

**American College of Radiology
ACR Appropriateness Criteria®**

Pretreatment Staging of Urothelial Cancer

Variant 1: Adult. Nonmuscle invasive bladder cancer. Pretreatment staging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CTU without and with IV contrast	Usually appropriate	Strong	⊕⊕⊕⊕ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	9	9	0	0	0	1	0	0	2	3	6
			References	Study Quality											
			41 (30888482)	2											
			40 (36454277)	3											
			39 (19457811)	4											
			38 (15486248)	4											
			37 (21512076)	3											
			36 (28677000)	3											
			35 (31377833)	4											
			34 (10961281)	4											
			22 (31443960)	4											
			5 (19457809)	4											
			2 (17157629)	4											
MRU without and with IV contrast	Usually appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	0	0	0	0	2	6	3
			References	Study Quality											
			62 (19037644)	4											

CT abdomen and pelvis with IV contrast	Usually appropriate	Strong	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	0	0	1	0	1	3	4	1	2
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References	Study Quality
29 (22446350)	3
28 (22198726)	3
27 (10799162)	3
26 (16793197)	2
25 (31685109)	4
6 (14733775)	2

MRI pelvis without and with IV contrast	Usually appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	7	7	0	0	0	1	2	0	6	2	1
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References	Study Quality
60 (34839167)	2
59 (31573328)	3
58 (34332846)	2
57 (31012814)	2
56 (29755006)	4
55 (24637583)	2
54 (21924408)	2
53 (27190913)	2
52 (25835087)	3
51 (23801469)	2
50 (19914691)	3
49 (1631289)	4
48 (25615755)	1
47 (15615961)	2
41 (30888482)	2
21 (18090497)	4
5 (19457809)	4

MRI abdomen and pelvis without and with IV contrast	May be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	6	6	0	0	0	1	4	4	2	0	0
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Radiography chest	Usually not appropriate	Limited	☼ <0.1 mSv	☼ <0.03 mSv [ped]	3	3	1	2	6	1	0	1	1	0	0
		References	Study Quality												
		33 (30117014)	3												
		32 (34861372)	4												
		31 (-3196645)	4												
FDG-PET/MRI skull base to mid-thigh	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		3	3	1	1	9	0	0	0	0	0	0
		References	Study Quality												
		44 (34140245)	3												
		43 (32147364)	3												
		42 (27775939)	2												
		22 (31443960)	4												
CT abdomen with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	2	4	2	3	0	0	0	0	0
		References	Study Quality												
		30 (21586938)	3												
CT abdomen without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	5	2	1	3	0	1	0	0	0
CT abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	2	2	4	4	3	0	0	0	0	0	0
CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	3	6	2	0	0	0	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	3	4	4	0	0	0	0	0	0
MRI abdomen without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	2	2	4	3	2	1	1	1	0	0	0

MRI abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	3	4	2	0	2	1	0	0	0
MRI head without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	2	2	5	4	3	0	0	0	0	0	0
		References	Study Quality												
		45 (21178055)	4												
		46 (12712482)	4												
US kidneys and bladder retroperitoneal	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	4	3	3	0	1	0	0	0	0
MRI head without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	1	1	7	3	2	0	0	0	0	0	0
Bone scan whole body	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	7	3	2	0	0	0	0	0	0

Variant 2: Adult. Muscle invasive bladder cancer. Pretreatment staging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CTU without and with IV contrast	Usually appropriate	Limited	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	8	8	0	0	1	0	0	1	2	3	6
		References	Study Quality												
		5 (19457809)	4												
		39 (19457811)	4												
		38 (15486248)	4												
		37 (21512076)	3												
		89 (16284138)	4												
MRU without and with IV contrast	Usually appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	8	8	0	0	1	0	0	1	2	5	3

		References	Study Quality												
		62 (19037644)	4												
CT abdomen and pelvis with IV contrast	Usually appropriate	Strong	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	0	0	0	0	2	0	7	2	2
		References	Study Quality												
		88 (18502346)	4												
		87 (26513586)	2												
		86 (23323729)	3												
		85 (34059435)	2												
		84 (33117695)	4												
		83 (30120501)	Good												
		82 (35035524)	3												
		81 (28225635)	4												
		45 (21178055)	4												
		39 (19457811)	4												
		35 (31377833)	4												
		34 (10961281)	4												
		30 (21586938)	3												
		29 (22446350)	3												
		28 (22198726)	3												
		27 (10799162)	3												
		25 (31685109)	4												
		6 (14733775)	2												
		5 (19457809)	4												
		2 (17157629)	4												
CT chest with IV contrast	Usually appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	0	0	1	0	1	1	8	2	0
		References	Study Quality												
		32 (34861372)	4												
		31 (-3196645)	4												

		30 (21586938)		3												
MRI abdomen and pelvis without and with IV contrast	Usually appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	7	7	0	1	0	1	3	0	6	0	0	
MRI pelvis without and with IV contrast	Usually appropriate	Strong	0 0 mSv	0 0 mSv [ped]	7	7	0	1	0	0	2	1	4	1	3	

References	Study Quality
49 (1631289)	4
48 (25615755)	1
110 (23746384)	2
108 (21688007)	2
52 (25835087)	3
51 (23801469)	2
53 (27190913)	2
54 (21924408)	2
61 (23040723)	2
55 (24637583)	2
47 (15615961)	2
107 (19247665)	2
109 (19332849)	2
50 (19914691)	3
111 (29392362)	1
106 (32112505)	4
60 (34839167)	2
59 (31573328)	3
58 (34332846)	2
57 (31012814)	2
56 (29755006)	4
41 (30888482)	2
21 (18090497)	4
12 (24893049)	2
11 (20813300)	3

64 (25842745)	3
68 (15749550)	3
66 (8364777)	3
71 (20028917)	2
65 (12092877)	4
35 (31377833)	4
112 (8470608)	4
73 (34850765)	3
72 (33621272)	Good
70 (22260895)	2
69 (19444499)	2

MRI abdomen and pelvis without IV contrast	May be appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	4	4	0	1	1	4	4	1	0	0	0
Bone scan whole body	May be appropriate	Limited	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	4	4	1	1	2	3	4	1	1	0	0

References	Study Quality
75 (2965914)	4
76 (8653315)	3
78 (17671529)	4
80 (33060038)	3
79 (31005656)	4
77 (35414637)	2
74 (12010321)	4

CT abdomen with IV contrast	Usually not appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	3	3	4	2	3	0	4	0	0	0	0
CT abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	⊗⊗⊗ 1-10 mSv	⊗⊗⊗⊗ 3-10 mSv [ped]	3	3	2	2	6	1	0	0	0	0	0
Radiography intravenous urography	Usually not appropriate	Limited	⊗⊗⊗ 1-10 mSv	⊗⊗⊗ 0.3-3 mSv [ped]	3	3	4	1	6	0	0	0	0	0	0

		References		Study Quality											
		37 (21512076)		3											
MRI abdomen without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	2	3	6	0	0	0	0	0	0
MRI head without and with IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	3	3	3	2	4	0	2	0	1	0	0
		References		Study Quality											
		45 (21178055)		4											
		46 (12712482)		4											
CT abdomen without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	6	1	3	1	2	0	0	0	0
CT abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	2	2	6	1	2	0	3	1	0	0	0
CT pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	3	3	5	0	0	0	0	0	0
CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	3	6	2	0	0	0	0	0	0
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	4	5	2	0	0	0	0	0	0
MRI abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	2	2	1	5	5	0	0	0	0	0	0
MRI head without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	2	2	5	2	2	1	1	0	1	0	0
US kidneys and bladder retroperitoneal	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	2	2	5	4	1	0	1	0	0	0	0
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	6	0	4	0	0	0	1	0	0

125 (17312032)	3
124 (20171676)	2
62 (19037644)	4

CT chest with IV contrast	Usually appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	7	7	0	0	0	0	1	0	7	3	0
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References	Study Quality
31 (-3196645)	4
32 (34861372)	4

MRI abdomen and pelvis without and with IV contrast	Usually appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	7	7	0	0	0	0	5	0	5	1	0
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Radiography chest	Usually appropriate	Limited	☼ <0.1 mSv	☼ <0.03 mSv [ped]	7	7	0	0	0	0	3	1	4	0	3
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References	Study Quality
31 (-3196645)	4
32 (34861372)	4
74 (12010321)	4

CT abdomen and pelvis with IV contrast	May be appropriate	Moderate	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	6	6	0	0	0	0	2	4	5	0	0
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References	Study Quality
113 (19058939)	M
83 (30120501)	Good
35 (31377833)	4
34 (10961281)	4
31 (-3196645)	4
19 (37096584)	4
8 (36967359)	4
5 (19457809)	4
2 (17157629)	4

CT chest without IV contrast	May be appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	6	6	0	0	0	1	4	4	2	0	0
		References	Study Quality												
		31 (-3196645)	4												
		32 (34861372)	4												
MRU without IV contrast	May be appropriate	Limited	0 0 mSv	0 0 mSv [ped]	6	6	0	0	0	0	2	6	3	0	0
		References	Study Quality												
		62 (19037644)	4												
		63 (18372452)	4												
FDG-PET/CT skull base to mid-thigh	May be appropriate	Strong	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	6	6	1	0	0	0	2	4	5	0	0
		References	Study Quality												
		123 (26044598)	3												
		122 (31140215)	4												
		121 (31591037)	3												
		92 (26847182)	2												
		91 (23179944)	1												
		90 (24341486)	2												
FDG-PET/MRI skull base to mid-thigh	May be appropriate	Expert Consensus	☼☼☼ 1-10 mSv		6	6	0	0	0	1	4	3	2	0	1
CT abdomen and pelvis without and with IV contrast	May be appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	5	5	1	0	2	2	4	1	1	0	0
MRI abdomen and pelvis without IV contrast	May be appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	5	5	0	0	1	1	8	1	0	0	0
CT abdomen and pelvis without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	3	3	2	2	6	1	0	0	0	0	0

Bone scan whole body	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	3	3	1	0	5	2	3	0	0	0	0	
		References		Study Quality												
		74 (12010321)		4												
CT abdomen with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	2	7	2	0	0	0	0	0	0	
CT abdomen without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	5	3	0	2	1	0	1	0	0	
CT abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	2	2	3	6	2	0	0	0	0	0	0	
CT chest without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	4	4	3	0	0	0	0	0	0	
CT pelvis with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	2	6	3	0	0	0	0	0	0	
CT pelvis without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	4	4	1	1	1	0	1	0	0	
CT pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	4	5	2	0	0	0	0	0	0	
Radiography intravenous urography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	2	2	4	2	5	0	0	0	0	0	0	
		References		Study Quality												
		37 (21512076)		3												
MRI abdomen without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	2	5	2	0	2	0	0	0	0	
MRI abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	2	2	1	6	2	0	2	0	0	0	0	

MRI head without and with IV contrast	Usually not appropriate	Expert Consensus	0.0 mSv	0.0 mSv [ped]	2	2	6	2	1	2	0	1	0	0	0
MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	0.0 mSv	0.0 mSv [ped]	2	2	4	4	2	0	1	0	0	0	0
MRI pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	0.0 mSv	0.0 mSv [ped]	2	2	2	5	3	0	0	0	0	1	0
US kidneys and bladder retroperitoneal	Usually not appropriate	Expert Consensus	0.0 mSv	0.0 mSv [ped]	2	2	4	3	0	2	1	1	0	0	0
US pelvis (bladder)	Usually not appropriate	Expert Consensus	0.0 mSv	0.0 mSv [ped]	2	2	4	4	2	0	1	0	0	0	0
MRI head without IV contrast	Usually not appropriate	Expert Consensus	0.0 mSv	0.0 mSv [ped]	1	1	8	1	1	1	0	1	0	0	0

Appendix Key

A more complete discussion of the items presented below can be found by accessing the supporting documents at the designated hyperlinks.

Appropriateness Category: The panel's recommendation for a procedure based on the assessment of the risks and benefits of performing the procedure for the specified clinical scenario.

SOE: Strength of Evidence. The assessment of the amount and quality of evidence found in the peer reviewed medical literature for an appropriateness recommendation.

- **References:** The citation number and PMID for the reference(s) associated with the recommendation.
- **Study Quality:** The assessment of the quality of an individual reference based on the number of study quality elements described in the reference.

RRL: Relative Radiation Level. A population based assessment of the amount of radiation a typical patient may be exposed to during the specified procedure.

Rating: The final rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Median: The median rating (1-9 scale) for the procedure as determined by the panel during rating rounds.

Final tabulations: A histogram showing the number of panel members who rated the procedure as noted in the column heading (ie, 1, 2, 3, etc.).

Additional supporting documents about the AC methodology and processes can be found at www.acr.org/ac.