THORACIC GUIDELINE

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Canadian Association of Radiologists
L'Association canadienne des radiologistes

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ABBREVIATIONS

ACR	American College of Radiology
AGREE-II	Appraisal of Guidelines for Research & Evaluation Instrument
AI	Artificial Intelligence
CAR	Canadian Association of Radiologists
CT	Computed Tomography
EP	Expert Panel
EtD	Evidence to Decision
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HRCT	High-resolution computed tomography
MRI	Magnetic Resonance Imaging
NICE	National Institute for Health and Care Excellence
RCR	Royal College of Radiologists
US	Ultrasound
XR	Radiograph

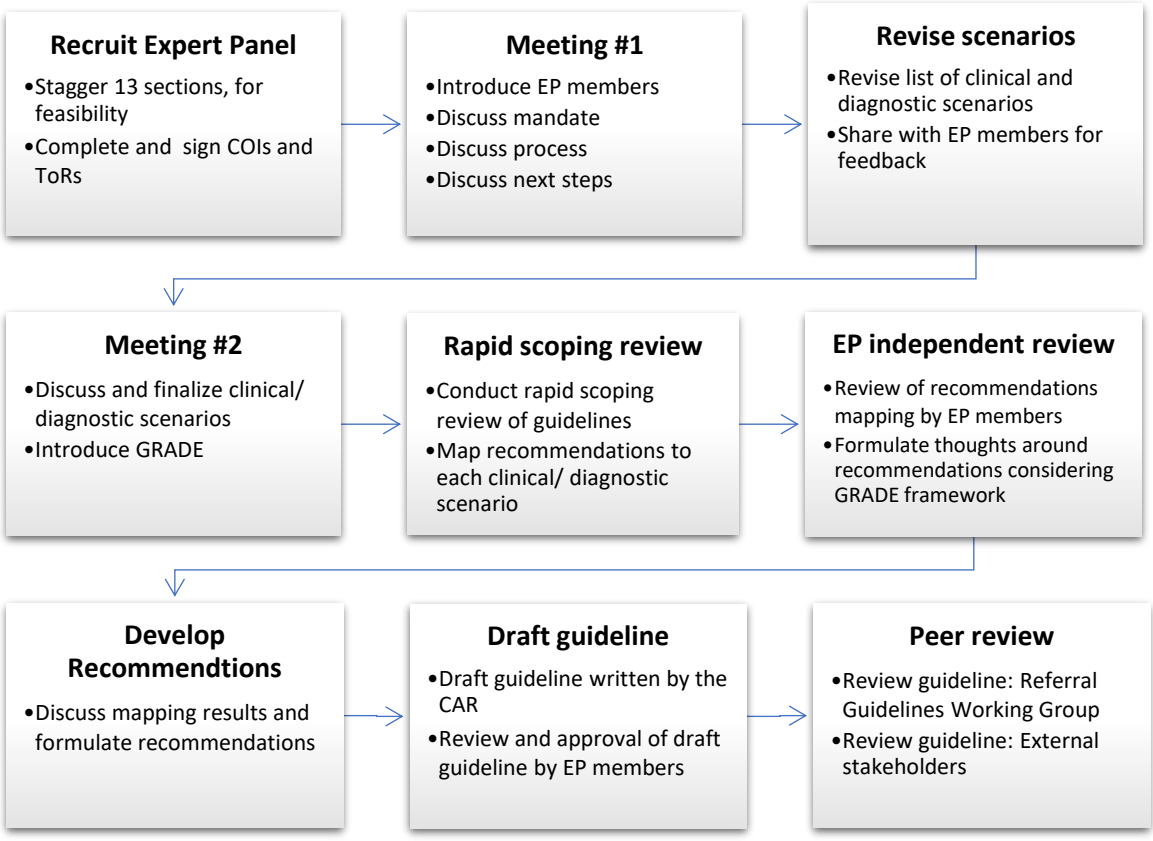
INTRODUCTION

The diagnostic imaging referral recommendations from the Canadian Association of Radiologists (CAR) were published in 2012 (https://car.ca/patient-care/referral-guidelines/). These recommendations were made up of 13 sections, of which one was Thoracic. In 2020, the CAR, funded by the Canadian Medical Association (CMA), developed a plan to update the CAR diagnostic imaging referral recommendations. The project mandate is to develop a comprehensive set of evidenced-based diagnostic imaging referral guidelines suited for integration into CDS systems.

An Expert Panel (EP) made up of thoracic radiologists, respirologists, a family physician, an emergency physician, a patient representative, and an evidence review/ guideline methodologist from across Canada met over a series of four meetings from November 2022 to April 2023.

The 26 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 24 clinical/diagnostic scenarios was created, which informed the systematic search strategy and rapid scoping review.

The general process of the guideline development is presented in **Figure 1**.



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, and allied health providers); however, they may also be used by radiologists, patients, and/or patient representatives.

The primary objective of the recommendations is to promote the most appropriate diagnostic imaging procedure(s), so that patients receive these procedure(s) at the right time, resulting in better health outcomes.

Scope

The guideline recommendations are designed to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring.

DISCLAIMER

These recommendations are not intended to stand alone. Medical care should be based on evidence, the patient's presentation, 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

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 [1], the Cochrane Handbook [2], and the rapid review interim guidance from the Cochrane Rapid Review Methods Group [3].

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 Thoracic EP.

Study design: Guidelines that were produced using three criteria in the AGREE-II assessment tool [4]:

(1) Systematic methods were used to search for evidence: Searched and named at least 1 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: Any diagnostic imaging modality (e.g., radiograph [XR], magnetic resonance imaging [MRI], computed tomography [CT], ultrasound [US]) were included.

Date of publication: To identify the most recent guidelines, which would contain the most recently published primary studies, and for feasibility, we included guidelines that were published or updated in 2017 and onward.

Language of publication: English, for feasibility.

Search

A systematic search strategy was developed by an experience information specialist (**Appendix 1**) using the list of clinical/diagnostic scenarios identified by the Thoracic EP members. The search was run in Medline and Embase on January 5, 2023. The search was limited to publications from 2017 onward to capture the most recent guidelines, and for feasibility. 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 [5], one 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 [6,7]. 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 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 and subsequent consensus. 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 reviewer evaluated the full texts of the guidelines against the eligibility criteria described above in the Inclusion Criteria.

Mapping

Recommendations were extracted from all included guidelines by one reviewer and presented in tabular form for each clinical/ diagnostic scenario. A synopsis (i.e., a condensed version of the evidence table) for each clinical/ diagnostic scenario was created based on the information in the evidence tables. These synopses highlighted the main recommendations across guidelines, with a focus on guidelines that used GRADE, and highlighted any discordant recommendations. These synopses were produced by the guideline methodologist and distributed to the EP members to help guide discussion when formulating the recommendations.

Critical appraisal

Each guideline was assessed for the level of quality using the AGREE-II instrument [4]. This was performed by one reviewer with a quality control check on a random sample of 10% of the guidelines.

FORMULATING RECOMMENDATIONS

Over two virtual meetings (April 4th and April 15th), the EP members discussed each of the clinical 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, for the next imaging modality or an alternative to the first imaging modality, in situations where the first imaging modality is negative, indeterminate, may not be available, or if additional imaging is required.

Specifying contrast protocols

The recommendations do not specify when contrast should or should not be used, as this decision may vary based on clinical presentation, regional practice preferences, preference of the referring clinician, radiologist and patient, and resource availability.

Grading of Recommendations Assessment, Development and Evaluation

The Grading of Recommendations Assessment, Development and Evaluation (GRADE) for Guidelines framework [8,9] 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 [10]. Therefore, this information was inferred by the level and strength of the evidence provided in the included guidelines.

(ii) We covered 24 clinical/diagnostic scenarios in the Thoracic section, which could have included several diagnostic imaging modality comparisons. This would have resulted in a minimum of 24 EtD frameworks, but realistically many more, as we would have had to create an EtD for each comparison (e.g., XR vs US, XR vs CT, MRI vs CT) 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; and
- Resource use and costs.

The strength and direction of the recommendations are represented by arrow directions and colours. Using GRADE as a guide [8], 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; however 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; however 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; however 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 8466 records were identified through the electronic database searches. After reviewing 2138 records, the AI reviewer excluded the remaining records (n=6328), as 97% of the predicted included records had been identified and the likelihood for inclusion of the remaining records was low (highest remaining prediction score of 4.25%). A second reviewer screened a set of randomly selected records (n=1701) for verification (~10% of included and 20% of excluded records). Among these, there were 23 conflicts, all between the two human screeners. These conflicts were resolved through discussion. An additional seven records were added from the supplemental searching. The full text for one record was not retrievable, and 19 records were published in non-English languages (**Appendix 4**). Among the remaining 135 full texts that were screened for eligibility, 19 were not guidelines providing diagnostic imaging recommendations for thoracic imaging, 25 were not covered by the current guideline, 31 did not use systematic methods or sufficiently describe the methods used in the formulation of the guideline, and eight were excluded for 'other' reasons. A list of excluded records with reasons is available upon request. Recommendations from 30 guidelines (32 publications) were included (**Figure 2 - PRISMA flow diagram**).

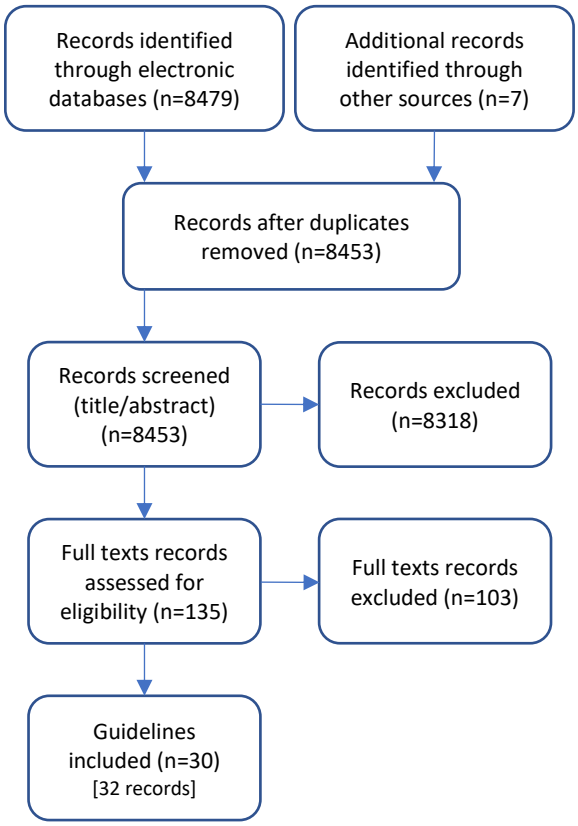


Figure 2 - PRISMA flow diagram

The number of guidelines included per clinical/diagnostic scenario ranged from zero to ten. Where available, the certainty of the evidence and/or strength of the recommendations are highlighted to provide a sense of the certainty of the evidence of the included primary studies (**Appendix 2**).

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 [10], the Oxford Centre for Evidence-based Medicine 2009 and 2011 [11,12], Level of Appropriateness (American College of Radiologists), 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 [13].

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 [14];
- Effective doses are measured using reference phantoms with population, age and sex-averaged tissue weighting factors [14], 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 [15], 2007[16]) 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 [17]; 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 members of the CAR Diagnostic Imaging Referral Guidelines Working Group (**Box 1**), members of the Canadian Society of Thoracic Radiology (Carole Dennie, Elsie Nguyen, Carolina Souza, Jana Taylor).

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

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Italicized name is a WG member who was also a member of the Thoracic Expert Panel.

THORACIC CLINICAL/DIAGNOSTIC SCENARIOS

There are clinical/diagnostic scenarios that may pertain to more than one CAR guideline section. For example, sinusitis could be relevant to both the Head and Neck section and the Thoracic section. Where applicable, we have pointed to other guideline sections within the recommendations.

TH01. Screening/Asymptomatic individuals
- TH01A. Pre-employment screening
- TH01B. Asbestos exposure
- TH01C. Routine in-patient radiographs

TH02. Non-specific chest pain

TH03. Hospital admission for non-thoracic conditions

TH04. Long-term care admission

TH05. Routine pre-operative

TH06. Post-interventional chest procedures

TH07. Upper respiratory tract infection

TH08. Acute exacerbation of asthma

TH09. Acute exacerbation of COPD

TH10. Suspected pneumonia

TH11. Pneumonia follow-up

TH12. Immunosuppressed patient with respiratory symptoms/ febrile neutropenia

TH13. Chronic cough

TH14. Suspected pneumothorax (non-traumatic)

TH15. Clinically suspected pleural effusion

TH16. Hemoptysis

TH17. Chronic dyspnea of non-cardiovascular origin

TH18. Suspected interstitial lung disease

TH19. Incidental lung nodule

TH20. Suspected mediastinal lesion

TH21. Suspected mediastinal lymphadenopathy

TH22. Elevated diaphragm on chest radiograph

The guideline recommendations are designed to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

RECOMMENDATIONS

TH01. Screening/Asymptomatic individuals

TH01A. Pre-employment screening

Recommendations

1. For most individuals we recommend **against routine chest XR** for pre-employment screening, except in specific circumstances (see Recommendation 2) (↓↓).
2. In individuals at high-risk for tuberculosis or in certain occupations (e.g., deep water divers), we recommend **routine chest XR** if one has not been done recently (↑↑).
3. In individuals with positive latent tuberculosis testing, we recommend **chest XR** to exclude active tuberculosis (↑↑).

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH01A**).

TH01B. Asbestos exposure

Recommendations

1. In asymptomatic individuals who have had occupational exposure to asbestos and require imaging for documentation or confirmation of injury, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **1.1** In individuals with equivocal chest XR and/or a high clinical suspicion for occupational lung disease, we recommend **high-resolution CT** as the next imaging modality (EP consensus).

Recommendations from one guideline were used during the discussions and formulation of these recommendations: the American College of Radiology guideline on Occupational lung disease [20] (**Appendix 2: Table TH01B**).

TH01C. Routine in-patient radiographs

Recommendations

1. In hospitalized patients, we recommend **against routine chest XR** (EP consensus).

Refer to TH03 for Hospital admission for non-thoracic conditions.

No guidelines were identified for this clinical scenario.

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TH02. Non-specific chest pain

Recommendations

In patients with non-specific chest pain (non-cardiac origin), imaging should be guided by clinical assessment, ECG, and serum biomarkers.

1. In stable patients where imaging is clinically or biochemically indicated, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **1.1** If the chest XR is normal or equivocal, we suggest that further investigations should be guided after clinical consideration of etiology✧ (EP consensus).

✧For example, musculoskeletal, abdominal, pulmonary, cardiovascular, esophageal

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the American College of Radiology Appropriateness Criteria on acute non-specific chest pain [21], the Canadian Association of Radiologist guideline Thoracic section [18], and the Royal College of Radiologists guideline Chest and Cardiovascular section [19] (**Appendix 2: Table TH02**).

TH03. Hospital admission for non-thoracic conditions

Recommendations

1. In patients being admitted to hospital for non-thoracic conditions, we recommend **against routine chest XR** (↓↓).

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], and the American College of Radiology guideline on routine chest imaging [22] (**Appendix 2: Table TH03**).

TH04. Long-term care admission

Recommendations

1. In individuals who are being admitted to long-term care, we recommend referring to the local practice guidelines to guide imaging (↑↑).

Recommendations from one guideline was used during the discussions and formulation of these recommendations: the American College of Radiology Appropriateness Criteria on imaging of possible tuberculosis [23] (**Appendix 2: Table TH04**).

TH05. Routine pre-operative

Recommendations

1. In patients undergoing non-cardiothoracic surgery, we suggest **against routine pre-operative chest XR** (↓).
2. In patients undergoing cardiothoracic surgery, we suggest **routine pre-operative chest XR** (↑).

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3. In frail elderly patients and in those with significant cardiorespiratory disease, we suggest **routine pre-operative chest XR** (↑).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American College of Radiology Appropriateness Criteria guideline on routine chest imaging [22], the Indian Society of Anaesthesiologists guideline on preoperative investigations [24], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH05**).

TH06. Post-interventional chest procedures

Recommendations

1. In patients who have undergone a chest procedure, including cardiothoracic surgery, we suggest **routine post-interventional chest XR** in situations where clinical judgement may not be sensitive to potential complications, including post transthoracic interventions (e.g., lung biopsy, central line, nasogastric tube, endotracheal tube placement, thoracentesis, chest tube, etc.) (↑).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the German S3 Guideline on the management of spontaneous pneumothorax and post-interventional pneumothorax [25], and the Perioperative Anesthesia Care in Thoracic surgery guideline on intraoperative and postoperative care [26] (**Appendix 2: Table TH06**).

TH07. Upper respiratory tract infection

Recommendations

1. In patients with uncomplicated upper respiratory tract infection, we recommend **against chest XR** (↓↓).

*For recommendations on sinusitis, see Head and Neck clinical scenario **H01A**. Sinus disease: Acute and chronic sinusitis.*

2. In patients with clinical suspicion of pneumonia, acute tracheobronchitis with other comorbid conditions, we suggest **chest XR** as the initial imaging modality (↑).

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH07**).

TH08. Acute exacerbation of asthma

Recommendations

1. In patients with acute asthma exacerbation without clinical concern for complications, we suggest against **chest XR** (↓).
2. In patients with acute asthma exacerbation with clinical concern for complications✧, we recommend **chest XR** as the initial imaging modality (↑↑).

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✧For example, clinical suspicion of pneumonia, suspected pneumomediastinum or pneumothorax, failure to respond to therapy

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the French guideline on management of severe asthma exacerbation [27], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH08**).

TH09. Acute exacerbation of COPD

Recommendations

1. In patients with acute exacerbation of COPD who do not need a referral to hospital, we suggest **against routine chest XR** (↓).
2. In patients with acute exacerbation of COPD who are referred to hospital, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **2.1** In situations where chest XR is negative or indeterminate where there is persistent clinical concern or management might be altered, we suggest **chest CT** as the next imaging modality (↑).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the NICE guideline on Chronic Obstructive Pulmonary Disease in over 16s [28], the Emergency Medicine Association of Turkey (EMAT)/Turkish Thoracic Society (TTS) Clinical Practice Guideline on management of COPD exacerbations [29], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH09**).

TH10. Suspected pneumonia

Recommendations

1. In stable outpatients with suspected pneumonia with a very high pre-test probability of pneumonia and when a chest XR would not alter management, we suggest **against chest XR** (↓).
2. In patients with abnormal vital signs secondary to suspected pneumonia, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **2.1** In patients with severe or complicated pneumonia (e.g., lung abscess, suspected empyema, or possible atypical organisms), we suggest **chest CT** as the next imaging modality (↑).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the CHEST Expert Panel guideline [30], the Lung Ultrasound in Internal Medicine (POLLUS-IM) guideline [31], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH10**).

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TH11. Pneumonia follow-up

Recommendations

1. In patients with clinical recovery of pneumonia, we do not recommend **follow-up chest XR** (↓↓).
2. In patients with persistent symptoms or physical signs of pneumonia or in those at higher risk of malignancy✧, we suggest **follow-up chest XR** at least six weeks after treatment (↑).
   - ↳ **2.1** In patients with no radiological or clinical resolution of pneumonia within the expected time (e.g., 8-12 weeks), we suggest **chest CT** as the next imaging modality (↑).

✧Smokers (>20 pack years), those >50 years old

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American Thoracic Society and Infectious Diseases Society of America guideline on diagnosis and treatment of adults with community-acquired pneumonia [32], and the Royal College of Radiologists guideline Chest and Cardiovascular section [19] (**Appendix 2: Table TH11**).

TH12. Immunosuppressed patient with respiratory symptoms/ febrile neutropenia

Recommendations

1. In immunosuppressed patients with respiratory symptoms/febrile neutropenia, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **1.1** If chest XR is normal, equivocal, or inconclusive and there remains high clinical suspicion for pulmonary infection, we recommend **low-dose chest CT** as the next imaging modality (↑↑).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American College of Radiology guideline on Acute Respiratory Illness in Immunocompromised Patients [33], and the Spanish Society of Medical Oncology guideline on management and prevention of febrile neutropenia in adults with solid tumors [34] (**Appendix 2: Table TH12**).

TH13. Chronic cough

Recommendations

Chronic cough is defined as a cough lasting 8 weeks or more.

1. In patients with chronic cough, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **1.1** In patients with normal physical exam and chest XR, we suggest **against routine chest CT** (↓).
   - ↳ **1.2** In patients with normal physical exam and chest XR and common causes of chronic cough have been excluded but there is ongoing clinical concern for etiology such as bronchiectasis, early interstitial lung disease, or lung cancer, we suggest **chest CT** as the next imaging modality (↑).

The guideline recommendations are designed to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the American College of Radiology Appropriateness Criteria guideline on chronic cough [35], the European Respiratory Society guideline on the diagnosis and treatment of chronic cough [36], and the Italian Intersociety Consensus guideline on chronic cough [37] (**Appendix 2: Table TH13**).

TH14. Suspected pneumothorax (non-traumatic)

Recommendations

1. In patients with suspected pneumothorax, we recommend **erect inspiratory chest XR** as the initial imaging modality (↑↑).
   - ↳ **1.1** If chest XR findings are equivocal or indeterminate and further imaging is required, we suggest **chest CT** as the next imaging modality (↑).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the German S3 Guideline on the management of spontaneous pneumothorax and post-interventional pneumothorax [25], the Lung Ultrasound in Internal Medicine (POLLUS-IM) guideline [31], and the Royal College of Radiologists guideline Chest and Cardiovascular section [19] (**Appendix 2: Table TH14**).

TH15. Clinically suspected pleural effusion

Recommendations

1. In patients with clinically suspected pleural effusion, we recommend **chest XR or bedside US (if available)** as the initial imaging modality (↑↑).
   - ↳ **1.1** If further imaging is required, we suggest **chest CT** as the next imaging modality (↑).

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American College of Radiology guideline on chronic dyspnea – non cardiovascular origin [38], the Lung Ultrasound in Internal Medicine (POLLUS-IM) guideline [31], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH15**).

TH16. Hemoptysis

Recommendations

1. In patients with trace hemoptysis, we recommend **chest XR** as the initial imaging modality (↑↑).
   - ↳ **1.1** In patients with risk factors✧ or persistent/recurrent unexplained hemoptysis, we recommend **chest CT** as a complementary imaging modality (↑↑).
2. In patients with clinically significant hemoptysis, we recommend **chest XR* and chest CT** as the initial imaging modalities (↑↑).

✧ Smoker (e.g., >20 pack years), high risk of malignancy, >40 years
* For baseline purposes

Recommendations from four guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American College of Radiology guideline on hemoptysis

The guideline recommendations are designed to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

[39], the Korean Clinical Imaging guideline for hemoptysis [40], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH16**).

TH17. Chronic dyspnea of non-cardiovascular origin

Recommendations

1. In patients with chronic dyspnea of non-cardiovascular origin, we recommend **chest XR** as the initial imaging modality (↑↑).

↳ **1.1** If chest XR is normal and clinical concern remains, any decision for further imaging should be based on clinical grounds (EP consensus).

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American College of Radiology guideline on chronic dyspnea – non cardiovascular origin [38], and the Lung Ultrasound in Internal Medicine (POLLUS-IM) guideline [31] (**Appendix 2: Table TH17**).

TH18. Suspected interstitial lung disease

Recommendations

1. In patients with suspected interstitial lung disease, we recommend **chest XR** as the initial imaging modality (↑↑).

↳ **1.1** If further imaging is required, given that chest XR does not rule out interstitial lung disease, we recommend **high-resolution CT (HRCT)** as the next imaging modality (↑↑).

Recommendations from ten guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the American College of Radiology guideline on diffuse lung disease [41], the American College of Radiology guideline on occupational lung disease [20], the American College of Radiology guideline on chronic dyspnea non-cardiovascular origin [38], the CHEST guideline on the diagnosis and management of hypersensitivity pneumonitis [42,43], the Indian Chest Society and National College of Chest Physicians guideline on the management of interstitial lung disease [44], the French practical guidelines for the diagnosis and management of idiopathic pulmonary fibrosis [45], the S2K Guideline for Diagnosis of Idiopathic Pulmonary Fibrosis [46], the Lung Ultrasound in Internal Medicine (POLLUS-IM) guideline [31], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH18**).

TH19. Incidental lung nodule

Recommendations

1. In patients with an incidental lung nodule detected on chest CT✧, we recommend following the Fleischner Society Guidelines for Management of Incidental Pulmonary Nodules Detected on CT Images (↑↑).

Fleischner Society Guidelines: https://doi.org/10.1148/radiol.2017161659

✧ Excluding CT chest as part of lung cancer screening

The guideline recommendations are designed to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, patient preference, and other factors. This guideline is based on evidence related to diagnostic imaging tests only, not the clinical management of a patient.

Recommendations from three guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], the Fleischner Society Guidelines for Management of Incidental Pulmonary Nodules Detected on CT Images [47,48], and the Royal College of Radiologists Chest and Cardiovascular section [19] (**Appendix 2: Table TH19**).

TH20. Suspected mediastinal lesion

Recommendations

1. In patients with suspected mediastinal lesion, we recommend **chest CT** as the initial imaging modality (↑↑).
   - ↳ **1.1** If further imaging is required to evaluate local invasion or to characterize tissue composition, we recommend **chest MRI** as the next imaging modality (↑↑).

Recommendations from two guidelines were used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18], and the American College of Radiology guideline on imaging of mediastinal masses [49] (**Appendix 2: Table TH20**).

TH21. Suspected mediastinal lymphadenopathy

Recommendations

1. In patients with suspected mediastinal lymphadenopathy, we recommend **chest CT** as the initial imaging modality (↑↑).

Recommendations from one guideline was used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18] (**Appendix 2: Table TH21**).

TH22. Elevated diaphragm on chest radiograph

Recommendations

1. In patients with elevated diaphragm on chest XR and suspected phrenic nerve palsy, we suggest **fluoroscopy** or **US** as the initial imaging modality (↑).

   The imaging modality may vary based on regional practice preferences and resource availability.

Recommendations from one guideline was used during the discussions and formulation of these recommendations: the Canadian Association of Radiologist guideline Thoracic section [18] (**Appendix 2: Table TH22**).

REFERENCES

[1] Peters M, Godfrey C, McInerney P, Munn Z, Tricco A, Khalil H. Chapter 11: Scoping Reviews. In: Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis. The Joanna Briggs Institute; 2020.

[2] Higgins J, Thomas J, Chandler J, Cumpston M, Li T, Page M, et al. Cochrane Handbook for Systematic Reviews of Interventions version 6.2 (updated February 2021). 2021.

[3] Garritty C, Gartlehner G, Nussbaumer-Streit B, King VJ, Hamel C, Kamel C, et al. Cochrane Rapid Reviews Methods Group offers evidence-informed guidance to conduct rapid reviews. J Clin Epidemiol 2021;130:13–22. https://doi.org/10.1016/j.jclinepi.2020.10.007.

[4] Brouwers MC, Kho ME, Browman GP, Burgers JS, Cluzeau F, Feder G, et al. AGREE II: advancing guideline development, reporting and evaluation in health care. CMAJ 2010;182:E839-842. https://doi.org/10.1503/cmaj.090449.

[5] Evidence Partners. DistillerSR 2011.

[6] Hamel C, Kelly SE, Thavorn K, Rice DB, Wells GA, Hutton B. An evaluation of DistillerSR's machine learning-based prioritization tool for title/abstract screening - impact on reviewer-relevant outcomes. BMC Med Res Methodol 2020;20:256. https://doi.org/10.1186/s12874-020-01129-1.

[7] Howard BE, Phillips J, Tandon A, Maharana A, Elmore R, Mav D, et al. SWIFT-Active Screener: Accelerated document screening through active learning and integrated recall estimation. Environ Int 2020;138:105623. https://doi.org/10.1016/j.envint.2020.105623.

[8] Andrews J, Guyatt G, Oxman AD, Alderson P, Dahm P, Falck-Ytter Y, et al. GRADE guidelines: 14. Going from evidence to recommendations: the significance and presentation of recommendations. J Clin Epidemiol 2013;66:719–25. https://doi.org/10.1016/j.jclinepi.2012.03.013.

[9] Andrews JC, Schünemann HJ, Oxman AD, Pottie K, Meerpohl JJ, Coello PA, et al. GRADE guidelines: 15. Going from evidence to recommendation-determinants of a recommendation's direction and strength. J Clin Epidemiol 2013;66:726–35. https://doi.org/10.1016/j.jclinepi.2013.02.003.

[10] Balshem H, Helfand M, Schünemann HJ, Oxman AD, Kunz R, Brozek J, et al. GRADE guidelines: 3. Rating the quality of evidence. J Clin Epidemiol 2011;64:401–6. https://doi.org/10.1016/j.jclinepi.2010.07.015.

[11] Oxford Centre for Evidence-based Medicine. Levels of Evidence 2009. https://www.cebm.ox.ac.uk/resources/levels-of-evidence/oxford-centre-for-evidence-based-medicine-levels-of-evidence-march-2009 (accessed July 22, 2021).

[12] OCEBM Levels of Evidence Working Group. The Oxford Levels of Evidence 2. Oxford Centre for Evidence-Based Medicine 2009. https://www.cebm.ox.ac.uk/resources/levels-of-evidence/ocebm-levels-of-evidence (accessed January 11, 2022).

[13] Governance: AAPM Position Statement on Radiation Risks from Medical Imaging Procedures. Policy number PS4-A. American Association of Physicists in Medicine 2018. https://www.aapm.org/org/policies/details.asp?type=PP&id=2548 (accessed January 9, 2023).

[14] ICRP. Use of dose quantities in radiological protection. ICRP Publication 147. 2021.

[15] ICRP. 1990 Recommendations of the International Commission on Radiological Protection. Report number 60 (Users Edition). 1991.

[16] ICRP. 2007 Recommendations of the International Commission on Radiological Protection. Report number 103 (Users Edition). 2007.

[17] Radiation Doses. Government of Canada: Canadian Nuclear Safety Commission 2020. http://nuclearsafety.gc.ca/eng/resources/radiation/introduction-to-radiation/radiation-doses.cfm (accessed January 3, 2023).

[18] Canadian Association of Radiologists. 2012 CAR Diagnostic Imaging Referral Guidelines. Canadian Association of Radiologists; 2012.

[19] The Royal College of Radiologists. RCR iRefer Guidelines: Making the best use of clinical radiology. London: The Royal College of Radiologists; 2017.

[20] Expert Panel on Thoracic Imaging, Cox CW, Chung JH, Ackman JB, Berry MF, Carter BW, et al. ACR Appropriateness Criteria® Occupational Lung Diseases. J Am Coll Radiol 2020;17:S188–97. https://doi.org/10.1016/j.jacr.2020.01.022.

[21] Expert Panel on Cardiac Imaging, Beache GM, Mohammed T-LH, Hurwitz Koweek LM, Ghoshhajra BB, Brown RKJ, et al. ACR Appropriateness Criteria® Acute Nonspecific Chest Pain-Low Probability of Coronary Artery Disease. J Am Coll Radiol 2020;17:S346–54. https://doi.org/10.1016/j.jacr.2020.09.006.
[22] Expert Panel on Thoracic Imaging, Bang T, Chung J, Walker C, Brixey A, Christensen J, et al. ACR Appropriateness Criteria® Routine Chest Imaging. 2022.
[23] Expert Panel on Thoracic Imaging:, Ravenel JG, Chung JH, Ackman JB, de Groot PM, Johnson GB, et al. ACR Appropriateness Criteria® Imaging of Possible Tuberculosis. J Am Coll Radiol 2017;14:S160–5. https://doi.org/10.1016/j.jacr.2017.02.022.
[24] Umesh G, Bhaskar SB, Harsoor SS, Dongare PA, Garg R, Kannan S, et al. Preoperative Investigations: Practice Guidelines from the Indian Society of Anaesthesiologists. Indian J Anaesth 2022;66:319–43. https://doi.org/10.4103/ija.ija_335_22.
[25] Schnell J, Beer M, Eggeling S, Gesierich W, Gottlieb J, Herth FJF, et al. Management of Spontaneous Pneumothorax and Post-Interventional Pneumothorax: German S3 Guideline. Respiration 2019;97:370–402. https://doi.org/10.1159/000490179.
[26] Piccioni F, Droghetti A, Bertani A, Coccia C, Corcione A, Corsico AG, et al. Recommendations from the Italian intersociety consensus on Perioperative Anesthesa Care in Thoracic surgery (PACTS) part 2: intraoperative and postoperative care. Perioper Med (Lond) 2020;9:31. https://doi.org/10.1186/s13741-020-00159-z.
[27] Le Conte P, Terzi N, Mortamet G, Abroug F, Carteaux G, Charasse C, et al. Management of severe asthma exacerbation: guidelines from the Société Française de Médecine d'Urgence, the Société de Réanimation de Langue Française and the French Group for Pediatric Intensive Care and Emergencies. Ann Intensive Care 2019;9:115. https://doi.org/10.1186/s13613-019-0584-x.
[28] NICE. Chronic obstructive pulmonary disease in over 16s: diagnosis and management. National Institute for Health and Care Excellence (NICE); 2018.
[29] Doğan NÖ, Varol Y, Köktürk N, Aksay E, Alpaydın AÖ, Çorbacıoğlu ŞK, et al. 2021 Guideline for the Management of COPD Exacerbations: Emergency Medicine Association of Turkey (EMAT) / Turkish Thoracic Society (TTS) Clinical Practice Guideline Task Force. Turk J Emerg Med 2021;21:137–76. https://doi.org/10.4103/2452-2473.329630.
[30] Hill AT, Gold PM, El Solh AA, Metlay JP, Ireland B, Irwin RS, et al. Adult Outpatients With Acute Cough Due to Suspected Pneumonia or Influenza: CHEST Guideline and Expert Panel Report. Chest 2019;155:155–67. https://doi.org/10.1016/j.chest.2018.09.016.
[31] Buda N, Kosiak W, Wełnicki M, Skoczylas A, Olszewski R, Piotrkowski J, et al. Recommendations for Lung Ultrasound in Internal Medicine. Diagnostics (Basel) 2020;10:597. https://doi.org/10.3390/diagnostics10080597.
[32] Metlay JP, Waterer GW, Long AC, Anzueto A, Brozek J, Crothers K, et al. Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America. Am J Respir Crit Care Med 2019;200:e45–67. https://doi.org/10.1164/rccm.201908-1581ST.
[33] Expert Panel on Thoracic Imaging, Lee C, Colletti PM, Chung JH, Ackman JB, Berry MF, et al. ACR Appropriateness Criteria® Acute Respiratory Illness in Immunocompromised Patients. J Am Coll Radiol 2019;16:S331–9. https://doi.org/10.1016/j.jacr.2019.05.019.
[34] Carmona-Bayonas A, Jimenez-Fonseca P, de Castro EM, Mata E, Biosca M, Custodio A, et al. SEOM clinical practice guideline: management and prevention of febrile neutropenia in adults with solid tumors (2018). Clin Transl Oncol 2019;21:75–86. https://doi.org/10.1007/s12094-018-1983-4.
[35] Expert Panel on Thoracic Imaging, Kuzniewski CT, Kizhner O, Donnelly EF, Henry TS, Amin AN, et al. ACR Appropriateness Criteria® Chronic Cough. J Am Coll Radiol 2021;18:S305–19. https://doi.org/10.1016/j.jacr.2021.08.007.
[36] Morice AH, Millqvist E, Bieksiene K, Birring SS, Dicpinigaitis P, Domingo Ribas C, et al. ERS guidelines on the diagnosis and treatment of chronic cough in adults and children. Eur Respir J 2020;55:1901136. https://doi.org/10.1183/13993003.01136-2019.
[37] De Vincentis A, Baldi F, Calderazzo M, Caliceti U, Guarnieri G, Lombardi F, et al. Chronic

cough in adults: recommendations from an Italian intersociety consensus. Aging Clin Exp Res 2022;34:1529–50. https://doi.org/10.1007/s40520-022-02154-4.
[38] Expert Panel on Thoracic Imaging:, McComb BL, Ravenel JG, Steiner RM, Chung JH, Ackman JB, et al. ACR Appropriateness Criteria® Chronic Dyspnea-Noncardiovascular Origin. J Am Coll Radiol 2018;15:S291–301. https://doi.org/10.1016/j.jacr.2018.09.015.
[39] Expert Panel on Thoracic Imaging, Olsen KM, Manouchehr-Pour S, Donnelly EF, Henry TS, Berry MF, et al. ACR Appropriateness Criteria® Hemoptysis. J Am Coll Radiol 2020;17:S148–59. https://doi.org/10.1016/j.jacr.2020.01.043.
[40] Kang M-J, Kim JH, Kim YK, Lee HJ, Shin KM, Kim JI, et al. 2018 Korean Clinical Imaging Guideline for Hemoptysis. Korean J Radiol 2018;19:866–71. https://doi.org/10.3348/kjr.2018.19.5.866.
[41] Expert Panel on Thoracic Imaging:, Hobbs SB, Chung JH, Walker CM, Bang TJ, Carter BW, et al. ACR Appropriateness Criteria® Diffuse Lung Disease. J Am Coll Radiol 2021;18:S320–9. https://doi.org/10.1016/j.jacr.2021.08.008.
[42] Fernández Pérez ER, Travis WD, Lynch DA, Brown KK, Johannson KA, Selman M, et al. Diagnosis and Evaluation of Hypersensitivity Pneumonitis: CHEST Guideline and Expert Panel Report. Chest 2021;160:e97–156. https://doi.org/10.1016/j.chest.2021.03.066.
[43] Fernández Pérez ER, Travis WD, Lynch DA, Brown KK, Johannson KA, Selman M, et al. Executive Summary: Diagnosis and Evaluation of Hypersensitivity Pneumonitis: CHEST Guideline and Expert Panel Report. Chest 2021;160:595–615. https://doi.org/10.1016/j.chest.2021.03.067.
[44] Singh S, Sharma BB, Bairwa M, Gothi D, Desai U, Joshi JM, et al. Management of interstitial lung diseases: A consensus statement of the Indian Chest Society (ICS) and National College of Chest Physicians (NCCP). Lung India 2020;37:359–78. https://doi.org/10.4103/lungindia.lungindia_275_20.
[45] Cottin V, Bonniaud P, Cadranel J, Crestani B, Jouneau S, Marchand-Adam S, et al. French practical guidelines for the diagnosis and management of idiopathic pulmonary fibrosis - 2021 update. Full-length version. Respir Med Res 2022;83:100948. https://doi.org/10.1016/j.resmer.2022.100948.
[46] Behr J, Günther A, Bonella F, Dinkel J, Fink L, Geiser T, et al. S2K Guideline for Diagnosis of Idiopathic Pulmonary Fibrosis. Respiration 2021;100:238–71. https://doi.org/10.1159/000512315.
[47] MacMahon H, Naidich DP, Goo JM, Lee KS, Leung ANC, Mayo JR, et al. Guidelines for Management of Incidental Pulmonary Nodules Detected on CT Images: From the Fleischner Society 2017. Radiology 2017;284:228–43. https://doi.org/10.1148/radiol.2017161659.
[48] Bueno J, Landeras L, Chung JH. Updated Fleischner Society Guidelines for Managing Incidental Pulmonary Nodules: Common Questions and Challenging Scenarios. Radiographics 2018;38:1337–50. https://doi.org/10.1148/rg.2018180017.
[49] Expert Panel on Thoracic Imaging, Ackman JB, Chung JH, Walker CM, Bang TJ, Carter BW, et al. ACR Appropriateness Criteria® Imaging of Mediastinal Masses. J Am Coll Radiol 2021;18:S37–51. https://doi.org/10.1016/j.jacr.2021.01.007.

APPENDIX 1. SEARCH STRATEGIES

2023 Jan 5
Ovid Multifile

Database: Embase Classic+Embase <1947 to 2023 January 04>, Ovid MEDLINE(R) ALL <1946 to January 04, 2023>
Search Strategy:
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1 Respiratory Tract Diseases/ (66229)
2 exp Bronchial Diseases/ (386206)
3 exp Granuloma, Respiratory Tract/ (4741)
4 exp Laryngeal Diseases/ (159551)
5 exp Lung Diseases/ (3190244)
6 exp Pleural Diseases/ (243948)
7 exp Respiration Disorders/ (644812)
8 exp Respiratory Hypersensitivity/ (524763)
9 exp Respiratory Tract Fistula/ (25736)
10 exp Respiratory Tract Infections/ (1124599)
11 exp Thoracic Diseases/ (805071)
12 exp Tracheal Diseases/ (53197)
13 ((airway* or (air adj way*) or bronch* or chest or laryng* or lung or lungs or lymph* or mediastin* or pleur* or pneumothora* or pneumo-thora* or pulmonar* or respirat* or thorac* or thorax* or trachea*) adj3 (disease? or disorder? or illness* or infect* or inflam* or lesion? or nodule? or pain* or syndrome?)).tw,kw,kf. (1530451)
14 Asbestosis/ (10838)
15 exp Asbestos/ and exp Environmental Exposure/ (5975)
16 (asbestos* adj3 expos*).tw,kw,kf. (16271)
17 asbestos#s.tw,kw,kf. (6119)
18 (idiopathic adj3 ((interstitial or interstitial) adj (pneumonit#s or pneumo-nit#s))).tw,kw,kf. (241)
19 ((nonspecific or non-specific or noncardi* or non-cardi* or nonheart* or non-heart* or unexplained) adj3 (chest adj3 pain*)).tw,kw,kf. (4041)
20 (NSCP or NSCPs).tw,kw,kf. (210)
21 Diagnostic Tests, Routine/ and (Long-Term Care/ or exp Nursing Homes/) (701)
22 ((longterm or long-term) adj2 (care or facility or facilities or healthcare or health care or institution or institutions) adj3 (routine* or admission* or admit* or screen*)).tw,kw,kf. (1558)
23 ((LTC or LTCF or LTCFs or RACF or RACFs or SNF or SNFs) adj3 (routine* or admission* or admit* or screen*)).tw,kw,kf. (1037)
24 Diagnostic Tests, Routine/ and Patient Admission/ (1779)
25 Diagnostic Tests, Routine/ and (admission* or admit* or inpatient? or screen*).tw,kw,kf. (15681)
26 (routine* adj3 (screen* or test*) adj10 (admission* or admit* or inpatient?)).tw,kw,kf. (1655)
27 ((preemploy* or pre-employ* or prehiring* or pre-hiring) adj3 (routine* or screen* or test*)).tw,kw,kf. (779)
28 ((preoperative* or pre-operative* or preop or "pre-op") adj3 (prepar* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (45757)
29 ((postoperative* or post-operative* or postop or "post-op") adj3 (procedur* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (71442)
30 ((postsurg* or post-surg* or postsurg or "post-surg") adj3 (procedur* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (3000)
31 ((postinterven* or post-interven*) adj3 (procedur* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (2631)
32 exp Pulmonary Embolism/ (163724)
33 ((lung or lungs or pulmon*) adj3 (embol* or microembol* or micro-embol* or thromboembol* or thrombo-embol* or infarct*)).tw,kw,kf. (154364)
34 exp Asthma/ (449791)
35 asthma*.tw,kw,kf. (450557)
36 exp Pulmonary Disease, Chronic Obstructive/ (231473)
37 (chronic adj2 (airflow* or air flow* or airway? or air way?) adj3 obstruct*).tw,kw,kf. (5723)
38 (COAD or COPD).tw,kw,kf. (165049)
39 (chronic adj2 bronchit#s).tw,kw,kf. (29463)
40 exp Pneumonia/ (704616)
41 (pneumonia* or bronchopneumonia* or broncho-pneumonia* or pleuropneumonia* or pleuro-pneumonia*).tw,kw,kf. (522788)
42 pleuris*.tw,kw,kf. (12359)
43 Febrile Neutropenia/ (39976)
44 (neutropenia* adj3 (fever* or febrile)).tw,kw,kf. (28994)
45 Pleural Effusion/ (56250)
46 ((pleura? adj1 effusion?) or pleurorrh?ea).tw,kw,kf. (75612)
47 Hemoptysis/ (39021)
48 (h?emoptys#s or h?emo-ptys#s or h?emophys#s or h?emo-phys#s or h?emoptoe).tw,kw,kf. (35195)
49 ((blood* or h?emoptoic or h?emoptysic) adj3 (expector* or sputum)).tw,kw,kf. (8668)
50 exp Dyspnea/ (258357)
51 (breathless* or dyspn?ea? or dyspn?eic).tw,kw,kf. (183694)
52 (breath* adj3 (difficult* or labo?red or problem* or shortness*)).tw,kw,kf. (49832)
53 exp Lung Diseases, Interstitial/ (188560)
54 ((interstitial or inter-stitial or diffuse) adj3 (lung disease? or pneumopath* or pneumo-path*)).tw,kw,kf. (47292)
55 Solitary Pulmonary Nodule/ (24056)
56 ((incidental or solitary or solid or subsolid* or sub-solid* or partsolid* or part-solid* or ground-glass*) adj3 nodule?).tw,kw,kf. (20394)
57 exp Lymphadenopathy/ (311522)
58 (lymphadenopath* or adenopath* or (enlarge* adj2 lymph*) or (swollen* adj2 lymph*)).tw,kw,kf. (102457)
59 ((elevated or raised) adj3 (diaphragm? or hemidiaphragm? or hemi-diaphragm?)).tw,kw,kf. (967)
60 exp Pulmonary Fibrosis/ (125741)
61 ((lung or lungs or pulmonar* or alveolit#s) adj2 (fibros* or scleros*)).tw,kw,kf. (83030)
62 (pneumoscleros* or pneumo-scleros*).tw,kw,kf. (643)
63 Pulmonary Emphysema/ (31022)
64 ((pulmonar* or centriacinar* or centrilobular* or focal or panacinar* or panlobular*) adj2 emphysema*).tw,kw,kf. (16750)
65 ((chronic* or continu* or persist* or incessant* or linger* or longterm or long-term or longlast* or long-last*) adj3 cough*).tw,kw,kf. (21084)
66 exp Tuberculosis/ (494949)
67 (tuberculos* or tuberculoma* or Koch* disease*).tw,kw,kf. (502930)
68 exp Occupational Diseases/ and exp Lung/ (12559)
69 Mass Chest X-Ray/ (218395)
70 ((chest or thorac* or thorax) adj5 (routine* adj3 (radiograph* or scan* or screen* or x-ray* or xray*))).tw,kw,kf. (4176)

Appendix 1. Search Strategies

71 Pneumothorax/ (67231)
72 (pneumothora* or pneumo-thora*).tw,kw,kf. (67179)
73 or/1-72 [THORACIC DISEASES] (6266777)
74 Diagnostic Imaging/ (283542)
75 dg.fs. [diagnostic imaging] (1411534)
76 (diagnos* adj3 (image? or imaging)).tw,kf. (133473)
77 (x-ray* or xray*).tw,kf. (954514)
78 Image Interpretation, Computer-Assisted/ (91146)
79 exp Imaging, Three-Dimensional/ (211898)
80 ((3D or 3-D or 3-dimension* or three dimension*) adj (image? or imaging)).tw,kf. (47520)
81 exp Ultrasonography/ (1439291)
82 (ultrasound* or ultrasonograph* or ultra-sonograph* or ultrasonic* or ultra-sonic*).tw,kf. (1108371)
83 (echograph* or echo-graph* or echotomograph* or echo-tomograph* or echosonograph* or echo sonograph*).tw,kf. (26133)
84 exp Radiography/ (2627981)
85 (radiograph* or radiographic imag* or roentgenograph* or roentgeno-graph*).tw,kf. (625062)
86 (fluoroscop* or fluoro-scop*).tw,kf. (89310)
87 exp Radionuclide Imaging/ (444412)
88 ((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 scintigra* or scinti-gra* or scintiphotograph* or scinti-photograph* or scintiscan* or scinti-scan* or scanograph* or lymphoscintigra* or lympho-scintigra*).tw,kf. (155909)
89 exp Tomography/ (3320896)
90 (tomograph* or tomo-graph*).tw,kf. (1169662)
91 (CAT scan* or CT scan* or PET scan* or PET imag* or PT scan* or PT imag*).tw,kf. (396112)
92 (SPECTCT or SPECT CT or "SPECT/CT").tw,kf. (17264)
93 (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. (1263842)
94 (cineradiograph* or cine-radiograph* or cinefluorograph* or cine-fluorograph* or radiocinematograph* or radio-cinematograph*).tw,kf. (4209)
95 Nuclear Medicine/ (44651)
96 ((nuclear or atomic) adj1 medicine?).tw,kf. (46985)
97 (nuclear adj1 radiolog*).tw,kf. (1223)
98 (sialogra* or salivogra* or sialoscintigra* or sialo-scintigra*).tw,kf. (3344)
99 (enteroclys* or enterogra*).tw,kf. (6232)
100 (esophagra* or oesophagra* or esophagogra* or oesophagogra*).tw,kf. (7145)
101 ((CT or virtual) adj colonoscop*).tw,kf. (1893)
102 (contrast adj (study or studies or medium)).tw,kf. (46835)
103 (cholangiopancreatogra* or cholangio-pancreatogra* or ERCP or MRCP).tw,kf. (56291)
104 cholecystogra*.tw,kf. (5474)
105 (angiograph* or angio-graph* or angiogram* or angio-gram*).tw,kf. (571510)
106 (bronchograph* or broncho-graph* or bronchogram* or broncho-gram*).tw,kf. (9331)
107 or/74-106 [IMAGING] (8307253)
108 73 and 107 [THORACIC DISEASES - IMAGING] (1240120)
109 exp Animals/ not Humans/ (17403569)
110 108 not 109 [ANIMAL-ONLY REMOVED] (982030)
111 (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. (6843345)
112 110 not 111 [OPINION PIECES, IRRELEVANT PUB TYPES REMOVED] (806922)
113 exp Guidelines as Topic/ (850697)
114 exp Clinical Protocols/ (304102)
115 Guideline.pt. (16546)
116 Practice Guideline.pt. (30196)
117 standards.fs. (766833)
118 Consensus Development Conference.pt. (12328)
119 Consensus Development Conference, NIH.pt. (801)
120 (consensus or guideline* or guidance? or standards or recommendation*).ti,kw,kf. (534290)
121 (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,kf. (301687)
122 or/113-121 [GUIDELINE FILTER] (2222602)
123 112 and 122 [THORACIC DISEASES - IMAGING - GUIDELINES] (27657)
124 limit 123 to yr="2017-current" (16013)
125 124 use medall [MEDLINE RECORDS] (2855)
126 respiratory tract disease/ (99034)
127 acute respiratory tract disease/ (3020)
128 bronchus disease/ (5881)
129 chronic aspecific respiratory tract disease/ (420)
130 chronic respiratory tract disease/ (6019)
131 diaphragm disease/ (1681)
132 larynx disorder/ (9379)
133 lung disease/ (172950)
134 mediastinum disease/ (4837)
135 painful breathing/ (93)
136 pleura disease/ (5602)
137 respiratory failure/ (127320)
138 exp respiratory function disorder/ (660843)
139 respiratory tract allergy/ (12496)
140 respiratory tract fistula/ (1737)
141 respiratory tract infection/ (114852)
142 respiratory tract inflammation/ (14656)
143 respiratory tract injury/ (956)
144 sputum discoloration/ (228)
145 trachea disease/ (3325)
146 exp tracheobronchomalacia/ (4768)
147 upper respiratory tract congestion/ (101)
148 thorax disease/ (8903)
149 chest tightness/ (7519)
150 exp mediastinum disease/ (57593)
151 obstructive airway disease/ (2519)
152 musculoskeletal chest pain/ (258)
153 noncardiac chest pain/ (1452)
154 painful breathing/ (93)
155 thorax pain/ (112941)
156 ((airway* or (air adj way*) or bronch* or chest or laryng* or lung or lungs or lymph* or mediastin* or pleur* or pneumothora* or pneumo-thora* or pulmonar* or respirat* or thorac* or thorax* or trachea*) adj3 (disease? or disorder? or illness* or infect* or

inflam* or lesion? or nodule? or pain* or syndrome?)).tw,kw,kf. (1530451)
157 asbestosis/ (10838)
158 (asbestos/ or asbestos fiber/) and exp environmental exposure/ (5548)
159 (asbestos* adj3 expos*).tw,kw,kf. (16271)
160 asbestos#s.tw,kw,kf. (6119)
161 (idiopathic adj3 ((interstitial or interstitial) adj (pneumonit#s or pneumo-nit#s))).tw,kw,kf. (241)
162 non specific chest pain/ (5)
163 ((nonspecific or non-specific or noncardi* or non-cardi* or nonheart* or non-heart* or unexplained) adj3 (chest adj3 pain*)).tw,kw,kf. (4041)
164 (NSCP or NSCPs).tw,kw,kf. (210)
165 ((longterm or long-term) adj2 (care or facility or facilities or healthcare or health care or institution or institutions) adj3 (routine* or admission* or admit* or screen*)).tw,kw,kf. (1558)
166 ((LTC or LTCF or LTCFs or RACF or RACFs or SNF or SNFs) adj3 (routine* or admission* or admit* or screen*)).tw,kw,kf. (1037)
167 hospital admission/ and (screen* or test*).ti,kw,kf. (5328)
168 (routine adj3 (screen* or test*) adj10 (admission* or admit* or inpatient?)).tw,kw,kf. (1424)
169 preemployment medical examination/ (740)
170 ((preemploy* or pre-employ* or prehiring* or pre-hiring) adj3 (routine* or screen* or test*)).tw,kw,kf. (779)
171 ((preoperative* or pre-operative* or preop or "pre-op") adj3 (prepar* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (45757)
172 ((postoperative* or post-operative* or postop or "post-op") adj3 (procedur* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (71442)
173 ((postsurg* or post-surg* or postsurg or "post-surg") adj3 (procedur* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (3000)
174 ((postinterven* or post-interven*) adj3 (procedur* or routine* or care or healthcare or health care or screen* or test*)).tw,kw,kf. (2631)
175 lung embolism/ (120886)
176 ((lung or lungs or pulmon*) adj3 (embol* or microembol* or micro-embol* or thromboembol* or thrombo-embol* or infarct*)).tw,kw,kf. (154364)
177 exp asthma/ (449791)
178 asthma*.tw,kw,kf. (450557)
179 chronic lung disease/ (17251)
180 chronic obstructive lung disease/ (214928)
181 (chronic adj2 (airflow* or air flow* or airway? or air way?) adj3 obstruct*).tw,kw,kf. (5723)
182 (COAD or COPD).tw,kw,kf. (165049)
183 (chronic adj2 bronchit#s).tw,kw,kf. (29463)
184 exp pneumonia/ (704616)
185 (pneumonia* or bronchopneumonia* or broncho-pneumonia* or pleuropneumonia* or pleuro-pneumonia*).tw,kw,kf. (522788)
186 pleuris*.tw,kw,kf. (12359)
187 exp febrile neutropenia/ (40511)
188 (neutropenia* adj3 (fever* or febrile)).tw,kw,kf. (28994)
189 exp pleura effusion/ (77449)
190 ((pleura? adj1 effusion?) or pleurorrh?ea).tw,kw,kf. (75612)
191 exp hemoptysis/ (39021)
192 (h?emoptys#s or h?emo-ptys#s or h?emophys#s or h?emo-phys#s or h?emoptoe).tw,kw,kf. (35195)
193 ((blood* or h?emoptoic or h?emoptysic) adj3 (expector* or sputum)).tw,kw,kf. (8668)
194 exp dyspnea/ (258357)
195 (breathless* or dyspn?ea? or dyspn?eic).tw,kw,kf. (183694)
196 (breath* adj3 (difficult* or labo?red or problem* or shortness*)).tw,kw,kf. (49832)
197 exp interstitial lung disease/ (188560)
198 ((interstitial or inter-stitial or diffuse) adj3 (lung disease? or pneumopath* or pneumo-path*)).tw,kw,kf. (47292)
199 lung nodule/ (26838)
200 ((incidental or solitary or solid or subsolid* or sub-solid* or partsolid* or part-solid* or ground-glass*) adj3 nodule?).tw,kw,kf. (20394)
201 exp lymphadenopathy/ (311522)
202 (lymphadenopath* or adenopath* or (enlarge* adj2 lymph*) or (swollen* adj2 lymph*)).tw,kw,kf. (102457)
203 ((elevated or raised) adj3 (diaphragm? or hemidiaphragm? or hemi-diaphragm?)).tw,kw,kf. (967)
204 exp lung fibrosis/ (98421)
205 ((lung or lungs or pulmonar* or alveolit#s) adj2 (fibros* or scleros*)).tw,kw,kf. (83030)
206 (pneumoscleros* or pneumo-scleros*).tw,kw,kf. (643)
207 exp lung emphysema/ (29049)
208 ((pulmonar* or centriacinar* or centrilobular* or focal or panacinar* or panlobular*) adj2 emphysema*).tw,kw,kf. (16750)
209 chronic cough/ (5567)
210 ((chronic* or continu* or persist* or incessant* or linger* or longterm or long-term or longlast* or long-last*) adj3 cough*).tw,kw,kf. (21084)
211 exp tuberculosis/ (494949)
212 (tuberculos* or tuberculoma* or Koch* disease*).tw,kw,kf. (502930)
213 exp occupational lung disease/ (35304)
214 thorax radiography/ (216459)
215 ((chest or thorac* or thorax) adj5 (routine* adj3 (radiograph* or scan* or screen* or x-ray* or xray*))).tw,kw,kf. (4176)
216 pneumothorax/ (67231)
217 (pneumothora* or pneumo-thora*).tw,kw,kf. (67179)
218 or/126-217 [THORACIC DISEASES] (5028654)
219 diagnostic imaging/ (283542)
220 (diagnos* adj3 (image? or imaging)).tw,kw,kf. (135134)
221 (x-ray* or xray*).tw,kw,kf. (954514)
222 computer assisted tomography/ (859021)
223 computer assisted diagnosis/ (67422)
224 exp three-dimensional imaging/ (211898)
225 ((3D or 3-D or 3-dimension* or three dimension*) adj (image? or imaging)).tw,kw,kf. (48137)
226 exp echography/ (1439291)
227 (ultrasound* or ultrasonograph* or ultra-sonograph* or ultrasonic* or ultra-sonic*).tw,kw,kf. (1108371)
228 (echograph* or echo-graph* or echotomograph* or echo-tomograph* or echosonograph* or echo sonograph*).tw,kw,kf. (26133)
229 exp radiography/ (2627981)
230 (radiograph* or radiographic imag* or roentgenograph* or roentgeno-graph*).tw,kw,kf. (625062)
231 (fluoroscop* or fluoro-scop*).tw,kw,kf. (89310)
232 exp scintiscanning/ (211293)
233 ((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 scintigra* or scinti-gra* or scintiphotograph* or scinti-photograph* or scintiscan* or scinti-scan* or scanograph* or lymphoscintigra* or lympho-scintigra*).tw,kw,kf. (156074)
234 exp tomography/ (3320896)
235 (tomograph* or tomo-graph*).tw,kw,kf. (1169662)
236 (CAT scan* or CT scan* or PET scan* or PET imag* or PT scan* or PT imag*).tw,kw,kf. (396112)
237 (SPECTCT or SPECT CT or "SPECT/CT").tw,kw,kf. (17264)
238 (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,kf. (1263842)
239 (cineradiograph* or cine-radiograph* or cinefluorograph* or cine-fluorograph* or radiocinematograph* or radio-cinematograph*).tw,kw,kf. (4209)
240 nuclear medicine/ (44651)
241 ((nuclear or atomic) adj1 medicine?).tw,kw,kf. (46987)
242 (nuclear adj1 radiolog*).tw,kw,kf. (1257)
243 (sialogra* or salivogra* or sialoscintigra* or sialo-scintigra*).tw,kw,kf. (3344)
244 (enteroclys* or enterogra*).tw,kw,kf. (6232)
245 (esophagra* or oesophagra* or esophagogra* or oesophagogra*).tw,kw,kf. (7145)
246 ((CT or virtual) adj colonoscop*).tw,kw,kf. (1930)
247 (contrast adj (study or studies or medium)).tw,kw,kf. (46835)
248 (cholangiopancreatogra* or cholangio-pancreatogra* or ERCP or MRCP).tw,kw,kf. (56291)
249 cholecystogra*.tw,kw,kf. (5474)
250 (angiograph* or angio-graph* or angiogram* or angio-gram*).tw,kw,kf. (571510)
251 (bronchograph* or broncho-graph* or bronchogram* or broncho-gram*).tw,kw,kf. (9331)
252 or/219-251 [IMAGING] (8181372)
253 218 and 252 [THORACIC DISEASES - IMAGING] (1028284)
254 (exp animal/ or exp animal experimentation/ or exp animal model/ or exp animal experiment/ or nonhuman/ or exp vertebrate/) not (exp human/ or exp human experimentation/ or exp human experiment/) (12944635)
255 253 not 254 [ANIMAL-ONLY REMOVED] (1001089)
256 editorial.pt. (1380208)
257 255 not 256 [OPINION PIECES REMOVED] (992419)
258 conference abstract.pt. (4651082)
259 257 not 258 [CONFERENCE ABSTRACTS REMOVED] (855423)
260 case report/ or exp case study/ (5311680)
261 259 not 260 [CASE REPORTS REMOVED] (474700)
262 exp practice guideline/ (708264)
263 (consensus or guideline* or guidance? or standards or recommendation*).ti,kw,kf. (534290)
264 (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,kf. (301687)
265 or/262-264 [GUIDELINE FILTER] (1270374)
266 261 and 265 [THORACIC DISEASES - IMAGING - GUIDELINES] (18176)
267 limit 266 to yr="2017-current" (7829)
268 267 use emczd [EMBASE RECORDS] (6722)
269 125 or 268 [BOTH DATABASES] (9577)
270 limit 269 to yr="2020-current" (5745)
271 remove duplicates from 270 (5110)
272 269 not 270 (3832)
273 remove duplicates from 272 (3369)
274 271 or 273 [UNIQUE RECORDS - BOTH DATABASES] (8479)
275 274 use medall [MEDLINE UNIQUE RECORDS] (2848)
276 274 use emczd [EMBASE UNIQUE RECORDS] (5631)

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APPENDIX 2. EVIDENCE TABLES

TH01. Screening/Asymptomatic Individuals

TH01A. Pre-employment screening

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	
CAR 2012 [18]	**F04. Pre-employment** - CXR: Indicated only in specific circumstances [B]: Individuals with positive tuberculin skin test to exclude active tuberculosis and for deep sea divers and submariners who require inspiration and expiration PA and a lateral examination to exclude apical bullae. No longer indicated for food handlers. **F07. Routine pre-employment** - CXR: Indicated only in specific circumstances [B]: Tuberculosis screening in patients with positive Mantoux test or CXRs. Immigration screening when country of origin has endemic tuberculosis. CXR is not indicated as a routine for smokers. - CT: Not indicated [B]: CT is not indicated as a routine for smokers.
RCR 2017 [19]	**CC17. Pre-employment or screening medicals in asymptomatic individuals: CXR** - CXR [B]

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

TH01B. Asbestos exposure

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)
CAR 2012 [18]	This scenario was not covered in 2012.
ACR 2020 [20]	**Occupational lung disease** ▪ Variant 1. Occupational exposure, screening, and surveillance of lung disease. Initial imaging.

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

TH01C. Routine in-patient radiographs

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)
CAR 2012 [18]	This scenario was not covered in 2012.

Abbreviations: CAR: Canadian Association of Radiologists

TH02. Non-specific chest pain

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)
CXR: chest radiograph	
CAR 2012 [18]	**F01. Non-specific chest pain** - ST elevation Myocardial Infarction (STEMI), Non-STEMI/High Risk acute coronary syndrome (ACS), Non-High Risk ACS and ACPS: Diagnostic Imaging should be guided by clinical assessment, electrocardiogram (ECG) and biomarkers. Refer to Cardiovascular Guidelines
ACR 2020 [21]	**Acute nonspecific chest pain** ▪ Variant 1. Acute nonspecific chest pain; low probability of coronary artery disease. Initial imaging.
RCR 2017 [19]	**CC16. Non-specific chest pain** - CXR [C]

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

TH03. Hospital admission for non-thoracic conditions

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)
CXR: chest radiograph	
CAR 2012 [18]	**F05. Hospital admission** - CXR: Indicated only in specific circumstances [A]: Routine CXR is not indicated. Admission CXR is indicated only in patients who have acute respiratory or cardiac disease and elderly patients with chronic cardiopulmonary disease with no recent CXR available.
ACR 2022 [22]	**Routine chest imaging** ▪ Variant 1. Routine chest imaging for hospital admission. No clinical concern for cardiopulmonary disease. Initial Imaging.

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

TH04. Long-term care admission

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)
CAR 2012 [18]	This scenario was not covered in 2012.
ACR 2017 [23]	**Imaging of possible tuberculosis** ▪ Variant 3. PPD not available. Placement in group home or skilled nursing facility. No clinical symptoms.

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

TH05. Routine pre-operative

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)
CXR: chest radiograph	
CAR 2012 [18]	**F06. Routine pre-operative** - CXR: Indicated only in specific circumstances [A]: Routine pre-operative CXR is not indicated. A pre-operative CXR is indicated only in patients who have an acute significant respiratory or cardiac disease and elderly patients with chronic cardiopulmonary disease with no recent CXR available.
ACR 2022 [22]	**Routine chest imaging** ▪ Variant 2. Routine preoperative chest imaging for noncardiothoracic surgery. No history of chronic cardiopulmonary disease or cardiothoracic surgery. Initial imaging. ▪ Variant 3. Routine preoperative chest imaging for noncardiothoracic surgery. History of chronic cardiopulmonary disease or cardiothoracic surgery. Initial imaging.
Indian Society of Anaesthesiologists 2022 [24]	**Pre-operative chest X-ray testing** - Recommendation 8a - Recommendation 8b **Routine pre-operative US airway assessment** - Recommendation 9
RCR 2017 [19]	**CC18. Routine pre-operative CXR** - CXR [C]

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

TH06. Post-interventional chest procedures

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)
CXR: chest radiograph	
CAR 2012 [18]	**F09. Post interventional procedures** - CXR: Indicated only in specific circumstances [A]: Many institutions have abandoned routine post procedural CXR in favour of on demand CXR. While there is evidence to support a low incidence of positivity in routine post procedural CXR, there is evidence that clinical judgment is not sensitive to complications of central line, N/G tube and endotracheal tubes insertion and CXR is indicated. However, pacemaker and tracheostomy probably do not require a stat post procedural CXR.
German S3 Guideline 2018 [25]	- radiological/sonographic - routine imaging procedures - pleurasonography
PACTS 2020 [26]	**Chest radiographs** - Recommendation 45 (USPSTF: LoE: Good; Strength of recommendation: C)

Abbreviations: CAR: Canadian Association of Radiologists; PACTS: Perioperative Anesthesa Care in Thoracic surgery

TH07. Upper respiratory tract infection

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	
CAR 2012 [18]	**F10. Upper respiratory tract infection** - CXR: Not initially indicated [B]: There is no evidence that a CXR is of value in the management of upper respiratory tract infection. CXR should be reserved for patients with clinical suspicion of pneumonia, acute tracheobronchitis with other comorbid conditions and those with symptoms persisting for longer than 3 weeks. - CT: Not indicated [B]
RCR 2017 [19]	**CC19. Upper respiratory tract infection** - CXR [C]

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

TH08. Acute exacerbation of asthma

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	
CAR 2012 [18]	**F11. Acute exacerbation of asthma** - CXR: Indicated only in specific circumstances [B]: Diagnostic Imaging should be guided by clinical concern for complications. CXR not indicated unless there is pyrexia, leukocytosis, persistent chest pain, other features of pneumonia, suspected pneumothorax, pneumomediastinum or need for hospitalization. - CT: Not initially indicated [C]: CT should be considered only in rare circumstances where management might be altered.
French Guideline 2019 [27]	**Should additional examinations be performed in patients with severe asthma exacerbation in an emergency situation?** - R1.2 adult (GRADE 2+, STRONG AGREEMENT)
RCR 2017 [19]	**CC20. Acute exacerbation of asthma** - CXR [B]

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

TH09. Acute exacerbation of COPD

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	
CAR 2012 [18]	**F12. Acute exacerbation of COPD** - CXR: Indicated only in specific circumstances [B]: Diagnostic Imaging should be guided by clinical concern for complications. CXR not indicated unless there is history of CAD, CHF, findings of pyrexia, leukocytosis, persistent chest pain, other features of pneumonia, suspected pneumothorax, pneumomediastinum or need for hospitalization. - CT: Not initially indicated [C]: Should only be considered in rare circumstances where management might be altered.
NICE 2018 (NG115) [28]	**Managing exacerbations of COPD** *Primary care* *People referred to hospital* - 1.3.3 In all people presenting to hospital with an acute exacerbation
Turkish Guideline 2021 [29]	Panel Recommendation 12 - Chest radiography - Non-contrast thorax CT
RCR 2017 [19]	**CC21. Acute exacerbation of COPD** - CXR [B]

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

TH10. Suspected pneumonia

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 [18]	**F13. Pneumonia** - CXR: Indicated [C]: Diagnostic Imaging should be guided by clinical findings. Initial imaging modality of choice when pneumonia is suspected. However, it should not be performed if pre-test probability is very high and a negative CXR would not preclude management. - CT: Not initially indicated [C]: Consider in cases of severe pneumonia, complicated pneumonia or possible atypical organisms. May help to diagnose pneumonia complicated with empyema and guide thoracentesis.
Chest Guideline 2019 [30]	- Recommendation 4. Chest radiography (Grade 2C).
POLLUS-IM 2020 [31]	▪ Pulmonary Pathologies Associated with Consolidations ▪ Pneumonia
RCR 2017 [19]	**CC22. Acute chest infection/pneumonia** - CXR [B] - US [B] - CT [C]

Abbreviations: CAR: Canadian Association of Radiologists; POLLUS-IM: Polish recommendations for lung ultrasound in internal medicine; RCR: Royal College of Radiologists

TH11. Pneumonia follow-up

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	
CAR 2012 [18]	**F14. Pneumonia follow-up** - CXR: Not initially indicated [B]: A CXR is only indicated in patients with signs and symptoms suggestive of a severe pneumonia. A CXR need not be repeated before hospital discharge in patients with satisfactory clinical recovery. A follow up CXR is recommended after at least six weeks for all patients who have persistent symptoms or physical signs or who are at higher risk of underlying malignancy (especially smokers and patients > 50 years), whether or not they are admitted to hospital. - CT: Not initially indicated [B]: CT is indicated only in cases with no radiological or clinical resolution within the expected time.
ATS and IDSA 2019 [32]	**Question 16: In Adults with CAP who are improving, should follow-up chest imaging be obtained?** - Chest imaging (conditional recommendation, low quality of evidence).
RCR 2017 [19]	**CC23. Acute chest infection/pneumonia follow-up** - CXR [B] - CT [C]

Abbreviations: ATS and IDSA: American Thoracic Society and Infectious Diseases Society of America; CAR: Canadian Association of Radiologists; RCR: Royal College of Radiologists

TH12. Immunosuppressed patient with respiratory symptoms/ febrile neutropenia

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	
CAR 2012 [18]	**F15. Immunosuppressed patient with respiratory symptoms / febrile neutropenia** - CXR: Indicated [B]: Initial imaging modality of choice; detects abnormalities and guides management in most cases. However, CXR may be normal in HIV and febrile neutropenic patients with pulmonary infection - CT: Indicated [B]: Indicated when CXR is normal or equivocal in patients with high clinical suspicion for pulmonary infection. CT is accurate in the diagnosis of specific infections (PCP, fungal pneumonia, TB) and may alter patient's management. HRCT with expiratory views is indicated in patients post bone marrow transplant with suspected obliterative bronchiolitis.
ACR 2019 [33]	**Acute Respiratory Illness in Immunocompromised Patients** ▪ Variant 1. Acute respiratory illness in immunocompromised patients. Cough, dyspnea, chest pain, or fever. Initial imaging. ▪ Variant 2. Acute respiratory illness in immunocompromised patients. Normal, equivocal, or nonspecific chest radiograph. Next imaging study.
SEOM 2019 [34]	- The initial assessment … (III, B) - CT the chest (II, B)

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; SEOM: Spanish Society of Medical Oncology

TH13. Chronic cough

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; **HRCT**: high resolution computed tomography; **XR**: radiograph	
CAR 2012 [18]	This scenario was not covered in 2012.
ACR 2021 [35]	**Chronic cough** ▪ Variant 1. Chronic cough lasting more than 8 weeks. No known risk factors for lung cancer. Initial imaging. ▪ Variant 2. Chronic cough lasting more than 8 weeks. Increased risk for lung cancer. Initial imaging. ▪ Variant 3. Chronic cough lasting more than 8 weeks. Persistent symptoms despite initial clinical evaluation and empiric treatment. Initial imaging.
ERS 2020 [36]	- Recommendation 1: Chest CT (GRADE Strength of recommendation, level of evidence: conditional, very low)
Italian Intersociety Consensus 2022 [37]	- Chest XR (Recommendation A/moderate) - HRCT (Recommendation D / moderate) - HRCT (Recommendation C / moderate) - HRCT (Recommendation A/moderate) *Using USPSTF strength of recommendations and a modified USPSTF grading of quality of evidence.*

Abbreviations: CAR: Canadian Association of Radiologists; ERS: European Respiratory Society

TH14. Suspected pneumothorax (non-traumatic)

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 [18]	This scenario was not covered in 2012.
German Guidelines 2018 [25]	- p.a. CXR standing in inspiration (Recommendation Grade A, Evidence grade I). - Sonographic examination (Recommendation Grade B, Evidence grade II). - CT (Recommendation grade: B, Evidence grade: Expert Consensus].
POLLUS-IM 2020 [31]	▪ **Pneumothorax**
RCR 2017 [19]	**CC30. Suspected pneumothorax (non-traumatic)** - CXR [C] - US [C] - CT [C]

Abbreviations: CAR: Canadian Association of Radiologists; POLLUS-IM: Polish recommendations for lung ultrasound in internal medicine; RCR: Royal College of Radiologists

TH15. Clinically suspected pleural effusion

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; **MRI**: magnetic resonance imaging; **PET/CT FDG**: positron emission tomography/computed tomography F-fluorodeoxyglucose; **US**: ultrasound	
CAR 2012 [18]	**F16. Pleural effusion** - CXR: Indicated [C]: A CXR can detect small quantities of pleural fluid (PA view: 175ml, lateral: 75ml, lateral decubitus: 10ml). More than 1cm thickness in lateral view allows safe diagnostic thoracentesis with no imaging guidance. - CT: Indicated only in specific circumstances [B]: CT scan may be ordered by a specialist or in consultation with a radiologist to further characterize pleural fluid and allow visualization of underlying lung and pleural pathology. CT with contrast may help in the diagnosis of suspected empyema, empyema versus lung abscess and pleural malignancy. However, CT attenuation value is not reliable for differentiating exudate from transudate. - US: Indicated [B]: US is indicated to confirm the presence of pleural fluid and is superior to CT in the detection of loculations and septations. Useful to guide diagnostic and therapeutic thoracentesis (more complicated procedures such as pleural biopsy or small empyema drainage may require CT guidance). - MRI: Not indicated [B]: MRI may be superior to CT in the differentiation of benign and malignant pleural disease and may help in the characterization of fluid content. However, it is not routinely used and does not replace diagnostic interventional procedures. - PET/CT FDG: Indicated under specific circumstances [B]: PET/CT could help to characterize pleural effusion in a patient with suspected or known cancer, especially mesothelioma. PET/CT could identify metastatic pleural implants and guide biopsy.
ACR 2018 [38]	**Chronic dyspnea-non cardiovascular origin** ▪ Variant 5. Chronic dyspnea. Suspected disease of the pleura or chest wall. Initial imaging.
POLLUS-IM 2020 [31]	▪ **Pleural effusion**
RCR 2017 [19]	**CC24. Suspected pleural effusion** - CXR [C] - US [B] - CT [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; POLLUS-IM: Polish recommendations for lung ultrasound in internal medicine; RCR: Royal College of Radiologists

TH16. Hemoptysis

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	
CAR 2012 [18]	**F17A. Hemoptysis (infrequent, low risk of malignancy, nonsmoker)** - CXR: Indicated [B]: All patients presenting with hemoptysis should have a CXR - CT: Not indicated initially [B]: CT is only indicated for patients with severe hemoptysis or other risk factors (See F17B). **F17B. Hemoptysis (smoker, high risk of malignancy, >40 years; or recurrent hemoptysis)** - CXR: Indicated [B]: All patients presenting with hemoptysis should have a CXR. If this is normal but the hemoptysis is significant or recurrent and occurs without a concurrent chest infection, further investigation is indicated. - CT: Indicated [B]: CT should be used to investigate the majority of patients with hemoptysis. CT may detect malignancy not identified on CXR. CT (with contrast if not contraindicated) often detects the cause and site of bleeding. HRCT is indicated in the investigation of bronchiectasis. If CT is normal, fails to demonstrate the site of bleeding or demonstrates central tumor, bronchoscopy is indicated. **F17C. Massive hemoptysis (>300 ml in 24 hours)** - CXR: Indicated [B]: If patient is stable, CXR is indicated for initial evaluation. - CT: Indicated [B]: CT is indicated if clinically feasible and if patient is stable. CT with contrast (if not contraindicated), may show source of bleeding and be helpful especially before bronchial artery embolization. Bronchoscopy is indicated in all patients with massive hemoptysis.
ACR 2020 [39]	**Hemoptysis** ▪ Variant 1. Massive (life-threatening) hemoptysis. Initial imaging. ▪ Variant 2. Nonmassive (non–life-threatening) hemoptysis. Initial imaging. ▪ Variant 3. Recurrent hemoptysis. Initial imaging.
Korean Guideline 2018 [40]	- Recommendation 1-1: Chest radiography (recommendation grade A, evidence level II) - Recommendation 1-2: Contrast-enhanced chest CT scan (recommendation grade A, evidence level II) - Recommendation 1-3: Contrast-enhanced chest CT scan (recommendation grade A, evidence level II) - Recommendation 1-4: Contrast-enhanced chest CT scan (recommendation grade A, evidence level III)
RCR 2017 [19]	**CC25. Haemoptysis (including massive haemoptysis)** - CXR [C] - CT [B] - Bronchial angiography with embolization [B]

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

TH17. Chronic dyspnea of non-cardiovascular origin

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/HRCT: computed tomography/high-resolution computed tomography; **CXR**: chest radiograph	
CAR 2012 [18]	**F18. Chronic dyspnea of pulmonary cause or suspected interstitial / diffuse lung disease** - CXR: Indicated [B]: Useful as initial imaging modality and to help direct further investigations. However, normal CX9R does not rule out interstitial/diffuse lung disease. - CT/HRCT: Indicated [B]: HRCT (see addendum) is the imaging modality of choice in evaluation of interstitial/diffuse lung disease and provides valuable information about disease reversibility and prognosis. Additional expiratory scans often help in the differential diagnosis. Prone HRCT may be indicated when asbestosis is suspected. Because of the higher radiation dose use of HRCT should be weighed against radiation risk in young patients, particularly females.
ACR 2018 [38]	**Chronic dyspnea-non cardiovascular origin** ▪ Variant 1. Chronic dyspnea. Unclear etiology. Initial imaging. ▪ Variant 2. Chronic dyspnea. Suspected chronic obstructive pulmonary disease (COPD). Initial imaging. ▪ Variant 3. Chronic dyspnea. Suspected central airways disease. Initial imaging. ▪ Variant 4. Chronic dyspnea. Suspected interstitial lung disease. Initial imaging. ▪ Variant 5. Chronic dyspnea. Suspected disease of the pleura or chest wall. Initial imaging. ▪ Variant 6. Chronic dyspnea. Suspected diaphragm dysfunction. Initial imaging.
POLLUS-IM 2020 [31]	▪ **Cardiogenic Pulmonary Edema and Heart Failure** ▪ **Pneumonia** ▪ **Atelectasis** ▪ **Other causes**

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; POLLUS-IM: Polish recommendations for lung ultrasound in internal medicine

TH18. Suspected interstitial lung disease

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/HRCT: computed tomography/high-resolution computed tomography; **CXR**: chest radiograph	
CAR 2012 [18]	**F18. Chronic dyspnea of pulmonary cause or suspected interstitial / diffuse lung disease** - CXR: Indicated [B]: Useful as initial imaging modality and to help direct further investigations. However, normal CR does not rule out interstitial/diffuse lung disease. - CT/HRCT: Indicated [B]: HRCT (see addendum) is the imaging modality of choice in evaluation of interstitial/diffuse lung disease and provides valuable information about disease reversibility and prognosis. Additional expiratory scans often help in the differential diagnosis. Prone HRCT may be indicated when asbestosis is suspected. Because of the higher radiation dose use of HRCT should be weighed against radiation risk in young patients, particularly females.
ACR 2021 [41]	**Diffuse lung disease** ▪ Variant 1. Suspected diffuse lung disease. Initial imaging.
ACR 2020 [20]	**Occupational lung diseases** ▪ Variant 2. Occupational exposure, suspected interstitial lung disease. Initial imaging. ▪ Variant 3. Occupational exposure, suspected interstitial lung disease based on radiography. Next imaging study.
ACR 2018 [38]	**Chronic dyspnea-non cardiovascular origin** ▪ Variant 4. Chronic dyspnea. Suspected interstitial lung disease. Initial imaging.
CHEST Guideline 2021 [42,43]	HRCT of the chest - Recommendation 4 (Weak Recommendation, Very Low-Quality Evidence) - Recommendation 10 (Weak Recommendation, Very Low-Quality Evidence)
ICS/NCCP 2020 [44]	**Q2. Should computed tomography scan chest be performed in diagnosis of interstitial lung disease?** - high-resolution computed tomography (HRCT) of chest (1A) - Volume scans on multi detector computed tomography (MDCT) [16 slice or higher] (1A) - Follow-up CT (usual practice point)
French Guidelines 2022 [45]	**Idiopathic pulmonary fibrosis** - Guideline 1
German Guideline 2021 [46]	- HRCT; chest x-ray alone - Volumetric, high-resolution, non-contrast, inspiratory CT images - *4 HRCT diagnostic categories as described in the publication of the Fleischner Society*
POLLUS-IM 2020 [31]	▪ **Interstitial Lung Disease Involving Pulmonary Fibrosis**
RCR 2017 [19]	**CC26. Suspected diffuse/ interstitial lung disease** - CXR [C] - CT [B]

Abbreviations: ACR: American College of Radiology; CAR: Canadian Association of Radiologists; ICS: Indian Chest Society; NCCP: National College of Chest Physicians; POLLUS-IM: Polish recommendations for lung ultrasound in internal medicine; RCR: Royal College of Radiologists

TH19. Incidental lung nodule

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; **PET/CT FDG**: positron emission tomography/computed tomography F-fluorodeoxyglucose; **MRI**: magnetic resonance imaging	
CAR 2012 [18]	**F19. Solitary pulmonary nodule (solid)** - CXR: Indicated [B]: Chest radiograph may be the first modality to demonstrate a SPN but is very limited in the characterization and final diagnosis. - CT: Indicated [B]: CT may demonstrate definite findings of benignity such as central calcification or fat which preclude further investigation. For indeterminate solid nodules on CT, management varies depending upon risk factors for malignancy as recommended by the Fleischner Society Guidelines for Follow up and Management of Nodules (see Addendum 1). - FDG-PET (FDG PET/CT): Indicated [A]: More sensitive than CT in the detection of malignancy in nodules larger than 8 mm. Characterization of solid nodules 8 mm and greater that are indeterminate on CT. May help in staging for these nodules proven to be malignant. **F20. Subsolid nodules (ground-glass and part-solid nodules)** - CXR: Indicated [C]: Chest radiograph may be the first modality to demonstrate a subsolid nodule but is very limited in the characterization and final diagnosis. Pure ground-glass nodules usually are not seen on chest radiograph. - CT: Indicated [B]: CT (especially HRCT) is much more accurate in the detection of ground-glass (GG) and part solid (PS) nodules and to demonstrate multicentric disease. No consensus in the literature yet regarding management of GG/PS nodules (Fleischner Society Guidelines for Nodules is not applied for these lesions). Interim guidelines published in 2010 suggest: Solitary lesions: GG nodule < 5 mm: no follow up or work up is required; GG nodule 5- 10 mm: CT in 3-6 months, annually for minimal 3 years if stable. Increase in size or solid component: surgical resection; GG nodule > 10 mm: CT in 3-6 months, surgical resection if persistent or enlarging; PS solid lesion any size: percutaneous biopsy or surgical resection. (Role of percutaneous biopsy is less clear because of sampling errors). Multiple lesions: GG nodules < 10mm: CT in 1 year; if any GG nodule > 10mm or PS nodule: CT follow up and surgical resection (sparing resection) - FDG-PET (FDG PET/CT): Indicated only in specific circumstances [B]: Questionable diagnostic value for pure GG nodules, especially when < 1cm. Malignant GG lesions unlikely to be positive on PET and have low risk of metastatic disease precluding PET/CT for staging. Indicated for PS lesions because of greater likelihood of invasive malignancy and for detection of metastasis and preoperative staging.
Fleischner Society 2017 [47,48]	▪ **Single solid noncalcified nodules** ▪ **Multiple Solid Nodule** ▪ **Subsolid Nodules – Single Ground Glass** ▪ **Subsolid Nodules – Single Part solid** ▪ **Subsolid Nodules – Multiple**

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; **PET/CT FDG**: positron emission tomography/computed tomography F-fluorodeoxyglucose; **MRI**: magnetic resonance imaging	
RCR 2017 [19]	**CC28. Incidentally detected lung nodules: follow-up** - CT (low dose) [C] - CXR [C] - PET-CT [C] - MRI [C]

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

TH20. Suspected mediastinal lesion

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; **MRI**: magnetic resonance imaging; **PET/CT FDG**: positron emission tomography/computed tomography F-fluorodeoxyglucose; **US**: ultrasound	
CAR 2012 [18]	**F22. Suspected mediastinal lesion on CXR** - CT: Indicated [C]: CT is very sensitive in the detection of mediastinal lesions and provides information to help in the differential diagnosis. CT may guide percutaneous biopsy. Optionally gated for paracardiac lesions. - MRI: Not initially indicated [C]: MRI accurately differentiates solid and cystic lesions and is superior to CT in the detection of invasion of mediastinal structures. Optionally gated if paracardiac. - US: Indicated only in specific circumstances [C]: May be warranted depending on suspicion of paracardiac lesion. - PET/CT FDG: Indicated only in specific circumstances [B]: FDG PET/CT should be performed only after CT scan is performed. Can identify biopsy site, identify extra-thoracic disease easier to biopsy, may prevent futile biopsy in a non FDG-avid lesion, identify a benign lesion (i.e. thymic hyperplasia), provides staging when a malignant chest lesion is confirmed.
ACR 2021 [49]	**Imaging of Mediastinal masses** ▪ Variant 1. Clinically suspected mediastinal mass. Initial imaging. ▪ Variant 2. Indeterminate mediastinal mass on radiography. Next imaging study. ▪ Variant 3. Indeterminate mediastinal mass on CT. Next imaging study. ▪ Variant 4. Indeterminate mediastinal mass on FDG-PET/CT. Next imaging study. ▪ Variant 5. Indeterminate mediastinal mass on MRI. Next imaging study or surveillance.

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

TH21. Suspected mediastinal lymphadenopathy

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; **PET/CT FDG**: positron emission tomography/computed tomography F-fluorodeoxyglucose	
CAR 2012 [18]	**F23. Suspected lymphadenopathy** - CXR: Indicated [C]: Limited sensitivity in detection of mediastinal and hilar adenopathy - CT: Indicated [C]: CT is very sensitive in the detection of mediastinal and hilar adenopathy and provides information that may help in the diagnosis (i.e. calcification, necrosis, nodal enhancement and parenchymal abnormality). CT may guide percutaneous biopsy depending on clinical concern. - PET/CT FDG: Indicated [A]: PET/CT can identify biopsy site, identify extra-thoracic disease easier to biopsy, may prevent futile biopsy of non FDG-avid lymph nodes, and can help in staging when a malignant lymph node is confirmed. It does not replace biopsy.

Abbreviations: CAR: Canadian Association of Radiologists

TH22. Elevated diaphragm on chest radiograph

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 [18]	**F24. Elevated diaphragm on CXR** - CXR: Indicated [B]: Decubitus CXR may increase accuracy in detection of effusion as the cause of apparent elevation of the diaphragm. - CT: Indicated [B]: To rule out mediastinal lesion involving phrenic nerve when CXR is negative. When CXR demonstrates mediastinal abnormality, CT is indicated for further characterization (see "suspected mediastinal lesion on CXR). - US: Indicated only in specific circumstances [A]: U/S can detect and evaluate pleural effusion and diaphragmatic motion in real time. May be more sensitive than fluoroscopy. - Fluoroscopy: Indicated only in specific circumstances: Fluoroscopy "sniff " test is accurate for evaluation of diaphragmatic motion in real time and to detect paralysis and paradoxical movement.

Abbreviations: CAR: Canadian Association of Radiologists

APPENDIX 3A. THORACIC SUMMARY OF RECOMMENDATIONS (ENGLISH)

Clinical/ Diagnostic Scenario	Recommendation	Strength of Rec.
CT: computed tomography; **MRI**: magnetic resonance imaging; **US**: ultrasound; **XR**: radiography **Strength of Recommendation:** ↑↑: strong for; ↑: conditional for; ↓↓: strong against; ↓: conditional against; **EPc**: Expert Panel consensus		
TH01. SCREENING/ASYMPTOMATIC INDIVIDUALS		
TH01A. Pre-employment screening	**1.** For most individuals we recommend **against routine chest XR** for pre-employment screening, except in specific circumstances (see Recommendation 2).	↓↓
	2. In individuals at high-risk for tuberculosis or in certain occupations (e.g., deep water divers), we recommend **routine chest XR** if one has not been done recently.	↑↑
	3. In individuals with positive latent tuberculosis testing, we recommend **chest XR** to exclude active tuberculosis.	↑↑
TH01B. Asbestos exposure	**1.** In asymptomatic individuals who have had occupational exposure to asbestos and require imaging for documentation or confirmation of injury, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** In individuals with equivocal chest XR and/or a high clinical suspicion for occupational lung disease, we recommend **high-resolution CT** as the next imaging modality.	EPc
TH01C. Routine in-patient radiographs	**1.** In in-patients, we recommend **against routine chest XR**.	EPc
	Refer to TH03 for Hospital admission for non-thoracic conditions.	
TH02. NON-SPECIFIC CHEST PAIN		
	In patients with non-specific chest pain (non-cardiac origin), imaging should be guided by clinical assessment, ECG, and serum biomarkers.	
	1. In stable patients where imaging is clinically or biochemically indicated, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** If the chest XR is normal or equivocal, we suggest that further investigations should be guided after clinical consideration of etiology.✧	EPc
	✧For example, musculoskeletal, abdominal, pulmonary, cardiovascular, esophageal	
TH03. HOSPITAL ADMISSION FOR NON-THORACIC CONDITIONS		
	1. In patients being admitted to hospital for non-thoracic conditions, we recommend **against routine chest XR**.	↓↓
TH04. LONG-TERM CARE ADMISSION		
	1. In individuals who are being admitted to long-term care, we recommend referring to the local practice guidelines.	↑↑
TH05. ROUTINE PRE-OPERATIVE		
	1. In patients undergoing non-cardiothoracic surgery, we suggest **against routine pre-operative chest XR**.	↓

The guideline recommendations are to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, 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.
CT: computed tomography; **MRI**: magnetic resonance imaging; **US**: ultrasound; **XR**: radiography **Strength of Recommendation:** ↑↑: strong for; ↑: conditional for; ↓↓: strong against; ↓: conditional against; **EPc**: Expert Panel consensus		
	2. In patients undergoing cardiothoracic surgery, we suggest **routine pre-operative chest XR**.	↑
	3. In frail elderly patients and in those with significant cardiorespiratory disease, we suggest **routine pre-operative chest XR**.	↑
TH06. POST-INTERVENTIONAL CHEST PROCEDURE		
	1. In patients who have undergone a chest procedure, including cardiothoracic surgery, we suggest **routine post-interventional chest XR** in situations where clinical judgement may not be sensitive to potential complications, including post transthoracic interventions (e.g., lung biopsy, central line, nasogastric tube, endotracheal tube placement, thoracentesis, chest tube, etc.).	↑
TH07. UPPER RESPIRATORY TRACT INFECTIONS		
For sinusitis, see H01A. Sinus disease	**1.** In patients with uncomplicated upper respiratory tract infection, we recommend **against chest XR**.	↓↓
	2. In patients with clinical suspicion of pneumonia, acute tracheobronchitis with other comorbid conditions, we suggest **chest XR** as the initial imaging modality.	↑
TH08. ACUTE EXACERBATION OF ASTHMA		
	1. In patients with acute asthma exacerbation without clinical concern for complications, we suggest **against chest XR**.	↓
	2. In patients with acute asthma exacerbation with clinical concern for complications✧, we recommend **chest XR** as the initial imaging modality. ✧For example, clinical suspicion of pneumonia, suspected pneumomediastinum or pneumothorax, failure to respond to therapy	↑↑
TH09. ACUTE EXACERBATION OF COPD		
	1. In patients with acute exacerbation of COPD who do not need a referral to hospital, we suggest **against routine chest XR**.	↓
	2. In patients with acute exacerbation of COPD who are referred to hospital, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **2.1** In situations where chest XR is negative or indeterminate where there is persistent clinical concern or management might be altered, we suggest **chest CT** as the next imaging modality.	↑
TH10. SUSPECTED PNEUMONIA		
	1. In stable outpatients with suspected pneumonia with a very high pre-test probability of pneumonia and when a chest XR would not alter management, we suggest **against chest XR**.	↓

The guideline recommendations are to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, 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.
	CT: computed tomography; **MRI**: magnetic resonance imaging; **US**: ultrasound; **XR**: radiography **Strength of Recommendation:** ↑↑: strong for; ↑: conditional for; ↓↓: strong against; ↓: conditional against; **EPc**: Expert Panel consensus	
	2. In patients with abnormal vital signs secondary to suspected pneumonia, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **2.1** In patients with severe or complicated pneumonia (e.g., lung abscess, suspected empyema, or possible atypical organisms), we suggest **chest CT** as the next imaging modality.	↑
TH11. PNEUMONIA FOLLOW-UP		
	1. In patients with clinical recovery of pneumonia, we do not recommend **follow-up chest XR**.	↓↓
	2. In patients with persistent symptoms or physical signs of pneumonia or in those at higher risk of malignancy✧, we suggest **follow-up chest XR** at least six weeks after treatment. ✧Smokers (>20 pack years), those >50 years old	↑
	↳ **2.1** In patients with no radiological or clinical resolution of pneumonia within the expected time (e.g., 8-12 weeks), we suggest **chest CT** as the next imaging modality.	↑
TH12. IMMUNOSUPPRESSED PATIENT WITH RESPIRATORY SYMPTOMS/FEBRILE NEUTROPENIA		
	1. In immunosuppressed patients with respiratory symptoms/febrile neutropenia, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** If chest XR is normal, equivocal, or inconclusive and there remains high clinical suspicion for pulmonary infection, we recommend **low-dose chest CT** as the next imaging modality.	↑↑
TH13. CHRONIC COUGH		
	Chronic cough is defined as a cough lasting 8 weeks or more.	
	1. In patients with chronic cough, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** In patients with normal physical exam and chest XR, we suggest **against routine chest CT**.	↓
	↳ **1.2** In patients with normal physical exam and chest XR and common causes of chronic cough have been excluded but there is ongoing clinical concern for etiology such as bronchiectasis, early interstitial lung disease, or lung cancer, we suggest **chest CT** as the next imaging modality.	↑
TH14. SUSPECTED PNEUMOTHORAX (NON-TRAUMATIC)		
	1. In patients with suspected pneumothorax, we recommend **erect inspiratory chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** If chest XR findings are equivocal or indeterminate and further imaging is required, we suggest **chest CT** as the next imaging modality.	↑
TH15. CLINICALLY SUSPECTED PLEURAL EFFUSION		

The guideline recommendations are to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, 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.
	CT: computed tomography; **MRI**: magnetic resonance imaging; **US**: ultrasound; **XR**: radiography **Strength of Recommendation:** ↑↑: strong for; ↑: conditional for; ↓↓: strong against; ↓: conditional against; **EPc**: Expert Panel consensus	
	1. In patients with clinically suspected pleural effusion, we recommend **chest XR or bedside US (if available)** as the initial imaging modality.	↑↑
	↳ **1.1** If further imaging is required, we suggest **chest CT** as the next imaging modality.	↑
TH16. HEMOPTYSIS		
	1. In patients with trace hemoptysis, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** In patients with risk factors✧ or persistent/recurrent unexplained hemoptysis, we recommend **chest CT** as a complementary imaging modality. ✧ smoker (e.g., >20 pack years), high risk of malignancy, >40 years	↑↑
	2. In patients with clinically significant hemoptysis, we recommend **chest XR* and chest CT** as the initial imaging modalities. * For baseline purposes	↑↑
TH17. CHRONIC DYSPNEA OF NON-CARDIOVASCULAR ORIGIN		
	1. In patients with chronic dyspnea of non-cardiovascular origin, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** If chest XR is normal and clinical concern remains, any decision for further imaging should be based on clinical grounds.	EPc
TH18. SUSPECTED INTERSTITIAL LUNG DISEASE		
	1. In patients with suspected interstitial lung disease, we recommend **chest XR** as the initial imaging modality.	↑↑
	↳ **1.1** If **further** imaging is required, given that chest XR do not rule out interstitial lung disease, we recommend **high-resolution CT (HRCT)** as the next imaging modality.	↑↑
TH19. INCIDENTAL LUNG NODULE		
	1. In patients with an incidental lung nodule detected on chest CT✧, we recommend following the Fleischner Society Guidelines for Management of Incidental Pulmonary Nodules Detected on CT Images. Fleischner Society Guidelines: https://doi.org/10.1148/radiol.2017161659 ✧ Excluding CT chest as part of lung cancer screening	↑↑
TH20. SUSPECTED MEDIASTINAL LESION		
	1. In patients with suspected mediastinal lesion, we recommend **chest CT** as the initial imaging modality.	↑↑
	↳ **1.1** If further imaging is required to evaluate local invasion or to characterize tissue composition, we recommend **chest MRI** as the next imaging modality.	↑↑
TH21. SUSPECTED MEDIASTINAL LYMPHADENOPATHY		

The guideline recommendations are to assist the choice of imaging modality in situations where it is felt clinically necessary to obtain imaging. Imaging should not delay definitive management. Whether or not imaging is indicated is outside the scope of this guideline. Additionally, we did not cover serial imaging, and time intervals for follow-up of known disease and/or treatment monitoring. 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 locations, particularly in rural or remote areas of Canada. Decisions about whether to recommend that a patient travel for recommended imaging or perform alternate imaging locally can be difficult, and should consider the expected benefits of recommended imaging, risks of travel, 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.
CT: computed tomography; **MRI**: magnetic resonance imaging; **US**: ultrasound; **XR**: radiography **Strength of Recommendation:** ↑↑: strong for; ↑: conditional for; ↓↓: strong against; ↓: conditional against; **EPc**: Expert Panel consensus		
	1. In patients with suspected mediastinal lymphadenopathy, we recommend **chest CT** as the initial imaging modality.	↑↑
TH22. ELEVATED DIAPHRAGM ON CHEST RADIOGRAPH (CXR)		
	1. In patients with elevated diaphragm on chest XR and suspected phrenic nerve palsy, we suggest **fluoroscopy** or **US** as the initial imaging modality. *The imaging modality may vary based on regional practice preferences and resource availability.*	↑

APPENDIX 3B. THORACIC SUMMARY OF RECOMMENDATIONS (FRENCH)

Scénario clinique/diagnostique	Recommandations	Force
TDM : tomodensitométrie; **IRM** : imagerie par résonance magnétique **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		
TH01. DÉPISTAGE/PATIENT ASYMPTOMATIQUE		
TH01A. Dépistage avant embauche	**1.** Pour la majorité des personnes, nous **déconseillons la radiographie pulmonaire de routine** dans le cadre d'un examen avant embauche, sauf en cas de circonstances particulières (voir le Recommandation 2).	↓↓
	2. Chez les patients à risque élevé de tuberculose ou occupant certains métiers particuliers (par exemple, les plongeurs en eau profonde), nous recommandons la **radiographie pulmonaire de routine** en l'absence d'examen récent.	↑↑
	3. Chez les personnes présentant un test positif pour une tuberculose latente, nous recommandons la **radiographie pulmonaire** pour exclure une tuberculose active.	↑↑
TH01B. Exposition à l'amiante	**1.** Chez les sujets asymptomatiques qui ont été exposés à l'amiante en raison de leur métier et qui doivent obtenir des résultats d'imagerie aux fins de documentation ou de confirmation d'une lésion, nous recommandons la **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Pour les sujets ayant une radiographie pulmonaire douteuse ou chez qui l'on soupçonne une de maladie pulmonaire d'origine professionnelle, nous recommandons une **TDM haute résolution** comme modalité d'imagerie subséquente.	EPc
TH01C. Radiographies de routine chez des patients hospitalisés	**1.** Chez les patients hospitalisés, nous **déconseillons la radiographie pulmonaire de routine**.	EPc
	Se reporter à la section TH03 pour l'admission à l'hôpital dans les cas d'affections non thoraciques.	
TH02. DOULEUR THORACIQUE NON SPÉCIFIQUE		
	Chez les patients présentant une douleur thoracique non spécifique (origine non cardiaque), l'imagerie doit être guidée par l'évaluation clinique, l'ECG et les biomarqueurs sériques.	
	1. Chez des patients stables, si l'imagerie est indiquée sur le plan clinique ou biochimique, nous recommandons une **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Si les résultats de la radiographie pulmonaire est normale ou douteuse, nous suggérons que les investigations supplémentaires soient guidées en fonction de la recherche clinique de l'étiologie.✧ ✧Par exemple, musculo-squelettique, abdominale, pulmonaire, cardiovasculaire, œsophagienne	EPc
TH03. HOSPITALISATION EN RAISON D'UNE AFFECTION NON THORACIQUE		
	1. Chez les patients admis à l'hôpital pour des affections non thoraciques, nous **déconseillons la radiographie pulmonaire de routine**.	↓↓

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 recommander à un patient de se déplacer pour obtenir l'imagerie recommandée ou d'effectuer localement un autre type d'imagerie; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au déplacement, 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	Recommandations	Force
TDM : tomodensitométrie; **IRM** : imagerie par résonance magnétique **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		
TH04. ADMISSION POUR SOINS DE LONGUE DURÉE		
	1. Dans le cas de sujets qui sont admis pour des soins de longue durée, nous recommandons de se reporter aux lignes directrices de pratique locale pour guider les décisions concernant l'imagerie.	↑↑
TH05. ROUTINE PRÉOPÉRATOIRE		
	1. Chez les patients subissant une opération non cardiothoracique, nous **déconseillons** la **radiographie pulmonaire préopératoire de routine**.	↓
	2. Chez les patients subissant une opération cardiothoracique, nous suggérons une **radiographie pulmonaire préopératoire de routine**.	↑
	3. Chez les patients âgés et fragiles et chez ceux qui ont une maladie cardiorespiratoire importante, nous suggérons une **radiographie pulmonaire préopératoire de routine**.	↑
TH06. PROCÉDURE THORACIQUE POST-INTERVENTIONNELLE		
	1. Chez les patients qui ont subi une opération cardiothoraciques ou thoracique, y compris des interventions transthoraciques (par exemple, biopsie pulmonaire, voie veineuse centrale, tube naso-gastrique, mise en place d'un tube endotrachéal, thoracocentèse, drain thoracique, etc.), nous suggérons une **radiographie pulmonaire de routine après l'intervention** afin de confirmer l'absence de complications qui auraient pu ne pas être prises en compte lors de l'évaluation clinique.	↑
TH07. INFECTIONS DES VOIES RESPIRATOIRES HAUTES		
Pour la sinusite, voir la section H01A : maladie des sinus	**1.** Chez les patients présentant une infection non compliquée des voies respiratoires hautes, nous **déconseillons la radiographie pulmonaire**.	↓↓
	2. Pour les patients chez qui les signes cliniques indiquent une pneumonie ou une trachéobronchite aiguë accompagnée d'affections comorbides, nous suggérons la **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑
TH08. EXACERBATION AIGUË D'UN ASTHME		
	1. Chez des patients présentant une poussée aiguë d'asthme et pour qui de potentielles complications ne constituent pas une source de préoccupation clinique, nous **déconseillons** la **radiographie pulmonaire.**	↓
	2. Chez des patients présentant une poussée aiguë d'asthme et pour qui de potentielles complications constituent une source de préoccupation clinique✧, nous recommandons la **radiographie pulmonaire** comme modalité d'imagerie initiale. ✧Par exemple, un soupçon clinique de pneumonie, de pneumomédiastin ou de pneumothorax, absence de réponse au traitement	↑↑

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 recommander à un patient de se déplacer pour obtenir l'imagerie recommandée ou d'effectuer localement un autre type d'imagerie; à cet égard, il faut tenir compte des avantages attendus de l'imagerie recommandée, des risques liés au déplacement, 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	Recommandations	Force
TDM : tomodensitométrie; **IRM** : imagerie par résonance magnétique **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		
TH09. POUSSÉE AIGUË DE MPOC		
	1. Chez des patients présentant une poussée aiguë de MPOC qui n'ont pas besoin d'être hospitalisés, nous **déconseillons la radiographie pulmonaire de routine**.	↓
	2. Chez des patients ayant une poussée aiguë de MPOC qui sont adressés à l'hôpital, nous recommandons la **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **2.1** Dans les cas où la radiographie pulmonaire est négative ou non concluante, mais que la préoccupation clinique persiste ou que l'on considère apporter des changements à la gestion du patient, nous suggérons une **TDM du thorax** comme modalité d'imagerie subséquente.	↑
TH10. SOUPÇON DE PNEUMONIE		
	1. Chez des patients non hospitalisés dont l'état est stable présentant une probabilité diagnostique très élevée de pneumonie avant l'examen et lorsque la radiographie pulmonaire ne modifierait pas le choix de traitement, nous **déconseillons la radiographie pulmonaire**.	↓
	2. Chez des patients présentant des signes vitaux anormaux liés à une pneumonie potentielle, nous recommandons la **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **2.1** Chez des patients présentant une pneumonie sévère ou compliquée (par exemple, abcès du poumon, empyème suspecté ou micro-organismes atypiques possibles), nous suggérons une **TDM du thorax** comme modalité d'imagerie subséquente.	↑
TH11. SUIVI D'UNE PNEUMONIE		
	1. Chez des patients en récupération clinique d'une pneumonie, nous **déconseillons une radiographie pulmonaire de suivi**.	↓↓
	2. Chez les patients présentant des symptômes persistants ou des signes physiques de pneumonie, ou ceux à risque plus élevé de cancer✧, nous suggérons une **radiographie pulmonaire de suivi** au moins six semaines après le traitement. ✧Fumeurs (> 20 paquets-années), patients > 50 ans	↑
	↳ **2.1** Pour les patients chez qui la pneumonie ne disparaît pas sur les résultats d'imagerie dans les délais attendus (par exemple 8 à 12 semaines) ou dont les signes cliniques de pneumonie persistent, nous suggérons une **TDM du thorax** comme modalité d'imagerie subséquente.	↑
TH12. PATIENTS AVEC IMMUNOSUPPRESSION ET SYMPTÔMES RESPIRATOIRES OU NEUTROPÉNIE FÉBRILE		

Scénario clinique/diagnostique	Recommandations	Force
	TDM : tomodensitométrie; **IRM** : imagerie par résonance magnétique **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	
	1. Chez les patients immunosupprimés avec des symptômes respiratoires ou une neutropénie fébrile, nous recommandons une **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Si les résultats de la radiographie pulmonaire sont normaux, douteux ou non concluants et s'il reste de forts soupçons cliniques d'infection pulmonaire, nous recommandons une **TDM du thorax à faible dose** comme modalité d'imagerie subséquente.	↑↑
TH13. TOUX CHRONIQUE		
	Une toux chronique est définie comme une toux qui dure 8 semaines ou plus.	
	1. Chez les patients présentant une toux chronique, nous recommandons la **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Chez des patients dont les résultats d'examen clinique et la radiographie pulmonaire sont normaux, nous **déconseillons une TDM du thorax de routine**.	↓
	↳ **1.2** Chez des patients dont les résultats d'examen clinique et la radiographie pulmonaire sont normaux, et chez lesquels les causes habituelles de toux chronique ont été exclues, mais pour lesquels une préoccupation clinique de bronchiectasie, de maladie pulmonaire interstitielle au stade précoce ou de cancer du poumon persiste, nous suggérons une **TDM du thorax** comme modalité d'imagerie subséquente.	↑
TH14. SOUPÇON DE PNEUMOTHORAX (NON TRAUMATIQUE)		
	1. Pour les patients chez qui l'on soupçonne un pneumothorax, nous recommandons une **radiographie pulmonaire** en **inspiration profonde debout** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Si les constatations de la radiographie pulmonaire sont douteuses ou indéterminées et si une imagerie supplémentaire est nécessaire, nous suggérons une **TDM du thorax** comme modalité d'imagerie subséquente.	↑
TH15. SOUPÇON CLINIQUE D'ÉPANCHEMENT PLEURAL		
	1. Chez les patients qui présentent des signes cliniques semblant indiquer un épanchement pleural, nous recommandons une **radiographie pulmonaire ou une échographie au chevet (si réalisable)** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Si un examen d'imagerie supplémentaire est nécessaire, nous suggérons une **TDM du thorax** comme modalité d'imagerie subséquente.	↑
TH16. HÉMOPTYSIE		

Scénario clinique/diagnostique	Recommandations	Force
	TDM : tomodensitométrie; **IRM** : imagerie par résonance magnétique **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	
	1. Chez des patients présentant des traces d'hémoptysie, nous recommandons une **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Chez des patients présentant des facteurs de risque✧ ou une hémoptysie inexpliquée, persistante ou récidivante, nous recommandons une **TDM du thorax** comme modalité d'imagerie complémentaire. ✧ Fumeur (par exemple, > 20 paquets-années), risque élevé de cancer, > 40 ans	↑↑
	2. Chez des patients présentant une hémoptysie considérée grave d'un point de vue clinique, nous recommandons une **radiographie pulmonaire* et une TDM du thorax** comme modalités d'imagerie initiales. * Afin d'obtenir une image de référence	↑↑
TH17. DYSPNÉE CHRONIQUE D'ORIGINE NON CARDIOVASCULAIRE		
	1. Chez des patients présentant une dyspnée chronique d'origine non cardiovasculaire, nous recommandons une **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Si les résultats de la radiographie pulmonaire sont normaux, mais que les préoccupations cliniques persistent, toute décision d'imagerie supplémentaire doit reposer sur des éléments cliniques.	EPc
TH18. SOUPÇON DE MALADIE PULMONAIRE INTERSTITIELLE		
	1. Pour les patients chez qui l'on soupçonne une maladie pulmonaire interstitielle, nous recommandons la **radiographie pulmonaire** comme modalité d'imagerie initiale.	↑↑
	↳ **1.1** Si un examen d'imagerie **supplémentaire** est requis, considérant que la radiographie pulmonaire ne permet pas d'éliminer la possibilité d'une maladie pulmonaire interstitielle, nous recommandons une **TDM à haute résolution (TDM-HR)** comme modalité d'imagerie subséquente.	↑↑
TH19. NODULE DU POUMON DE DÉCOUVERTE FORTUITE		
	1. Chez les patients présentant un nodule du poumon découvert de manière fortuite lors d'un examen de TDM du thorax✧, nous recommandons de suivre les lignes directrices de la Fleischner Society au sujet de la gestion des nodules pulmonaires de découverte fortuite détectés sur des images de TDM. Lignes directrices de la Fleischner Society : https://doi.org/10.1148/radiol.2017161659 ✧Ce qui exclut les nodules observés sur une TDM du thorax dans le cadre du dépistage du cancer du poumon	↑↑
TH20. SOUPÇON DE LÉSION DU MÉDIASTIN		
	1. Pour les patients chez qui l'on soupçonne une lésion du médiastin, nous recommandons la **TDM du thorax** comme modalité d'imagerie initiale.	↑↑

Scénario clinique/diagnostique	Recommandations	Force
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	↳ **1.1** Si un examen d'imagerie supplémentaire est nécessaire afin d'évaluer une invasion locale ou pour déterminer la composition des tissus, nous recommandons une **IRM du thorax** comme modalité d'imagerie subséquente.	↑↑
TH21. SOUPÇON DE LYMPHADÉNOPATHIE MÉDIASTINALE		
	1. Pour les patients chez qui l'on soupçonne une lymphadénopathie médiastinale, nous recommandons une **TDM du thorax** comme modalité d'imagerie initiale.	↑↑
TH22. DIAPHRAGME SURÉLEVÉ SUR LA RADIOGRAPHIE PULMONAIRE		
	1. Chez les patients présentant un diaphragme surélevé sur les résultats de radiographie de thorax et chez qui l'on soupçonne une paralysie du nerf phrénique, nous suggérons la **fluoroscopie** ou l'**échographie** comme modalité d'imagerie initiale. *La modalité d'imagerie peut varier en fonction des préférences de pratique régionales et de la disponibilité des ressources.*	↑

APPENDIX 4. POTENTIALLY RELEVANT NON-ENGLISH GUIDELINES

1. Song J, Nam BD, Yoon SH, Yoo JY, Jeong Y.J, Yeo CD, Lim SY, Lee SY, Kim HK, Kim BH, Jin KN, Yong HS. Korean Clinical Imaging Guidelines for the Appropriate Use of Chest MRI. *Taehan Yongsang Uihakhoe Chi* 2021; 82:562-574.
2. Pleural Mediastinal Diseases Working Group of Chinese Thoracic Society. Chinese expert consensus on diagnosis of pleural effusion. *Chung-Hua Chieh Ho Ho Hu Hsi Tsa Chih Chinese Journal of Tuberculosis & Respiratory Diseases* 2022; 45:1080-1096.
3. Ley S, Biederer J, Ley-Zaporozhan J, Wielputz MO, Vogel-Claussen J, Das M, Hamer O. Chest X-ray: implementation and indication: Recommendations of the thoracic imaging working group of the German Radiological Society. *Radiologe* 2022; 62:149-157.
4. Kraus T, Teschler H. Update of the AWMF S2k Guideline Diagnostics and Assessment of Occupational Asbestos-Related Diseases - What's New? *Pneumologie* 2021; 75:201-205.
5. Fink L, Jonigk D. The updated S2k guideline for the diagnosis of idiopathic pulmonary fibrosis : Essential aspects for pathology. *Pathologe* 2021; 42:40-47.
6. Berezowska S. Fibrotic hypersensitivity pneumonia: focus on pathology-relevant aspects of the new ATS/JRS/ALAT clinical guideline for the diagnosis of hypersensitivity pneumonia in adults. *Pathologe* 2021; 42:48-54.
7. Behr J, Gunther A, Bonella F, Dinkel J, Fink L, Geiser T, Geisler K, Glaser S, Handzhhiev S, Jonigk D, Koschel D, Kreuter M, Leuschner G, Markart P, Prasse A, Schonfeld N, Schupp JC, Sitter H, Muller-Quernheim J, Costabel U. German Guideline for Idiopathic Pulmonary Fibrosis. *Pneumologie* 2020; 74:263-293.
8. Schumichen C, Schmidt M, Krause T. Lung scintigraphy. *Nuclear-Medizin* 2018; 57:74-91.
9. Benahmed N, Briat G, Rondia K, Vlayen J. Routine preoperative testing in adults undergoing elective non-cardiothoracic surgery. *Revue Medicale de Bruxelles* 2018; 39:101-107.
10. Dalhoff K, Abele-Horn M, Andreas S, Deja M, Ewig S, Gastmeier P, Gatermann S, Gerlach H, Grabein B, Heusel CP, Hoffken G, Kolditz M, Kramme E, Kuhl H, Lange C, Mayer K, Nachtigall I, Panning M, Pletz M, Rath PM, Rohde G, Rosseau S, Schaaf B, Schreiter D, Schutte H, Seifert H, Spies C, Welte T. Epidemiology, Diagnosis and Treatment of Adult Patients with Nosocomial Pneumonia - Update 2017 - S3 Guideline of the German Society for Anaesthesiology and Intensive Care Medicine, the German Society for Infectious Diseases, the German Society for Hygiene and Microbiology, the German Respiratory Society and the Paul-Ehrlich-Society for Chemotherapy, the German Radiological Society and the Society for Virology. *Pneumologie* 2018; 72:15-63.
11. Kammoun S, Hayouni A, Ghrairi H, Racil H, Rouetbi N, Garrouche A, Gargouri I, Ben Younes R, Maatallah A, Slama S, Smaoui M, Bali F, Tritar F, Charfi MR. Chronic Obstructive Pulmonary Disease: Tunisian Society of Respiratory Diseases and Allergology Guidelines. *Tunisie Medicale* 2017; 95:722-733.
12. Diego Roza C, Cruz Carmona MJ, Fernandez Alvarez R, Ferrer Sancho J, Marin Martinez B, Martinez Gonzalez C, Rodriguez Portal JA, Romero Valero F, Villena Garrido V. Recommendations for the Diagnosis and Management of Asbestos-Related Pleural and Pulmonary Disease. *Archivos de Bronconeumologia* 2017; 53:437-442.
13. Cottin V, Bonniaud P, Cadranel J, Crestani B, Jouneau S, Marchand-Adam S, Nunes H, Wemeau-Stervinou L, Bergot E, Blanchard E, Borie R, Bourdin A, Chenivesse C, Clement A, Gomez E, Gondouin A, Hirschi S, Lebargy F, Marquette CH, Montani D, Prevot G, Quetant S, Reynaud-Gaubert M, Salaun M, Sanchez O, Trumbic B, Berkani K, Brillet PY, Campana M, Chalabreysse L, Chatte G, Debieuvre D, Ferretti G, Fourrier JM, Just N, Kambouchner M, Legrand B, Le Guillou F, Lhuillier JP, Mehdaoui A, Naccache JM, Paganon C, Remy-Jardin M, Si-Mohamed S, Terrioux P. French practical guidelines for the diagnosis and management of IPF - 2021 update, short version. *Revue des Maladies Respiratoires* 2022; 39(3):275-312.
14. Avdeev SN, Chikina S.Y, Nagatkina OV. Idiopathic guideline pulmonary fibrosis: A new international clinical. *Pulmonologiya* 2019; 29(5):525-552.
15. Pintado B, Rigual JA, Arrieta P. Diagnostic and therapeutic guideline of pneumothorax. *Medicine* (Spain) 2019; 12(88):5189-5192.
16. National Institutes for Food, Drug, Control, Cardio-Thoracic Working Group, Chinese Society of Radiology Chinese Medical Association. Expert consensus on the rule and quality control of pulmonary nodule annotation based on thoracic CT. *Chinese Journal of Radiology* 2019; 53(1):9-15.
17. Berthold LD, Weidemann J, Wunsch R. Recommendations for actions according to the S1 guidelines "Respiratory tract diseases - Imaging diagnostics". *Monatsschrift fur Kinderheilkunde* 2019; 167(3):251-253.
18. Zwissler B. Preoperative evaluation of adult patients before elective, non-cardiothoracic surgery. *Anasthesiologie und Intensivmedizin* 2017; 58(6):349-364.
19. Vlayen J, Benahmed N, Briat G. Preoperative testing in noncardiothoracic surgery. *Tijdschrift voor Geneeskunde* 2017; 73(3):131-137.

APPENDIX 5. AGREE-II ASSESSMENTS

Guideline	Domain 1				Domain 2				Domain 3									Domain 4				Domain 5								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 (%)	
RCR 2017 [19]	3	3	3	9 (100)	3	3	3	9 (100)	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)	3
ACR 2020 (Occ. lung disease) [20]	3	3	2	8 (89)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	3	2	2	1	8 (67)	3	3	6 (100)	2
ACR 2020 (Non-spec. chest pain) [21]	3	1	3	7 (78)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	2	2	1	1	6 (50)	2	3	5 (83)	2
ACR 2022 (Routine chest) [22]	3	2	3	8 (89)	2	1	3	6 (67)	3	3	3	3	2	3	3	2	22 (92)	3	3	3	9 (100)	1	3	2	1	7 (58)	2	1	4 (67)	2
ACR 2017 (TB) [23]	2	2	2	6 (67)	3	1	3	7 (78)	3	2	3	3	3	3	3	1	21 (88)	3	3	3	9 (100)	3	2	2	1	8 (67)	1	3	4 (67)	2
ISA 2022 [24]	3	3	3	9 (100)	2	1	3	6 (67)	3	3	3	3	3	3	3	1	22 (92)	3	3	3	9 (100)	2	2	2	2	8 (67)	1	3	4 (67)	2
S3 guideline 2018 [25]	3	2	3	8 (89)	3	1	3	7 (78)	3	2	3	3	2	3	3	1	20 (83)	3	3	3	9 (100)	2	2	2	2	8 (67)	1	1	2 (33)	2
PACTS 2020 [26]	3	2	3	8 (89)	3	1	3	7 (78)	3	2	3	3	3	3	3	1	21 (88)	3	3	3	9 (100)	2	3	2	3	10 (83)	3	3	6 (100)	3
French guidelines 2018 [27]	3	3	3	9 (100)	3	1	3	7 (78)	3	2	3	3	3	3	3	1	21 (88)	2	1	3	6 (67)	1	1	1	3	6 (50)	1	3	4 (67)	2
NICE (COPD) 2018 [28]	3	2	3	8 (89)	3	3	3	9 (100)	3	3	3	3	3	3	1	1	20 (83)	3	3	3	9 (100)	3	3	3	3	12 (100)	1	3	4 (67)	3
EMAT/TTS 2021 [29]	3	3	3	9 (100)	3	1	3	7 (78)	3	3	3	3	3	3	3	1	22 (92)	3	3	3	9 (100)	2	3	2	3	10 (83)	3	3	6 (100)	3
CHEST 2019 [30]	2	3	3	8 (89)	3	3	3	9 (100)	3	3	3	3	2	3	3	1	21 (88)	3	2	3	8 (89)	2	2	1	1	6 (50)	3	3	6 (100)	2
POLLUS-IM 2020 [31]	3	3	2	8 (89)	3	1	3	7 (78)	3	3	3	3	3	3	3	2	23 (96)	3	3	3	9 (100)	3	3	2	3	11 (92)	3	3	6 (100)	3
ATS/IDSA 2019 [32]	3	3	3	9 (100)	3	1	3	7 (78)	3	3	3	3	3	3	3	1	22 (92)	3	3	3	9 (100)	3	3	1	3	10 (83)	3	3	6 (100)	3
ACR 2019 (Immuno-compromised) [33]	2	2	2	6 (67)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	3	2	2	1	8 (67)	2	3	5 (83)	2
SEOM 2018 [34]	3	2	3	8 (89)	2	1	3	6 (67)	2	3	3	1	3	3	3	1	19 (79)	3	3	3	9 (100)	2	3	1	3	9 (75)	1	3	4 (67)	2
ACR 2021 (Chronic cough) [35]	3	3	2	8 (89)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	2	2	1	1	6 (50)	3	3	6 (100)	2
ERS 2020 [36]	3	3	3	9 (100)	3	3	3	9 (100)	3	3	3	3	3	3	3	1	22 (92)	3	3	2	8 (89)	3	3	3	1	10 (83)	3	3	6 (100)	3
Italian intersociety 2022 [37]	3	2	3	8 (89)	3	1	3	7 (78)	2	2	3	3	3	3	3	1	20 (83)	2	3	3	8 (89)	3	3	2	3	11 (92)	3	3	6 (100)	3
ACR 2018 (Dyspnea) [38]	3	3	2	8 (89)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	3	2	2	1	8 (67)	1	3	4 (67)	2

Appendix 5. AGREE-II assessments

Guideline	Domain 1				Domain 2				Domain 3									Domain 4				Domain 5								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 2020 (Hemoptysis) [39]	3	3	2	8 (89)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	2	2	2	1	7 (58)	2	3	5 (83)	2
Korean guideline 2018 [40]	3	3	3	9 (100)	2	1	3	6 (67)	3	3	3	3	3	2	3	1	21 (88)	3	2	3	8 (89)	1	2	1	1	5 (42)	1	1	2 (33)	2
ACR 2021 (Diffuse lung disease) [41]	3	3	2	8 (89)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	2	2	2	1	7 (58)	3	3	6 (100)	2
CHEST 2021 [42,43]	3	3	3	9 (100)	3	2	3	8 (89)	3	3	3	3	1	3	3	1	20 (83)	3	3	3	9 (100)	3	3	2	3	11 (92)	2	3	5 (83)	3
ICS/NCCP 2020 [44]	3	3	3	9 (100)	3	1	3	7 (78)	3	2	3	3	3	3	3	1	21 (88)	3	3	3	9 (100)	3	3	3	3	12 (100)	1	3	4 (67)	3
French guidelines 2022 [45]	3	2	3	8 (89)	3	3	3	9 (100)	3	2	2	3	3	3	3	1	20 (83)	3	2	3	8 (89)	3	3	2	3	11 (92)	1	3	4 (67)	3
S2K 2021 [46]	3	3	3	9 (100)	3	1	3	7 (78)	3	3	3	3	2	3	3	2	22 (92)	3	3	2	8 (89)	2	3	1	3	9 (75)	3	3	6 (100)	3
Fleischner Society 2017 [47,48]	3	2	3	8 (89)	3	1	3	7 (78)	3	2	3	3	3	3	3	1	21 (88)	3	3	3	9 (100)	3	3	1	3	10 (83)	1	3	4 (67)	2
ACR 2021 (Media-stinal mass) [49]	3	2	2	7 (78)	3	1	3	7 (78)	3	2	2	3	3	3	3	1	20 (83)	3	3	3	9 (100)	2	3	2	1	8 (67)	1	3	4 (67)	2

Abbreviations: **ACR**: American College of Radiology; **ATS/IDSA**: American Thoracic Society and Infectious Diseases Society of America; **CAR**: Canadian Association of Radiologists; **EMAT/TTS**: Emergency Medicine Association of Turkey/Turkish Thoracic Society, **ERS**: European Respiratory Society; **ICS/NCCP**: Indian Chest Society/National College of Chest Physicians; **NICE**: National Institute for Health and Clinical Excellence; **PACTS**: Perioperative Anesthesa Care in Thoracic surgery; **POLLUS-IM**: Polish recommendations for lung ultrasound in internal medicine; **RCR**: Royal College of Radiologists; **SEOM**: Spanish Society of Medical Oncology