

The Weill Cornell Neck Pain Appropriate Use Criteria (AUC) addresses nine clinical conditions common to patients presenting with Neck Pain and makes recommendations to optimize diagnostic effectiveness.

Common Clinical Conditions	
0	Not Neck Pain
1	Compression Fracture - Known or Suspected, No Trauma
2	Neck Pain, Greater than 6 weeks, No Additional Pathology
3	History of C-Spine Surgery
4	Infection - Known or Suspected
5	Neck Trauma, NEXUS criteria met Low Risk for C-Spine Fracture
6	Neck Trauma, NEXUS criteria not met, High Risk for C-Spine Fracture
7	Neoplasm – Cervical - Known or Suspected
8	Neck Pain, Neurologic Impairment consistent with C-Spine Pathology
9	Neck Pain, Patient Age less than 18

The Neck Pain AUC is activated when a user orders one of the following twelve Advanced Imaging Procedures.

Advanced Imaging Procedures	
1	CT Cervical Spine without Contrast
2	CT Cervical Spine with Contrast
3	CT Cervical Spine with and without Contrast
4	MR Cervical Spine without contrast
5	MR Cervical Spine with Contrast
6	MR Cervical Spine with and Without Contrast
7	CT Neck Soft Tissue without Contrast
8	CT Neck Soft Tissue with Contrast
9	CT Neck Soft Tissue with and without Contrast
10	MR Neck without Contrast
11	MR Neck with Contrast
12	MR Neck with and without Contrast

The Neck Pain AUC recommends one of the following fourteen Imaging Procedures based on the clinical condition.

Recommended Imaging Procedures	
1	CT Cervical Spine without Contrast
2	CT Cervical Spine with Contrast
3	CT Cervical Spine with and without Contrast
4	MR Cervical Spine without contrast
5	MR Cervical Spine with Contrast
6	MR Cervical Spine with and Without Contrast
7	CT Neck Soft Tissue without Contrast
8	CT Neck Soft Tissue with Contrast
9	CT Neck Soft Tissue with and without Contrast
10	MR Neck without Contrast
11	MR Neck with Contrast
12	MR Neck with and without Contrast
13	XR Cervical Spine

Nexus Criteria

The Neck Pain AUC logic utilizes five Nexus Criteria.

Cervical Spine radiography is indicated for patients with neck trauma unless they meet all the Nexus Criteria

NEXUS Criteria	
1	No Posterior Midline Cervical-Spine Tenderness
2	No Evidence of Intoxication
3	A Normal Level of Alertness (15 on the Glasgow Coma Scale)
4	No Focal Neurologic Deficit
5	No Painful Distracting Injuries

Logic Tables

The following Clinical Condition Logic Tables provide the Neck Pain AUC logic for each clinical condition.

The logic incorporates prior imaging studies and contrast contraindications where applicable.

Key

Value	Score
Blank	No Score Assigned
0	AUC Not Applicable – Allows User to Proceed with Original Order
1	Inappropriate
2	Contact Radiology
3	Appropriate
4	Appropriate Preferred

Advice Text

The Advice Text provided in each condition is for Ordering Provider information and education purposes.

Condition 0 – Not Neck Pain - AUC Logic Activated, AUC Not Applicable

Condition	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference
Not for neck pain	0	0	0	0	0	0		0	0	0	0	0	0	2

Condition 0 - Advice Text

Not covered by guidelines.

Condition 1 - Compression Fracture - Known or Suspected, No Trauma

Condition	Priors	Contraindications	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference	Advice Text
Compression Fracture - Known or Suspected, No Trauma			1	1	1	1	1	1	4	1	1	1	1	1	1		a
Compression Fracture - Known or Suspected, No Trauma	XR		4	1	1	3	1	1		1	1	1	1	1	1	LBP	b
Compression Fracture - Known or Suspected, No Trauma	XR	MR	4	1	1	1	1	1		1	1	1	1	1	1		c

Condition 1 - Advice Text

a	Cervical spine radiographs are preferred as the initial exam for suspected vertebral compression fracture.
b	CT of the cervical spine without contrast is the preferred exam for suspected vertebral compression fracture. MR may also be useful in the detection of fracture and in assessing in the acuity of the fracture.
c	CT of the cervical spine without contrast is the preferred exam for suspected vertebral compression fracture.

Condition 2 - Greater than 6 weeks, No Additional Pathology

Condition	Contraindications	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference	Advice Text
Neck Pain > 6 weeks no Additional Pathology		1	1	1	4	1	1		1	1	1	1	1	1	1, LBP	a
Neck Pain > 6 weeks no Additional Pathology	MR	4	1	1	1	1	1		1	1	1	1	1	1		b

Condition 2 - Advice Text

a	MR of the cervical spine without contrast is the preferred exam for evaluation of neck pain.
b	MR of the cervical spine without contrast is the preferred exam for evaluation of neck pain. However, this patient may have a contraindication to MR. CT is a useful alternative.

Condition 3 – Neck Pain, History of C-Spine Surgery

Condition	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference
Neck Pain Hx of C-Spine Surgery	0	0	0	0	0	0		0	0	0	0	0	0	LBP

Condition 3 - Advice Text

Not covered by guidelines.

Condition 4 – Infection - Known or Suspected

Condition	Contraindications	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference	Advice Text
Infection - Known or Suspected		3	3	1	3	1	4		1	1	1	1	1	1	1, LBP	a
Infection - Known or Suspected	GAD	3	3	1	4	1	1		1	1	1	1	1	1		b
Infection - Known or Suspected	IOD	3	1	1	3	1	4		1	1	1	1	1	1		c
Infection - Known or Suspected	MR	4	3	1	1	1	1		1	1	1	1	1	1		d
Infection - Known or Suspected	GAD IOD	3	1	1	4	1	1		1	1	1	1	1	1		e
Infection - Known or Suspected	MR IOD	4	1	1	1	1	1		1	1	1	1	1	1		f

Condition 4 - Advice Text

a	MR of the cervical spine without and with contrast is the preferred exam for patients presenting with neck pain and suspected infection or neoplastic conditions.
b	MR of the cervical spine without contrast is recommended due to contraindication to Gadolinium. While contrast is typically helpful for evaluation for infection or neoplasm in the spine it is not necessary.
c	MR of the cervical spine without and with contrast is the preferred exam for patients presenting with neck pain and suspected infection or neoplastic conditions.
d	MR of the cervical spine without and with contrast is the preferred exam for evaluation of neck pain. However, this patient may have a contraindication to MR. CT is a useful alternative.
e	MR of the cervical spine without contrast is recommended due to contraindication to Gadolinium. While contrast is typically helpful for evaluation for infection or neoplasm in the spine it is not necessary.
f	MR of the cervical spine without and with contrast is the preferred exam for evaluation of neck pain. However, this patient may have a contraindication to MR. CT is a useful alternative.

Condition 5 – Neck Trauma, NEXUS criteria met Low Risk for C-Spine Fracture

Condition	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference
Neck Trauma, NEXUS criteria met (Low Risk for C-Spine Fracture)	1	1	1	1	1	1		1	1	1	1	1	1	2

Condition 5 - Advice Text

Imaging not recommended for neck trauma in the absence of concerning findings.
--

Condition 6 – Neck Trauma, NEXUS criteria not met, High Risk for C-Spine Fracture

Condition	Contraindications	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference	Advice Text
Neck Trauma, NEXUS criteria not met - High Risk for C-Spine Fracture		4	1	1	3	1	1	4	1	1	1	1	1	1	2	a
Neck Trauma, NEXUS criteria not met - High Risk for C-Spine Fracture	MR	4	1	1	1	1	1	4	1	1	1	1	1	1		b

Condition 6 - Advice Text

a	CT of the cervical spine is the most appropriate for the evaluation of patients with cervical spine trauma who do not meet the NEXUS criteria for clearance without imaging.
b	CT of the cervical spine is the most appropriate for the evaluation of patients with cervical spine trauma who do not meet the NEXUS criteria for clearance without imaging.

Condition 7 – Cervical Neoplasm - Known or Suspected

Condition	Contraindications	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference	Advice Text
Neoplasm, Known or Suspected		3	3	1	3	1	4		1	1	1	1	1	1	1, LBP	a
Neoplasm, Known or Suspected	GAD	3	3	1	4	1	1		1	1	1	1	1	1		b
Neoplasm, Known or Suspected	IOD	3	1	1	3	1	4		1	1	1	1	1	1		c
Neoplasm, Known or Suspected	MR	4	3	1	1	1	1		1	1	1	1	1	1		d
Neoplasm, Known or Suspected	GAD IOD	3	1	1	4	1	1		1	1	1	1	1	1		e
Neoplasm, Known or Suspected	MR IOD	4	1	1	1	1	1		1	1	1	1	1	1		f

Condition 7 - Advice Text

a	MR of the cervical spine without and with contrast is the preferred exam for patients presenting with neck pain and suspected infection or neoplastic conditions.
b	MR of the cervical spine without contrast is recommended due to contraindication to Gadolinium. While contrast is typically helpful for evaluation for infection or neoplasm in the spine it is not necessary.
c	MR of the cervical spine without and with contrast is the preferred exam for patients presenting with neck pain and suspected infection or neoplastic conditions.
d	MR of the cervical spine without and with contrast is the preferred exam for evaluation of neck pain. However, this patient may have a contraindication to MR. CT is a useful alternative.
e	MR of the cervical spine without contrast is recommended due to contraindication to Gadolinium. While contrast is typically helpful for evaluation for infection or neoplasm in the spine it is not necessary.
f	MR of the cervical spine without and with contrast is the preferred exam for evaluation of neck pain. However, this patient may have a contraindication to MR. CT is a useful alternative.

Condition 8 – Neck Pain, Neurologic Impairment consistent with C-Spine Pathology

Condition	Contraindications	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine wwo	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference
Neck Pain, Neurologic Impairment		1	1	1	4	1	1		1	1	1	1	1	1	
Neck Pain, Neurologic Impairment	MR	4	4	1	1	1	1		1	1	1	1	1	1	1, LBP
Neck Pain, Neurologic Impairment	MR IOD	4	1	1	1	1	1		1	1	1	1	1	1	1, LBP

Condition 8 - Advice Text

a	MR of the cervical spine without contrast is the preferred exam for patients with neurologic impairment.
b	CT Cervical Spine with and without contrast is recommended for patients with neurologic impairment and a contraindication to MR.
c	CT Cervical Spine without contrast is recommended for patients with neurologic impairment and contraindications to MR and iodinating contrast.

Condition 9 – Neck Pain, Patient Age less than 18

Condition	CT C-Spine wo	CT C-Spine w	CT C-Spine wwo	MR C-Spine wo	MR C-Spine w	MR C-Spine	XR C-Spine	CT Neck wo	CT Neck w	CT Neck wwo	MR Neck wo	MR Neck w	MR Neck wwo	Reference
Patient < 18 years	0	0	0	0	0	0		0	0	0	0	0	0	LBP

Condition 9 - Advice Text

Not covered by guidelines.

Sources

The Neck Pain AUC has been developed by Weill Cornell Medicine utilizing the following published sources and Local Best Practices (LBP).

No.	Source	Score
1	An approach to neck pain for the family physician, Teichtahl AJ, McColl G, An approach to neck pain for the family physician, Australian Family Physician 46(11), 2013. https://www.ncbi.nlm.nih.gov/pubmed/24217096	5
2	Validity of a set of clinical criteria to rule out injury to the cervical Spine in patients with blunt trauma, Hoffman JR et al, Validity of a set of clinical criteria to rule out injury to the cervical Spine in patients with blunt trauma, National Emergency X-Radiography Utilization Study Group. N Engl J Med. 2000 Jul 13;343(2):94-9. https://www.ncbi.nlm.nih.gov/pubmed/10891516	3
LBP	Weill Cornell Medicine Local Best Practice	NA

Contributors

The Neck Pain AUC has been developed by the following.

Brenna Farmer, MD, Emergency Medicine, WCPO
 Keith Hentel, MD, MS, ED & MSK Radiology, Informatics WCPO
 Jacob Kazam, MD, ED & MSK Radiology, WCPO
 Louise Klebanoff, MD, Neurology, WCPO
 Richard Lappin, MD, Emergency Medicine, WCPO
 Angela Lignelli, MD, Neuroimaging, Columbia P&S
 Sameer Malhotra MD, MA, Internal Medicine, Informatics, Health Policy Research, WCPO
 Joshua Lantos, MD, Neuroimaging, WCPO
 Alvin Mushlin, MD, Public Health/Population Health, WCPO
 Jessica Rotman, MD, ED & MSK Radiology, WCPO
 Rahul Sharma, MD, MBA, Emergency Medicine, WCPO
 George Shih MD, MS Informatics, WCPO
 Joseph Underwood, MD, Emergency Medicine, Columbia P&S
 Joshua Weintraub, MD, Imaging Guided Interventions, Columbia P&S
 Peter Wyer, MD, Emergency Medicine, Columbia P&S

Additional Contributors

Thomas Jessen, JD, Informatics, WCPO
 Courtney Yeager, MS, Imaging, WCPO

No Conflicts Reported