

Johns Hopkins University School of Medicine
Appropriate Use Criteria
Priority Clinical Area: Neck Pain
Clinical Presentation: Neck Pain
Setting: Ambulatory and Emergency Department

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). Neck pain is included in the PCAs.

The Johns Hopkins University School of Medicine (JHUSOM) endorses the University of Utah's AUCs for nontraumatic neck pain. The purpose of this review is to identify high-grade evidence in the literature regarding the utility of computed tomography (CT) and magnetic resonance imaging (MRI) scanning for emergency department patients with traumatic neck pain.

LITERATURE REVIEW

JHUSOM partnered with the [Harvard Medical School \(HMS\) Library of Evidence \(LOE\)](#), which has performed the necessary literature reviews and evidence grading that CMS requires for the eight PCAs and more. The HMS LOE made this possible by creating a master database that all qualified provider-led entities (QPLEs) can use. JHUSOM creates, modifies and/or endorses its own AUC by reviewing the HMS LOE literature review and evidence grade assigned for each logic point, and by making an assessment regarding whether the review and grading are acceptable when developing or modifying our AUC, as required under CMS AUC program regulations. JHUSOM will disclose use of the HMS LOE resources and outputs on its website, and all faculty involved in the HMS LOE provide conflict of interest disclosures on their website.

To design our AUC for pulmonary embolism advanced imaging, we searched the HMS LOE for Oxford Grade 1 or 2 evidence, as detailed in the evidence table below. The HMS LOE details its literature review and grading process on [its website](#).

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APPROPRIATE USE CRITERIA

Title	Scenario 1: Cervical spine trauma in elderly patient	Scenario 2: Cervical spine trauma AND dangerous mechanism	Scenario 3: Cervical spine trauma and evidence of neurologic injury	Scenario 4: Cervical spine trauma and positive physical exam	Scenario 5: Cervical spine trauma and altered mental status	Scenario 6: Cervical spine trauma and high clinical suspicion despite negative CT
Definition	Cervical spine trauma, age > 65 and first advanced imaging test	Cervical spine trauma AND first advanced imaging test AND any one of the following: fall >1 meter or five stairs; axial load to head; motor vehicle collision > 60 mph, rollover or ejection; all-terrain vehicle; painful distracting injury	Cervical spine trauma, first advanced imaging test AND either of the following: paresthesia in extremities OR focal neurologic deficit	Cervical spine trauma, first advanced imaging test AND posterior midline tenderness	Cervical spine trauma, first advanced imaging test AND either of the following: intoxication OR Glaskow Coma Scale < 15	Cervical spine trauma, negative neck CT AND persistent neurologic deficit
AUC rules						
Consistent with AUC	Neck CT	Neck CT	Neck CT	Neck CT	Neck CT	Neck MRI
Allowable by AUC			Neck MRI			
Not consistent with AUC	Neck MRI, nuclear medicine bone scan	Neck MRI, nuclear medicine bone scan	Nuclear medicine bone scan	Neck MRI, nuclear medicine bone scan	Neck MRI, nuclear medicine bone scan	
No AUC						

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EVIDENCE TABLE

HMS LOE identified four publications investigating traumatic neck pain that were graded level 2 or higher by the Oxford scoring system, as detailed in the evidence table below. This evidence was used to determine when CT and MRI imaging are appropriate in the emergency setting.

	Article/guideline title: Canadian C-spine rule	Article/guideline title: Canadian C-spine rule	Article/guideline title: NEXUS cervical spine rule	Article/guideline title: NEXUS cervical spine rule
PRIORITY CLINICAL AREA	Neck pain	Neck pain	Neck pain	Neck pain
IMAGING MODALITY	X-ray	X-ray	X-ray	X-ray
BODY REGION	Cervical spine	Cervical spine	Cervical spine	Cervical spine
DX/SYMP TOM(S)	Suspected cervical injury, neck pain, trauma	Suspected cervical injury, neck pain, trauma	Blunt trauma	Blunt trauma
PIECE OF LOGIC	IF NOT ([age >=65] OR [fall >3 feet] OR [axial load to head] OR [motor vehicle accident >100km/hour] OR [vehicle rollover] OR [vehicle ejection] OR [use of motorized recreational vehicle] OR [bicycle collision] OR [paresthesia in extremities]) AND ([able to safely assess range of motion] AND [able to rotate neck 45 degrees left and right]), THEN NOT [X-ray C-spine]	IF ([age >=65] OR [fall >3 feet] OR [axial load to head] OR [motor vehicle accident >100km/hour] OR [vehicle rollover] OR [vehicle ejection] OR [use of motorized recreational vehicle] OR [bicycle collision] OR [paresthesia in extremities]) AND NOT ([able to safely assess range of motion] OR [able to rotate neck 45 degrees left and right]), THEN [X-ray C-spine]	IF ([focal neurologic deficit] OR [midline spinal tenderness] OR [altered level of consciousness] OR [intoxication] OR [distracting injury]), THEN [X-ray cervical spine]	IF NOT ([focal neurologic deficit] OR [midline spinal tenderness] OR [altered level of consciousness] OR [intoxication] OR [distracting injury]), THEN NOT [X-ray cervical spine]
OXFORD GRADE (2011)	Level 2 (Diagnosis)	Level 2 (Diagnosis)	Level 2 (Diagnosis)	Level 2 (Diagnosis)
STUDY DESIGN	Cohort study	Cohort study	Cohort study	Cohort study

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MULTIDISCIPLINARY TEAM

JHUSOM requires that all practicing physicians participating in the development of AUC disclose any conflicts of interest using the International Community 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 neck pain AUC development team are:

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