. Traumatic visual defect. Suspect orbital injury. Initial imaging.
RCR 2017 [23] High quality	<p>T03. Blunt orbital trauma</p> <ul style="list-style-type: none"> - XR facial bones [B] - CT [B] - MRI [B] <p>T04. Orbital trauma: penetrating injury</p> <ul style="list-style-type: none"> - XR orbits [B] - CT [B] - US [B] - MRI [B] <p>T05. Orbital lesions: suspected foreign body</p> <ul style="list-style-type: none"> - XR orbits [B] - US [B] - CT [C]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; RCR: Royal College of Radiologists

Table T05. Suspected cervical spine trauma in adults

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; CTA: computed tomography angiography; MRA: magnetic resonance angiography; MRI: magnetic resonance imaging; XR: radiograph	
CAR 2012 [20]	<p>J07. Conscious patient with head and/or facial injury only</p> <ul style="list-style-type: none"> - XR cervical spine: Indicated only in specific circumstances [A]: In an alert, stable patient XR is indicated only if there are the following risk factors: Age >65 years; Dangerous mechanism of injury; Paresthesias in the extremities or other neurological deficit; Midline tenderness, Inability to actively rotate the neck 45° to the right and the left. If the XR is normal and there is persistent pain, flexion and extension views can be obtained to assess possible ligament damage. - CT cervical Spine: Indicated [A]: Although XR is indicated in the specific circumstances outlined above, due to superior visualization of both bony and soft-tissue injury CT should be obtained as a first line modality if available, and to further characterize injury should one be suspected on XR. <p>J08. Unconscious patient with head injury</p> <ul style="list-style-type: none"> - CT cervical Spine: Indicated [A]: CT is indicated to characterize both bony and soft-tissue injury. - XR cervical spine: Indicated in specific circumstances [B]: Indicated only if CT is not available. <p>J09. Neck injury and pain with or without neurological deficit</p> <ul style="list-style-type: none"> - CT Cervical Spine: Indicated [A]: CT is indicated to characterize both bony and soft-tissue injury. - MRI: Specialized investigation [B]: May be valuable in specialized situations where CT is negative and a purely ligamentous injury is suspected, or to further characterize injury already seen on CT. - XR cervical spine Indicated [B]: Indicated only if CT is not readily available. <p>J10. Neck injury with pain but XR initially normal; suspected ligamentous injury</p> <ul style="list-style-type: none"> - CT Cervical Spine: Indicated [A]: CT should be performed to detect radiographically occult fracture. - MRI: Specialized investigation [B]: MRI demonstrates ligamentous injuries better than CT. - XR cervical spine: Specialized investigation [B]: Views taken in flexion and extension (consider fluoroscopy) as achieved by the patient with no assistance and under medical supervision.
ACR 2019 [33] Moderate quality	<p>ACR Suspected spine trauma</p> <ul style="list-style-type: none"> ▪ Variant 1. Age greater than or equal to 16 years and less than 65 years. Suspected acute blunt cervical spine trauma; imaging not indicated by NEXUS or CCR clinical criteria. Patient meets low-risk criteria. Initial imaging. ▪ Variant 2. Age greater than or equal to 16 years. Suspected acute cervical spine blunt trauma. Imaging indicated by NEXUS or CCR clinical criteria. Initial imaging.
NICE 2016 [34] High quality	<p>Spinal injury: assessment and initial management</p> <ul style="list-style-type: none"> - CT: Recommendation 41 - MRI: Recommendation 42 - Recommendation 43
NICE 2019 [22] High quality	<p>Head injury: assessment and early management</p> <ul style="list-style-type: none"> - CT - X-ray

Appendix 2. Evidence Tables

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
	CT: computed tomography; CTA: computed tomography angiography; MRA: magnetic resonance angiography; MRI: magnetic resonance imaging; XR: radiograph
RCR 2017 [23] High quality	<ul style="list-style-type: none"> - MRI, CTA or MRA <p>T08. Cervical spine assessment in conscious patient with head and/or facial injury only</p> <ul style="list-style-type: none"> - XR/ CT cervical spine [A] <p>T09. Cervical spine assessment in unconscious patient with head injury</p> <ul style="list-style-type: none"> - CT [B] - XR cervical spine [B] - MRI [B] <p>T11. Neck injury with neurological deficit</p> <ul style="list-style-type: none"> - MRI [B] - CT [B] - XR cervical spine [B] <p>T10. Neck injury with pain</p> <ul style="list-style-type: none"> - CT [B] - MRI [B] - XR cervical spine [A] <p>T12. Neck injury with pain but initial imaging normal; suspected ligamentous injury</p> <ul style="list-style-type: none"> - CT [B] - MRI [B] - XR cervical spine [B]
Spinal Cord Society 2020 [35] Moderate quality	<p>Radiological protocol in spinal trauma</p> <ul style="list-style-type: none"> - XR - CT - MRI
WFNS Spine Com. 2020 [36] Moderate quality	<p>Spinal Cord Injury</p> <ul style="list-style-type: none"> - MRI

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; CCR: Canadian Cervical Rules; Com: Committee; NEXUS: National Emergency X-Ray Utilization Study; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists; WFNS: World Federation of Neurological Societies

Appendix 2. Evidence Tables

Table T06. Suspected cervical spine trauma in children

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; XR: radiograph	
CAR 2012 [20]	This scenario was not addressed in the 2012 CAR guidelines.
ACR 2019 [38] Moderate quality	<p>Suspected spine trauma – child</p> <ul style="list-style-type: none"> ▪ Variant 1. Child, 3 to 16 years of age, acute cervical spine trauma, meets low risk criteria (based on PECARN or NEXUS). Initial imaging. ▪ Variant 2. Child, 3 to 16 years of age, acute cervical spine trauma, at least one risk factor with reliable clinical examination (based on PECARN or NEXUS). Initial imaging. ▪ Variant 3. Child, younger than 3 years of age, acute cervical spine trauma, Pieretti-Vanmarcke weighted score greater than or equal to 2 to 8 points. Initial imaging.
NICE 2016 [34] High quality	<p>Spinal injury: assessment and initial management</p> <ul style="list-style-type: none"> - MRI: Recommendation 37 - XR: Recommendation 38 - Recommendation 40
NICE 2019 [22] High quality	<p>Head injury: assessment and early management</p> <ul style="list-style-type: none"> - CT - X-ray
Pediatric Cervical Spine Clearance Working Group 2019 [39]	<p>Pediatric Cervical Spine Clearance</p> <p>Recommendations for the following scenarios:</p> <ul style="list-style-type: none"> - Patient with a GCS Score of 14 or 15 - Patient with a GCS Score of ≤8 - Patient with a GCS Score of 9 to 13

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; GCS: Glasgow Coma Scale; NEXUS: National Emergency X-Ray Utilization Study; NICE: National Institute for Health and Care Excellence; PECARN: Pediatric Emergency Care Applied Research Network

Appendix 2. Evidence Tables

Table T07. Suspected head and neck vascular injury, including penetrating injury

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; CTA: computed tomography angiography; MRA: magnetic resonance angiography; MRI: magnetic resonance imaging; XR: radiograph	
CAR 2012 [20]	This scenario was not addressed in the 2012 CAR guidelines.
ACR 2016 [21] Moderate quality	Head trauma <ul style="list-style-type: none"> ▪ Variant 7. Suspected intracranial arterial injury ▪ Variant 8. Suspected intracranial venous injury
ACR 2017 [40] Moderate quality	Penetrating neck injury <ul style="list-style-type: none"> ▪ Variant 1. Penetrating neck injury. Clinical soft injury signs.
EAST 2020 [41] Moderate quality	Blunt cerebrovascular injury <ul style="list-style-type: none"> - CTA for low-risk (very low certainty) and high-risk (very low certainty) cervical spine injuries
NICE 2019 [22] High quality	See MRI, CTA, MRA in Head injury: assessment and early management <ul style="list-style-type: none"> - CT or MRI angiography [Grade B recommendation]
WFNS Spine Committee 2020 [42] Moderate quality	Subaxial cervical spine injuries Vertebral artery injury after cervical trauma <ul style="list-style-type: none"> - CTA

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; EAST: Eastern Association for the Surgery of Trauma; NICE: National Institute for Health and Care Excellence; WFNS: World Federation of Neurological Societies

Table T08. Suspected thoracolumbar fracture

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; XR: radiograph	
CAR 2012 [20]	<p>J11. Trauma without neurological deficit, with or without pain</p> <ul style="list-style-type: none"> - XR: Indicated in specific circumstances [B]: Imaging is not usually indicated in a conscious asymptomatic patient, who can be reliably examined. Imaging is indicated if there is a history of a significant mechanism such as a fall or a high-impact motor vehicle accident, if there is pain and/or tenderness or if the patient cannot be reliably evaluated. XR may also be indicated in situations when CT is not readily available. - CT Spine: Indicated [A]: Threshold to CT should be low when there is pain / tenderness, a significant mechanism of injury, the presence of other spinal fractures, or when it is not possible to clinically evaluate a patient. <p>J12. Trauma: with neurological deficit, with or without pain</p> <ul style="list-style-type: none"> - CT: Indicated [A]: CT is indicated to further evaluate for injury with or without localizing signs. - MRI: Indicated [B]: MRI is indicated if there is concern about a cord injury not seen on CT, if a purely ligamentous injury is suspected, or to further characterize injury already seen on CT. - XR: Indicated [C]: Should be performed only when CT is unavailable. Regardless CT / MRI is essential.
ACR 2019 [33] Moderate quality	<p>Suspected spine trauma</p> <ul style="list-style-type: none"> ▪ Variant 9. Age greater than or equal to 16 years. Blunt trauma meeting criteria for thoracic and lumbar imaging. Initial imaging.
ACR 2019 [38] Moderate quality	<p>Suspected spine trauma – child</p> <ul style="list-style-type: none"> ▪ Variant 4. Child, younger than 16 years of age, suspected thoracolumbar spine trauma. Initial imaging.
CNS 2019 [43,44] Moderate quality	<p>Thoracolumbar Spine Trauma</p> <ul style="list-style-type: none"> - MRI - XR
KSR/NEHCA 2019 [45] High quality	<p>Suspected Traumatic Thoracolumbar Spine Injury</p> <ul style="list-style-type: none"> - CT
NICE 2016 [34] High quality	<p>Spinal injury</p> <ul style="list-style-type: none"> - XR: Recommendation 44 - CT: Recommendation 45 - Recommendation 46
RCR 2017 [23] High quality	<p>T13. Thoracic and lumbar spine trauma without pain, tenderness or neurological deficit</p> <ul style="list-style-type: none"> - XR [B] <p>T14. Thoracic and lumbar spine trauma with pain but no neurological deficit with or without pain</p> <ul style="list-style-type: none"> - XR [B] - CT [B] <p>T15. Thoracic and lumbar spine trauma with neurological deficit with or without pain</p> <ul style="list-style-type: none"> - XR [B]

Appendix 2. Evidence Tables

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; XR: radiograph	
	<ul style="list-style-type: none"> - MRI [B] - CT [B]
Spinal Cord Society 2020 [35] Moderate quality	Radiological protocol in spinal trauma <ul style="list-style-type: none"> - XR - CT - MRI
Spine Section DGOU 2018 [46] Moderate quality	Fractures of the Thoracolumbar Spine <ul style="list-style-type: none"> - XR - CT - MRI

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; CNS: Congress of Neurological Surgeons; Com: Committee; DGOU: German Society for Orthopaedics and Trauma; EAST: Eastern Association for the Surgery of Trauma; KSR: Korean Society of Radiology; NEHCA: National Evidence-Based Healthcare Collaborating Agency; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T09. Acute hip and pelvic trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; E-FAST: extended focused assessment with sonography in trauma; MRI: magnetic resonance imaging; NM: nuclear medicine; XR: radiograph	
CAR 2012 [20]	<p>J13. Fall with pain</p> <ul style="list-style-type: none"> - XR Pelvis and Lateral XR Hip: Indicated [B]: XR is indicated as an initial imaging modality if a pelvic or femoral neck fracture is suspected - CT: Indicated [B]: CT is indicated if XR shows no fracture but there is ongoing pain or inability to weight bear. CT may also be indicated to further characterize fractures seen on XR. - NM: Indicated in specific circumstances [C]: NM bone scan should performed at least 48-72 hours post-injury to maximize sensitivity. <p>J21. Suspected hip fracture</p> <ul style="list-style-type: none"> ▪ XR: Indicated [A]: XR is the appropriate initial imaging modality. ▪ CT: Indicated [B]: CT is indicated if there is ongoing inability to weight bear and/or a high suspicion for fracture despite a negative XR. ▪ MRI: Indicated [B]: MRI is indicated for ongoing suspicion of hip fracture in the setting of a normal XR or CT, especially if a stress fracture is suspected. ▪ NM: Indicated [B]: NM bone scan can be performed where MRI is unavailable or contraindicated. NM bone scan should performed at least 48-72 hours post-injury to maximize sensitivity.
ACR 2019 [47] Moderate quality	<p>Acute hip pain – suspected fracture</p> <ul style="list-style-type: none"> ▪ Variant 1. Acute hip pain. Fall or minor trauma. Suspect fracture. Initial imaging. ▪ Variant 2. Acute hip pain. Fall or minor trauma. Negative radiographs.
NICE 2017 [48] High quality	<p>Occult hip fracture</p> <ul style="list-style-type: none"> - MRI - CT
NICE 2017 [49] High quality	<p>NICE Fracture (complex) (pelvic)</p> <p>Pelvic imaging</p> <ul style="list-style-type: none"> - CT: Recommendation 25 (very low certainty) ▪ CT/XR: Recommendation 26 (low certainty) <p>Patients with suspected or confirmed pelvic fracture and suspected bladder and urethral injuries</p> <p>The GDG decided a research recommendation to investigate this imaging strategy was appropriate (very low to moderate certainty)</p>
RCR 2017 [23] High quality	<p>T16. Pelvic injury with suspected femoral neck fracture</p> <ul style="list-style-type: none"> - XR pelvis & lateral XR hip [C] - MRI/CT/ NM (bone scan) [B] <p>T17. Pelvic injury with urethral bleeding</p> <ul style="list-style-type: none"> - Retrograde urethrogram [C] - CT [B]

Appendix 2. Evidence Tables

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; E-FAST: extended focused assessment with sonography in trauma; MRI: magnetic resonance imaging; NM: nuclear medicine; XR: radiograph	
	T18. Trauma to coccyx or coccydynia <ul style="list-style-type: none"> - MRI [C] - XR [C]
WSES 2017 [50] Moderate quality	Pelvic Trauma <ul style="list-style-type: none"> ▪ Pelvic X-ray and E-FAST [strong recommendation, moderate-quality evidence] ▪ Multi phasic CT-scan with intravenous contrast [strong recommendation, moderate-quality evidence]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists; WSES: World Society of Emergency Surgery

Appendix 2. Evidence Tables

Table T10. Acute shoulder trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; US: ultrasound; XR: radiograph	
CAR 2012 [20]	J14. Shoulder injury <ul style="list-style-type: none"> ▪ XR: Indicated [B]: XR is the appropriate initial imaging modality.
ACR 2018 [51] Moderate quality	ACR Shoulder pain – traumatic <ul style="list-style-type: none"> ▪ Variant 1. Traumatic shoulder pain. Any etiology. Initial imaging.
RCR 2017 [23] High quality	T19. Shoulder injury <ul style="list-style-type: none"> - XR [B] - US [B] - MRI [C] - CT [C]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T11. Acute elbow trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; US: ultrasound; XR: radiograph	
CAR 2012 [20]	J15. Elbow trauma - XR: Indicated [B]: XR is the appropriate initial imaging modality.
ESSR 2018 [52] Moderate quality	Elbow trauma - US
RCR 2017 [23] High quality	T20. Elbow trauma - XR [B] - MRI/CT/US [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; ESSR: European Society of Musculoskeletal Radiology; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T12. Acute hand and wrist trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; NM: nuclear medicine; XR: radiograph	
CAR 2012 [20]	<p>J16. Wrist injury: suspected scaphoid fracture</p> <ul style="list-style-type: none"> - XR: Indicated [A]: XR is the appropriate initial imaging modality. If a scaphoid fracture is suspected a scaphoid view should be requested. Delayed XR (at least ten days) is appropriate if there is a high suspicion of a scaphoid fracture but a normal initial XR. - CT: Indicated in special circumstances [B]: If a scaphoid fracture or other carpal fracture is suspected and the XR is normal CT is appropriate for further evaluation. - MRI: Indicated in special circumstances [B]: If a scaphoid fracture is suspected and the XR is normal and early diagnosis is required, MRI is the preferred modality for further evaluation. - NM: Indicated in special circumstances [C]: If a scaphoid fracture is suspected and the XR is normal and early diagnosis is required NM can be used for further evaluation but NM bone scan should performed at least 48-72 hours post-injury to maximize sensitivity.
ACR 2019 [53] Moderate quality	<p>Acute hand and wrist trauma</p> <ul style="list-style-type: none"> ▪ Variant 1. Acute blunt or penetrating trauma to the hand or wrist. Initial imaging.
NICE 2016 [54] High quality	<p>NICE Fractures (non-complex)</p> <ul style="list-style-type: none"> - MRI: Recommendation 9 (very low and low certainty of the evidence, dependent on outcome)
RCR 2017 [23] High quality	<p>T21. Wrist injury: suspected scaphoid fracture</p> <ul style="list-style-type: none"> - XR [B] - MRI/CT [B] - NM (bone scan) [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T13. Acute knee trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
MRI: magnetic resonance imaging; XR: radiograph	
CAR 2012 [20]	J17. Knee trauma: fall / blunt trauma - XR: Indicated in specific circumstances [A]: XR is the appropriate initial imaging modality. It is indicated if any of the following risk factors are present: Age \geq 55 years; Tenderness over the head of the fibula; Isolated tenderness of the patella; Inability to flex to 90°; Inability to weight bear 4 steps immediately and in the emergency department
ACR 2020 [55] Moderate quality	ACR Acute trauma to the knee (Adult or child \geq 5 years) <ul style="list-style-type: none"> ▪ Variant 1. Adult or child 5 years of age or older. Fall or acute twisting trauma to the knee. No focal tenderness, no effusion, able to walk. Initial imaging. ▪ Variant 2. Adult or child 5 years of age or older. Fall or acute twisting trauma to the knee. One or more of the following: focal tenderness, effusion, inability to bear weight. Initial imaging. ▪ Variant 6. Adult or child 5 years of age or older. Acute trauma to the knee. Mechanism unknown. Focal patellar tenderness, effusion, able to walk. Initial imaging. ▪ Variant 7. Adult or child 5 years of age or older. Significant trauma to the knee (e.g., motor vehicle accident, knee dislocation). Initial imaging.
AAST-WSES 2020 [56] Moderate quality	- Occult popliteal artery injury (<i>Weak recommendation, moderate-quality evidence</i>)
ESSKA 2020 [57] Moderate quality	Traumatic meniscus tears - MRI
NICE 2016 [54] High quality	NICE Fractures (non-complex) - XR: Recommendation 7 (<i>low (children) and very low (adults) certainty of evidence</i>).
RCR 2017 [23] High quality	T22. Knee trauma: fall/blunt trauma - XR [B]

Abbreviations: AAST-WSES: American Association for the Surgery of Trauma–World Society of Emergency Surgery; ACR: American College of Radiology; CAR: Canadian Association of Radiologists; ESSKA: European Society for Sports Traumatology, Knee Surgery and Arthroscopy; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T14. Acute ankle trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; US: ultrasound; XR: radiograph	
CAR 2012 [20]	<p>J18. Acute ankle injury</p> <ul style="list-style-type: none"> - XR: Indicated in specific circumstances [A]: XR is the appropriate initial imaging modality. It is indicated if any of the following risk factors are present: Inability to weight-bear four steps immediately and in the emergency room; Point tenderness over the medial malleolus; and/or The posterior edge and distal tip of the lateral malleolus. - CT: Indicated in specific circumstances [B]: CT is indicated to rule out an occult fracture if there is: An ankle effusion in the setting of normal x-rays and combined effusion (anterior to posterior) of greater than 13mm with ongoing suspicion of fracture; Ongoing pain or inability to weight bear. - MRI: Indicated in specific circumstances [B]: MRI is indicated if there is a suspected isolated soft-tissue injury, occult fracture not seen on CT, or to further characterize fractures seen on CT.
ACR 2020 [59] Moderate quality	<p>Acute trauma to the ankle</p> <ul style="list-style-type: none"> ▪ Variant 1. Adult or child ≥ 5 years of age. Acute trauma to the ankle or acute trauma to the ankle with persistent pain for more than 1 week but less than 3 weeks. No exclusionary criteria present. Initial imaging. ▪ Variant 2. Adult or child ≥ 5 years of age. Acute trauma to the ankle. No exclusionary criteria present (e.g., neurologically intact [including no peripheral neuropathy]). Patient meets the requirements for evaluation by the Ottawa Ankle Rules, which are negative: No point tenderness over the malleoli, talus, or calcaneus on physical examination. Able to walk. Initial imaging. ▪ Variant 3. Adult or child ≥ 5 years of age. Acute trauma to the ankle. Exclusionary criteria are present (e.g., neurologic disorder, neuropathy, or other). Patient does not meet requirements for evaluation by the Ottawa Ankle Rules. Initial imaging. Other possible cautionary or exclusionary scenarios include pregnancy, penetrating trauma, or presence of prior recent outside radiographs on transfer.
ESSKA-AFAS 2016 [60] Low quality	<p>Acute isolated syndesmotic injuries</p> <ul style="list-style-type: none"> - Plain radiographs - CT scans - Dynamic US - MRI
NICE 2016 [54] High quality	<p>NICE Fractures (non-complex)</p> <ul style="list-style-type: none"> - XR: Recommendation 8 [low certainty (length of stay); moderate certainty (no. of x-ray); very low certainty (patient satisfaction)].
RCR 2017 [23] High quality	<p>T23. Acute ankle injury</p> <ul style="list-style-type: none"> - XR [A] - US/MRI/CT [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; ESSKA-AFAS: European Society for Sports Traumatology-Ankle and Foot Associates, Knee Surgery and Arthroscopy; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists

Appendix 2. Evidence Tables

Table T15. Acute foot trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; XR: radiograph	
CAR 2012 [20]	J19. Foot injury - XR: Indicated only in specific circumstances [A]: XR is the appropriate initial imaging modality.
ACR 2020 [63] Moderate quality	Acute foot trauma (adults and children) <ul style="list-style-type: none"> ▪ Variant 1. Adult or child older than 5 years of age. Acute trauma to the foot. Ottawa rules can be evaluated without exclusionary criteria. Ottawa rules are negative. No suspected abnormalities in regions not evaluated by the Ottawa rules. Initial imaging. ▪ Variant 2. Adult or child older than 5 years of age. Acute trauma to the foot. Ottawa rules can be evaluated without exclusionary criteria. Ottawa rules are positive. Initial imaging. ▪ Variant 3. Adult or child older than 5 years of age. Acute trauma to the foot. Ottawa rules cannot be evaluated due to exclusionary criteria. Initial imaging. ▪ Variant 4. Adult or child older than 5 years of age. Acute trauma to the foot. Ottawa rules can be evaluated without exclusionary criteria. Ottawa rules are negative. Suspected pathology in an anatomic area not addressed by Ottawa rules (not involving the midfoot; e.g., metatarsal-phalangeal joint, metatarsal, toe, tendon, etc). Initial imaging.
RCR 2017 [23] High quality	T24. Foot injury - XR [B] - MRI/CT [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; RCR: Royal College of Radiologists

Table T16. Superficial soft tissue injury foreign body

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; US: ultrasound; XR: radiograph	
CAR 2012 [20]	<p>J22. Soft tissue injury: radio-opaque foreign body suspected</p> <ul style="list-style-type: none"> - XR: Indicated [A]: XR is the appropriate initial imaging modality. - US: Indicated in specific circumstances [B]: US may be indicated if glass or wood foreign body is suspected and XR is normal. <p>J23. Soft tissue injury: radiolucent foreign body suspected</p> <ul style="list-style-type: none"> - XR: Indicated in specific circumstances [B]: Indicated only if there is concern about associated bony abnormality. - US: Indicated in specific circumstances [B]: US is the appropriate initial imaging modality if a radiolucent, soft-tissue foreign body is suspected.
ACR	See ACR (Suspected head and neck vascular injury, including penetrating injury) in Table 7
RCR 2017 [23] High quality	<p>T26. Soft tissue injury: foreign body – E.g., metal, glass, painted wood, thorns</p> <ul style="list-style-type: none"> - XR [B] - US [B] - CT [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; RCR: Royal College of Radiologists

Table T17. Acute chest trauma in adults

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
<p>CT: computed tomography; CTA: computed tomography angiograph; CXR: chest radiograph; eFAST: extended focused assessment with sonography for trauma; US: ultrasound; XR: radiograph</p>	
<p>CAR 2012 [20]</p>	<p>J25. Chest trauma: Minor, suspected rib fracture</p> <ul style="list-style-type: none"> - CXR: Indicated in specific circumstances [C]: Undisplaced rib fractures are difficult to identify and their diagnosis does not alter management. However, identification of rib fractures may be useful in order to counsel patients on recovery. <p>J26. Chest trauma: Moderate to severe</p> <ul style="list-style-type: none"> - CXR: Indicated [A]: CXR is indicated as an initial examination but should not delay CT if there are suspected severe injuries such as a pneumothorax. - CT Chest: Indicated [A]: CT with contrast is indicated in the setting of severe trauma or penetrating injury in a patient who is hemodynamically stable. Unstable patients may require immediate surgery. - CTA Chest: Indicated in special circumstances [B]: CTA is indicated in the setting of suspected traumatic aortic injury, or high energy transfer mechanism. <p>J27. Suspected esophageal or airway injury</p> <ul style="list-style-type: none"> - CT: Indicated in special circumstances [B]: Contrast enhanced CT with water soluble oral contrast can be indicated in the setting of suspected esophageal or airway injury in consultation prior to esophageal endoscopy or bronchoscopy.
<p>ACR 2019 [64] Moderate quality</p>	<p>Rib fractures</p> <ul style="list-style-type: none"> ▪ Variant 1. Suspected rib fractures from minor blunt trauma (injury confined to ribs). Initial imaging
<p>ACR 2020 [65] Moderate quality</p>	<p>Blunt chest trauma: suspected cardiac injury</p> <ul style="list-style-type: none"> ▪ Variant 1. Suspected cardiac injury following blunt trauma, hemodynamically stable patient. ▪ Variant 2. Suspected cardiac injury following blunt trauma, hemodynamically unstable patient.
<p>NICE 2016 [66] High quality</p>	<p>Major trauma</p> <ul style="list-style-type: none"> - CXR and/or eFAST: Recommendation 14 - CT: Recommendation 15
<p>RCR 2017 [23] High quality</p>	<p>T28. Chest trauma: minor</p> <ul style="list-style-type: none"> - CXR [C] <p>T29. Chest trauma: moderate severity, stable patient</p> <ul style="list-style-type: none"> - CXR [B] - CT [B] - US [B] <p>T30. Penetrating chest injury</p> <ul style="list-style-type: none"> - CXR [C] - CT [B] - US [B] <p>T31. Sternal injury</p>

Appendix 2. Evidence Tables

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
	CT: computed tomography; CTA: computed tomography angiograph; CXR: chest radiograph; eFAST: extended focused assessment with sonography for trauma; US: ultrasound; XR: radiograph
	<ul style="list-style-type: none"> - Lateral XR sternum [C] - US [B] - CT [B]
WSES 2019 [67] Moderate quality	Esophageal emergencies <ul style="list-style-type: none"> - Contrast-enhanced CT and CT esophagography - Flexible endoscopy

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists; WSES: World Society of Emergency Surgery

Appendix 2. Evidence Tables

Table T18. Acute chest trauma in children

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; CXR: chest radiograph; US: ultrasound	
CAR 2012 [20]	This scenario was not addressed in the 2012 CAR guidelines.
NICE 2016 [66] High quality	Major trauma - CXR and/or US: Recommendation 16 (<i>low level of certainty</i>) - CT: Recommendation 17
RCR 2017 [23] High quality	T29. Chest trauma: moderate severity, stable patient - CXR [B] - CT [B] - US [B]

Abbreviations: CAR: Canadian Association of Radiologists; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists

Table T19. Acute abdominal trauma in adults

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
<p>CT: computed tomography; CXR: chest radiograph; eFAST: extended focused assessment with sonography for trauma; MRI: magnetic resonance imaging; XR: radiograph; US: ultrasound</p>	
<p>CAR 2012 [20]</p>	<p>J28. Blunt or stab injury</p> <ul style="list-style-type: none"> ▪ CT: Indicated [A]: CT with contrast is indicated in the setting of severe trauma or penetrating injury in a patient who is hemodynamically stable. Unstable patients may require immediate surgery. ▪ Abdominal XR supine and CXR erect: Indicated [B]: If CT is unavailable, supine abdominal XR and erect CXR are indicated to diagnose free intra peritoneal air. Pelvic x-rays are indicated to diagnose pelvic fractures which may denote internal injuries. ▪ CT Cystogram: Indicated only in specific circumstances [C]: A CT cystogram may be indicated in patients with severe pelvic trauma with suspected bladder or urethral injury. <p>J29. Renal trauma</p> <ul style="list-style-type: none"> - CT: Indicated [A]: CT is the best imaging modality to investigate patients with suspected major renal injury. Adults with blunt renal trauma but only microscopic hematuria do not require imaging. - US: Indicated only in specific circumstances [B]: US may be used if CT is unavailable but is not as sensitive as CT for evaluating traumatic injury.
<p>ACR 2019 [68] Moderate quality</p>	<p>Penetrating Trauma—Lower Abdomen and Pelvis</p> <ul style="list-style-type: none"> ▪ Variant 1. Penetrating trauma, lower abdomen and pelvis. Suspected lower urinary tract trauma. Initial imaging.
<p>EAST 2018 [69] Moderate quality</p>	<p>Traumatic diaphragmatic injuries</p> <ul style="list-style-type: none"> ▪ Laparoscopy/CT (very low certainty)
<p>EAST 2019 [70] High quality</p>	<p>Blunt force bladder injuries</p> <ul style="list-style-type: none"> - Low-risk patients: XR versus routine retro grade CT cystography (conditional recommendation based on very low-quality evidence) - Moderate-risk patients: CT cystography versus XR (strong recommendation for based on very low-quality evidence) - High-risk patients: CT cystography versus XR (strong recommendation based on very low-quality evidence)
<p>French guidelines 2020 [71] Moderate quality</p>	<p>Severe abdominal trauma</p> <ul style="list-style-type: none"> - Contrast-enhanced thoraco-abdominal CT scan (strong recommendation, high level certainty)
<p>RCR 2017 [23] High quality</p>	<p>T33. Blunt abdominal injury (T32) and Penetrating abdominal injury</p> <ul style="list-style-type: none"> - CT [B] - Abdominal XR supine & CXR erect [C] - US [B] <p>T34. Renal trauma: blunt or penetrating injury with haematuria</p> <ul style="list-style-type: none"> - CT [B] - Intravenous urography [B] - US [B]

Appendix 2. Evidence Tables

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; CXR: chest radiograph; eFAST: extended focused assessment with sonography for trauma; MRI: magnetic resonance imaging; XR: radiograph; US: ultrasound	
WSES-AAST 2019 [72] Moderate quality	Duodeno-pancreatic and extrahepatic biliary tree trauma <ul style="list-style-type: none"> - E-FAST (strong recommendation, high level of certainty) - US/Contrast enhanced US (conditional recommendation, moderate level of certainty) - CT-scan with intravenous contrast (strong recommendation, high level of certainty) - Oral contrast material with intravenous contrast-enhanced CT (conditional recommendation, high level of certainty) - Repeat CT-scan (conditional recommendation, high level of certainty) - MRI cholangiopancreatography (strong recommendation, moderate level of certainty) - MRI (conditional recommendation, high level of certainty) - Abdominal plain films (conditional recommendation, high level of certainty) - Hepatobiliary scintigraphy (conditional recommendation, moderate level of certainty)
WSES 2017 [73] Moderate quality	Splenic Trauma <ul style="list-style-type: none"> ▪ E-FAST (Strong recommendation, high-quality evidence) ▪ CT scan with intravenous contrast (Strong recommendation, high-quality evidence) ▪ Doppler US and contrast-enhanced US (Strong recommendation, moderate-quality evidence)
WSES 2020 [74] Moderate quality	Liver trauma <ul style="list-style-type: none"> - E-FAST (Strong recommendation, high-quality evidence) - CT scan with intravenous contrast (Strong recommendation, high-quality evidence)

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; EAST: Eastern Association for the Surgery of Trauma; NICE: National Institute for Health and Care Excellence; RCR: Royal College of Radiologists; WSES: World Society of Emergency Surgery; WSES-AAST: World Society of Emergency Surgery-American Association for the Surgery of Trauma

Table T20. Acute abdominal trauma in children

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; eFAST: extended focused assessment with sonography for trauma; MRI: magnetic resonance imaging; XR: radiograph; US: ultrasound	
CAR 2012 [20]	<p>L59. Blunt abdominal trauma, high risk mechanism or clinical examination consistent with visceral injury</p> <ul style="list-style-type: none"> - CT abdomen and pelvis: Indicated [B]: CT with IV contrast enhancement remains the initial imaging investigation of choice to identify sites of hemorrhage, solid and hollow visceral injuries, as well as associated bony injuries. CT can guide management in hospital as well as post-discharge follow-up. - US abdomen and pelvis: Not indicated [B]: US has only moderate sensitivity for hemoperitoneum, misses approximately one fifth to one quarter of solid visceral injuries and cannot be used to rule out hollow visceral injuries. The contribution that US makes to the management of hemodynamically stable and unstable children with hemoperitoneum in the acute setting is debatable. US may be useful in the follow-up of known visceral injuries to reduce the total radiation burden to the patient. - XR abdomen: Not indicated [C]: Suspected abdominal injury should be evaluated with cross-sectional imaging.
RCR 2017 [23] High quality	<p>P23. BLUNT ABDOMINAL TRAUMA IN CHILDREN</p> <ul style="list-style-type: none"> - CT [B] - US [B] - Abdominal XR [B]
WSES-AAST 2019 [72] Moderate quality	<p>Duodeno-pancreatic and extrahepatic biliary tree trauma</p> <ul style="list-style-type: none"> - MRI (conditional recommendation, high level of certainty)
WSES 2017 [73] Moderate quality	<p>Splenic Trauma</p> <ul style="list-style-type: none"> - E-FAST (Strong recommendation, high-quality evidence) - CT (Strong recommendation, moderate-quality evidence), (Strong recommendation, high-quality evidence) - Complete abdominal US (Strong recommendation, moderate-quality evidence). - Contrast-enhanced CT (Strong recommendation, high-quality evidence). - Doppler US and contrast-enhanced US (Strong recommendation, moderate-quality evidence)
WSES 2020 [74] Moderate quality	<p>Liver trauma</p> <ul style="list-style-type: none"> - E-FAST (Strong recommendation, high-quality evidence) - CT scan with intravenous contrast (Strong recommendation, high-quality evidence)

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; CT: Computed Tomography; RCR: Royal College of Radiologists; WSES: World Society of Emergency Surgery; WSES-AAST: World Society of Emergency Surgery-American Association for the Surgery of Trauma

Table T21. Non-accidental trauma

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
CT: computed tomography; MRI: magnetic resonance imaging; NM: nuclear medicine; XR: radiograph; US: ultrasound	
<p>CAR 2012 [20]</p>	<p>L21. Suspected child abuse (non-verbal child)</p> <ul style="list-style-type: none"> - XR skeletal survey: Indicated [A]: A skeletal survey with appropriately coned views of skull, spine, chest/ribs, pelvis, upper and lower extremities should be performed by radiographers trained in pediatric imaging technique. - XR skeletal survey, follow-up after 2 weeks: Specialized Investigation [B]: A follow-up skeletal survey can detect additional fractures and clarify equivocal lesions on the initial survey. Skull views should be omitted. This should be done in direct consultation with the child protection specialist to weigh the need for additional information against the additional radiation exposure. Consideration may be given to targeted views. - NM whole body bone scan: Indicated [B]: Whole body bone scan can be complementary to XR skeletal survey in the detection of fractures. It is less sensitive with respect to metaphyseal fractures and skull fractures, but more sensitive with respect to rib fractures. - CT head: Indicated [B]: Unenhanced CT of the head should be part of the initial work-up for skull fractures, intracranial hemorrhage and parenchymal brain injury in all infants less than one year of age and in any infant or child with encephalopathy, focal neurological findings or retinal hemorrhage. CT is complementary to MRI in the estimation of timing of injuries. <p>L22. Suspected child abuse (verbal child)</p> <ul style="list-style-type: none"> - XR skeletal survey: Not indicated [C]: Injured bones/joints should be identified by history and physical examination in the verbal child. - XR of individual bones/joints: Indicated [C]: XR should be targeted to injured bones/joints. - MN whole body bone scan: Not indicated [C]: Injured bones/joints should be identified by history and physical examination in the verbal child. - CT head: Specialized examination [C]: The need for CT of the head should be discussed with a child protection specialist on an individual basis and guided by history and physical examination. - MRI brain: Specialized examination [C]: The need for MRI of the brain should be discussed with a child protection specialist on an individual basis and guided by history and physical examination. <p>L23. Suspected child abuse (visceral injury, any age)</p> <ul style="list-style-type: none"> - CT chest, abdomen, and/or pelvis: Indicated [C]: All CT should be performed with intravenous contrast enhancement to optimize detection of vascular and solid visceral injuries; CT of the abdomen and pelvis should be performed with oral contrast enhancement to optimize detection of hollow visceral injuries. (Also see the section on "Blunt Abdominal Trauma".) - US abdomen and pelvis: Moderately indicated [C]: US may be used as a screening tool to detect intraperitoneal fluid in cases of suspected visceral injury; however, its ability to depict solid and hollow visceral injuries is limited, compared to CT. (Also see the section on "Blunt Abdominal Trauma".)
<p>ACR 2017 [75] Moderate quality</p>	<p>Suspected physical abuse-child</p>

Appendix 2. Evidence Tables

Guideline Group AGREE-II Assessment	Imaging modality addressed in guideline recommendations and/or clinical scenarios covered (Note: Recommendations are not included, except for the 2012 CAR guideline)
	CT: computed tomography; MRI: magnetic resonance imaging; NM: nuclear medicine; XR: radiograph; US: ultrasound
	<ul style="list-style-type: none"> - Variant 1. Suspected physical abuse. Child ≤ 24 months of age. Neurologic or visceral injuries not clinically suspected. Initial imaging evaluation. - Variant 2. Suspected physical abuse. Child > 24 months of age. Neurologic or visceral injuries not clinically suspected. Initial imaging evaluation. - Variant 3. Child with one or more of the following: neurologic signs or symptoms, apnea, complex skull fracture, other fractures, or injuries highly suspicious for child abuse. Initial imaging evaluation. - Variant 4. Child. Suspected physical abuse. Suspected thoracic or abdominopelvic injuries (eg, abdominal skin bruises, distension, tenderness, or elevated liver or pancreatic enzymes). Initial imaging evaluation.
German guideline 2020 [76] Moderate quality	Suspected Child Abuse <ul style="list-style-type: none"> - MRI - Cranial CT and MRI - Skeletal survey - Skeletal scintigraphy
PCSCWG 2019 [39] Moderate quality	Pediatric Cervical Spine Clearance <ul style="list-style-type: none"> - MRI
RCR 2017 [23,77] High quality	P31. NON-ACCIDENTAL INJURY (NAI)/CHILD ABUSE <ul style="list-style-type: none"> - Skeletal survey (including skull XR, chest XR, oblique XR ribs, abdominal XR, XR spine and limbs)

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; PCSCWG: Pediatric Cervical Spine Clearance Working Group; RCR: Royal College of Radiologists

APPENDIX 3. TRAUMA SUMMARY OF RECOMMENDATIONS

Appendix 3A. English

Clinical/ Diagnostic Scenario	Recommendation	Strength of Rec.
<p>CT: computed tomography; MRI: magnetic resonance imaging; OPG: orthopantomography; US: ultrasound; XR: radiograph Strength of Recommendation: ↑↑: strong for; ↑: conditional for; ↓: conditional against; ↓↓: strong against; EPC: Expert Panel consensus</p>		
T01. Acute head trauma in adults	1. In adults who have sustained an acute head injury who meet criteria for imaging according to a clinical decision rule (e.g., CCHR, NEXUS II, etc.), we recommend CT head as the initial imaging modality. [see page 9 for CCHR and NEXUS criteria]	↑↑
	2. In adults who have sustained an acute head injury, we recommend against XR , except as a problem-solving tool (e.g., gunshot wounds).	↓↓
T02. Acute head trauma in children (see also T21. Non-accidental trauma)	1. In children who have sustained an acute head injury who meet criteria for imaging according to a clinical decision rule (e.g., PECARN, CATCH), we recommend CT head as the initial imaging modality. [see page 10 for PECARN and CATCH criteria]	↑↑
	2. In children who have sustained an acute head injury, we recommend against XR , except as a problem-solving tool (e.g., gunshot wounds, non-accidental trauma)	↓↓
T03. Acute facial trauma	1. In patients with facial trauma, we recommend CT as the initial imaging modality.	↑↑
	2. In patients with isolated facial trauma*, we recommend against XR . ↳ 2.1 *In patients with suspected mandibular fracture, we suggest OPG if CT is not available.	↓↓ ↑
T04. Acute orbital trauma	1. In patients with orbital trauma, we recommend CT as the initial imaging modality.	↑↑
	2. In patients with orbital trauma, we recommend against XR , except when the clinical question is exclusion of retained metallic foreign body.	↓↓
T05. Suspected cervical spine trauma in adults	1. In adults who have suspected cervical spine injury who meet criteria for imaging according to a clinical decision rule (e.g., Canadian C-Spine), we recommend a cervical spine CT as the initial imaging modality. [see page 12 for C-Spine Rule]	↑↑
	↳ 1.1 In low-risk patients, in settings where CT is not readily available, we suggest XR as the initial imaging modality.	↑

The guideline recommendations address choice of imaging modality, not the management of individual patients in contexts where modalities are not available. Imaging should not delay definitive management. These recommendations are not intended to stand alone. Medical care should be based on evidence, a clinician’s expert judgment, the patient’s circumstances, values, and preferences, and resource availability. We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

Clinical/ Diagnostic Scenario	Recommendation	Strength of Rec.
<p>CT: computed tomography; MRI: magnetic resonance imaging; OPG: orthopantomography; US: ultrasound; XR: radiograph Strength of Recommendation: ↑↑: strong for; ↑: conditional for; ↓: conditional against; ↓↓: strong against; EPC: Expert Panel consensus</p>		
	<p>2. In adults with normal CT of the cervical spine who have persistent suspicion of significant ligamentous or spinal cord injury, we recommend MRI.</p>	<p>↑↑</p>
<p>T06. Suspected cervical spine trauma in children</p>	<p>1. In children with cervical spine trauma where clinical exam and/or mechanism of injury suggest high likelihood of fracture, OR if child is difficult to assess clinically (e.g., young age, distracting injuries), OR child would undergo head or chest CT for other injuries, we recommend CT as the initial imaging modality.</p>	<p>↑↑</p>
	<p>2. In children with cervical spine trauma who <u>do not meet the patient population in recommendation 1</u>, but may require imaging (e.g., failed a clinical decision rule like PECARN), we recommend XR as the initial imaging modality.</p>	<p>↑↑</p>
	<p>↳ 2.1 In situations where XR is non-diagnostic and there is persistent clinical concern for cervical spine injury, OR if XR is abnormal, OR if there is clinical-radiologic discrepancy, we recommend CT as the next imaging modality.</p>	<p>↑↑</p>
	<p>3. In children with normal CT of the cervical spine who have persistent suspicion of significant ligamentous or spinal cord injury, we recommend MRI.</p>	<p>↑↑</p>
<p>T07. Suspected head and neck vascular injury, including penetrating injury</p>	<p>1. In patients with suspected head and neck vascular injury, we recommend CT angiogram* as the initial imaging modality.</p>	<p>↑↑</p>
	<p>↳ 1.1 *In patients where there is suspicion of significant/management altering venous injury, we recommend including CT venogram.</p>	<p>↑↑</p>
<p>T08. Suspected thoracolumbar fracture</p>	<p>1. In patients with suspected thoracolumbar spine fracture <u>without</u> neurological deficits, we recommend XR* as the initial imaging modality.</p>	<p>↑↑</p>
	<p>↳ 1.1 *If CT of the chest, abdomen, and pelvis has been performed for other indications, given that the thoracic and lumbar spine have been included, XR are not recommended for initial spine assessment.</p>	<p>EPC</p>
	<p>2. In patients with suspected thoracolumbar spine fracture <u>with</u> neurological deficits, we recommend CT as the initial imaging modality.</p>	<p>↑↑</p>

The guideline recommendations address choice of imaging modality, not the management of individual patients in contexts where modalities are not available. Imaging should not delay definitive management. These recommendations are not intended to stand alone. Medical care should be based on evidence, a clinician’s expert judgment, the patient’s circumstances, values, and preferences, and resource availability. We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

Clinical/ Diagnostic Scenario	Recommendation	Strength of Rec.
<p>CT: computed tomography; MRI: magnetic resonance imaging; OPG: orthopantomography; US: ultrasound; XR: radiograph Strength of Recommendation: ↑↑: strong for; ↑: conditional for; ↓: conditional against; ↓↓: strong against; EPC: Expert Panel consensus</p>		
<p>T09. Acute hip and pelvic trauma</p>	<p>1. In patients with acute hip and/or pelvic trauma, we recommend XR as the initial imaging modality. ↳ 1.1 In situations where XR is negative and there is persistent clinical concern for hip and/or pelvic fracture, we recommend CT as the next imaging modality.</p>	<p>↑↑ ↑↑</p>
<p>T10. Acute shoulder trauma</p>	<p>1. In patients with acute shoulder trauma, we recommend XR* as the initial imaging modality. If a dislocation is identified, post-reduction XR should also be performed. <i>*We suggest a 4-view series that includes a frontal, glenoid, trans-scapular-Y, and axillary (modified if necessary).</i> ↳ 1.1 In situations where XR is negative or non-diagnostic and there is persistent clinical concern for <u>bony</u> injury, we suggest CT as the next imaging modality.</p>	<p>↑↑ ↑ ↑</p>
<p>T11. Acute elbow trauma</p>	<p>1. In patients with acute elbow trauma, we recommend XR as the initial imaging modality. If a dislocation is identified, post-reduction XR should also be performed. ↳ 1.1 In skeletally mature patients, in situations where XR is negative or non-diagnostic and there is persistent clinical concern for <u>bony</u> injury, we suggest CT as the next imaging modality.</p>	<p>↑↑ ↑</p>
<p>T12. Acute hand and wrist trauma</p>	<p>1. In patients with acute hand and/or wrist trauma, we recommend XR* as the initial imaging modality. If a dislocation is identified, post-reduction XR should also be performed. *If a scaphoid injury is suspected, we recommend a dedicated scaphoid view. If fractures of other carpal bones are suspected, we recommend the appropriate dedicated radiographic views. ↳ 1.1 In skeletally mature patients, in situations where XR is negative or non-diagnostic and there is persistent clinical concern for <u>bony</u> injury, we suggest CT or MRI as the next imaging modality. ↳ 1.2 If scaphoid fracture is suspected and CT or MR is not available, we recommend immobilization and repeat XR in 10-14 days.</p>	<p>↑↑ ↑↑/EPC ↑ ↑↑</p>
<p>T13. Acute knee trauma</p>	<p>1. In patients with acute knee trauma who meet the criteria in the <i>Ottawa Knee Rule</i>, we recommend XR* as the initial imaging modality. Patients ≥ 18 years of age with acute knee pain should have knee radiographs if they meet any of the following criteria: Are 55 years of age or older; Have palpable tenderness over the head of the fibula; Have isolated patellar tenderness; Cannot flex the</p>	<p>↑↑</p>

The guideline recommendations address choice of imaging modality, not the management of individual patients in contexts where modalities are not available. Imaging should not delay definitive management. These recommendations are not intended to stand alone. Medical care should be based on evidence, a clinician’s expert judgment, the patient’s circumstances, values, and preferences, and resource availability. We recognize that not all imaging modalities are available in all treating locations, particularly in rural or remote areas of Canada. Decisions about whether to transport a patient for recommended imaging or perform alternate imaging locally or serial clinical examination/ observation can be difficult, and should consider the expected benefits of recommended imaging, risks of transport, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

Clinical/ Diagnostic Scenario	Recommendation	Strength of Rec.
<p>CT: computed tomography; MRI: magnetic resonance imaging; OPG: orthopantomography; US: ultrasound; XR: radiograph Strength of Recommendation: ↑↑: strong for; ↑: conditional for; ↓: conditional against; ↓↓: strong against; EPC: Expert Panel consensus</p>		
	<p>knee to 90°; Inability to bear weight both immediately after the injury and in emergency department (4 steps). <i>* Lateral view cross-table positioning is preferred to the upright weight-bearing view. The sunrise view of the patella is recommended if there is clinical suspicion of patellar dislocation.</i></p> <p>↳ 1.1 In situations where XR is negative or non-diagnostic and there is persistent clinical concern for <u>bony</u> injury, we suggest CT as the next imaging modality.</p>	<p>EPC/↑↑ ↑</p>
<p>T14. Acute ankle trauma</p>	<p>1. In patients with acute ankle trauma who meet the <i>Ottawa Ankle Rule</i>, we recommend ankle XR as the initial imaging modality.</p> <p>An ankle X-ray series is only necessary if there is pain near the malleoli and any of these findings: Inability to bear weight both immediately after the injury and in emergency department (4 steps) OR Bone tenderness over the distal 6 cm of the posterior edge or tip of either malleolus.</p> <p>↳ 1.1 In situations where XR is negative or non-diagnostic and there is persistent clinical concern for <u>bony</u> injury, we suggest CT as the next imaging modality.</p>	<p>↑↑ ↑</p>
<p>T15. Acute foot trauma</p>	<p>1. In patients with acute foot trauma in whom fracture is suspected, we recommend foot XR as the initial imaging modality.</p> <p>↳ 1.1 In situations where XR is negative or non-diagnostic and there is persistent clinical concern for <u>bony</u> injury, we suggest CT as the next imaging modality.</p>	<p>↑↑ ↑</p>
<p>T16. Superficial soft tissue injury foreign body</p>	<p>1. In patients with suspected superficial soft tissue foreign body, we recommend XR as the initial imaging modality.</p> <p>↳ 1.1 In situations where no foreign body is detected on XR and there is persistent clinical concern for foreign body, we recommend US as the next imaging modality.</p>	<p>↑↑ ↑↑</p>
<p>T17. Acute chest trauma in adults</p>	<p>1. In adults with minor chest trauma with a low suspicion of clinically significant injury*, we suggest no imaging.</p> <p>2. In adults with moderate to severe chest trauma, we recommend XR as the initial imaging modality, proceeding to CT if there is any clinical or radiological concern.</p>	<p>↓ ↑↑</p>

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Clinical/ Diagnostic Scenario	Recommendation	Strength of Rec.
<p>CT: computed tomography; MRI: magnetic resonance imaging; OPG: orthopantomography; US: ultrasound; XR: radiograph Strength of Recommendation: ↑↑: strong for; ↑: conditional for; ↓: conditional against; ↓↓: strong against; EPC: Expert Panel consensus</p>		
<p>T18. Acute chest trauma in children</p>	<ol style="list-style-type: none"> In children with minor chest trauma and/or where there is low suspicion of clinically significant injury, we suggest no imaging. In children with moderate to severe chest trauma, we recommend XR as the initial imaging modality, proceeding to CT if there is any clinical or radiological concern. 	<p style="text-align: center;">↓</p> <p style="text-align: center;">↑↑</p>
<p>T19. Acute abdominal trauma in adults</p>	<ol style="list-style-type: none"> In adults who have sustained abdominal trauma, in whom internal injury is suspected, we recommend CT as the initial imaging modality. <ul style="list-style-type: none"> ↳ 1.1 In the specific clinical context where CT is not available, we suggest that US be used, while considering its significant limitations. In adults with suspected bladder injury, following clinical examination and initial abdominal and pelvic CT, we suggest CT cystography. 	<p style="text-align: center;">↑↑</p> <p style="text-align: center;">↑</p> <p style="text-align: center;">↑</p>
<p>T20. Acute abdominal trauma in children</p>	<ol style="list-style-type: none"> In children who have sustained abdominal trauma, in whom internal injury is suspected, we recommend CT as the initial imaging modality. <ul style="list-style-type: none"> ↳ 1.1 In the specific clinical context where CT is not available, we suggest that US be used, while considering its significant limitations. In children with suspected bladder injury, following clinical examination and initial abdominal and pelvic CT, we suggest CT cystography. 	<p style="text-align: center;">↑↑</p> <p style="text-align: center;">↑</p> <p style="text-align: center;">↑</p>
<p>T21. Non-accidental trauma</p>	<ol style="list-style-type: none"> In children with suspected non-accidental trauma, we recommend skeletal survey XR as the initial imaging modality. If there is suspicion of non-accidental head trauma, especially in very young children, we suggest CT head. For older children, please refer to T02. Acute head trauma in children. 	<p style="text-align: center;">↑↑</p> <p style="text-align: center;">↑</p>

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Appendix 3B. French

Scénario clinique/diagnostique	Recommandation	Force de la recommandation
<p>TDM : tomодensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPc: Consensus d'un panel d'experts</p>		
<p>T01. Traumatisme crânien aigu chez l'adulte</p>	<p>1. Chez l'adulte ayant subi un traumatisme crânien aigu répondant aux critères d'imagerie selon une règle de décision clinique (par exemple, CCHR, NEXUS II, etc.), nous recommandons une TDM de la tête comme modalité d'imagerie initiale. (voir page 9 de la ligne directrice pour les critères CCHR et NEXUS)</p> <p>2. Chez l'adulte ayant subi un traumatisme crânien aigu, nous déconseillons le recours à la radiographie, sauf pour résoudre un problème particulier (par exemple, en cas de plaies par arme à feu).</p>	<p>↑↑</p> <p>↓↓</p>
<p>T02. Traumatisme crânien aigu chez l'enfant (Voir également T21. Traumatisme non accidentel)</p>	<p>1. Chez l'enfant ayant subi un traumatisme crânien aigu répondant aux critères d'imagerie selon une règle de décision clinique (par exemple, PECARN ou CATCH), nous recommandons la TDM de la tête comme modalité d'imagerie initiale. (voir page 9 de la ligne directrice pour les critères CCHR et NEXUS)</p> <p>2. Chez l'enfant ayant subi un traumatisme crânien aigu, nous déconseillons le recours à la radiographie, sauf pour résoudre un problème particulier (par exemple, en cas de plaies par arme à feu ou de traumatisme non accidentel).</p>	<p>↑↑</p> <p>↓↓</p>
<p>T03. Traumatisme aigu du visage</p>	<p>1. Chez un patient ayant subi un traumatisme aigu du visage, nous recommandons une TDM comme modalité d'imagerie initiale.</p> <p>2. Chez un patient ayant subi un traumatisme isolé du visage*, nous déconseillons le recours à la radiographie.</p> <p>↳ 2.1 *Chez un patient chez qui on soupçonne une fracture de la mandibule, nous suggérons une OPG si une TDM n'est pas disponible.</p>	<p>↑↑</p> <p>↓↓</p> <p>↑</p>

Les recommandations des lignes directrices portent sur le choix de la modalité d'imagerie, et non sur la prise en charge de patients individuels dans des contextes où les modalités ne sont pas disponibles. À noter cependant que l'imagerie ne doit pas retarder une gestion décisive. Par ailleurs, ces recommandations ne sont pas conçues pour être utilisées seules. Les soins médicaux doivent reposer sur des données probantes, le jugement expert d'un clinicien, la situation, les valeurs et les préférences d'un patient, ainsi que sur la disponibilité des ressources. Nous sommes conscients que certaines modalités d'imagerie ne sont pas disponibles partout, en particulier dans les zones rurales et isolées du Canada. Il peut être difficile de décider s'il vaut mieux transporter un patient pour obtenir l'imagerie recommandée ou effectuer localement un autre type d'imagerie ou des examens cliniques/observations à répétition; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au transport, des préférences du patient et d'autres facteurs. La présente ligne directrice repose sur des données probantes liées uniquement aux tests d'imagerie diagnostique et non à la gestion clinique du patient.

Scénario clinique/diagnostique	Recommandation	Force de la recommandation
<p>TDM : tomodensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPC: Consensus d'un panel d'experts</p>		
<p>T04. Traumatisme aigu de l'orbite</p>	<ol style="list-style-type: none"> 1. Chez un patient ayant subi un traumatisme aigu de l'orbite, nous recommandons une TDM comme modalité d'imagerie initiale. 2. Chez un patient ayant subi un traumatisme de l'orbite, nous déconseillons le recours à la radiographie, sauf quand la question clinique consiste à éliminer la présence d'un corps étranger métallique inclus. 	<p>↑↑ ↓↓</p>
<p>T05. Suspicion de traumatisme de la colonne cervicale chez l'adulte</p>	<ol style="list-style-type: none"> 1. Chez l'adulte chez qui on soupçonne une lésion de la colonne cervicale et répondant aux critères d'imagerie selon une règle de décision clinique (par exemple, Canadian C-Spine), nous recommandons une TDM de la colonne cervicale comme modalité d'imagerie initiale. (voir page 12 de la ligne directrice pour la règle sur la colonne vertébrale [C-Spine Rule]) ↳ 1.1 Chez des patients à risque faible, dans le cas où une TDM ne serait pas facilement disponible, nous suggérons une radiographie comme modalité d'imagerie initiale. 2. Chez l'adulte ayant une TDM normale de la colonne cervicale, mais chez qui on soupçonne toujours une lésion ligamentaire ou de la moelle épinière significative, nous recommandons une IRM. 	<p>↑↑ ↑ ↑↑</p>
<p>T06. Suspicion de traumatisme de la colonne cervicale chez l'enfant</p>	<ol style="list-style-type: none"> 1. Chez un enfant ayant eu un traumatisme de la colonne cervicale, chez qui l'examen clinique et/ou le mécanisme lésionnel suggèrent une forte probabilité de fracture OU si l'évaluation clinique de l'enfant est difficile (par exemple, jeune âge ou blessures gênant l'examen) OU si l'enfant doit subir une TDM de la tête ou du thorax pour d'autres blessures, nous recommandons une TDM comme modalité d'imagerie initiale. 2. Chez un enfant ayant eu un traumatisme de la colonne cervicale qui <u>ne répond pas aux critères relatifs à la population concernée de la recommandation 1</u>, mais qui peut nécessiter une imagerie (par exemple, ne répond pas aux critères d'une règle de décision clinique telle que celle du PECARN), nous recommandons une radiographie comme modalité d'imagerie 	<p>↑↑ ↑↑</p>

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<p>TDM : tomodensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPC: Consensus d'un panel d'experts</p>		
	<p>initiale.</p> <p>↳ 2.1 Dans les cas où la radiographie ne permet pas de poser un diagnostic et il y a un doute clinique persistant autour d'une lésion de la colonne cervicale OU si la radiographie est anormale OU s'il existe une discordance entre la clinique et les résultats radiologiques, nous recommandons une TDM comme modalité d'imagerie subséquente.</p> <p>3. Chez l'enfant ayant une TDM normale de la colonne cervicale, mais chez qui on soupçonne toujours une lésion ligamentaire ou de la moelle épinière significative, nous recommandons une IRM.</p>	<p>↑↑</p> <p>↑↑</p>
<p>T07. Suspicion de lésion vasculaire de la tête et du cou, y compris plaie pénétrante</p>	<p>1. Chez un patient chez qui on soupçonne une lésion vasculaire de la tête et du cou, nous recommandons une angio-TDM* comme modalité d'imagerie initiale.</p> <p>↳ 1.1 *Chez un patient chez qui on soupçonne une lésion veineuse significative ou perturbant la circulation veineuse, nous recommandons d'inclure une phase veineuse à l'angio-TDM.</p>	<p>↑↑</p> <p>↑↑</p>
<p>T08. Suspicion de fracture thoracolumbaire</p>	<p>1. Chez un patient chez qui on soupçonne une fracture de la colonne vertébrale thoracolumbaire <u>sans</u> déficits neurologiques, nous recommandons une radiographie* comme modalité d'imagerie initiale.</p> <p>↳ 1.1 *Si une TDM du thorax, de l'abdomen et du bassin a été pratiquée pour d'autres indications, considérant que la colonne vertébrale thoracique et lombaire a été incluse dans l'imagerie, la radiographie n'est pas recommandée comme technique d'évaluation initiale de la colonne vertébrale.</p> <p>2. Chez un patient chez qui on soupçonne une fracture de la colonne vertébrale thoracolumbaire <u>avec</u> déficits neurologiques, nous recommandons une TDM comme modalité d'imagerie initiale.</p>	<p>↑↑</p> <p>EP</p> <p>↑↑</p>

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Scénario clinique/diagnostique	Recommandation	Force de la recommandation
<p>TDM : tomодensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPC: Consensus d'un panel d'experts</p>		
<p>T09. Traumatisme aigu de la hanche et du pelvis</p>	<p>1. Chez un patient ayant subi un traumatisme aigu de la hanche et/ou du pelvis, nous recommandons la radiographie comme modalité d'imagerie initiale.</p> <p>↳ 1.1 Dans le cas où la radiographie initiale est négative et où un doute clinique persiste concernant la fracture de la hanche et/ou du pelvis, nous recommandons une TDM comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>↑↑</p>
<p>T10. Traumatisme aigu de l'épaule</p>	<p>1. Chez un patient ayant subi un traumatisme aigu de l'épaule, nous recommandons une radiographie comme modalité d'imagerie initiale. Si une luxation est identifiée, une radiographie post-réduction doit aussi être pratiquée.</p> <p><i>*Nous suggérons une série de quatre vues incluant une vue frontale, glénoïdienne, scapulaire-Y et axillaire (modifiée si nécessaire).</i></p> <p>↳ 1.1 Dans les cas où la radiographie est négative ou ne permet pas de poser un diagnostic et qu'un doute clinique persiste concernant une lésion <u>osseuse</u>, nous suggérons une TDM comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>↑</p> <p>↑</p>
<p>T11. Traumatisme aigu du coude</p>	<p>1. Chez un patient ayant subi un traumatisme aigu du coude, nous recommandons une radiographie comme modalité d'imagerie initiale. Si une luxation est identifiée, une radiographie post-réduction doit aussi être pratiquée.</p> <p>↳ 1.1 Chez un patient au squelette mature, dans les cas où la radiographie est négative ou ne permet pas de poser diagnostic et qu'un doute clinique persiste concernant une lésion <u>osseuse</u>, nous suggérons une TDM comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>↑</p>
<p>T12. Traumatisme aigu de la main et du poignet</p>	<p>1. Chez un patient ayant subi un traumatisme aigu de la main et/ou du poignet, nous recommandons une radiographie* comme modalité d'imagerie initiale. Si une luxation est identifiée, une radiographie post-réduction doit aussi être pratiquée.</p>	<p>↑↑</p>

Les recommandations des lignes directrices portent sur le choix de la modalité d'imagerie, et non sur la prise en charge de patients individuels dans des contextes où les modalités ne sont pas disponibles. À noter cependant que l'imagerie ne doit pas retarder une gestion décisive. Par ailleurs, ces recommandations ne sont pas conçues pour être utilisées seules. Les soins médicaux doivent reposer sur des données probantes, le jugement expert d'un clinicien, la situation, les valeurs et les préférences d'un patient, ainsi que sur la disponibilité des ressources. Nous sommes conscients que certaines modalités d'imagerie ne sont pas disponibles partout, en particulier dans les zones rurales et isolées du Canada. Il peut être difficile de décider s'il vaut mieux transporter un patient pour obtenir l'imagerie recommandée ou effectuer localement un autre type d'imagerie ou des examens cliniques/observations à répétition; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au transport, des préférences du patient et d'autres facteurs. La présente ligne directrice repose sur des données probantes liées uniquement aux tests d'imagerie diagnostique et non à la gestion clinique du patient.

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<p>TDM : tomodensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPc: Consensus d'un panel d'experts</p>		
	<p>*Si une lésion du scaphoïde est suspectée, nous recommandons une vue spécifique du scaphoïde. Si des fractures d'autres os du carpe sont suspectées, nous recommandons les incidences radiographiques spécifiques appropriées.</p> <p>↳ 1.1 Chez un patient au squelette mature, dans les cas où la radiographie est négative ou ne permet pas de poser un diagnostic et qu'un doute clinique persiste concernant une lésion <u>osseuse</u>, nous suggérons une TDM ou une IRM comme modalité d'imagerie subséquente.</p> <p>↳ 1.2 Si une fracture du scaphoïde est suspectée et que la TDM et l'IRM ne sont pas disponibles, nous recommandons l'immobilisation et une nouvelle radiographie après 10 à 14 jours.</p>	<p>↑↑/EP</p> <p>↑</p> <p>↑↑</p>
<p>T13. Traumatisme aigu du genou</p>	<p>1. Chez un patient ayant subi un traumatisme aigu du genou et répondant aux critères de la <i>règle d'Ottawa</i> sur le genou, nous recommandons la radiographie* comme modalité d'imagerie initiale.</p> <p>Les patients âgés de 18 ans ou plus ayant une douleur aiguë du genou doivent faire l'objet de radiographies du genou s'ils satisfont l'un des critères suivants : Sont âgés de 55 ans ou plus; Ont une sensation douloureuse au-dessus de la tête de la fibula (péroné); Ont une sensation douloureuse rotulienne isolée; Ne peuvent pas fléchir le genou à 90°; Ne peuvent pas supporter leur propre poids à la fois immédiatement après la lésion et dans le service des urgences (4 pas).</p> <p><i>* Un positionnement pour vue de profil latéral en travers de la table est préférable par rapport à une incidence en position verticale et en charge. L'incidence en lever de soleil de la patella est recommandée si une luxation de la patella est suspectée.</i></p> <p>↳ 1.1 Dans les cas où la radiographie est négative ou ne permet pas de poser un diagnostic et qu'un doute clinique persiste concernant une lésion <u>osseuse</u>, nous suggérons une TDM comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>EP/↑↑</p> <p>↑</p>

Les recommandations des lignes directrices portent sur le choix de la modalité d'imagerie, et non sur la prise en charge de patients individuels dans des contextes où les modalités ne sont pas disponibles. À noter cependant que l'imagerie ne doit pas retarder une gestion décisive. Par ailleurs, ces recommandations ne sont pas conçues pour être utilisées seules. Les soins médicaux doivent reposer sur des données probantes, le jugement expert d'un clinicien, la situation, les valeurs et les préférences d'un patient, ainsi que sur la disponibilité des ressources. Nous sommes conscients que certaines modalités d'imagerie ne sont pas disponibles partout, en particulier dans les zones rurales et isolées du Canada. Il peut être difficile de décider s'il vaut mieux transporter un patient pour obtenir l'imagerie recommandée ou effectuer localement un autre type d'imagerie ou des examens cliniques/observations à répétition; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au transport, des préférences du patient et d'autres facteurs. La présente ligne directrice repose sur des données probantes liées uniquement aux tests d'imagerie diagnostique et non à la gestion clinique du patient.

Scénario clinique/diagnostique	Recommandation	Force de la recommandation
<p>TDM : tomodensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPC: Consensus d'un panel d'experts</p>		
<p>T14. Traumatisme aigu de la cheville</p>	<p>1. Chez un patient ayant subi un traumatisme aigu de la cheville et répondant aux critères de la <i>règle d'Ottawa pour la cheville</i>, nous recommandons la radiographie comme modalité d'imagerie initiale.</p> <p>Une série de radiographies de la cheville n'est nécessaire qu'en cas de douleur près des malléoles et de l'une des constatations suivantes : Ne peuvent pas supporter leur propre poids à la fois immédiatement après la lésion et dans le service des urgences (4 pas) OU éprouvent une sensation douloureuse osseuse sur les 6 cm distaux du bord postérieur ou de la pointe de l'une ou l'autre des malléoles.</p> <p>↳ 1.1 Dans les cas où la radiographie est négative ou ne permet pas de poser un diagnostic et qu'un doute clinique persiste concernant une lésion <u>osseuse</u>, nous suggérons une TDM comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>↑</p>
<p>T15. Traumatisme aigu du pied</p>	<p>1. Chez un patient ayant subi un traumatisme aigu du pied avec suspicion de fracture, nous recommandons une radiographie du pied comme modalité d'imagerie initiale.</p> <p>↳ 1.1 Dans les cas où la radiographie est négative ou ne permet pas de poser un diagnostic et qu'un doute clinique persiste concernant une lésion <u>osseuse</u>, nous suggérons une TDM comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>↑</p>
<p>T16. Lésion superficielle des tissus mous avec corps étranger</p>	<p>1. Chez un patient ayant une lésion superficielle suspectée des tissus mous causée par un corps étranger, nous recommandons une radiographie comme modalité d'imagerie initiale.</p> <p>↳ 1.1 Dans les cas où aucun corps étranger n'est décelé sur les radiographies et où il persiste néanmoins un doute clinique sur la présence d'un corps étranger, nous recommandons une échographie comme modalité d'imagerie subséquente.</p>	<p>↑↑</p> <p>↑↑</p>
	<p>1. Chez un adulte ayant subi un traumatisme mineur du thorax avec faible suspicion de lésion cliniquement significative*, nous ne suggérons aucune imagerie.</p>	<p>↓</p>

Les recommandations des lignes directrices portent sur le choix de la modalité d'imagerie, et non sur la prise en charge de patients individuels dans des contextes où les modalités ne sont pas disponibles. À noter cependant que l'imagerie ne doit pas retarder une gestion décisive. Par ailleurs, ces recommandations ne sont pas conçues pour être utilisées seules. Les soins médicaux doivent reposer sur des données probantes, le jugement expert d'un clinicien, la situation, les valeurs et les préférences d'un patient, ainsi que sur la disponibilité des ressources. Nous sommes conscients que certaines modalités d'imagerie ne sont pas disponibles partout, en particulier dans les zones rurales et isolées du Canada. Il peut être difficile de décider s'il vaut mieux transporter un patient pour obtenir l'imagerie recommandée ou effectuer localement un autre type d'imagerie ou des examens cliniques/observations à répétition; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au transport, des préférences du patient et d'autres facteurs. La présente ligne directrice repose sur des données probantes liées uniquement aux tests d'imagerie diagnostique et non à la gestion clinique du patient.

Scénario clinique/diagnostique	Recommandation	Force de la recommandation
<p>TDM : tomodensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation: ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPC: Consensus d'un panel d'experts</p>		
<p>T17. Traumatisme aigu du thorax chez l'adulte</p>	<p>2. Chez l'adulte ayant subi un traumatisme modéré à sévère du thorax, nous recommandons une radiographie comme modalité d'imagerie initiale, avant de poursuivre avec une TDM s'il y a un doute clinique ou radiologique quelconque.</p>	<p>↑↑</p>
<p>T18. Traumatisme aigu du thorax chez l'enfant</p>	<p>1. Chez un enfant ayant subi un traumatisme mineur du thorax avec une faible suspicion de lésion cliniquement significative, nous ne suggérons aucune imagerie.</p> <p>2. Chez l'enfant ayant subi un traumatisme modéré à sévère du thorax, nous recommandons une radiographie comme modalité d'imagerie initiale, avant de poursuivre avec une TDM s'il y a un doute clinique ou radiologique quelconque.</p>	<p>↓</p> <p>↑↑</p>
<p>T19. Traumatisme aigu de l'abdomen chez l'adulte</p>	<p>1. Chez un adulte ayant subi un traumatisme abdominal et chez lequel on suspecte une lésion interne, nous recommandons une TDM comme modalité d'imagerie initiale.</p> <p>↳ 1.1 Dans un contexte clinique spécifique où une TDM n'est pas disponible, nous suggérons d'avoir recours à une échographie tout en ayant conscience de ses nombreuses limites.</p> <p>2. Chez l'adulte chez qui on suspecte une lésion de la vessie, après un examen clinique et une TDM initiale de l'abdomen et du pelvis, nous suggérons une uro-TDM (cystographie sous TDM).</p>	<p>↑↑</p> <p>↑</p> <p>↑</p>
<p>T20. Traumatisme aigu de l'abdomen chez l'enfant</p>	<p>1. Chez un enfant ayant subi un traumatisme abdominal et chez qui on suspecte une lésion interne, nous recommandons une TDM comme modalité d'imagerie initiale.</p> <p>↳ 1.1 Dans un contexte clinique spécifique où une TDM n'est pas disponible, nous suggérons d'avoir recours à une échographie tout en ayant conscience de ses nombreuses limites.</p> <p>2. Chez un enfant chez qui on suspecte une lésion de la vessie, après un examen clinique et une TDM initiale de l'abdomen et du pelvis, nous suggérons une uro-TDM (cystographie sous</p>	<p>↑↑</p> <p>↑</p> <p>↑</p>

Les recommandations des lignes directrices portent sur le choix de la modalité d'imagerie, et non sur la prise en charge de patients individuels dans des contextes où les modalités ne sont pas disponibles. À noter cependant que l'imagerie ne doit pas retarder une gestion décisive. Par ailleurs, ces recommandations ne sont pas conçues pour être utilisées seules. Les soins médicaux doivent reposer sur des données probantes, le jugement expert d'un clinicien, la situation, les valeurs et les préférences d'un patient, ainsi que sur la disponibilité des ressources. Nous sommes conscients que certaines modalités d'imagerie ne sont pas disponibles partout, en particulier dans les zones rurales et isolées du Canada. Il peut être difficile de décider s'il vaut mieux transporter un patient pour obtenir l'imagerie recommandée ou effectuer localement un autre type d'imagerie ou des examens cliniques/observations à répétition; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au transport, des préférences du patient et d'autres facteurs. La présente ligne directrice repose sur des données probantes liées uniquement aux tests d'imagerie diagnostique et non à la gestion clinique du patient.

Scénario clinique/diagnostique	Recommandation	Force de la recommandation
TDM : tomodensitométrie; IRM : imagerie par résonance magnétique; OPG : orthopantomographie; Force de la recommandation : ↑↑: fortement en faveur; ↑: en faveur sous certaines conditions; ↓: contre sous certaines conditions; ↓↓: fortement contre; EPC : Consensus d'un panel d'experts		
TDM.		
T21. Traumatisme non accidentel	<ol style="list-style-type: none"> 1. Chez un enfant chez qui on suspecte un traumatisme non accidentel, nous recommandons une étude radiographique du squelette entier comme modalité d'imagerie initiale. 2. Si un traumatisme crânien non accidentel est suspecté, en particulier chez les très jeunes enfants, nous suggérons une TDM de la tête. Pour les enfants plus âgés, veuillez consulter la section T02. Traumatisme crânien aigu chez l'enfant . 	↑↑ ↑

Les recommandations des lignes directrices portent sur le choix de la modalité d'imagerie, et non sur la prise en charge de patients individuels dans des contextes où les modalités ne sont pas disponibles. À noter cependant que l'imagerie ne doit pas retarder une gestion décisive. Par ailleurs, ces recommandations ne sont pas conçues pour être utilisées seules. Les soins médicaux doivent reposer sur des données probantes, le jugement expert d'un clinicien, la situation, les valeurs et les préférences d'un patient, ainsi que sur la disponibilité des ressources. Nous sommes conscients que certaines modalités d'imagerie ne sont pas disponibles partout, en particulier dans les zones rurales et isolées du Canada. Il peut être difficile de décider s'il vaut mieux transporter un patient pour obtenir l'imagerie recommandée ou effectuer localement un autre type d'imagerie ou des examens cliniques/observations à répétition; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au transport, des préférences du patient et d'autres facteurs. La présente ligne directrice repose sur des données probantes liées uniquement aux tests d'imagerie diagnostique et non à la gestion clinique du patient.

APPENDIX 4. POTENTIALLY RELEVANT NON-ENGLISH GUIDELINES

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Appendix 4. Potentially relevant non-English guidelines

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Appendix 5. AGREE-II ASSESSMENTS OF INCLUDED GUIDELINES

APPENDIX 5. AGREE-II ASSESSMENTS

Guideline	Domain 1				Domain 2				Domain 3							Domain 4				Domain 5					Domain 6			Overall quality		
	1	2	3	Score (%)	4	5	6	Score (%)	7	8	9	10	11	12	13	14	Score (%)	15	16	17	Score (%)	18	19	20	21	Score (%)	22		23	Score (%)
ACR Head 2016 [21]	2	2	2	6 (67)	3	2	2	7 (78)	2	2	2	3	3	3	1	3	19 (79)	3	3	3	9 (100)	1	2	1	1	5 (42)	2	2	4 (67)	Moderate
NICE CG176 2019 [22]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	2	3	3	3	3	23 (96)	3	3	3	9 (100)	3	3	3	1	10 (83)	3	3	6 (100)	High
RCR 2017 [23]	3	3	3	9 (100)	3	2	3	8 (89)	3	3	3	3	3	1	3	1	20 (83)	3	3	3	9 (100)	3	2	3	1	9 (75)	2	2	4 (67)	High
ACR Head-child 26]	2	2	3	7 (78)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	3	1	3	9 (75)	2	3	5 (83)	Moderate
CDC 2018 [27]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	2	23 (96)	3	3	3	9 (100)	2	3	1	2	8 (67)	3	3	6 (100)	High
Italian Gdl. 2018 [28]	3	2	3	8 (89)	3	3	3	9 (100)	3	3	3	3	3	3	3	3	24 (100)	3	3	3	9 (100)	3	3	3	3	12 (100)	3	3	6 (100)	High
Scand. Gdl. 2016 [29]	3	3	3	9 (100)	3	1	3	7 (78)	3	3	3	3	3	3	2	3	23 (96)	3	3	3	9 (100)	3	3	1	3	10 (83)	1	3	4 (67)	High
ACR Orbits 2018 [32]	2	2	2	6 (67)	3	2	3	8 (89)	2	2	2	3	3	3	1	3	19 (79)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	2	4 (67)	Moderate
ACR Spine 2019 [33]	2	2	3	7 (78)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	3	1	3	9 (75)	2	2	4 (67)	Moderate
NICE NG41 2016 [34]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	3	24 (100)	3	3	3	9 (100)	3	3	3	1	10 (83)	3	3	6 (100)	High
SCC 2019 [35]	3	2	2	7 (78)	3	1	2	6 (67)	3	2	2	3	2	3	1	1	17 (71)	3	3	3	9 (100)	2	2	1	3	8 (67)	3	3	6 (100)	Moderate
WFNS 2020 [36]	3	2	2	7 (78)	2	1	2	5 (56)	3	2	1	3	3	3	1	1	17 (71)	3	3	3	9 (100)	2	2	1	1	6 (50)	1	3	4 (67)	Moderate
ACR Spine ch 2019 [38]	3	2	3	8 (89)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	3	8 (67)	2	2	4 (67)	Moderate

Appendix 5. AGREE-II ASSESSMENTS OF INCLUDED GUIDELINES

Guideline	Domain 1				Domain 2				Domain 3							Domain 4				Domain 5					Domain 6			Overall quality			
	1	2	3	Score (%)	4	5	6	Score (%)	7	8	9	10	11	12	13	14	Score (%)	15	16	17	Score (%)	18	19	20	21	Score (%)	22		23	Score (%)	
PCSC 2019 [39]	2	3	3	8 (89)	3	1	3	7 (78)	3	3	1	3	3	2	1	1	17 (71)	3	3	3	9 (100)	3	3	1	3	10 (83)	2	2	4 (67)	Moderate	
ACR Pn Neck 2017 [40]	2	2	2	6 (67)	3	2	3	8 (89)	2	2	2	3	3	3	1	3	19 (79)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	2	4 (67)	Moderate	
EAST Cereb. 2020 [41]	3	3	3	9 (100)	1	1	2	4 (44)	3	3	3	2	2	3	1	1	18 (75)	3	3	3	9 (100)	2	2	1	3	8 (67)	1	3	4 (67)	Moderate	
WFNS 2020 [42]	3	2	3	8 (89)	2	1	2	5 (56)	3	3	2	2	2	3	1	1	17 (71)	3	3	3	9 (100)	2	2	1	1	6 (50)	1	3	4 (67)	Moderate	
CNS 2019 [43]	3	3	3	9 (100)	2	1	3	6 (67)	3	3	3	2	2	3	1	3	20 (83)	3	3	3	9 (100)	2	1	1	1	5 (42)	3	3	6 (100)	Moderate	
CNS 2018 [44]	3	3	3	9 (100)	3	1	3	7 (78)	3	3	3	3	3	2	3	3	23 (96)	3	3	3	9 (100)	2	2	1	3	8 (67)	2	3	5 (83)	Moderate	
KSR 2018 [45]	3	3	2	8 (89)	3	3	2	8 (89)	3	3	3	3	3	3	3	1	22 (92)	3	3	3	9 (100)	3	3	1	2	9 (75)	2	3	5 (83)	High	
DGOU 2018 [46]	3	2	3	8 (89)	3	1	3	7 (78)	3	3	2	2	3	3	1	1	18 (75)	3	3	2	8 (89)	1	1	1	3	6 (50)	3	3	6 (100)	Moderate	
ACR Hip 2019 [47]	2	2	2	6 (67)	3	2	3	8 (89)	3	2	2	3	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	3	1	1	7 (58)	2	2	4 (67)	Moderate
NICE CG124 2017 [48]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	3	24 (100)	3	3	3	9 (100)	3	3	3	3	12 (100)	3	3	6 (100)	High	
NICE NG37 2016 [49]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	3	24 (100)	3	3	3	9 (100)	3	3	3	1	10 (83)	3	3	6 (100)	High	
WSES Pelvic 2017 [50]	3	3	2	8 (89)	2	1	2	5 (56)	3	3	3	3	2	3	1	1	19 (79)	3	3	3	9 (100)	3	3	1	1	8 (67)	3	3	6 (100)	Moderate	
ACR Should. 2018 [51]	1	1	2	4 (44)	3	2	3	8 (89)	2	1	2	3	3	3	1	3	18 (75)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	2	4 (67)	Moderate	
ESSR 2018 [52]	3	2	2	7 (78)	3	1	2	6 (67)	3	3	2	3	2	2	1	1	17 (71)	2	2	2	6 (67)	2	2	1	1	6 (50)	3	3	6 (100)	Moderate	

Appendix 5. AGREE-II ASSESSMENTS OF INCLUDED GUIDELINES

Guideline	Domain 1				Domain 2				Domain 3							Domain 4				Domain 5					Domain 6			Overall quality		
	1	2	3	Score (%)	4	5	6	Score (%)	7	8	9	10	11	12	13	14	Score (%)	15	16	17	Score (%)	18	19	20	21	Score (%)	22		23	Score (%)
ACR Hand 2019 [53]	3	1	2	6 (67)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	3	1	3	9 (75)	2	3	5 (83)	Moderate
NICE NG38 2016 [54]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	3	24 (100)	3	3	3	9 (100)	3	3	3	3	12 (100)	3	3	6 (100)	High
ACR Knee 2020 [55]	2	2	3	7 (78)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	2	7 (58)	2	3	5 (83)	Moderate
AAST-WSES 2020 [56]	3	1	2	6 (67)	2	1	2	5 (56)	3	2	3	3	2	2	1	1	17 (71)	2	3	3	8 (89)	1	1	1	3	6 (50)	1	3	4 (67)	Moderate
ESSKA 2020 [57]	2	3	3	8 (89)	3	1	3	7 (78)	2	2	3	3	3	3	3	1	20 (83)	2	3	2	7 (78)	2	2	1	3	8 (67)	3	3	6 (100)	Moderate
ACR Ankle 2020 [59]	2	2	3	7 (78)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	3	8 (67)	2	3	5 (83)	Moderate
ESSKA-AFAS 2016 [60]	3	2	3	8 (89)	2	1	2	5 (56)	3	3	2	1	1	3	1	1	15 (63)	3	3	2	8 (89)	1	1	2	1	5 (42)	1	1	2 (33)	Low
ACR Foot 2020 [63]	3	2	3	8 (89)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	3	8 (67)	2	2	4 (67)	Moderate
ACR Rib 2019 [64]	2	2	2	6 (67)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	3	5 (83)	Moderate
ACR Chest 2020 [65]	2	2	2	6 (67)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	2	4 (67)	Moderate
NICE NG39 2016 [66]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	3	24 (100)	3	3	3	9 (100)	3	3	3	1	10 (83)	3	3	6 (100)	High
WSES Eso. 2019 [67]	3	3	2	8 (89)	2	1	2	5 (56)	3	2	3	2	3	2	3	1	19 (79)	3	3	3	9 (100)	2	2	1	3	8 (67)	3	3	6 (100)	Moderate
ACR Pen-Ab. 2019 [68]	2	2	1	5 (56)	3	2	3	8 (89)	3	2	2	3	3	3	1	3	20 (83)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	2	4 (67)	Moderate
EAST Diaph. 2018 [69]	3	3	3	9 (100)	2	1	2	5 (56)	3	3	3	2	3	3	3	1	21 (88)	3	3	3	9 (100)	2	2	1	2	7 (58)	3	3	6 (100)	Moderate

Appendix 5. AGREE-II ASSESSMENTS OF INCLUDED GUIDELINES

Guideline	Domain 1				Domain 2				Domain 3							Domain 4				Domain 5					Domain 6			Overall quality		
	1	2	3	Score (%)	4	5	6	Score (%)	7	8	9	10	11	12	13	14	Score (%)	15	16	17	Score (%)	18	19	20	21	Score (%)	22		23	Score (%)
EAST Blad. 2018 [70]	3	3	3	9 (100)	3	2	2	7 (78)	3	3	3	3	3	3	2	1	21 (88)	3	3	3	9 (100)	2	2	1	2	7 (58)	1	3	4 (67)	High
French Gdl. 2020 [71]	3	3	3	9 (100)	3	1	3	7 (78)	2	1	2	3	3	3	1	1	16 (67)	3	3	3	9 (100)	2	3	1	1	7 (58)	2	3	5 (83)	Moderate
WSES-AAST 2019 [72]	2	2	3	7 (78)	2	1	2	5 (56)	3	1	3	3	3	2	1	1	17 (71)	3	3	3	9 (100)	3	2	1	3	9 (75)	3	3	6 (100)	Moderate
WSES Splen. 2017 [73]	3	1	3	7 (78)	2	1	2	5 (56%)	3	3	3	3	2	3	1	1	19 (79)	3	3	3	9 (100)	3	3	1	1	8 (67)	3	3	6 (100)	Moderate
WSES Liver 2020 [74]	3	2	3	8 (89)	2	1	2	5 (56%)	3	3	3	3	2	2	1	1	18 (75)	3	3	3	9 (100)	3	3	1	1	8 (67)	3	3	6 (100)	Moderate
ACR Abuse 2017 [75]	2	2	3	7 (78)	3	2	3	8 (89)	2	2	2	3	3	3	1	3	19 (79)	3	3	3	9 (100)	2	2	1	3	8 (67)	2	3	5 (83)	Moderate
German Gdl. 2019 [76]	3	2	3	8 (89)	3	1	2	6 (67)	2	2	2	2	3	2	3	1	17 (71)	3	3	3	9 (100)	2	3	1	2	8 (67)	3	3	6 (100)	Moderate
RCR 2018 [77]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	2	3	2	3	3	22 (92)	3	3	3	9 (100)	3	3	3	3	12 (100)	3	3	6 (100)	High