INTRODUCTION

The Centers for Medicare and Medicaid Services (CMS) Appropriate Use Criteria (AUC) program takes effect January 2020 and requires ambulatory and emergency medicine providers to consult AUC using a CMS approved clinical decision support mechanism when ordering advanced imaging (CT, MRI or nuclear medicine) in eight priority clinical areas (PCAs). Lung cancer is included in the PCAs. This evidentiary review identified the highest-grade evidence in the literature pertaining to the utility of CT, MRI and nuclear medicine for patients with the following scenarios:

- Initial diagnosis and staging of lung cancer: AUCs detailed below
- Lung cancer screening (AUCs to be developed)
- Lung nodule surveillance (AUCs to be developed)
- Surveillance after treatment (AUCs to be developed)

LITERATURE REVIEW

Broad search Jan. 26, 2019


PRISMA

- 1,105 references imported for screening as 1,105 studies
  - Zero duplicates removed
- 1,104 studies screened against title and abstract
  - 826 studies excluded
- 278 studies pulled and subdivided by topic
  - Lung cancer screening

Published December 2019
Johns Hopkins University School of Medicine  
Appropriate Use Criteria  
Priority Clinical Area: Lung Cancer  
Setting: Ambulatory and Emergency Department

- Clinical practice guidelines
- Lung cancer diagnosis and staging
- Positron emission tomography (PET)/CT for lung cancer
- Miscellaneous
- Three publications focused on initial chest CT for diagnosis

Publication type
- One meta-analysis
- Two systematic reviews

Oxford grade
- Three studies Oxford Grade 1

Clinical practice guideline (CPG) search July 15, 2019
(lung cancer[MeSH Major Topic]) AND (diagnosis [MeSH Major Topic]) AND “guideline”[Publication Type]

PRISMA
- 55 references imported
  - Zero duplicates removed
- 55 studies screened against title and abstract
  - 48 studies excluded
- Seven studies assessed for full-text eligibility
  - Zero studies excluded
- Seven guidelines included and supplemented by 11 related (same society and NCCN (National Comprehensive Cancer Network) guideline)

Oxford Grade: See evidence table for grading of CPG rules.

Evidence tables are found separately on the Johns Hopkins Medicine’s Appropriate Use Criteria website.

Published December 2019
# APPROPRIATE USE CRITERIA

<table>
<thead>
<tr>
<th>Title</th>
<th>Clinical scenario 1: Suspicion of lung cancer clinically</th>
<th>Clinical scenario 2: Suspicion of lung cancer radiographically, no neurologic or musculoskeletal symptoms</th>
<th>Clinical scenario 3: Known lung cancer and suspicion of cerebral metastases</th>
<th>Clinical scenario 4: Known lung cancer and suspicion of spine metastases</th>
<th>Clinical scenario 5: Known lung cancer and bone metastases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>Suspect lung cancer, no other concerns and no radiograph</td>
<td>Radiograph positive for cancer but no brain, spine or bone symptoms</td>
<td>Lung cancer diagnosis and signs or symptoms of brain pathology</td>
<td>Lung cancer diagnosis and signs or symptoms of spine pathology</td>
<td>Lung cancer diagnosis and signs or symptoms of bone pathology</td>
</tr>
<tr>
<td>AUC Rules</td>
<td>Consistent with AUC: No advanced imaging is consistent with AUC for this clinical presentation.</td>
<td>Chest CT</td>
<td>Brain CT or MRI</td>
<td>Spine CT or MRI</td>
<td>Bone scan</td>
</tr>
<tr>
<td></td>
<td>Allowable by AUC: Brain CT or MRI in Small Cell Lung Cancer only</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does not meet AUC: Chest CT or MRI, brain CT or MRI, spine CT or MRI, bone scan, PET/CT</td>
<td>Chest MRI, spine CT or MRI, bone scan, PET/CT</td>
<td>Chest CT or MRI, spine CT or MRI, bone scan, PET/CT</td>
<td>Chest CT or MRI, brain CT or MRI, bone scan, PET/CT</td>
<td>Chest CT or MRI, brain CT or MRI, spine CT or MRI, PET/CT</td>
</tr>
<tr>
<td></td>
<td>No AUC available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Evidentiary vs Consensus: Consensus</td>
<td>Evidentiary</td>
<td>Evidentiary</td>
<td>Evidentiary</td>
<td>Evidentiary</td>
</tr>
</tbody>
</table>

*Published December 2019*
MULTIDISCIPLINARY TEAM

The Johns Hopkins University School of Medicine requires that all practicing physicians participating in the development of AUC disclose any conflicts of interest using the International Committee of Medical Journal Editors (ICMJE) form. This information is publically available in a timely fashion upon request, for not less than five years after the most recent published update of the relevant appropriate use criteria. Members of the shoulder pain AUC development team are:

Jonathan Hansen  Emergency Medicine, Johns Hopkins Bayview Medical Center
Susan Peterson  Emergency Medicine, The Johns Hopkins Hospital
Mustapha Saheed  Emergency Medicine, The Johns Hopkins Hospital
Youngjee Choi  Internal Medicine, Johns Hopkins Medicine — Green Spring Station
Carrie Herzke  Internal Medicine, The Johns Hopkins Hospital
Danny Lee  Internal Medicine, Johns Hopkins Community Physicians
Josephine Feliciano  Oncology, Johns Hopkins Bayview Medical Center
Russell Hales  Radiation Oncology, Johns Hopkins Sidney Kimmel Comprehensive Cancer Center
Pamela Johnson  Radiology, The Johns Hopkins Hospital
Tony Lin  Radiology, The Johns Hopkins Hospital
Franco Verde  Radiology, Johns Hopkins Bayview Medical Center

Disclosure: AUC developers may receive future royalties from licensure of AUC to CMS-approved clinical decision support mechanisms (CDSMs).