

Evidence-based Cancer Imaging Program  
Appropriate Use Criteria

# Hip Pain

October 5, 2022



Memorial Sloan Kettering  
Cancer Center

## Disclaimer

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## Background

The Evidence-based Cancer Imaging Program (ECIP) was established to ensure ongoing compliance with the Centers for Medicare and Medicaid Services (CMS) Appropriate Use Criteria Program by expanding upon our existing evidence-based practices at Memorial Sloan Kettering Cancer Center (MSK). ECIP develops and implements appropriate use criteria (AUC) for ordering advanced diagnostic imaging services, and takes into consideration the unique needs of patients with cancer and our expertise as a cancer center.

AUC are guidelines developed by our Imaging Disease Management Teams (IDMT) that link: a specific clinical condition or presentation; one or more imaging exams; and an assessment of the appropriateness of each exam. Using AUCs helps to achieve the goal that all patients receive only what imaging is best for them, while avoiding unnecessary tests.

## Abbreviations

Abbreviation	Definition
<b>AUC</b>	Appropriate use criteria
<b>CAP</b>	Chest, abdomen, and pelvis
<b>CMS</b>	Centers for Medicare and Medicaid Services
<b>CT</b>	Computed tomography
<b>ECIP</b>	Evidence-based Cancer Imaging Program
<b>FDG</b>	Fluorodeoxyglucose
<b>IDMT</b>	Imaging Disease Management Team
<b>IV</b>	Intravenous
<b>MDP</b>	Methylene diphosphonate

Abbreviation	Definition
<b>MRI</b>	Magnetic resonance imaging
<b>MSK</b>	Memorial Sloan Kettering Cancer Center
<b>NaF</b>	Sodium fluoride
<b>OCEBM</b>	Oxford Centre for Evidence-Based Medicine
<b>PET</b>	Positron emission tomography
<b>SPECT</b>	Single-photon emission computed tomography
<b>WB</b>	Whole-body
<b>WBC</b>	White blood cell

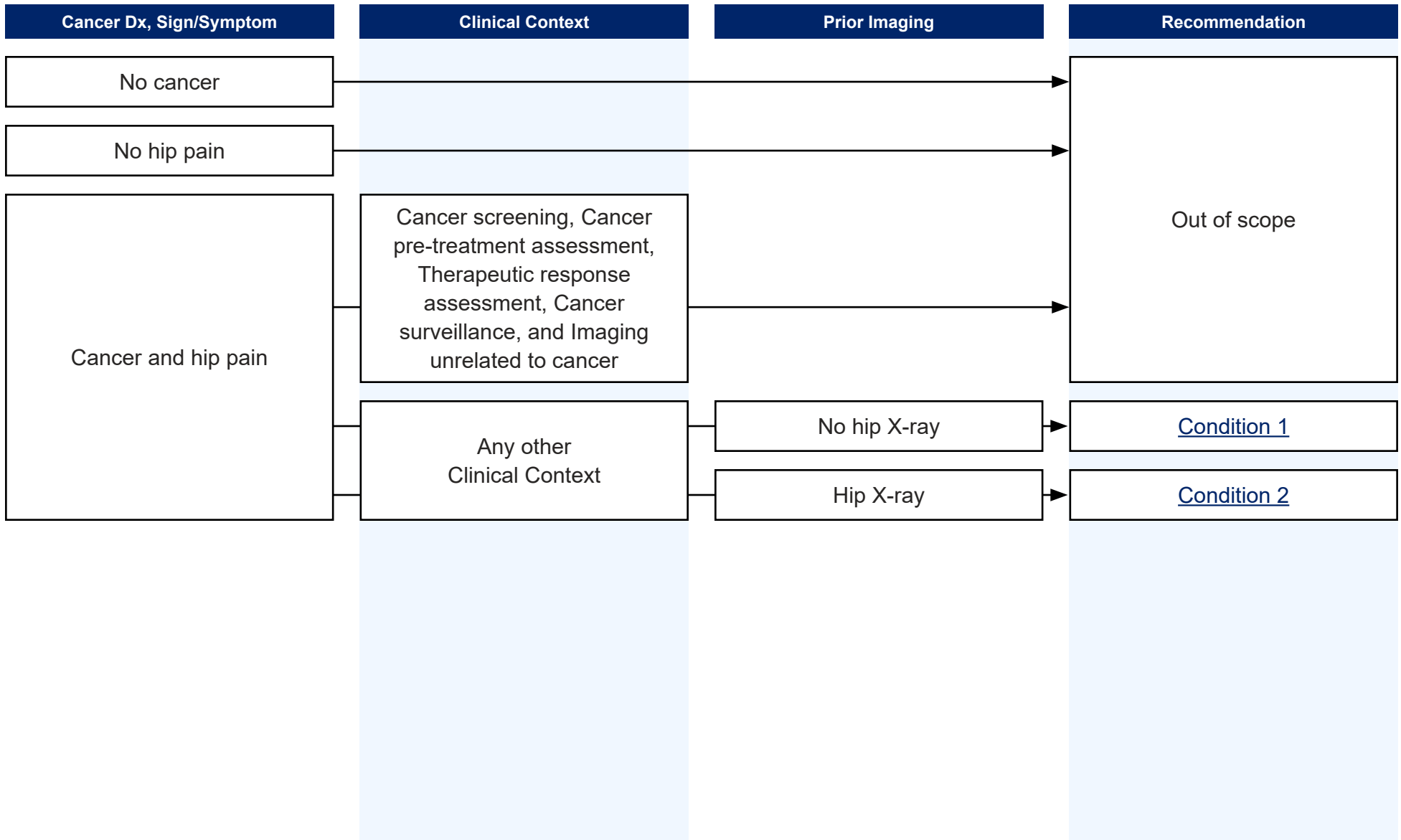
## Clinical Context

Clinical Context	Description	Relevant for this AUC?
Cancer screening	Neoplasm detection in asymptomatic patients. Imaging type and schedule informed by guidelines.	<input type="checkbox"/>
Neoplasm detection or diagnostic workup	Assessment of signs or symptoms concerning for neoplastic disease.	<input checked="" type="checkbox"/>
Cancer staging or restaging	Establishing location and extent of neoplastic disease. Restaging may occur after treatment or intervention.	<input checked="" type="checkbox"/>
Cancer pre-treatment assessment	Imaging performed to optimize the cancer treatment plan.	<input type="checkbox"/>
Therapeutic response assessment	Assessment of treatment response to guide subsequent management.	<input type="checkbox"/>
Therapeutic complication assessment	Evaluation of possible treatment-related complications or adverse events.	<input checked="" type="checkbox"/>
Cancer complication or comorbidity assessment	Evaluation of cancer or comorbidity-related complications or adverse events.	<input checked="" type="checkbox"/>
Cancer surveillance	Ongoing scheduled assessment of neoplastic disease status.	<input type="checkbox"/>
Survivorship	Assessment of long-term or late effects from cancer or cancer treatment as well as ongoing health needs of cancer survivors.	<input checked="" type="checkbox"/>
Imaging unrelated to cancer	Imaging obtained for indication or concern not related to cancer.	<input type="checkbox"/>

## Age

Adults only (≥ 18 years)

## Appropriate Use Criteria





## Condition 1: Hip Pain, Cancer, No Prior X-ray

### USUALLY APPROPRIATE

#### X-ray hip

Initial imaging should include radiography to assess cortical bone integrity and tumor matrix.

#### X-ray pelvis

Initial imaging should include radiography to assess cortical bone integrity and tumor matrix.

### SOMETIMES APPROPRIATE

### RARELY APPROPRIATE

## Condition 2: Hip Pain, Cancer, Prior X-ray

USUALLY APPROPRIATE
MRI hip without and with IV contrast
MRI hip without IV contrast
MRI pelvis without and with IV contrast
MRI pelvis without IV contrast
CT pelvis with IV contrast
CT lower extremity with IV contrast

SOMETIMES APPROPRIATE
X-ray hip
X-ray pelvis
CT pelvis without IV contrast
CT lower extremity without IV contrast
FDG PET/CT head to toe/limbs
FDG PET/CT neck/CAP

RARELY APPROPRIATE
Ultrasound
MDP bone scan (with or without SPECT)
NaF PET/CT
CT angiography
CT venography
MR angiography
WBC nuclear scan
MR arthrography
WB MRI

- If pretest probability of metastasis in hip is moderate or high, MRI or CT should be performed if radiography is unremarkable.
- CT, FDG-PET/CT, or bone scan (MDP or NaF) may be useful for patients with contraindications to MR scanning.
- IV contrast is recommended for both CT and MRI to optimally evaluate soft tissue tumor deposits and extraosseous extension of bone tumors.
- T1-weighted MR images should be obtained for optimal evaluation of bone marrow; proton density images are suboptimal for this purpose.
- In patients with a history of cancer, ultrasound should not be utilized as an isolated test.
- Conditional: MRI or CT should be considered if hip or pelvic region has been irradiated at least 3 years earlier, to assess for radiation-associated sarcoma.



## Key Evidence

### HIP PAIN

Ref No.	Published Evidence	Grade*
1	Blomlie V, Rofstad EK, Talle K, Sundfør K, Winderen M, Lien HH. Incidence of radiation-induced insufficiency fractures of the female pelvis: evaluation with MR imaging. <i>AJR Am J Roentgenol.</i> 1996 Nov;167(5):1205-1210. <a href="#">PMID: 8911181</a>	3
2	Blum A, Raymond A, Teixeira P. Strategy and optimization of diagnostic imaging in painful hip in adults. <i>Orthop Traumatol Surg Res.</i> 2015 Feb;101(1 Suppl):S85-99. <a href="#">PMID: 25599865</a>	5
3	Ikushima H, Osaki K, Furutani S, et al. Pelvic bone complications following radiation therapy of gynecologic malignancies: clinical evaluation of radiation-induced pelvic insufficiency fractures. <i>Gynecol Oncol.</i> 2006 Dec;103(3):1100-1104. <a href="#">PMID: 16919711</a>	4
4	Keeney JA, Nunley RM, Adelani M, Mall N. Magnetic resonance imaging of the hip: poor cost utility for treatment of adult patients with hip pain. <i>Clin Orthop Relat Res.</i> 2014 Mar;472(3):787-792. <a href="#">PMID: 24363186</a>	4
5	Mintz DN, Roberts CC, Bencardino, JT, et al. ACR Appropriateness Criteria Chronic Hip Pain. <i>J Am Coll Radiol.</i> 2017; 14:S90-S102. <a href="#">PMID: 28473098</a>	5
6	Rossi F, Torri L, Dominietto A, Tagliafico AS. Spectrum of magnetic resonance imaging findings in transplanted multiple myeloma patients with hip/pelvic pain (according to MY-RADS): A single center experience. <i>Eur J Radiol.</i> 2020 Sep;130:109154. <a href="#">PMID: 32629214</a>	4

Notation	Consensus-based Statement	Grade*
§	<p>In addition to reviewing the published literature for evidence, the MSK Musculoskeletal Imaging Disease Management Team leveraged consensus-based expert opinion and clinical best practices to supplement the evidence in this area to define the appropriate imaging guidelines for this clinical condition.</p> <p>Key points:</p> <ul style="list-style-type: none"> <li>Advanced imaging is often needed to determine the cause of pain in an oncology patient, due to the potential of many cancers to metastasize to bone marrow or soft tissues. Such metastases are often inapparent at radiography. Treatment decisions will be based on the cause of the pain, and is clearly different for traumatic, degenerative, or oncologic causes.</li> </ul>	<b>5</b>

\*Grade assigned in accordance with the Oxford Centre for Evidence-Based Medicine (OCEBM) Levels of Evidence 2011: <https://www.cebm.ox.ac.uk/resources/levels-of-evidence/ocebml-levels-of-evidence>



## Multidisciplinary Imaging Disease Management Team

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Radiologist
- **Robert A. Lefkowitz, MD**  
Radiologist
- **Stephanie Lobaugh, MS**  
Research Biostatistician
- **Steven C. Martin, MD**  
Internist & Hospitalist
- **Daniel E. Prince, MD, MPH**  
Surgeon

## Methodology

Details about our methodology can be found here:

<https://www.mskcc.org/departments/radiology/evidence-based-cancer-imaging/methodology>

## Resources

### CMS Appropriate Use Criteria Program Website

<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Appropriate-Use-Criteria-Program>

### MSK's ECIP Website

<https://www.mskcc.org/departments/radiology/evidence-based-cancer-imaging>

### OCEBM Levels of Evidence

<https://www.cebm.ox.ac.uk/resources/levels-of-evidence/ocebm-levels-of-evidence>