

American College of Radiology
ACR Appropriateness Criteria®

Acute Pyelonephritis

Variant 1: Suspected acute pyelonephritis. First-time presentation. Uncomplicated patient (eg, no history of pyelonephritis, diabetes, immune compromise, history of stones or renal obstruction, prior renal surgery, advanced age, vesicoureteral reflux, lack of response to therapy, or pregnancy). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen with IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	17	0	0	0	0	0	0	0	0
		References		Study Quality											
		15 (18203942)		4											
		14 (2655002)		4											
		1 (29298155)		4											
		10 (28271650)		4											
CT abdomen without IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	12	0	3	0	0	2	0	0	0
		References		Study Quality											
		15 (18203942)		4											
		14 (2655002)		4											
		1 (29298155)		4											
		10 (28271650)		4											
CT abdomen without and with IV contrast	Usually not appropriate	Limited	☹☹☹☹ 10-30 mSv	☹☹☹☹☹ 10-30 mSv [ped]	1	1	12	0	2	1	0	1	1	0	0
		References		Study Quality											
		15 (18203942)		4											

		16 (22859793)	4													
CTU without and with IV contrast	Usually not appropriate	Limited	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	17	0	0	0	0	0	0	0	0	0
		References	Study Quality													
		15 (18203942)	4													
		14 (2655002)	4													
		1 (29298155)	4													
		10 (28271650)	4													
Radiography intravenous urography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	16	0	0	0	0	0	0	0	1	0
		References	Study Quality													
		15 (18203942)	4													
Fluoroscopy voiding cystourethrography	Usually not appropriate	Limited	☼☼ 0.1-1mSv	☼☼ 0.03-0.3 mSv [ped]	1	1	16	0	0	0	0	0	0	0	1	0
		References	Study Quality													
		15 (18203942)	4													
MRI abdomen without IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	13	2	1	0	0	0	0	0	1	0
		References	Study Quality													
		15 (18203942)	4													
MRI abdomen without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	13	3	0	0	0	0	0	0	1	0
		References	Study Quality													
		15 (18203942)	4													
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	14	2	0	0	0	0	0	0	1	0
		References	Study Quality													
		15 (18203942)	4													

MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	13	3	0	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
MRU without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	15	1	0	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
MRU without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	14	2	0	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
US abdomen	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	17	0	0	0	0	0	0	0	0
		References		Study Quality											
		15 (18203942)		4											
		17 (30708379)		3											
		10 (28271650)		4											
Radiography abdomen and pelvis	Usually not appropriate		☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	16	0	0	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
US color Doppler kidneys and bladder retroperitoneal	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	16	0	0	0	0	0	1	0	0
		References		Study Quality											
		15 (18203942)		4											
DMSA renal scan	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	15	0	0	0	1	0	0	1	0

References	Study Quality
15 (18203942)	4

Variant 2: Suspected acute pyelonephritis. Complicated patient (eg, recurrent pyelonephritis, diabetes, immune compromise, advanced age, vesicoureteral reflux, or lack of response to initial therapy). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen and pelvis with IV contrast	Usually appropriate	Limited	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	8	8	1	0	0	0	1	1	1	5	8

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
2 (17599303)	4
10 (28271650)	4
16 (22859793)	4

US color Doppler kidneys and bladder retroperitoneal	May be appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	6	6	1	0	0	5	0	5	5	1	0
--	--------------------	--------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
41 (12592126)	1
37 (21792579)	4
42 (15241674)	1
40 (10961277)	4

		38 (11149528)		3													
		10 (28271650)		4													
		36 (20428429)		2													
CT abdomen with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	4	1	3	3	2	4	0	0	0		
		References		Study Quality													
		15 (18203942)		4													
		14 (2655002)		4													
		21 (7789019)		4													
		20 (3883000)		4													
		8 (30392592)		4													
		18 (28525662)		4													
		17 (30708379)		3													
		19 (30224907)		3													
		1 (29298155)		4													
		16 (22859793)		4													
CT abdomen and pelvis without and with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	5	5	2	2	4	0	3	1	3	2	0		
		References		Study Quality													
		15 (18203942)		4													
		14 (2655002)		4													
		21 (7789019)		4													
		20 (3883000)		4													
		8 (30392592)		4													
		18 (28525662)		4													
		17 (30708379)		3													
		19 (30224907)		3													
		1 (29298155)		4													
		2 (17599303)		4													
		10 (28271650)		4													

		16 (22859793)			4													
MRI abdomen and pelvis without and with IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	5	5	1	1	0	2	9	3	1	0	0			
		References	Study Quality															
		29 (23887662)	3															
		27 (23884301)	2															
		30 (23749224)	3															
		28 (24443116)	3															
		14 (2655002)	4															
		20 (3883000)	4															
		8 (30392592)	4															
		31 (27229497)	4															
		32 (19711638)	4															
US abdomen	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	5	5	0	0	0	2	12	3	0	0	0			
		References	Study Quality															
		37 (21792579)	4															
		39 (17941932)	2															
		38 (11149528)	3															
		10 (28271650)	4															
		36 (20428429)	2															
CT abdomen and pelvis without IV contrast	May be appropriate	Limited	⊕⊕⊕ 1-10 mSv	⊕⊕⊕⊕ 3-10 mSv [ped]	4	4	3	3	2	1	6	2	0	0	0			
		References	Study Quality															
		15 (18203942)	4															
		14 (2655002)	4															
		21 (7789019)	4															
		20 (3883000)	4															
		8 (30392592)	4															
		18 (28525662)	4															
		17 (30708379)	3															

CTU without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	3	3	4	1	10	1	1	0	0	0	0
MRI abdomen without IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	5	2	4	4	2	0	0	0	0
MRI abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	○ 0 mSv	○ 0 mSv [ped]	3	3	4	1	4	0	8	0	0	0	0
MRU without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	3	3	6	1	2	1	7	0	0	0	0

References	Study Quality
33 (24128878)	3
34 (20531092)	4
35 (14975495)	1

CT abdomen without IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	2	2	7	3	6	1	0	0	0	0	0
--------------------------------	-------------------------	---------	--------------	---------------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

Radiography intravenous urography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	13	2	1	0	0	0	0	1	0
-----------------------------------	-------------------------	---------	--------------	---------------------	---	---	----	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4

Fluoroscopy voiding cystourethrography	Usually not appropriate	Limited	☼☼☼ 0.1-1mSv	☼☼☼ 0.03-0.3 mSv [ped]	1	1	10	4	2	0	0	0	0	1	0
		References		Study Quality											
		25 (22040289)		2											
		26 (15993478)		4											
MRU without IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	9	1	7	0	0	0	0	0	0
		References		Study Quality											
		33 (24128878)		3											
		34 (20531092)		4											
		35 (14975495)		1											
Radiography abdomen and pelvis	Usually not appropriate		☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	13	2	1	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
DMSA renal scan	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	9	2	6	0	0	0	0	0	0
		References		Study Quality											
		23 (23414827)		4											
		24 (10966194)		4											

Variant 3: Suspected acute pyelonephritis. History of renal stones or renal obstruction. Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen and pelvis with IV contrast	Usually appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	8	8	1	1	0	0	0	2	2	5	6

References	Study Quality
15 (18203942)	4
22 (27563103)	2
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
10 (28271650)	4
11 (-3194118)	4
16 (22859793)	4

CT abdomen and pelvis without and with IV contrast	Usually appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢☢ 10-30 mSv [ped]	8	8	0	0	0	0	0	0	5	10	2
---	------------------------	---------	-------------------	---------------------------------	---	---	---	---	---	---	---	---	---	----	---

References	Study Quality
15 (18203942)	4
22 (27563103)	2
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
10 (28271650)	4
11 (-3194118)	4
16 (22859793)	4

CT abdomen and pelvis without IV contrast	May be appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	6	6	0	0	2	0	4	6	2	2	1
---	--------------------	---------	--------------	---------------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4
22 (27563103)	2
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
10 (28271650)	4
11 (-3194118)	4
16 (22859793)	4

US color Doppler kidneys and bladder retroperitoneal	May be appropriate	Strong	○ ○ mSv	○ ○ mSv [ped]	6	6	1	0	0	1	3	8	3	1	0
--	--------------------	--------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
41 (12592126)	1
37 (21792579)	4
42 (15241674)	1
40 (10961277)	4
38 (11149528)	3
10 (28271650)	4
36 (20428429)	2
44 (12819343)	4
45 (23091240)	4

CT abdomen without and with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	5	5	4	0	4	3	0	6	0	0	0
---	-----------------------------------	----------------	----------------	-----------------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

MRI abdomen and pelvis without and with IV contrast	May be appropriate	Limited	0 0 mSv	0 0 mSv [ped]	5	5	1	1	2	4	6	3	0	0	0
---	--------------------	---------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
29 (23887662)	3
30 (23749224)	3
28 (24443116)	3
14 (2655002)	4
8 (30392592)	4
31 (27229497)	4
32 (19711638)	4

US abdomen	May be appropriate	Strong	0 0 mSv	0 0 mSv [ped]	5	5	0	0	0	1	8	7	0	1	0
------------	--------------------	--------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
37 (21792579)	4
39 (17941932)	2
38 (11149528)	3
10 (28271650)	4
36 (20428429)	2
44 (12819343)	4
45 (23091240)	4

8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

CTU without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	3	3	5	1	4	0	5	1	1	0	0
MRI abdomen without IV contrast	Usually not appropriate	Limited	○ ○ mSv	○ ○ mSv [ped]	3	3	7	1	7	2	0	0	0	0	0

References	Study Quality
31 (27229497)	4
32 (19711638)	4

MRI abdomen without and with IV contrast	Usually not appropriate	Limited	○ ○ mSv	○ ○ mSv [ped]	3	3	5	1	4	5	2	0	0	0	0
--	-------------------------	---------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
31 (27229497)	4
32 (19711638)	4

MRU without IV contrast	Usually not appropriate	Limited	○ ○ mSv	○ ○ mSv [ped]	2	2	8	2	2	4	1	0	0	0	0
-------------------------	-------------------------	---------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
31 (27229497)	4
32 (19711638)	4
43 (29399012)	3

MRU without and with IV contrast	Usually not appropriate	Limited	○ ○ mSv	○ ○ mSv [ped]	2	2	6	3	3	5	0	0	0	0	0
----------------------------------	-------------------------	---------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
31 (27229497)	4
32 (19711638)	4
43 (29399012)	3

Radiography abdomen and pelvis	Usually not appropriate		☹☹☹ 1-10 mSv	☹☹☹ 0.3-3 mSv [ped]	2	n/a	0	0	0	0	0	0	0	0	0	0
DMSA renal scan	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹ 0.3-3 mSv [ped]	2	2	7	2	3	3	1	0	0	1	0	0
		References		Study Quality												
		24 (10966194)		4												
Radiography intravenous urography	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹ 0.3-3 mSv [ped]	1	1	13	3	0	0	0	0	0	0	1	0
		References		Study Quality												
		15 (18203942)		4												
Fluoroscopy voiding cystourethrography	Usually not appropriate	Limited	☹☹ 0.1-1mSv	☹☹ 0.03-0.3 mSv [ped]	1	1	12	3	1	0	0	0	0	0	1	0
		References		Study Quality												
		15 (18203942)		4												
Fluoroscopy antegrade pyelography	Usually not appropriate	Limited	☹☹☹ 1-10 mSv		1	1	12	3	0	1	0	0	0	0	1	0
		References		Study Quality												
		15 (18203942)		4												

Variant 4: Suspected acute pyelonephritis. Pregnant female with no other complications (eg, no history of diabetes, immune compromise, history of stones or renal obstruction, prior renal surgery, vesicoureteral reflux, or lack of response to therapy). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
US color Doppler kidneys and bladder retroperitoneal	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	6	6	0	1	0	0	1	8	4	1	2
		References		Study Quality											
		41 (12592126)		1											
		37 (21792579)		4											

		36 (20428429)		2											
		48 (15625136)		4											
MRI abdomen without IV contrast	May be appropriate	Limited	0 0 mSv	0 0 mSv [ped]	4	4	4	2	2	8	1	0	0	0	0
		References		Study Quality											
		29 (23887662)		3											
		30 (23749224)		3											
		28 (24443116)		3											
		47 (-3188535)		4											
		31 (27229497)		4											
		32 (19711638)		4											
MRU without IV contrast	May be appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	4	4	1	3	3	5	5	0	0	0	0
CT abdomen and pelvis without IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	3	3	6	1	5	3	0	1	1	0	0
		References		Study Quality											
		46 (-3120926)		4											
CT abdomen with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	9	0	7	1	0	0	0	0	0
CT abdomen without IV contrast	Usually not appropriate	Expert Consensus	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	9	1	2	2	2	1	0	0	0
CT abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	1	1	14	2	1	0	0	0	0	0	0
CT abdomen and pelvis with IV contrast	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼☼ 3-10 mSv [ped]	1	1	11	0	5	1	0	0	0	0	0
		References		Study Quality											
		46 (-3120926)		4											

CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	9	2	4	0	0	1	0	1	0
		References		Study Quality											
		46 (-3120926)		4											
CTU without and with IV contrast	Usually not appropriate	Expert Consensus	⊗⊗⊗⊗ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	1	1	11	1	2	1	0	1	0	1	0
Radiography intravenous urography	Usually not appropriate	Limited	⊗⊗⊗ 1-10 mSv	⊗⊗⊗ 0.3-3 mSv [ped]	1	1	15	1	0	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
Fluoroscopy voiding cystourethrography	Usually not appropriate	Limited	⊗⊗ 0.1-1mSv	⊗⊗ 0.03-0.3 mSv [ped]	1	1	16	0	0	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
MRI abdomen without and with IV contrast	Usually not appropriate	Limited	○ 0 mSv	○ 0 mSv [ped]	1	1	15	1	1	0	0	0	0	0	0
		References		Study Quality											
		29 (23887662)		3											
		30 (23749224)		3											
		28 (24443116)		3											
		47 (-3188535)		4											
		31 (27229497)		4											
		32 (19711638)		4											
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Strong	○ 0 mSv	○ 0 mSv [ped]	1	1	9	1	7	0	0	0	0	0	0
		References		Study Quality											
		29 (23887662)		3											
		27 (23884301)		2											

		30 (23749224)	3															
		28 (24443116)	3															
		20 (3883000)	4															
		8 (30392592)	4															
		47 (-3188535)	4															
		31 (27229497)	4															
		32 (19711638)	4															
	MRU without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	2	1	0	0	0	0	0	0	0	
Radiography abdomen and pelvis	Usually not appropriate		☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0	0		
Fluoroscopy antegrade pyelography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	15	1	0	0	0	0	0	0	1	0		
		References		Study Quality														
		15 (18203942)		4														
DMSA renal scan	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	15	1	0	0	0	0	0	0	1	0		
		References		Study Quality														
		15 (18203942)		4														

Variant 5: Suspected acute pyelonephritis. History of pelvic renal transplant with native kidneys in situ and no other complications (eg, no history of pyelonephritis, diabetes, history of stones or renal obstruction, prior renal surgery, advanced age, vesicoureteral reflux, lack of response to therapy, or pregnancy). Initial imaging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT abdomen and pelvis with IV contrast	Usually appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	7	7	1	0	0	0	1	2	10	2	0
		References		Study Quality											
		15 (18203942)		4											

14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

US duplex Doppler kidney transplant	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	7	7	0	0	0	0	0	2	7	3	4
-------------------------------------	---------------------	---------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
53 (20659906)	2

CT abdomen and pelvis without and with IV contrast	May be appropriate	Limited	⊕⊕⊕⊕ 10-30 mSv	⊗⊗⊗⊗⊗ 10-30 mSv [ped]	5	5	3	1	2	1	9	0	0	0	0
--	--------------------	---------	----------------	-----------------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

MRI abdomen and pelvis without and with IV contrast	May be appropriate	Strong	O 0 mSv	O 0 mSv [ped]	5	5	0	1	0	4	4	7	0	0	0
---	--------------------	--------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
53 (20659906)	2

MRI pelvis without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	5	2	5	4	0	0	0	0	0
MRI pelvis without and with IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	5	1	3	6	1	0	0	0	0
MRU without IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	6	2	5	1	2	0	0	0	0
MRU without and with IV contrast	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	6	0	4	5	1	0	0	0	0
US color Doppler kidneys and bladder retroperitoneal	Usually not appropriate	Expert Consensus	0 0 mSv	0 0 mSv [ped]	3	3	5	2	7	2	0	0	0	0	0
CTU without and with IV contrast	Usually not appropriate	Expert Consensus	☼☼☼☼ 10-30 mSv	☼☼☼☼☼ 10-30 mSv [ped]	2	2	6	3	6	1	0	0	0	0	0
MRI abdomen without and with IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	2	2	8	5	3	0	0	0	0	0	0

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

US abdomen	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	2	2	8	1	6	1	0	0	0	0	0
------------	-------------------------	---------	---------	---------------	---	---	---	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4

14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4

CT abdomen with IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	10	4	2	0	0	0	0	0	0
-----------------------------	-------------------------	---------	--------------	---------------------	---	---	----	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4
8 (30392592)	4
18 (28525662)	4
17 (30708379)	3
19 (30224907)	3
1 (29298155)	4
16 (22859793)	4
52 (30689126)	4

CT abdomen without IV contrast	Usually not appropriate	Limited	☹☹☹ 1-10 mSv	☹☹☹☹ 3-10 mSv [ped]	1	1	14	1	1	0	0	0	0	0	0
--------------------------------	-------------------------	---------	--------------	---------------------	---	---	----	---	---	---	---	---	---	---	---

References	Study Quality
15 (18203942)	4
14 (2655002)	4
21 (7789019)	4
20 (3883000)	4

MRI abdomen without IV contrast	Usually not appropriate	Limited	0 0 mSv	0 0 mSv [ped]	1	1	13	2	1	0	0	0	0	0	0
		References		Study Quality											
		15 (18203942)		4											
		14 (2655002)		4											
		21 (7789019)		4											
		20 (3883000)		4											
		8 (30392592)		4											
		18 (28525662)		4											
		17 (30708379)		3											
		19 (30224907)		3											
		1 (29298155)		4											
		16 (22859793)		4											
Radiography abdomen and pelvis	Usually not appropriate		☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	n/a	0	0	0	0	0	0	0	0	0
Fluoroscopy antegrade pyelography	Usually not appropriate	Limited	☼☼☼ 1-10 mSv		1	1	13	2	1	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											
DMSA renal scan	Usually not appropriate	Limited	☼☼☼ 1-10 mSv	☼☼☼ 0.3-3 mSv [ped]	1	1	14	1	1	0	0	0	0	1	0
		References		Study Quality											
		15 (18203942)		4											

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.