## American College of Radiology ACR Appropriateness Criteria®

## **Central Venous Access Device and Site Selection**

Variant 1: Device selection: Acutely ill patient requiring infusion of vesicant medication, hemodynamic monitoring, and frequent blood draws for 2 weeks or shorter.

December	Appropriateness	SOF	A J14- DDI	D. J. DDI	D-45	Madian			]	Final	Tabi	ulatio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Nontunneled central venous catheter	Usually appropriate	Moderate	N/A	N/A	8	8	0	0	0	0	0	3	2	7	4
		References		Study	Quality										
		15 (20857280)			1										
		14 (16865322)			4										
		13 (16100130)			M										
		12 (16970212)			M										
		11 (30095499)			Good						-	_			
PICC	Usually appropriate	Strong	N/A	N/A	8	8	0	0	0	0	1	1	4	4	6
		References		Study	Quality										
		17 (28665469)			4										
		16 (20574104)			1										
		15 (20857280)			1										
		14 (16865322)			4										
		13 (16100130)			M										
		12 (16970212)			M										
		11 (30095499)			ood							_			
Tunneled central venous catheter	May be appropriate	Limited	N/A	N/A	5	5	0	0	2	1	6	6	0	0	0

			References 12 (16970212)			Quality M										
Midline catheter	May approp	be oriate	Strong	N/A	N/A	5	5	0	1	1	1	8	4	0	0	0
			References		Study	Quality										
			10 (34553435)			2										
			9 (24811603)			1										
Chest port	Usuall approp	y not oriate	Limited	N/A	N/A	1	1	11	3	2	0	0	0	0	0	0
			References		Study	Quality					•					
			8 (23739070)			2										
Arm port	Usuall approp	y not oriate	Limited	N/A	N/A	1	1	11	3	2	0	0	0	0	0	0
			References		Study	Quality										
			8 (23739070)			2										

Variant 2: Device selection: Patient with acute renal failure requiring central venous access for renal replacement therapy, anticipated duration of therapy for 2 weeks or shorter.

D 1	Appropriateness	COE	A L L DDI	D I DDI	D 41	3.6.11			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Nontunneled dialysis catheter	Usually appropriate	Moderate	N/A	N/A	9	9	0	0	0	0	0	2	0	4	10
		References		Study	/ Quality										
		References         Study Quality           11 (30095499)         Good           18 (29202728)         2													
		· · · · · · · · · · · · · · · · · · ·													
Tunneled dialysis catheter	Usually appropriate	Limited	N/A	N/A	7	7	0	0	0	2	0	2	8	3	0
		References		N/A N/A 7 Study Quality											
		18 (29202728)			2										

Chest port	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	14	1	0	0	0	0	1	0	0
Arm port	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	14	1	0	0	0	0	1	0	0
PICC	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	14	1	0	0	0	0	0	1	0

Variant 3: Device selection: Patient with renal failure requiring central venous access for renal replacement therapy, anticipated duration of therapy for more than 2 weeks.

Donas dana	Appropriateness	SOF	A J14- DD1	D. J. DDI	D - 42	M- 1!			F	inal '	Tabu	latio	ns		
Procedure	Category	SOE	Adults RRI	L Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Tunneled dialysis catheter	Usually appropriate	Limited	N/A	N/A	9	9	0	0	0	0	0	1	1	2	12
		References		Study	Quality										
		12 (16970212)			M										
		19 (30345873)			3										
Nontunneled dialysis catheter	May be appropriate	Limited	N/A	N/A	5	5	0	0	1	5	5	3	1	1	0
		References		Study	Quality										
		12 (16970212)			M										
		19 (30345873)			3										
Chest port	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	14	1	0	0	0	0	0	0	1
Arm port	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	14	1	0	0	0	0	1	0	0
PICC	Usually not appropriate	Expert Consensus	N/A	N/A	1	1	14	1	0	0	0	0	1	0	0

Variant 4: Device selection: Patient with cancer diagnosis requiring central venous access for weekly chemotherapy infusion for more than 2 weeks.

	Appropriateness	g.o.=						Final Tabulations  1 2 3 4 5 6 7 8 9  0 0 0 0 0 0 1 3 1							
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2						8	9
Chest port	Usually appropriate	Strong	N/A	N/A	9	9	0	0	0	0	0	0	1	3	12
		References		Study	Quality										
		24 (33788748)			3										
		22 (31005243)			1										
		28 (21652113)			3										
		27 (24218174)			M										
		26 (31044308)		C	Good										
		25 (32479699)		Inac	lequate										
		23 (19179550)			1										
		21 (31464692)		Not A	Assessed										
		20 (24005884)			1						,				
Arm port	Usually appropriate	Strong	N/A	N/A	7	7	0	0	1	0	0	3	11	1	0
		References		Study	Quality										
		24 (33788748)			3										
		22 (31005243)			1										
		25 (32479699)		Inac	lequate										
		23 (19179550)			1										
		21 (31464692)		Not A	Assessed										
		20 (24005884)			1						_				
Tunneled central venous catheter	May be appropriate	Strong	N/A	N/A	6	6	1	0	0	0	6	5	3	1	0
		References		Study	Quality										
		12 (16970212)			M										
		30 (2666137)			1										
		29 (26113804)			2										
		28 (21652113)			3										

			27 (24218174)			M										
			26 (31044308)		C	Good						_				
PICC	May approp	be oriate	Strong	N/A	N/A	6	6	0	0	1	5	1	4	3	2	0
			References		Study	Quality										
			22 (31005243)			1										
			29 (26113804)			2										
			25 (32479699)		Inac	lequate										
			21 (31464692)		Not A	Assessed										
			20 (24005884)			1										
			12 (16970212)			M										
Nontunneled central venous catheter	Usually approp	y not oriate	Limited	N/A	N/A	3	3	4	4	6	1	1	0	0	0	0
			References		Study	Quality										
			12 (16970212)		M											
			28 (21652113)			3										
			27 (24218174)		M											
			26 (31044308)		G	Good										

Variant 5: Device selection: Patient requiring continuous or very frequent intravenous administration of intravenous medications (excluding total parenteral nutrition) for more than 2 weeks.

<b>D</b> 1	Appropri	iateness	GOT.	A L L DDI		o D T	D (1	3.5.11			F	inal '	Tabu	latio	ns		
Procedure	Categ		SOE	Adults RRL	Peds 1	KKL	Rating	Median	1	2	3	4	5	6	7	8	9
Tunneled central venous catheter	Usua approp	.*	Moderate	N/A	N/.	Ą	7	7	0	0	0	0	1	2	7	4	2
			References		•	Study	Quality										
			12 (16970212)				M										
			28 (21652113)				3										

27 (24218174) 26 (31044308) M

Good

PICC	Usual appropr	ly iate	Strong	N/A		N/A	7	7	0	0	0	0	6	0	6	2	2
			References			Study	Quality										
			12 (16970212)				M										
			25 (32479699)			Inac	lequate										
			22 (31005243)				1										
			21 (31464692)			Not A	Assessed										
			20 (24005884)				1					1					1
Chest port	May l appropr	oe riate	Limited	N/A		N/A	6	6	0	0	0	2	5	8	0	0	0
			References			Study	Quality										
		8 (23739070)					2										
			12 (16970212)			M											
			25 (32479699)			Inac	lequate										
Arm port	May l appropr	oe riate	Limited	N/A		N/A	4	4	0	0	1	7	7	0	0	0	0
			References			Study	Quality		-						-		
			8 (23739070)				2										
			12 (16970212)				M										
			25 (32479699)			Inac	lequate										
Nontunneled central venous catheter	Usually appropr	not Limited N/A				N/A	2	2	2	8	3	1	1	1	0	0	0
		References				Study	Quality										
			12 (16970212)			M											
			28 (21652113)			3											

Variant 6: Device selection: Patient requiring long-term total parenteral nutrition and another indication for central access.

n 1	Appropriateness	70D	A L L DDY	n i nni	D (1	3.5 11			1	inal	Tab	ulatio	ons		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9

	Appropriateness	~ ~ -							F	inal	Tabı	ılatio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Tunneled central venous catheter double lumen	Usually appropriate	Limited	N/A	N/A	8	8	0	0	0	0	0	1	1	9	4
		References		Study	y Quality										
		34 (29489708)			4										
		33 (19464090)			4										
		32 (28558699)			3										
		31 (32511768)			2						_	_	_		
Double lumen PICC	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	1	2	3	3	3	4
		References		Study	y Quality										
		35 (29148004)													
		34 (29489708)	(29489708) 4												
		34 (29489708) 4 33 (19464090) 4													
		32 (28558699)			3										
		31 (32511768)			2										
Single lumen PICC	May be appropriate	Strong	N/A	N/A	6	6	0	0	0	0	5	4	5	1	0
		References		Study	y Quality										
		35 (29148004)			2										
		34 (29489708)			4										
		33 (19464090)			4										
		32 (28558699)			3										
		31 (32511768)			2										
Tunneled central venous catheter single lumen	May be appropriate	Limited	N/A	N/A	6	6	0	0	0	1	2	8	3	1	0
		References		Study	y Quality										
		34 (29489708)			4										
		33 (19464090)			4										
		32 (28558699) 3 3													

			31 (32511768)			2										
Chest port	May approp	be oriate	Limited	N/A	N/A	4	4	1	2	3	5	4	0	0	0	0
			References		Study	Quality										
			31 (32511768)			2										
			32 (28558699)			3			_	_						
Arm port	Usuall approp	y not oriate	Limited	N/A	N/A	3	3	1	2	7	3	1	1	0	0	0
			References		Study	Quality										
			31 (32511768)			2										
			32 (28558699)			3										

Variant 7: Device selection: Patient with chronic kidney disease requiring central venous catheter IV infusions for more than 2 weeks.

ъ	Appropri	ateness	COL	4 1 14 DDI	.   ,	D 1 DD1	D 4	3.5.11			F	inal	Tabu	latio	ns		
Procedure	Categ	gory	SOE	Adults RRI		Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Tunneled central venous catheter single lumen	Usua approp		Limited	N/A		N/A	8	8	0	0	1	0	0	0	3	8	3
			References			Study	Quality										
			46 (27647824)				3		_								
Tunneled central venous catheter double lumen	Usua approp		Limited	N/A		N/A	7	7	0	0	1	0	3	1	4	6	1
			References			Study	Quality										
			46 (27647824)		3												
Chest port via internal jugular vein	May approp	be riate	Strong	N/A		N/A	6	6	0	0	1	1	6	2	3	1	2
			References		Study Quality												
			38 (2314526)				2										
		39 (1754109)					2										

Chest port via subclavian vein	Usually approp	y not riate	Strong	N/A	N/A	3	3	6	1	3	4	1	0	1	0	0
			References		Stud	y Quality										
			38 (2314526)			2										
			39 (1754109)			2										
Arm port	Usually approp	y not riate	Limited	N/A	N/A	2	2	8	3	2	1	1	0	1	0	0
			References		Stud	y Quality										
			36 (12616419)													
			37 (33116552)			3										
PICC	Usually approp	y not riate	Strong	N/A	N/A	2	7	7	1	0	0	0	0	0	0	
			References		Stud	y Quality										
			45 (-3195138)		4 4											
			44 (32778223)													
			43 (22704142)													
			42 (29514546)			3										
			41 (11099241)			3										
			40 (15961840)			4										
			36 (12616419)		2											
		25 (32479699)			Ina	dequate										
		22 (31005243)				1										
		16 (20574104)				1										
			15 (20857280)			1										

Variant 8: Site selection: Patient with acute illness requiring central venous catheter for anticipated therapy for 2 weeks or shorter.

Duranduna	Appropriateness	SOE	Adults RRL	Peds RRL	Rating	Median			F	inal T	[abu]	latio	ns		
Procedure	Category	SUE	Adults KKL	Peus KKL	Kaung	Median	1	2	3	4	5	6	7	8	9
Right or left internal jugular vein	Usually appropriate	Strong	N/A	N/A	9	9	0	0	0	0	0	1	2	3	10

Procedure	Appropriatenes Category	SOE SOE	Adults RRL	Peds RRL	Rating	Median	1	2				ations		8	9
		References		Study	y Quality										
		62 (30231668)			3										
		58 (26398070)			1										
		56 (16280064)			2										
		52 (29992634)			3										
Right or left subclavian vein	Usually appropriate	Strong	N/A	N/A	7	7	1	0	0	0	1	5	4	3	2
		References		Study	y Quality							•	·	•	
		62 (30231668)													
		61 (22419292)													
		58 (26398070)			1										
		57 (11495620)			1										
		56 (16280064)			2										
		52 (29992634)			3										
Upper extremity vein	Usually appropriate	Strong	N/A	N/A	7	7	0	0	0	0	3	3	3	2	5
		References		Study	y Quality										
		15 (20857280)			1										
		51 (29148000)			2										
		14 (16865322)			4										
		13 (16100130)			M										
		12 (16970212)													
		11 (30095499)			Good			1							
Right or left external jugular vein	May be appropriate	Limited	N/A	N/A	6	6	0	0	1	0	1	7	4	2	1
		References		Study Quality							,	'			
		54 (24306665)			2										

						1								
	53 (25198827)			4										
	52 (29992634)			3										
May be appropriate	Strong	N/A	N/A	5	5	1	0	0	2	6	6	1	0	0
	References		Stu	dy Quality										
	61 (22419292)			M										
	60 (8001386)			1										
	59 (29924154)			2										
	58 (26398070)													
	57 (11495620)													
	56 (16280064)													
	55 (9831940)			2										
	51 (29148000)			2										
Usually not appropriate	Limited	N/A	N/A	2	2	8	3	4	0	1	0	0	0	0
	References		Stu	dy Quality										
	47 (14514812)			2										
Usually not appropriate	Limited	N/A	N/A	2	2	7	3	4	1	1	0	0	0	0
	References		Stu				·			·				
	50 (30281060)		·											
	49 (7747727)			2										
	48 (24190069)			4										
	Usually not appropriate  Usually not	Strong   Strong	N/A   References   61 (22419292)   60 (8001386)   59 (29924154)   58 (26398070)   57 (11495620)   56 (16280064)   55 (9831940)   51 (29148000)   Usually not appropriate	Strong	Strong	Strong   N/A   N/A   5   5	Strong	Strong   N/A   N/A   5   5   1   0	Strong   N/A   N/A   5   5   1   0   0	Strong   N/A   N/A   S   S   S   I   0   0   2	Strong	S2 (29992634)   S3   Strong   N/A   N/A   S   S   S   I   0   0   2   6   6	Strong   N/A   N/A   S   S   1   0   0   2   6   6   1	May be appropriate   Strong   N/A   N/A   5   5   1   0   0   2   6   6   1   0

Variant 9: Site selection: Patient with chronic kidney disease or end-stage renal disease requiring central venous catheter.

	Appropriateness	COF	A L L DDY	D I DDI	D (1	3.6.11			F	inal T	[abu]	latio	ns		
Procedure	Category	SOE	Adults RRL	Peds RRL	Rating	Median	1	2	3	4	5	6	7	8	9
Right or left internal jugular vein	Usually appropriate	Strong	N/A	N/A	9	9	0	0	0	0	0	2	2	2	10

							1								
		References		Study	y Quality		_								
		38 (2314526)			2										
		39 (1754109)			2										
		61 (22419292)			M	_		1	1		1				
Right or left femoral vein	May be appropriate	Strong	N/A	N/A	6	6	0	0	0	0	3	10	2	1	0
		References		Study	y Quality										
		64 (30359982)			1										
		61 (22419292)			M										
		60 (8001386)			1										
		58 (26398070)													
		57 (11495620)			1	_		_							
Right or left external jugular vein	May be appropriate	Limited	N/A	N/A	0	0	0	0	4	9	2	0	0		
		References		Stud											
		53 (25198827)			4										
Right or left subclavian vein	May be appropriate	Strong	N/A	N/A	4	4	0	3	1	8	3	0	0	0	0
		References		Study	y Quality										
		38 (2314526)			2										
		39 (1754109)			2										
Inferior vena cava	May be appropriate	Strong	N/A	N/A	4	4	0	1	4	5	5	0	0	0	0
		References		Study	y Quality	·									
		63 (33318464)			2										
		50 (30281060)			3										
		49 (7747727)			2										
		48 (24190069)			4										
Hepatic vein	Usually not	T : 1, 1	N/A	N/A	3	3	2	4	4	5	0	0	0	0	0
Trepatite vein	appropriate	Limited	IN/A	IN/A	3			_	7			U	U		

			47 (14514812)				2										
Upper extremity vein	Usually approp	y not riate	Strong	N/A		N/A	2	2	7	6	2	0	0	0	0	0	0
			References			Study	Quality										
			45 (-3195138)				4										
			44 (32778223)				4										
			43 (22704142)				2										
			42 (29514546)				3										
			41 (11099241)	1099241) 3													
			40 (15961840)				4										
			36 (12616419)														
			16 (20574104)		1												
			15 (20857280)				1										
			22 (31005243)				1										

## **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.