American College of Radiology
ACR Appropriateness Criteria®

Staging of Renal Cell Carcinoma

Variant 1: Renal cell carcinoma. No contraindication to either iodinated CT contrast or gadolinium-based MR intravenous contrast. Staging.

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	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	8	8	0	0	0	0	2	2	3	5	4

References	Study Quality
36 (25410425)	2
35 (20937417)	2
38 (28296683)	3
43 (23325783)	2
15 (15100536)	2
16 (14512329)	2
31 (18937590)	3
32 (21342488)	3
33 (12704036)	3
34 (17082687)	1
39 (11796275)	2
47 (9888732)	4
48 (12090319)	4
44 (21843882)	2
46 (11734949)	3
3 (30523454)	3
5 (30803729)	4

		37 (31607203)	2												
		28 (20148365)	3												
		29 (18710440)	3												
		30 (11275723)	3												
		40 (25304287)	3												
		41 (27867332)	3												
		42 (30456180)	4												
		45 (10350288)	4												
		13 (-3195129)	4												
MRI abdomen without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	0	0	0	5	5	5
		References	Study Quality												
		33 (12704036)	3												
		63 (15100535)	2												
		64 (15615960)	2												
		66 (15665685)	2												
		62 (14684543)	3												
		67 (11832712)	3												
		68 (18076946)	3												
		47 (9888732)	4												
		48 (12090319)	4												
		5 (30803729)	4												
		65 (31741596)	3												
		69 (29724245)	2												
		13 (-3195129)	4												
CT abdomen with IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	0	1	0	1	1	6	4	3
		References	Study Quality												
		36 (25410425)	2												
		18 (24566409)	3												
		35 (20937417)	2												

38 (28296683)	3
43 (23325783)	2
25 (24321262)	4
26 (10737472)	2
24 (18311784)	3
21 (7954317)	4
17 (2196982)	4
14 (16304081)	3
22 (17286945)	M
23 (19007371)	3
27 (23108238)	M
19 (25593113)	3
20 (24819422)	3
15 (15100536)	2
16 (14512329)	2
31 (18937590)	3
32 (21342488)	3
33 (12704036)	3
34 (17082687)	1
39 (11796275)	2
44 (21843882)	2
46 (11734949)	3
3 (30523454)	3
5 (30803729)	4
37 (31607203)	2
28 (20148365)	3
29 (18710440)	3
30 (11275723)	3
40 (25304287)	3
41 (27867332)	3
42 (30456180)	4

		45 (10350288)	4													
		13 (-3195129)	4													
CT chest with IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	1	0	0	0	1	1	6	2	5	
		References	Study Quality													
		49 (26880407)	2													
		50 (20846691)	3													
		5 (30803729)	4													
		54 (27684653)	3													
		51 (25241004)	3													
		52 (19450840)	3													
		53 (21557795)	2													
		55 (31955483)	3													
		13 (-3195129)	4													
MRI abdomen and pelvis without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	7	7	0	0	1	0	1	3	4	4	3	
		References	Study Quality													
		33 (12704036)	3													
		63 (15100535)	2													
		64 (15615960)	2													
		66 (15665685)	2													
		62 (14684543)	3													
		67 (11832712)	3													
		68 (18076946)	3													
		47 (9888732)	4													
		48 (12090319)	4													
		5 (30803729)	4													
		65 (31741596)	3													
		69 (29724245)	2													
		13 (-3195129)	4													

CT abdomen without and with IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	5	5	3	2	5	2	0	1	2	1	0

References	Study Quality
36 (25410425)	2
18 (24566409)	3
35 (20937417)	2
38 (28296683)	3
43 (23325783)	2
25 (24321262)	4
26 (10737472)	2
24 (18311784)	3
21 (7954317)	4
17 (2196982)	4
14 (16304081)	3
22 (17286945)	M
23 (19007371)	3
27 (23108238)	M
19 (25593113)	3
20 (24819422)	3
15 (15100536)	2
16 (14512329)	2
31 (18937590)	3
32 (21342488)	3
33 (12704036)	3
34 (17082687)	1
39 (11796275)	2
44 (21843882)	2
46 (11734949)	3
3 (30523454)	3
5 (30803729)	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	3	3	5	1	0	1	2	1	0

References	Study Quality
36 (25410425)	2
35 (20937417)	2
38 (28296683)	3
43 (23325783)	2
15 (15100536)	2
16 (14512329)	2
31 (18937590)	3
32 (21342488)	3
33 (12704036)	3
34 (17082687)	1
39 (11796275)	2
47 (9888732)	4
48 (12090319)	4
44 (21843882)	2
46 (11734949)	3
3 (30523454)	3
5 (30803729)	4
37 (31607203)	2
37 (31607203)	2
28 (20148365)	3
29 (18710440)	3
30 (11275723)	3
40 (25304287)	3
41 (27867332)	3
42 (30456180)	4
45 (10350288)	4
13 (-3195129)	4

		28 (20148365)		3												
		29 (18710440)		3												
		30 (11275723)		3												
		40 (25304287)		3												
		41 (27867332)		3												
		42 (30456180)		4												
		45 (10350288)		4												
		13 (-3195129)		4												
Radiography chest	May be appropriate	Limited	☢ <0.1 mSv	☢ <0.03 mSv [ped]	5	5	0	2	1	2	11	0	0	0	0
		References		Study Quality												
		54 (27684653)		3												
		53 (21557795)		2												
		13 (-3195129)		4												
CT head with IV contrast	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	4	4	6	0	1	3	4	1	1	0	0
		References		Study Quality												
		5 (30803729)		4												
		56 (33578374)		4												
		57 (33525046)		2												
		13 (-3195129)		4												
Bone scan whole body with SPECT or SPECT/CT area of interest	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	2	2	4	2	4	2	0	0	0
		References		Study Quality												
		12 (11696720)		3												
		14 (16304081)		3												
		11 (4060382)		3												
		5 (30803729)		4												
		13 (-3195129)		4												

CT chest without and with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	5	3	5	2	1	0	0	0	0

References	Study Quality
49 (26880407)	2
50 (20846691)	3
5 (30803729)	4
54 (27684653)	3
51 (25241004)	3
52 (19450840)	3
53 (21557795)	2
55 (31955483)	3
13 (-3195129)	4

CT head without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	3	3	6	1	7	1	0	0	0	1	0

References	Study Quality
5 (30803729)	4
56 (33578374)	4
57 (33525046)	2
13 (-3195129)	4

CT head without and with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	6	0	6	1	3	0	0	0	0

References	Study Quality
5 (30803729)	4
56 (33578374)	4
57 (33525046)	2
13 (-3195129)	4

MRI abdomen without IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	3	3	5	2	5	1	3	0	0	0	0

References	Study Quality
33 (12704036)	3

		63 (15100535)	2													
		64 (15615960)	2													
		66 (15665685)	2													
		62 (14684543)	3													
		67 (11832712)	3													
		68 (18076946)	3													
		65 (31741596)	3													
		69 (29724245)	2													
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	3	3	4	2	6	3	1	0	0	0	0
		References	Study Quality													
		33 (12704036)	3													
		63 (15100535)	2													
		64 (15615960)	2													
		66 (15665685)	2													
		62 (14684543)	3													
		67 (11832712)	3													
		68 (18076946)	3													
		47 (9888732)	4													
		48 (12090319)	4													
		5 (30803729)	4													
		65 (31741596)	3													
		69 (29724245)	2													
		13 (-3195129)	4													
MRI head without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	6	2	5	2	0	1	0	0	0
		References	Study Quality													
		5 (30803729)	4													
		56 (33578374)	4													
		57 (33525046)	2													
		13 (-3195129)	4													

MRI head without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	3	3	6	3	1	0	0	0	0

References	Study Quality
5 (30803729)	4
56 (33578374)	4
57 (33525046)	2
13 (-3195129)	4

MRU without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	5	1	6	0	2	2	0	0	0

References	Study Quality
5 (30803729)	4
13 (-3195129)	4

MRU without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	3	4	9	0	0	0	0	0	0

References	Study Quality
5 (30803729)	4
13 (-3195129)	4

Bone scan whole body	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	4	1	4	3	3	0	0	1	0

References	Study Quality
12 (11696720)	3
11 (4060382)	3
5 (30803729)	4
13 (-3195129)	4

FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	3	4	9	0	0	0	0	0	0

References	Study Quality
5 (30803729)	4
59 (30120698)	2
58 (25210086)	4

		60 (30234688)	2												
		13 (-3195129)	4												
Fluoride PET/CT skull base to mid-thigh	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		3	3	4	3	6	1	2	0	0	0	0
		References	Study Quality												
		61 (26202597)	3												
		5 (30803729)	4												
		13 (-3195129)	4												
CT abdomen without IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	5	4	7	0	0	0	0	0	0
		References	Study Quality												
		36 (25410425)	2												
		18 (24566409)	3												
		35 (20937417)	2												
		38 (28296683)	3												
		43 (23325783)	2												
		25 (24321262)	4												
		26 (10737472)	2												
		24 (18311784)	3												
		21 (7954317)	4												
		17 (2196982)	4												
		14 (16304081)	3												
		22 (17286945)	M												
		23 (19007371)	3												
		27 (23108238)	M												
		19 (25593113)	3												
		20 (24819422)	3												
		15 (15100536)	2												
		16 (14512329)	2												
		31 (18937590)	3												
		32 (21342488)	3												

33 (12704036)	3
34 (17082687)	1
39 (11796275)	2
44 (21843882)	2
46 (11734949)	3
3 (30523454)	3
5 (30803729)	4
37 (31607203)	2
28 (20148365)	3
29 (18710440)	3
30 (11275723)	3
40 (25304287)	3
41 (27867332)	3
42 (30456180)	4
45 (10350288)	4
13 (-3195129)	4

CT abdomen and pelvis without IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	4	5	7	0	0	0	0	0	0

References	Study Quality
36 (25410425)	2
35 (20937417)	2
38 (28296683)	3
43 (23325783)	2
15 (15100536)	2
16 (14512329)	2
31 (18937590)	3
32 (21342488)	3
33 (12704036)	3
34 (17082687)	1
39 (11796275)	2
47 (9888732)	4

48 (12090319)	4
44 (21843882)	2
46 (11734949)	3
3 (30523454)	3
5 (30803729)	4
37 (31607203)	2
28 (20148365)	3
29 (18710440)	3
30 (11275723)	3
40 (25304287)	3
41 (27867332)	3
42 (30456180)	4
45 (10350288)	4
13 (-3195129)	4

CT chest without IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	2	2	6	3	3	1	3	0	0	0	0

References	Study Quality
49 (26880407)	2
50 (20846691)	3
5 (30803729)	4
54 (27684653)	3
51 (25241004)	3
52 (19450840)	3
53 (21557795)	2
55 (31955483)	3
13 (-3195129)	4

CTU without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	2	2	4	6	6	0	0	0	0	0	0

References	Study Quality
5 (30803729)	4

		13 (-3195129)		4											
US abdomen	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	6	4	5	0	0	0	1	0	0
		References		Study Quality											
		5 (30803729)		4											
		70 (6252674)		3											
		71 (7347111)		3											
		72 (33006090)		2											
		73 (28073200)		3											
		13 (-3195129)		4											
US abdomen with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	6	3	6	0	0	0	0	1	0
		References		Study Quality											
		5 (30803729)		4											
		70 (6252674)		3											
		71 (7347111)		3											
		72 (33006090)		2											
		73 (28073200)		3											
		13 (-3195129)		4											

Variant 2: Renal cell carcinoma. Contraindication to both iodinated CT and gadolinium-based MR intravenous contrast. Staging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
CT chest without IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	8	8	1	0	0	0	1	1	5	4	4
		References		Study Quality											
		49 (26880407)		2											
		63 (15100535)		2											
		64 (15615960)		2											

		34 (17082687)		1											
		74 (15577678)		4											
		75 (17487856)		3											
		5 (30803729)		4											
		13 (-3195129)		4											
MRI abdomen without IV contrast	Usually appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	8	8	1	0	0	1	0	0	2	6	6
MRI abdomen and pelvis without IV contrast	Usually appropriate	Limited	O 0 mSv	O 0 mSv [ped]	8	8	0	0	1	0	1	2	3	6	3
		References		Study Quality											
		47 (9888732)		4											
		48 (12090319)		4											
		5 (30803729)		4											
		13 (-3195129)		4											
CT abdomen and pelvis without IV contrast	May be appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	6	6	1	0	1	0	2	7	3	1	1
		References		Study Quality											
		15 (15100536)		2											
		16 (14512329)		2											
		47 (9888732)		4											
		48 (12090319)		4											
CT abdomen without IV contrast	May be appropriate (Disagreement)	Expert Opinion	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	5	5	1	1	0	1	2	5	5	1	0
		References		Study Quality											
		15 (15100536)		2											
		16 (14512329)		2											
MRI head without IV contrast	May be appropriate	Limited	O 0 mSv	O 0 mSv [ped]	4	4	1	3	3	7	2	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											

		13 (-3195129)		4											
Bone scan whole body	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	5	1	2	4	3	0	0	1	0
		References		Study Quality											
		12 (11696720)		3											
		11 (4060382)		3											
		5 (30803729)		4											
		13 (-3195129)		4											
Bone scan whole body with SPECT or SPECT/CT area of interest	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	1	1	12	2	0	0	0	0
		References		Study Quality											
		12 (11696720)		3											
		14 (16304081)		3											
		11 (4060382)		3											
		5 (30803729)		4											
		13 (-3195129)		4											
Radiography chest	May be appropriate	Limited	☢ <0.1 mSv	☢ <0.03 mSv [ped]	4	4	0	2	2	8	3	1	0	0	0
		References		Study Quality											
		54 (27684653)		3											
		55 (31955483)		3											
		13 (-3195129)		4											
CT head without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	3	3	1	1	7	5	2	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		4											
FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	3	3	8	2	0	0	0	0	0

References	Study Quality
5 (30803729)	4
59 (30120698)	2
58 (25210086)	4
60 (30234688)	2
13 (-3195129)	4

Fluoride PET/CT skull base to mid-thigh	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		3	3	6	2	5	1	0	0	2	0	0

References	Study Quality
61 (26202597)	3
5 (30803729)	4
13 (-3195129)	4

MRU without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	8	2	6	0	0	0	0	0	0

References	Study Quality
5 (30803729)	4
13 (-3195129)	4

US abdomen	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	7	4	4	0	0	0	1	0	0

References	Study Quality
5 (30803729)	4
70 (6252674)	3
71 (7347111)	3
72 (33006090)	2
73 (28073200)	3
13 (-3195129)	4

US abdomen with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	7	5	3	0	0	0	0	1	0

References	Study Quality
5 (30803729)	4
70 (6252674)	3

		71 (7347111)	3												
		72 (33006090)	2												
		73 (28073200)	3												
		13 (-3195129)	4												
CT abdomen with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	13	1	0	0	0	0	1	1	0
		References	Study Quality												
		15 (15100536)	2												
		16 (14512329)	2												
CT abdomen without and with IV contrast	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	13	1	1	0	0	0	1	0	0
		References	Study Quality												
		15 (15100536)	2												
		16 (14512329)	2												
CT abdomen and pelvis with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	12	2	1	0	0	0	1	0	0
		References	Study Quality												
		15 (15100536)	2												
		16 (14512329)	2												
		47 (9888732)	4												
		48 (12090319)	4												
CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	12	2	1	0	0	0	1	0	0
		References	Study Quality												
		15 (15100536)	2												
		16 (14512329)	2												
		47 (9888732)	4												
		48 (12090319)	4												

CT chest with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	13	1	1	0	0	0	1	0	0

References	Study Quality
49 (26880407)	2
63 (15100535)	2
64 (15615960)	2
34 (17082687)	1
74 (15577678)	4
75 (17487856)	3
5 (30803729)	4
13 (-3195129)	4

CT chest without and with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	13	1	1	0	0	0	1	0	0

References	Study Quality
49 (26880407)	2
63 (15100535)	2
64 (15615960)	2
34 (17082687)	1
74 (15577678)	4
75 (17487856)	3
5 (30803729)	4
13 (-3195129)	4

CT head with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	1	14	1	1	0	0	0	0	0	0

References	Study Quality
5 (30803729)	4
13 (-3195129)	4

CT head without and with 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

		5 (30803729)		4											
		13 (-3195129)		4											
CTU without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	14	0	2	0	0	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		4											
MRI abdomen without and with IV contrast	Usually not appropriate	Expert Consensus	O 0 mSv	O 0 mSv [ped]	1	1	14	1	1	0	0	0	0	0	0
MRI abdomen and pelvis without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	12	2	2	0	0	0	0	0	0
		References		Study Quality											
		47 (9888732)		4											
		48 (12090319)		4											
		5 (30803729)		4											
		13 (-3195129)		4											
MRI head without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	13	1	2	0	0	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		4											
MRU without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	1	1	13	1	2	0	0	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		4											

Variant 3: Renal cell carcinoma. Contraindication only to iodinated CT intravenous contrast. Staging.

Procedure	Appropriateness Category	SOE	Adults RRL	Peds RRL	Rating	Median	Final Tabulations								
							1	2	3	4	5	6	7	8	9
MRI abdomen without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	1	0	0	1	0	4	8	2

References	Study Quality
33 (12704036)	3
63 (15100535)	2
64 (15615960)	2
66 (15665685)	2
62 (14684543)	3
67 (11832712)	3
68 (18076946)	3
65 (31741596)	3
69 (29724245)	2

MRI abdomen and pelvis without and with IV contrast	Usually appropriate	Strong	O 0 mSv	O 0 mSv [ped]	8	8	0	1	0	0	0	1	5	6	3

References	Study Quality
33 (12704036)	3
63 (15100535)	2
64 (15615960)	2
66 (15665685)	2
62 (14684543)	3
67 (11832712)	3
68 (18076946)	3
47 (9888732)	4
48 (12090319)	4
5 (30803729)	4
65 (31741596)	3
69 (29724245)	2
13 (-3195129)	4

CT chest without IV contrast	Usually appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	7	7	0	1	0	0	1	1	8	4	1

References	Study Quality
49 (26880407)	2
63 (15100535)	2
64 (15615960)	2
34 (17082687)	1
74 (15577678)	4
75 (17487856)	3
5 (30803729)	4
13 (-3195129)	4

CT abdomen without IV contrast	May be appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	6	6	0	1	1	1	4	8	1	0	0

References	Study Quality
15 (15100536)	2
16 (14512329)	2

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

References	Study Quality
15 (15100536)	2
16 (14512329)	2
47 (9888732)	4
48 (12090319)	4

Bone scan whole body with SPECT or SPECT/CT area of interest	May be appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	4	4	0	1	1	13	1	0	0	0	0

References	Study Quality
12 (11696720)	3
14 (16304081)	3
11 (4060382)	3
5 (30803729)	4

		13 (-3195129)	4												
Radiography chest	May be appropriate	Limited	☢ <0.1 mSv	☢ <0.03 mSv [ped]	4	4	0	1	1	8	5	1	0	0	0
		References	Study Quality												
		54 (27684653)	3												
		55 (31955483)	3												
		13 (-3195129)	4												
CT head without IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	3	3	5	2	5	1	2	0	0	0	1
		References	Study Quality												
		5 (30803729)	4												
		13 (-3195129)	4												
MRI abdomen without IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	3	3	4	1	5	4	1	0	1	0	0
		References	Study Quality												
		33 (12704036)	3												
		63 (15100535)	2												
		64 (15615960)	2												
		66 (15665685)	2												
		62 (14684543)	3												
		67 (11832712)	3												
		68 (18076946)	3												
		65 (31741596)	3												
		69 (29724245)	2												
MRI abdomen and pelvis without IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	3	3	3	1	6	1	4	1	0	0	0
		References	Study Quality												
		33 (12704036)	3												
		63 (15100535)	2												
		64 (15615960)	2												

		66 (15665685)		2											
		62 (14684543)		3											
		67 (11832712)		3											
		68 (18076946)		3											
		47 (9888732)		4											
		48 (12090319)		4											
		5 (30803729)		4											
		65 (31741596)		3											
		69 (29724245)		2											
		13 (-3195129)		4											
MRI head without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	5	2	7	1	0	0	1	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		4											
MRI head without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	3	3	1	1	7	6	1	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		4											
Bone scan whole body	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	4	2	3	2	4	0	0	1	0
		References		Study Quality											
		12 (11696720)		3											
		11 (4060382)		3											
		5 (30803729)		4											
		13 (-3195129)		4											
FDG-PET/CT skull base to mid-thigh	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢ 3-10 mSv [ped]	3	3	4	4	7	1	0	0	0	0	0
		References		Study Quality											

		5 (30803729)	4												
		59 (30120698)	2												
		58 (25210086)	4												
		60 (30234688)	2												
		13 (-3195129)	4												
Fluoride PET/CT skull base to mid-thigh	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv		3	3	5	3	4	1	1	1	1	0	0
		References	Study Quality												
		61 (26202597)	3												
		5 (30803729)	4												
		13 (-3195129)	4												
MRU without IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	8	2	6	0	0	0	0	0	0
		References	Study Quality												
		5 (30803729)	4												
		13 (-3195129)	4												
MRU without and with IV contrast	Usually not appropriate	Limited	O 0 mSv	O 0 mSv [ped]	2	2	8	2	5	1	0	0	0	0	0
		References	Study Quality												
		5 (30803729)	4												
		13 (-3195129)	4												
US abdomen	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	8	2	5	0	0	0	1	0	0
		References	Study Quality												
		5 (30803729)	4												
		70 (6252674)	3												
		71 (7347111)	3												
		72 (33006090)	2												
		73 (28073200)	3												
		13 (-3195129)	4												

US abdomen with IV contrast	Usually not appropriate	Strong	O 0 mSv	O 0 mSv [ped]	2	2	8	3	4	0	0	0	0	1	0

References	Study Quality
5 (30803729)	4
70 (6252674)	3
71 (7347111)	3
72 (33006090)	2
73 (28073200)	3
13 (-3195129)	4

CT abdomen with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	12	2	1	0	0	0	1	0	0

References	Study Quality
15 (15100536)	2
16 (14512329)	2

CT abdomen without and with IV contrast	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	12	1	2	0	0	0	1	0	0

References	Study Quality
15 (15100536)	2
16 (14512329)	2

CT abdomen and pelvis with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	13	2	0	0	0	0	1	0	0

References	Study Quality
15 (15100536)	2
16 (14512329)	2
47 (9888732)	4
48 (12090319)	4

CT abdomen and pelvis without and with IV contrast	Usually not appropriate	Strong	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	13	2	0	0	0	0	1	0	0

References	Study Quality
15 (15100536)	2
16 (14512329)	2
47 (9888732)	4
48 (12090319)	4

CT chest with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	12	1	2	0	0	0	1	0	0

References	Study Quality
49 (26880407)	2
63 (15100535)	2
64 (15615960)	2
34 (17082687)	1
74 (15577678)	4
75 (17487856)	3
5 (30803729)	4
13 (-3195129)	4

CT chest without and with IV contrast	Usually not appropriate	Strong	☢☢☢ 1-10 mSv	☢☢☢☢ 3-10 mSv [ped]	1	1	12	1	2	0	0	0	1	0	0

References	Study Quality
49 (26880407)	2
63 (15100535)	2
64 (15615960)	2
34 (17082687)	1
74 (15577678)	4
75 (17487856)	3
5 (30803729)	4
13 (-3195129)	4

CT head with IV contrast	Usually not appropriate	Limited	☢☢☢ 1-10 mSv	☢☢☢ 0.3-3 mSv [ped]	1	1	14	1	1	0	0	0	0	0	0

References	Study Quality

		5 (30803729)		4											
		13 (-3195129)		4											
CT head without and with 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											
		5 (30803729)		4											
		13 (-3195129)		4											
CTU without and with IV contrast	Usually not appropriate	Limited	☢☢☢☢ 10-30 mSv	☢☢☢☢☢ 10-30 mSv [ped]	1	1	14	1	1	0	0	0	0	0	0
		References		Study Quality											
		5 (30803729)		4											
		13 (-3195129)		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.**