

## Registered Nurses' Association of Ontario *Vascular Access, Second Edition* June 2021

### Systematic Review Search Strategy

Concurrent with the review of existing guidelines, a systematic review for recent literature relevant to the scope of the guideline was conducted by a health sciences librarian.

In addition, expert panel members were asked to review personal libraries to identify key articles not found through the above search strategies. Articles identified by panel members were included in the search results if two guideline development methodologists independently determined the articles had not been identified by the literature search and met the inclusion criteria.

**Databases Searched:** Cumulative Index to Nursing and Allied Health (CINAHL), Medline, Medline in Process, Cochrane Central Register of Controlled Trials (CCRCT), Cochrane Database of Systematic Reviews, Embase, Emcare, Epub ahead of print, and PsycINFO (only for Recommendation Question 7).

### Inclusion Criteria:

The following criteria were used to guide the literature search:

- A primary focus on the following interventions for health service organizations, academic institutions, health providers and/or students, and the prioritized outcomes per topic:
  1. **Intervention** – Comprehensive education about the vascular access device (VAD)  
**Outcomes** – Dwell time, completion of therapy, hospital re-admission rate and complications.
  2. **Intervention** – Practical education for the insertion and management of VADs  
**Outcomes** – Complications (including insertion-related complications), number of successful observed attempts and provider attitude/confidence.
  3. **Intervention** – Insertion of VADs by specialists  
**Outcomes** – Complications (including insertion-related complications), and number of successful attempts.
  4. **Intervention** – Blood draw from a VAD  
**Outcomes** – Specimen rejection, patient satisfaction, contamination rate (specific to blood cultures) and dwell time.
  5. **Intervention** – Daily review of a peripheral vascular access device (PVAD)  
**Outcome** – Complications.
  6. **Intervention** - Use of visualization technology (e.g., ultrasound and vein finders) for the insertion of peripheral vascular access devices or arterial catheters  
**Outcomes** - Success rate on the first attempt/number of failed attempts, patient satisfaction and complications.
  7. **Intervention** - Pharmacological and/or non-pharmacological pain management strategy

**Outcomes** - Patient's rating of pain, patient comfort, fear/anxiety (related to poke/needle phobia) and patient satisfaction.

**N.B.** Questions 1, 2 and 3 were searched together

**Inclusion Criteria:**

- Published after January 2013
- Published in English
- Accessible for retrieval
- Interventions within nursing scope of practice
- Vascular access across the lifespan
- Peer-reviewed literature
- Any study design (e.g., quantitative, qualitative, mixed methods, systematic reviews)

**Exclusion Criteria:**

The following criteria were used to exclude literature from the search:

- Topic **NOT** related to the aforementioned interventions prioritized outcomes
- Dissertations, commentaries, narratives, discussion papers, case studies, expert reports, consensus documents, studies with no specific methodology
- Studies not published in English
- Unpublished literature (e.g., grey literature)
- Studies published prior to 2013
- Interventions outside the scope of nursing practice

**Search Terms:**

**Recommendation Question 1:** Should providing education to persons and their families about their vascular access device be recommended?

**Recommendation Question 2:** Should practical education for the insertion and management of vascular access devices for health providers be recommended?

**Recommendation Question 3:** Should vascular access specialist teams be recommended?

Original Search Strategy (January 2013 – February 2019)

Update Search 1: February 2019 – November 2020

Update Search 2: November 2020 – April 2021

*\*Note: the same original search strategy was used to complete the update searches.*

Databases:

- Cumulative Index to Nursing and Allied Health (CINAHL)
- Medline

- Cochrane Central
- Cochrane Database of Systematic Reviews
- Embase
- Emcare
- Epub ahead of print

**Database: CINAHL**

**Search strategy:**

Search ID#	Search Terms	Search Options	Last Run Via	Results
S224	S138 OR S221 OR S222	Limiters - Published Date: 20130101-20191231; English Language; Peer Reviewed Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,205
S223	S138 OR S221 OR S222	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	9,821
S222	S121 AND S181 AND S217	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,876

S221	S121 AND S220	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,115
S220	S218 OR S219	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	102,911
S219	((MH "Education, Health Sciences")) OR ((MH "Education, Allied Health+")) OR ((MH "Education, Chiropractic")) OR ((MH "Education, Medical, Continuing")) OR ((MH "Education, Nursing, Continuing")) OR ((MH "Education, Pharmacy")) OR ((MH "Education, Podiatry"))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	42,958
S218	continuing education OR professional development OR staff development	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	66,686

			Database - CINAHL with Full Text	
S217	S182 OR S183 OR S184 OR S185 OR S186 OR S187 OR S188 OR S189 OR S190 OR S191 OR S192 OR S193 OR S194 OR S195 OR S196 OR S197 OR S198 OR S199 OR S200 OR S201 OR S202 OR S203 OR S204 OR S205 OR S206 OR S207 OR S208 OR S209 OR S210 OR S211 OR S212 OR S213 OR S214 OR S215 OR S216	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,491,315
S216	(support* n2 (worker# or staff#))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,039
S215	social n2 worker#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	13,794
S214	health* n2 educator#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	3,522

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S213	patient care# n2 team#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	368
S212	nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	763,925
S211	hospital* n2 worker# OR OR interdisciplinary OR inter-disciplinary OR multidisciplinary OR multi-disciplinary OR collaborative practice*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	61,093
S210	health* n2 worker#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	21,029

			Database - CINAHL with Full Text	
S209	hospital* n2 practitioner#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	634
S208	health* n2 practitioner#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	8,131
S207	hospital* n2 occupation#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	42
S206	health* n2 occupation#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,357

S205	hospital* n2 profession*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,221
S204	health* n2 profession*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	68,657
S203	hospital* n2 employe*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,426
S202	health* n2 employe*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,170
S201	hospital* n2 personnel#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	829



			Search Screen - Advanced Search Database - CINAHL with Full Text	
S200	health* n2 personnel#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	84,790
S199	hospital* n2 staff#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	24,230
S198	health* n2 staff#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,300
S197	hospital* n2 provider#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	1,100

			Database - CINAHL with Full Text	
S196	health* n2 provider#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	35,342
S195	(MH "Administrative Personnel") OR (MH "Health Facility Administrators") OR (MH "Nurse Administrators") OR (MH "Physician Executives")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	27,122
S194	(MH "Health Educators")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,327
S193	(MH "Practical Nursing")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,090

S192	(MH "Nursing Staff, Hospital")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	17,359
S191	(MH "Nurses+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	196,321
S190	(MH "Practical Nurses")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,191
S189	(MH "Nursing Role")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	48,401
S188	(MH "Social Workers")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	7,255

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S187	(MH "Social Work+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	11,263
S186	(MH "Multidisciplinary Care Team+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	37,595
S185	(MH "Health Occupations+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	650,459
S184	(MH "Personnel, Health Facility+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	31,722

			Database - CINAHL with Full Text	
S183	(MH "Health Personnel+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	476,780
S182	(MH "Attitude of Health Personnel+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	80,280
S181	S139 OR S140 OR S141 OR S142 OR S143 OR S144 OR S145 OR S146 OR S147 OR S148 OR S149 OR S150 OR S151 OR S152 OR S153 OR S154 OR S155 OR S156 OR S157 OR S158 OR S159 OR S160 OR S161 OR S162 OR S163 OR S164 OR S165 OR S166 OR S167 OR S168 OR S169 OR S170 OR S171 OR S172 OR S173 OR S174 OR S175 OR S176 OR S177 OR S178 OR S179 OR S180	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,360,049

S180	accredit*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	16,773
S179	simulation#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	41,120
S178	skill#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	110,276
S177	abilit*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	111,749
S176	knowledge*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	191,667

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S175	coaching#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,202
S174	mentor*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	17,588
S173	instruction*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	29,612
S172	elearn*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S171	learn*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S170	colloquium*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S169	conferenc*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S168	orientation#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display



S167	seminar#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S166	workshop# or workshop#	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S165	curricul*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S164	teaching*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S163	preceptor-ship*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S162	preceptorship*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S161	preceptorship*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S160	train*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S159	((staff# or profession*) n2 develop*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S158	educat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S157	(MH "Education, Interdisciplinary")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S156	(MH "Education, Continuing (Credit)")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S155	(MH "Education, Continuing+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S154	(MH "Mentorship")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S153	(MH "Teaching+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S152	(MH "Teachers")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S151	(MH "Staff Development") OR (MH "Employee Orientation")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S150	(MH "Program Development+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S149	(MH "Preceptorship")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S148	(MH "Outcomes of Education")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S147	(MH "Learning Methods+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S146	(MH "Learning Environment, Clinical")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S145	(MH "Professional Knowledge+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S144	(MH "Educational Technology")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S143	(MH "Educational Measurement+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S142	(MH "Education, Competency-Based")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S141	(MH "Education, Clinical+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S140	(MH "Curriculum+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S139	(MH "Education")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S138	S121 AND S137	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S137	S122 OR S123 OR S124 OR S125 OR S126 OR S127 OR S128 OR S129 OR S130 OR S131 OR	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

	S132 OR S133 OR S134 OR S135 OR S136		Search Screen - Advanced Search Database - CINAHL with Full Text	
S136	qualitative stud* OR qualitative research*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S135	selfcare OR self care	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S134	famil* N2 educat* OR famil* N2 train*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S133	patient* N2 train*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display



			Database - CINAHL with Full Text	
S132	spouse* or husband or wife	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S131	patient* N2 education	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S130	caregiver* OR care giver*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S129	sibling*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S128	(MH "Qualitative Studies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S127	(MH "Self Care+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S126	(MH "Family+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S125	(MH "Caregiver Burden")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S124	(MH "Caregiver Support")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S123	(MH "Caregivers")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S122	(MH "Patient Education")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S121	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

	OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113 OR S114 OR S115 OR S116 OR S117 OR S118 OR S119 OR S120			
S120	line* N2 plac*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S119	line* N2 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S118	catheter* N2 plac*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S117	catheter* N2 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S116	punctur* N3 "blood vessel"*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S115	punctur* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S114	TX difficult* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S113	puncture* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S112	venesection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S111	venipunctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S110	phlebotom*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S109	(MH "Punctures")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S108	(MH "Phlebotomists")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S107	(MH "Cordocentesis")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S106	(MH "Blood Specimen Collection+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S105	(MH "Phlebotomy")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S104	(MH "Venipuncture+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S103	(MH "Arterial Puncture")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S102	heart N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display



S101	heart N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S100	(MH "Heart Catheterization")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S99	peripheral* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S98	peripheral* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S97	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S96	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S95	iv N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S94	double lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S93	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S92	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S91	catheter* N3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S90	catheter* adj3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S89	insert* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S88	line* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S87	line* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S86	line* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S85	line* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S84	line* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S83	line* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S82	catheter* N3 complication*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S81	catheter* N3 dislocat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S80	catheter* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S79	catheter* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S78	catheter* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S77	catheter* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S76	catheter* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S75	catheter* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S74	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S73	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S72	double lumen*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S71	line?* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S70	catheter* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S69	line* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S68	line* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S67	catheter* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display



			Database - CINAHL with Full Text	
S66	tunneled N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S65	catheter* adj3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S64	vortex	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S63	pediasat	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S62	groshong	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S61	cv cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S60	central N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S59	central N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S58	broviac	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S57	vein* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S56	arter* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S55	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S54	dialock*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S53	vectra*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S52	arter* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S51	picc	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S50	catheter* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S49	catheter* N3 central venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S48	catheter* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S47	line* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S46	line* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S45	catheter* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S44	intravenous N3 administrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S43	catheter* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S42	line* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S41	line* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S40	catheter* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S39	(catheter* N3 abstract*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S38	line* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S37	lineN3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S36	catheter* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S35	device remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S34	reservoir* N3 venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S33	portacath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S32	port a cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display



			Search Screen - Advanced Search Database - CINAHL with Full Text	
S31	intraarterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S30	intra-arterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S29	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S28	catheter* N3 vascular	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S27	catheter* N3 port*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S26	arter* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S25	MH "Device Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S24	MH "Catheter Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S23	(MH "Administration, Intravenous+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S22	(MH "Infusions, Intravenous")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S21	MH "Injections, Intravenous"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S20	MH "Injections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S19	(MH "Injection Sites")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S18	MH "Catheter Occlusion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S17	MH "Catheter-Related Bloodstream Infections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S16	MH "Catheter-Related Infections+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S15	(MH "Catheter Placement Determination")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S14	(MH "Venous Cutdown")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S13	(MH "Catheter Care, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S12	(MH "Catheter Care")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S11	MH "Peripherally Inserted Central Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S10	MH "Central Venous Catheters+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S9	MH "Arterial Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S8	(MH "Catheters, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S7	(MH "Catheters")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S6	(MH "Vascular Access Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S5	MH "Catheters, Vascular+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S4	MH "Vascular Access Devices, Implantable"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S3	(MH "Infusion Devices, Intermittent")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S2	(MH "Infusion Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S1	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

**Database: Medline**

**Search Strategy:**

- 1 catheters/ (4163)
- 2 Cannula/ (346)
- 3 catheters, indwelling/ (17952)
- 4 exp vascular access devices/ (4277)
- 5 catheter obstruction/ (209)
- 6 catheterization, central venous/ (14321)
- 7 exp catheterization, peripheral/ (10696)
- 8 exp cardiac catheterization/ (48367)
- 9 exp administration, intravenous/ (138349)
- 10 exp infusions, intravenous/ (53166)
- 11 exp injections, intravenous/ (80808)
- 12 Infusion Pumps/ (5201)
- 13 exp Catheter-Related Infections/ (4247)
- 14 exp Device Removal/ (11881)
- 15 (catheter\* adj3 port\*).mp,kw. (1764)
- 16 (catheter\* adj3 vascular).mp,kw. (1893)
- 17 (vascular adj3 access).mp,kw. (9124)
- 18 (intra-arterial adj3 line\*).mp,kw. (38)
- 19 (intraarterial adj3 line\*).mp,kw. (15)
- 20 "port a cath?".mp,kw. (426)
- 21 portacath\*.mp,kw. (68)



- 22 (reservoir\* adj3 venous\*).mp,kw. (310)
- 23 device remov\*.mp,kw. (12451)
- 24 (catheter\* adj3 remov\*).mp,kw. (6360)
- 25 (line\* adj3 remov\*).mp,kw. (1069)
- 26 (catheter\* adj3 obstruct\*).mp,kw. (2)
- 27 (catheter\* adj3 insert\*).mp,kw. (11268)
- 28 (line\* adj3 insert\*).mp,kw. (1960)
- 29 (line\* adj3 fail\*).mp,kw. (3132)
- 30 (catheter\* adj3 fail\*).mp,kw. (1174)
- 31 (intravenous adj3 administrat\*).mp,kw. (45880)
- 32 (catheter\* adj3 in-dwell\*).mp,kw. (120)
- 33 (line\* adj3 in-dwell\*).mp,kw. (6)
- 34 (line\* adj3 indwell\*).mp,kw. (183)
- 35 (catheter\* adj3 indwell\*).mp,kw. (22899)
- 36 (catheter\* adj3 central venous\*).mp,kw. (19364)
- 37 (catheter\* adj3 peripheral).mp,kw. (9261)
- 38 picc.mp,kw. (831)
- 39 (arter\* adj3 catheter\*).mp,kw. (11438)
- 40 dialock\*.mp,kw. (15)
- 41 vectra\*.mp,kw. (118)
- 42 (arter\* adj3 access\*).mp,kw. (3494)
- 43 (vein\* adj3 access\*).mp,kw. (1119)
- 44 broviac.mp,kw. (308)
- 45 (central adj3 catheter\*).mp,kw. (20338)
- 46 (central adj3 line\*).mp,kw. (4629)
- 47 cv cath\*.mp,kw. (51)
- 48 groshong.mp,kw. (90)
- 49 pediasat.mp,kw. (9)
- 50 vortex.mp,kw. (3055)
- 51 (catheter\* adj3 vein?).mp,kw. (3821)
- 52 (catheter\* adj3 arter\*).mp,kw. (11438)
- 53 (tunneled adj3 catheter\*).mp,kw. (1081)
- 54 (line? adj3 vein?).mp,kw. (343)
- 55 (line\* adj3 arter\*).mp,kw. (2160)
- 56 (catheter\* adj3 subclavian\*).mp,kw. (1391)
- 57 (line?\* adj3 subclavian\*).mp,kw. (84)

- 58 double lumen\*.mp,kw. (2694)
- 59 avalon elite.mp,kw. (28)
- 60 dual lumen.mp,kw. (409)
- 61 (catheter\* adj3 thrombos\*).mp,kw. (1190)
- 62 (catheter\* adj3 occlusion\*).mp,kw. (1330)
- 63 (catheter\* adj3 migrat\*).mp,kw. (668)
- 64 (catheter adj3 infection\*).mp,kw. (8055)
- 65 (catheter\* adj3 fracture\*).mp,kw. (308)
- 66 (catheter\* adj3 leakage\*).mp,kw. (211)
- 67 (catheter\* adj3 dislocat\*).mp,kw. (222)
- 68 (catheter\* adj3 complication\*).mp,kw. (4187)
- 69 (line? adj3 thrombos\*).mp,kw. (110)
- 70 (line? adj3 occlusion\*).mp,kw. (112)
- 71 (line? adj3 migrat\*).mp,kw. (652)
- 72 (line? adj3 infection\*).mp,kw. (2465)
- 73 (line\* adj3 fracture\*).mp,kw. (2349)
- 74 (line\* adj3 leakage\*).mp,kw. (202)
- 75 (insert\* adj3 peripheral).mp,kw. (427)
- 76 (catheter\* adj3 nurs\*).mp,kw. (297)
- 77 avalon elite.mp,kw. (28)
- 78 dual lumen.mp,kw. (409)
- 79 double lumen\*.mp,kw. (2694)
- 80 (iv adj3 peripher\*).mp,kw. (621)
- 81 (intra-venous adj3 peripher\*).mp,kw. (2)
- 82 (intravenous adj3 peripher\*).mp,kw. (1178)
- 83 (peripheral\* adj3 catheter\*).mp,kw. (9725)
- 84 (peripheral\* adj3 line?).mp,kw. (1467)
- 85 (difficult\* adj2 vein?).mp,kw. (111)
- 86 (vein? adj2 punctur\*).mp,kw. (549)
- 87 (vein\* adj3 find\*).mp,kw. (591)
- 88 midline.mp,kw. (26983)
- 89 (arter\* adj3 line\*).mp,kw. (2160)
- 90 (catheter\* adj3 cardiac).mp,kw. (55954)
- 91 (line\* adj3 cardiac).mp,kw. (1166)
- 92 (line\* adj3 heart).mp,kw. (1022)
- 93 (catheter\* adj3 heart).mp,kw. (7738)

- 94 exp blood specimen collection/ (14758)
- 95 exp cordocentesis/ (440)
- 96 exp petrosal sinus sampling/ (197)
- 97 exp phlebotomy/ (5467)
- 98 Punctures/ (12877)
- 99 phlebotom\*.mp,kw. (9509)
- 100 apheresis.mp,kw. (6051)
- 101 puncture\*.tw,kw. (38101)
- 102 venipuncture\*.mp,kw. (2957)
- 103 veni-puncture\*.mp,kw. (7)
- 104 venesection\*.mp,kw. (660)
- 105 (catheter\* adj2 insert\*).mp,kw. (9477)
- 106 (line\* adj2 plac\*).mp,kw. (1815)
- 107 (line\* adj2 insert\*).mp,kw. (1481)
- 108 (catheter\* adj2 plac\*).mp,kw. (9776)
- 109 or/1-108 (438709)
- 110 exp "Attitude of Health Personnel"/ (148605)
- 111 exp Health Personnel/ (473992)
- 112 exp Personnel, Hospital/ (87581)
- 113 exp Health Occupations/ (1613633)
- 114 exp Professional Role/ (79712)
- 115 exp Patient Care Team/ (64727)
- 116 "Continuity of Patient Care"/ (17808)
- 117 Social Work/ (14714)
- 118 Social Workers/ (356)
- 119 Consultants/ (6526)
- 120 exp Counseling/ (41204)
- 121 Research Personnel/ (14789)
- 122 Leadership/ (38119)
- 123 Volunteers/ (9146)
- 124 Nurse's Role/ (39258)
- 125 Licensed Practical Nurses/ (57)
- 126 exp Nurses/ (83839)
- 127 exp Nursing Staff/ (63649)
- 128 Nursing Staff, Hospital/ (43277)
- 129 exp Nursing/ (245241)

- 130 Nursing, Practical/ (3427)
- 131 Health Educators/ (369)
- 132 exp Students, Health Occupations/ (62622)
- 133 Consumer Advocacy/ (3281)
- 134 exp Educational Personnel/ (33980)
- 135 exp Faculty/ (33183)
- 136 School Teachers/ (764)
- 137 (health\* adj2 provider?).mp,kw. (47405)
- 138 (health\* adj2 staff?).mp,kw. (5665)
- 139 (health\* adj2 personnel?).mp,kw. (163507)
- 140 (health\* adj2 employe\*).mp,kw. (5902)
- 141 (health\* adj2 profession\*).mp,kw. (80607)
- 142 (health\* adj2 occupation?).mp,kw. (12609)
- 143 (health\* adj2 practitioner?).mp,kw. (7685)
- 144 (profession\* adj2 role?).mp,kw. (14839)
- 145 nurs\*.mp,kw. (656576)
- 146 (care? adj2 team?).mp,kw. (69191)
- 147 (care? adj2 continuit\*).mp,kw. (5606)
- 148 ((inter-profession\* or interprofession\*) adj2 team?).mp,kw. (1134)
- 149 ((inter-disciplinar\* or interdisciplinar\*) adj2 team?).mp,kw. (3745)
- 150 ((multi-disciplinar\* or multidisciplinar\*) adj2 team?).mp,kw. (14486)
- 151 consultant?.mp,kw. (21954)
- 152 counsellor?.mp,kw. (1637)
- 153 researcher?.mp,kw. (117152)
- 154 (research adj2 personnel?).mp,kw. (15136)
- 155 (consumer? adj2 advoca\*).mp,kw. (3565)
- 156 leader\*.mp,kw. (79491)
- 157 volunteer?.mp,kw. (174095)
- 158 educator?.mp,kw. (22055)
- 159 (education\* adj2 personnel?).mp,kw. (382)
- 160 facult\*.mp,kw. (70273)
- 161 professor?.mp,kw. (17173)
- 162 teacher?.mp,kw. (34414)
- 163 (social adj2 worker?).mp,kw. (8600)
- 164 (support\* adj2 (worker? or staff?)).mp,kw. (4412)
- 165 (peer\* adj2 worker\*).mp,kw. (231)

- 166 (communit\* adj2 worker?).mp,kw. (7019)
- 167 (lay adj2 profession\*).mp,kw. (646)
- 168 nonprofession\*.mp,kw. (1537)
- 169 (child\* adj2 protective).mp,kw. (1353)
- 170 (daycare? adj2 worker?).mp,kw. (15)
- 171 (home adj1 visitor?).mp,kw. (216)
- 172 (health\* adj2 student?).mp,kw. (12061)
- 173 (health\* adj2 student\*).mp,kw. (12111)
- 174 (medic\* adj2 student\*).mp,kw. (44673)
- 175 or/110-174 (2815932)
- 176 ed.fs. (261877)
- 177 Education/ (20068)
- 178 exp Curriculum/ (79085)
- 179 exp Education, Distance/ (3490)
- 180 exp Education, Premedical/ (743)
- 181 exp Education, Professional/ (281929)
- 182 exp Educational Measurement/ (137405)
- 183 exp Inservice Training/ (27825)
- 184 exp Interdisciplinary Placement/ (70)
- 185 exp Mentoring/ (880)
- 186 Preceptorship/ (4774)
- 187 exp Teaching/ (80351)
- 188 exp Hospitals, Teaching/ (48381)
- 189 exp education department, hospital/ (213)
- 190 exp Teaching Materials/ (114848)
- 191 exp Licensure/ (17076)
- 192 Certification/ (15438)
- 193 exp Accreditation/ (18173)
- 194 exp Credentialing/ (52699)
- 195 exp Simulation Training/ (7006)
- 196 Videoconferencing/ (1301)
- 197 Webcasts as Topic/ (299)
- 198 Mentors/ (9886)
- 199 Learning/ (59914)
- 200 exp Professional Competence/ (108424)
- 201 Health Knowledge, Attitudes, Practice/ (100480)

- 202 exp Staff Development/ (8820)
- 203 educat\*.mp,kw. (873054)
- 204 ((staff? or profession\*) adj2 develop\*).mp,kw. (18944)
- 205 (clinical adj2 clerkship?).mp,kw. (4985)
- 206 fellow\*.mp,kw. (22409)
- 207 train\*.mp,kw. (429445)
- 208 preceptorship\*.mp,kw. (5017)
- 209 preceptor-ship\*.mp,kw. (1)
- 210 teaching\*.mp,kw. (156247)
- 211 curricul\*.mp,kw. (86849)
- 212 course?.mp,kw. (515128)
- 213 module?.mp,kw. (46559)
- 214 (workshop? or work shop?).mp,kw. (30392)
- 215 seminar?.mp,kw. (7739)
- 216 orientation?.mp,kw. (129526)
- 217 session?.mp,kw. (127929)
- 218 round?.mp,kw. (63876)
- 219 webinar?.mp,kw. (300)
- 220 videoconferenc\*.mp,kw. (2210)
- 221 video-conferenc\*.mp,kw. (463)
- 222 audioconferenc\*.mp,kw. (16)
- 223 audio-conferenc\*.mp,kw. (17)
- 224 teleconferenc\*.mp,kw. (868)
- 225 tele-conferenc\*.mp,kw. (14)
- 226 conferenc\*.mp,kw. (75604)
- 227 colloquium\*.mp,kw. (707)
- 228 webcast\*.mp,kw. (1142)
- 229 web-cast\*.mp,kw. (6)
- 230 learn\*.mp,kw. (360458)
- 231 elearn\*.mp,kw. (151)
- 232 instruction\*.mp,kw. (60107)
- 233 mentor\*.mp,kw. (16326)
- 234 coaching?.mp,kw. (3941)
- 235 knowledge\*.mp,kw. (572481)
- 236 abilit\*.mp,kw. (727193)
- 237 competen\*.mp,kw. (197347)

- 238 skill?.mp,kw. (153616)
- 239 simulation?.mp,kw. (326097)
- 240 licenc\*.mp,kw. (2085)
- 241 licensure?.mp,kw. (19390)
- 242 credential\*.mp,kw. (6535)
- 243 accredit\*.mp,kw. (28633)
- 244 certificat\*.mp,kw. (39010)
- 245 practicum?.mp,kw. (963)
- 246 or/176-245 (3822253)
- 247 exp Patient Education as Topic/ (81308)
- 248 exp Caregivers/ (31769)
- 249 Family/ (71950)
- 250 exp Nuclear Family/ (122739)
- 251 exp Family Relations/ (86695)
- 252 Adult Children/ (1196)
- 253 sibling\*.mp,kw. (47212)
- 254 care giver\*.mp,kw. (2171)
- 255 caregiver\*.mp,kw. (56999)
- 256 spouse\*.mp,kw. (26981)
- 257 carer?.mp,kw. (10805)
- 258 (patient\* adj2 educat\*).mp,kw. (99215)
- 259 (patient? adj2 train\*).mp,kw. (5830)
- 260 (famil\* adj2 educat\*).mp,kw. (9189)
- 261 (famil\* adj2 train\*).mp,kw. (2522)
- 262 exp Self Care/ (51101)
- 263 selfcare.mp,kw. (93)
- 264 self care.mp,kw. (37906)
- 265 exp Qualitative Research/ (43721)
- 266 qualitative stud\*.mp,kw. (28650)
- 267 qualitative research\*.mp,kw. (50292)
- 268 or/247-267 (536868)
- 269 109 and 268 (4964)
- 270 109 and 175 and 246 (8953)
- 271 269 or 270 (12830)
- 272 limit 271 to (english language and yr="2013 -Current") (3361)

**Database: Cochrane Central Register of Controlled Trials (CCRCT)  
Search Strategy:**

- 1 catheters/ (204)
- 2 Cannula/ (35)
- 3 catheters, indwelling/ (959)
- 4 exp vascular access devices/ (234)
- 5 catheter obstruction/ (15)
- 6 catheterization, central venous/ (745)
- 7 exp catheterization, peripheral/ (840)
- 8 exp cardiac catheterization/ (2573)
- 9 exp administration, intravenous/ (17507)
- 10 exp infusions, intravenous/ (9796)
- 11 exp injections, intravenous/ (7461)
- 12 Infusion Pumps/ (458)
- 13 exp Catheter-Related Infections/ (254)
- 14 exp Device Removal/ (365)
- 15 (catheter\* adj3 port\*).mp,kw. (195)
- 16 (catheter\* adj3 vascular).mp,kw. (223)
- 17 (vascular adj3 access).mp,kw. (1287)
- 18 (intra-arterial adj3 line\*).mp,kw. (8)
- 19 (intraarterial adj3 line\*).mp,kw. (1)
- 20 "port a cath?".mp,kw. (29)
- 21 portacath\*.mp,kw. (2)
- 22 (reservoir\* adj3 venous\*).mp,kw. (57)
- 23 device remov\*.mp,kw. (846)
- 24 (catheter\* adj3 remov\*).mp,kw. (1387)
- 25 (line\* adj3 remov\*).mp,kw. (95)
- 26 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 27 (catheter\* adj3 insert\*).mp,kw. (2382)
- 28 (line\* adj3 insert\*).mp,kw. (200)
- 29 (line\* adj3 fail\*).mp,kw. (782)
- 30 (catheter\* adj3 fail\*).mp,kw. (416)
- 31 (intravenous adj3 administrat\*).mp,kw. (28253)
- 32 (catheter\* adj3 in-dwell\*).mp,kw. (47)
- 33 (line\* adj3 in-dwell\*).mp,kw. (5)
- 34 (line\* adj3 indwell\*).mp,kw. (21)



- 35 (catheter\* adj3 indwell\*).mp,kw. (1728)
- 36 (catheter\* adj3 central venous\*).mp,kw. (1899)
- 37 (catheter\* adj3 peripheral).mp,kw. (1063)
- 38 picc.mp,kw. (199)
- 39 (arter\* adj3 catheter\*).mp,kw. (1849)
- 40 dialock\*.mp,kw. (0)
- 41 vectra\*.mp,kw. (44)
- 42 (arter\* adj3 access\*).mp,kw. (486)
- 43 (vein\* adj3 access\*).mp,kw. (230)
- 44 broviac.mp,kw. (14)
- 45 (central adj3 catheter\*).mp,kw. (2072)
- 46 (central adj3 line\*).mp,kw. (469)
- 47 cv cath\*.mp,kw. (4)
- 48 groshong.mp,kw. (14)
- 49 pediasat.mp,kw. (1)
- 50 vortex.mp,kw. (54)
- 51 (catheter\* adj3 vein?).mp,kw. (819)
- 52 (catheter\* adj3 arter\*).mp,kw. (1849)
- 53 (tunneled adj3 catheter\*).mp,kw. (192)
- 54 (line? adj3 vein?).mp,kw. (56)
- 55 (line\* adj3 arter\*).mp,kw. (495)
- 56 (catheter\* adj3 subclavian\*).mp,kw. (184)
- 57 (line?\* adj3 subclavian\*).mp,kw. (9)
- 58 double lumen\*.mp,kw. (492)
- 59 avalon elite.mp,kw. (0)
- 60 dual lumen.mp,kw. (43)
- 61 (catheter\* adj3 thrombos\*).mp,kw. (324)
- 62 (catheter\* adj3 occlusion\*).mp,kw. (276)
- 63 (catheter\* adj3 migrat\*).mp,kw. (90)
- 64 (catheter adj3 infection\*).mp,kw. (1286)
- 65 (catheter\* adj3 fracture\*).mp,kw. (38)
- 66 (catheter\* adj3 leakage\*).mp,kw. (60)
- 67 (catheter\* adj3 dislocat\*).mp,kw. (33)
- 68 (catheter\* adj3 complication\*).mp,kw. (1325)
- 69 (line? adj3 thrombos\*).mp,kw. (21)
- 70 (line? adj3 occlusion\*).mp,kw. (17)

- 71 (line? adj3 migrat\*).mp,kw. (14)
- 72 (line? adj3 infection\*).mp,kw. (234)
- 73 (line\* adj3 fracture\*).mp,kw. (126)
- 74 (line\* adj3 leakage\*).mp,kw. (34)
- 75 (insert\* adj3 peripheral).mp,kw. (131)
- 76 (catheter\* adj3 nurs\*).mp,kw. (160)
- 77 avalon elite.mp,kw. (0)
- 78 dual lumen.mp,kw. (43)
- 79 double lumen\*.mp,kw. (492)
- 80 (iv adj3 peripher\*).mp,kw. (168)
- 81 (intra-venous adj3 peripher\*).mp,kw. (0)
- 82 (intravenous adj3 peripher\*).mp,kw. (433)
- 83 (peripheral\* adj3 catheter\*).mp,kw. (1216)
- 84 (peripheral\* adj3 line?).mp,kw. (126)
- 85 (difficult\* adj2 vein?).mp,kw. (36)
- 86 (vein? adj2 punctur\*).mp,kw. (390)
- 87 (vein\* adj3 find\*).mp,kw. (44)
- 88 midline.mp,kw. (1441)
- 89 (arter\* adj3 line\*).mp,kw. (495)
- 90 (catheter\* adj3 cardiac).mp,kw. (2115)
- 91 (line\* adj3 cardiac).mp,kw. (60)
- 92 (line\* adj3 heart).mp,kw. (202)
- 93 (catheter\* adj3 heart).mp,kw. (1407)
- 94 exp blood specimen collection/ (625)
- 95 exp cordocentesis/ (6)
- 96 exp petrosal sinus sampling/ (3)
- 97 exp phlebotomy/ (396)
- 98 Punctures/ (397)
- 99 phlebotom\*.mp,kw. (786)
- 100 apheresis.mp,kw. (912)
- 101 puncture\*.tw,kw. (4061)
- 102 venipuncture\*.mp,kw. (655)
- 103 veni-puncture\*.mp,kw. (1)
- 104 venesection\*.mp,kw. (76)
- 105 (catheter\* adj2 insert\*).mp,kw. (2162)
- 106 (line\* adj2 plac\*).mp,kw. (674)

- 107 (line\* adj2 insert\*).mp,kw. (165)
- 108 (catheter\* adj2 plac\*).mp,kw. (2115)
- 109 or/1-108 (66572)
- 110 exp "Attitude of Health Personnel"/ (2103)
- 111 exp Health Personnel/ (7471)
- 112 exp Personnel, Hospital/ (836)
- 113 exp Health Occupations/ (16726)
- 114 exp Professional Role/ (654)
- 115 exp Patient Care Team/ (1586)
- 116 "Continuity of Patient Care"/ (566)
- 117 Social Work/ (173)
- 118 Social Workers/ (15)
- 119 Consultants/ (35)
- 120 exp Counseling/ (4662)
- 121 Research Personnel/ (78)
- 122 Leadership/ (179)
- 123 Volunteers/ (253)
- 124 Nurse's Role/ (304)
- 125 Licensed Practical Nurses/ (0)
- 126 exp Nurses/ (1088)
- 127 exp Nursing Staff/ (584)
- 128 Nursing Staff, Hospital/ (409)
- 129 exp Nursing/ (3112)
- 130 Nursing, Practical/ (10)
- 131 Health Educators/ (21)
- 132 exp Students, Health Occupations/ (1457)
- 133 Consumer Advocacy/ (14)
- 134 exp Educational Personnel/ (3628)
- 135 exp Faculty/ (380)
- 136 School Teachers/ (58)
- 137 (health\* adj2 provider?).mp,kw. (3698)
- 138 (health\* adj2 staff?).mp,kw. (583)
- 139 (health\* adj2 personnel?).mp,kw. (5280)
- 140 (health\* adj2 employe\*).mp,kw. (488)
- 141 (health\* adj2 profession\*).mp,kw. (4856)
- 142 (health\* adj2 occupation?).mp,kw. (155)

- 143 (health\* adj2 practitioner?).mp,kw. (2374)
- 144 (profession\* adj2 role?).mp,kw. (275)
- 145 nurs\*.mp,kw. (27483)
- 146 (care? adj2 team?).mp,kw. (2838)
- 147 (care? adj2 continuit\*).mp,kw. (909)
- 148 ((inter-profession\* or interprofession\*) adj2 team?).mp,kw. (92)
- 149 ((inter-disciplinar\* or interdisciplinar\*) adj2 team?).mp,kw. (242)
- 150 ((multi-disciplinar\* or multidisciplinar\*) adj2 team?).mp,kw. (1106)
- 151 consultant?.mp,kw. (1328)
- 152 counsellor?.mp,kw. (248)
- 153 researcher?.mp,kw. (7309)
- 154 (research adj2 personnel?).mp,kw. (258)
- 155 (consumer? adj2 advoca\*).mp,kw. (26)
- 156 leader\*.mp,kw. (2050)
- 157 volunteer?.mp,kw. (57320)
- 158 educator?.mp,kw. (1484)
- 159 (education\* adj2 personnel?).mp,kw. (128)
- 160 facult\*.mp,kw. (2532)
- 161 professor?.mp,kw. (255)
- 162 teacher?.mp,kw. (3768)
- 163 (social adj2 worker?).mp,kw. (706)
- 164 (support\* adj2 (worker? or staff?)).mp,kw. (539)
- 165 (peer\* adj2 worker\*).mp,kw. (55)
- 166 (communit\* adj2 worker?).mp,kw. (1213)
- 167 (lay adj2 profession\*).mp,kw. (49)
- 168 nonprofession\*.mp,kw. (222)
- 169 (child\* adj2 protective).mp,kw. (163)
- 170 (daycare? adj2 worker?).mp,kw. (0)
- 171 (home adj1 visitor?).mp,kw. (104)
- 172 (health\* adj2 student?).mp,kw. (1814)
- 173 (health\* adj2 student\*).mp,kw. (1970)
- 174 (medic\* adj2 student\*).mp,kw. (3276)
- 175 or/110-174 (135207)
- 176 ed.fs. (7427)
- 177 Education/ (554)
- 178 exp Curriculum/ (1636)

- 179 exp Education, Distance/ (121)
- 180 exp Education, Premedical/ (4)
- 181 exp Education, Professional/ (4249)
- 182 exp Educational Measurement/ (4168)
- 183 exp Inservice Training/ (745)
- 184 exp Interdisciplinary Placement/ (0)
- 185 exp Mentoring/ (0)
- 186 Preceptorship/ (34)
- 187 exp Teaching/ (3628)
- 188 exp Hospitals, Teaching/ (1257)
- 189 exp education department, hospital/ (2)
- 190 exp Teaching Materials/ (3721)
- 191 exp Licensure/ (38)
- 192 Certification/ (45)
- 193 exp Accreditation/ (23)
- 194 exp Credentialing/ (118)
- 195 exp Simulation Training/ (0)
- 196 Videoconferencing/ (152)
- 197 Webcasts as Topic/ (20)
- 198 Mentors/ (196)
- 199 Learning/ (2044)
- 200 exp Professional Competence/ (3142)
- 201 Health Knowledge, Attitudes, Practice/ (5391)
- 202 exp Staff Development/ (79)
- 203 educat\*.mp,kw. (55461)
- 204 ((staff? or profession\*) adj2 develop\*).mp,kw. (540)
- 205 (clinical adj2 clerkship?).mp,kw. (173)
- 206 fellow\*.mp,kw. (2225)
- 207 train\*.mp,kw. (72129)
- 208 preceptorship\*.mp,kw. (53)
- 209 preceptor-ship\*.mp,kw. (0)
- 210 teaching\*.mp,kw. (11457)
- 211 curricul\*.mp,kw. (3993)
- 212 course?.mp,kw. (52343)
- 213 module?.mp,kw. (3499)
- 214 (workshop? or work shop?).mp,kw. (2655)

- 215 seminar?.mp,kw. (540)
- 216 orientation?.mp,kw. (3575)
- 217 session?.mp,kw. (52156)
- 218 round?.mp,kw. (2225)
- 219 webinar?.mp,kw. (93)
- 220 videoconferenc\*.mp,kw. (503)
- 221 video-conferenc\*.mp,kw. (154)
- 222 audioconferenc\*.mp,kw. (1)
- 223 audio-conferenc\*.mp,kw. (4)
- 224 teleconferenc\*.mp,kw. (183)
- 225 tele-conferenc\*.mp,kw. (4)
- 226 conferenc\*.mp,kw. (33019)
- 227 colloquium\*.mp,kw. (7)
- 228 webcast\*.mp,kw. (27)
- 229 web-cast\*.mp,kw. (0)
- 230 learn\*.mp,kw. (23128)
- 231 elearn\*.mp,kw. (55)
- 232 instruction\*.mp,kw. (11195)
- 233 mentor\*.mp,kw. (1003)
- 234 coaching?.mp,kw. (1931)
- 235 knowledge\*.mp,kw. (27588)
- 236 abilit\*.mp,kw. (32893)
- 237 competen\*.mp,kw. (7538)
- 238 skill?.mp,kw. (19258)
- 239 simulation?.mp,kw. (8494)
- 240 licenc\*.mp,kw. (526)
- 241 licensure?.mp,kw. (238)
- 242 credential\*.mp,kw. (165)
- 243 accredit\*.mp,kw. (601)
- 244 certificat\*.mp,kw. (698)
- 245 practicum?.mp,kw. (41)
- 246 or/176-245 (285010)
- 247 exp Patient Education as Topic/ (7981)
- 248 exp Caregivers/ (1770)
- 249 Family/ (1307)
- 250 exp Nuclear Family/ (4608)

- 251 exp Family Relations/ (2764)
- 252 Adult Children/ (22)
- 253 sibling\*.mp,kw. (1496)
- 254 care giver\*.mp,kw. (241)
- 255 caregiver\*.mp,kw. (8350)
- 256 spouse\*.mp,kw. (1292)
- 257 carer?.mp,kw. (1632)
- 258 (patient\* adj2 educat\*).mp,kw. (13815)
- 259 (patient? adj2 train\*).mp,kw. (4889)
- 260 (famil\* adj2 educat\*).mp,kw. (1304)
- 261 (famil\* adj2 train\*).mp,kw. (422)
- 262 exp Self Care/ (5072)
- 263 selfcare.mp,kw. (59)
- 264 self care.mp,kw. (7571)
- 265 exp Qualitative Research/ (860)
- 266 qualitative stud\*.mp,kw. (1406)
- 267 qualitative research\*.mp,kw. (1997)
- 268 or/247-267 (44221)
- 269 109 and 268 (700)
- 270 109 and 175 and 246 (1703)
- 271 269 or 270 (2247)
- 272 limit 271 to (english language and yr="2013 -Current") (841)

### **Database: Cochrane Database of Systematic Reviews**

#### **Search Strategy:**

- 1 (catheter\* adj3 port\*).mp,kw. (24)
- 2 (catheter\* adj3 vascular).mp,kw. (31)
- 3 (vascular adj3 access).mp,kw. (95)
- 4 (intra-arterial adj3 line\*).mp,kw. (2)
- 5 (intraarterial adj3 line\*).mp,kw. (0)
- 6 "port a cath?".mp,kw. (19)
- 7 portacath\*.mp,kw. (9)
- 8 (reservoir\* adj3 venous\*).mp,kw. (2)
- 9 device remov\*.mp,kw. (33)
- 10 (catheter\* adj3 remov\*).mp,kw. (107)

- 11 (line\* adj3 remov\*).mp,kw. (19)
- 12 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 13 (catheter\* adj3 insert\*).mp,kw. (198)
- 14 (line\* adj3 insert\*).mp,kw. (43)
- 15 (line\* adj3 fail\*).mp,kw. (50)
- 16 (catheter\* adj3 fail\*).mp,kw. (37)
- 17 (intravenous adj3 administrat\*).mp,kw. (474)
- 18 (catheter\* adj3 in-dwell\*).mp,kw. (13)
- 19 (line\* adj3 in-dwell\*).mp,kw. (0)
- 20 (line\* adj3 indwell\*).mp,kw. (7)
- 21 (catheter\* adj3 indwell\*).mp,kw. (110)
- 22 (catheter\* adj3 central venous\*).mp,kw. (133)
- 23 (catheter\* adj3 peripheral).mp,kw. (60)
- 24 picc.mp,kw. (19)
- 25 (arter\* adj3 catheter\*).mp,kw. (83)
- 26 dialock\*.mp,kw. (0)
- 27 vectra\*.mp,kw. (1)
- 28 (arter\* adj3 access\*).mp,kw. (29)
- 29 (vein\* adj3 access\*).mp,kw. (16)
- 30 broviac.mp,kw. (11)
- 31 (central adj3 catheter\*).mp,kw. (144)
- 32 (central adj3 line\*).mp,kw. (97)
- 33 cv cath\*.mp,kw. (0)
- 34 groshong.mp,kw. (1)
- 35 pediasat.mp,kw. (0)
- 36 vortex.mp,kw. (4)
- 37 (catheter\* adj3 vein?).mp,kw. (33)
- 38 (catheter\* adj3 arter\*).mp,kw. (83)
- 39 (tunneled adj3 catheter\*).mp,kw. (2)
- 40 (line? adj3 vein?).mp,kw. (6)
- 41 (line\* adj3 arter\*).mp,kw. (29)
- 42 (catheter\* adj3 subclavian\*).mp,kw. (11)
- 43 (line?\* adj3 subclavian\*).mp,kw. (1)
- 44 double lumen\*.mp,kw. (10)
- 45 avalon elite.mp,kw. (0)
- 46 dual lumen.mp,kw. (2)



- 47 (catheter\* adj3 thrombos\*).mp,kw. (36)
- 48 (catheter\* adj3 occlusion\*).mp,kw. (28)
- 49 (catheter\* adj3 migrat\*).mp,kw. (10)
- 50 (catheter adj3 infection\*).mp,kw. (105)
- 51 (catheter\* adj3 fracture\*).mp, kw. (3)
- 52 (catheter\* adj3 leakage\*).mp,kw. (7)
- 53 (catheter\* adj3 dislocat\*).mp,kw. (4)
- 54 (catheter\* adj3 complication\*).mp,kw. (60)
- 55 (line? adj3 thrombos\*).mp,kw. (5)
- 56 (line? adj3 occlusion\*).mp,kw. (3)
- 57 (line? adj3 migrat\*).mp,kw. (2)
- 58 (line? adj3 infection\*).mp,kw. (31)
- 59 (line\* adj3 fracture\*).mp,kw. (13)
- 60 (line\* adj3 leakage\*).mp,kw. (1)
- 61 (insert\* adj3 peripheral).mp,kw. (18)
- 62 (catheter\* adj3 nurs\*).mp,kw. (5)
- 63 avalon elite.mp,kw. (0)
- 64 dual lumen.mp,kw. (2)
- 65 double lumen\*.mp,kw. (10)
- 66 (iv adj3 peripher\*).mp,kw. (5)
- 67 (intra-venous adj3 peripher\*).mp,kw. (0)
- 68 (intravenous adj3 peripher\*).mp,kw. (20)
- 69 (peripheral\* adj3 catheter\*).mp,kw. (71)
- 70 (peripheral\* adj3 line?).mp,kw. (24)
- 71 (difficult\* adj2 vein?).mp,kw. (3)
- 72 (vein? adj2 punctur\*).mp,kw. (7)
- 73 (vein\* adj3 find\*).mp,kw. (4)
- 74 midline.mp,kw. (151)
- 75 (arter\* adj3 line\*).mp,kw. (29)
- 76 (catheter\* adj3 cardiac).mp,kw. (37)
- 77 (line\* adj3 cardiac).mp,kw. (1)
- 78 (line\* adj3 heart).mp,kw. (10)
- 79 (catheter\* adj3 heart).mp,kw. (17)
- 80 phlebotom\*.mp,kw. (38)
- 81 apheresis.mp,kw. (40)
- 82 puncture\*.tw,kw. (270)

- 83 venipuncture\*.mp,kw. (31)
- 84 veni-puncture\*.mp,kw. (0)
- 85 venesection\*.mp,kw. (6)
- 86 (catheter\* adj2 insert\*).mp,kw. (157)
- 87 (line\* adj2 plac\*).mp,kw. (40)
- 88 (line\* adj2 insert\*).mp,kw. (32)
- 89 (catheter\* adj2 plac\*).mp,kw. (118)
- 90 or/1-89 (1492)
- 91 (health\* adj2 provider?).mp,kw. (1016)
- 92 (health\* adj2 staff?).mp,kw. (154)
- 93 (health\* adj2 personnel?).mp,kw. (202)
- 94 (health\* adj2 employe\*).mp,kw. (38)
- 95 (health\* adj2 profession\*).mp,kw. (1526)
- 96 (health\* adj2 occupation?).mp,kw. (22)
- 97 (health\* adj2 practitioner?).mp,kw. (233)
- 98 (profession\* adj2 role?).mp,kw. (41)
- 99 nurs\*.mp,kw. (2735)
- 100 (care? adj2 team?).mp,kw. (174)
- 101 (care? adj2 continuit\*).mp,kw. (87)
- 102 ((inter-profession\* or interprofession\*) adj2 team?).mp,kw. (6)
- 103 ((inter-disciplinar\* or interdisciplinar\*) adj2 team?).mp,kw. (31)
- 104 ((multi-disciplinar\* or multidisciplinar\*) adj2 team?).mp,kw. (265)
- 105 consultant?.mp,kw. (662)
- 106 counsellor?.mp,kw. (167)
- 107 researcher?.mp,kw. (3532)
- 108 (research adj2 personnel?).mp,kw. (54)
- 109 (consumer? adj2 advoca\*).mp,kw. (20)
- 110 leader\*.mp,kw. (434)
- 111 volunteer?.mp,kw. (1539)
- 112 educator?.mp,kw. (172)
- 113 (education\* adj2 personnel?).mp,kw. (31)
- 114 facult\*.mp,kw. (467)
- 115 professor?.mp,kw. (1220)
- 116 teacher?.mp,kw. (268)
- 117 (social adj2 worker?).mp,kw. (195)
- 118 (support\* adj2 (worker? or staff?)).mp,kw. (117)

- 119 (peer\* adj2 worker\*).mp,kw. (11)
- 120 (communit\* adj2 worker?).mp,kw. (112)
- 121 (lay adj2 profession\*).mp,kw. (53)
- 122 nonprofession\*.mp,kw. (14)
- 123 (child\* adj2 protective).mp,kw. (4)
- 124 (daycare? adj2 worker?).mp,kw. (0)
- 125 (home adj1 visitor?).mp,kw. (12)
- 126 (health\* adj2 student?).mp,kw. (36)
- 127 (health\* adj2 student\*).mp,kw. (36)
- 128 (medic\* adj2 student\*).mp,kw. (90)
- 129 or/91-128 (6806)
- 130 educat\*.mp,kw. (2868)
- 131 ((staff? or profession\*) adj2 develop\*).mp,kw. (79)
- 132 (clinical adj2 clerkship?).mp,kw. (4)
- 133 fellow\*.mp,kw. (909)
- 134 train\*.mp,kw. (2857)
- 135 preceptorship\*.mp,kw. (8)
- 136 preceptor-ship\*.mp,kw. (1)
- 137 teaching\*.mp,kw. (584)
- 138 curricul\*.mp,kw. (156)
- 139 course?.mp,kw. (3217)
- 140 module?.mp,kw. (1195)
- 141 (workshop? or work shop?).mp,kw. (415)
- 142 seminar?.mp,kw. (88)
- 143 orientation?.mp,kw. (349)
- 144 session?.mp,kw. (1816)
- 145 round?.mp,kw. (279)
- 146 webinar?.mp,kw. (5)
- 147 videoconferenc\*.mp,kw. (34)
- 148 video-conferenc\*.mp,kw. (31)
- 149 audioconferenc\*.mp,kw. (0)
- 150 audio-conferenc\*.mp,kw. (1)
- 151 teleconferenc\*.mp,kw. (24)
- 152 tele-conferenc\*.mp,kw. (5)
- 153 conferenc\*.mp,kw. (5896)
- 154 colloquium\*.mp,kw. (18)

- 155 webcast\*.mp,kw. (12)
- 156 web-cast\*.mp,kw. (7)
- 157 learn\*.mp,kw. (1384)
- 158 elearn\*.mp,kw. (13)
- 159 instruction\*.mp,kw. (957)
- 160 mentor\*.mp,kw. (176)
- 161 coaching?.mp,kw. (101)
- 162 knowledge\*.mp,kw. (4725)
- 163 abilit\*.mp,kw. (3287)
- 164 competen\*.mp,kw. (436)
- 165 skill?.mp,kw. (1469)
- 166 simulation?.mp,kw. (191)
- 167 licenc\*.mp,kw. (108)
- 168 licensure?.mp,kw. (38)
- 169 credential\*.mp,kw. (31)
- 170 accredit\*.mp,kw. (115)
- 171 certificat\*.mp,kw. (99)
- 172 practicum?.mp,kw. (2)
- 173 sibling\*.mp,kw. (169)
- 174 or/130-172 (9115)
- 175 care giver\*.mp,kw. (199)
- 176 caregiver\*.mp,kw. (1074)
- 177 spouse\*.mp,kw. (104)
- 178 carer?.mp,kw. (1037)
- 179 (patient\* adj2 educat\*).mp,kw. (475)
- 180 (patient? adj2 train\*).mp,kw. (103)
- 181 (famil\* adj2 educat\*).mp,kw. (94)
- 182 (famil\* adj2 train\*).mp,kw. (36)
- 183 selfcare.mp,kw. (6)
- 184 self care.mp,kw. (420)
- 185 qualitative stud\*.mp,kw. (176)
- 186 qualitative research\*.mp,kw. (122)
- 187 or/175-186 (2556)
- 188 90 and 187 (312)
- 189 90 and 129 and 174 (984)
- 190 188 or 189 (1042)

191 limit 190 to full systematic reviews (950)

192 limit 191 to last 7 years (659)

**Database: Embase**

**Search Strategy:**

- 1 vascular access device/ (1108)
- 2 vascular equipment/ (504)
- 3 exp vascular access/ (23245)
- 4 exp cannulation/ (36860)
- 5 exp catheter removal/ (6179)
- 6 device removal/ (17606)
- 7 exp central venous catheter/ (21397)
- 8 intravenous catheter/ (6226)
- 9 exp vein catheterization/ (13562)
- 10 exp central venous catheterization/ (8787)
- 11 exp catheter complication/ (21745)
- 12 exp catheter care/ (578)
- 13 exp double lumen catheter/ (418)
- 14 exp midline catheter/ (67)
- 15 exp peripheral venous catheter/ (702)
- 16 exp peripherally inserted central venous catheter/ (2695)
- 17 exp catheter infection/ (16069)
- 18 cannula/ (10004)
- 19 catheters, indwelling/ (10605)
- 20 heart catheter/ (3801)
- 21 exp heart catheterization/ (55939)
- 22 exp artery catheterization/ (9446)
- 23 exp infusion pump/ (8036)
- 24 catheters, indwelling/ (10605)
- 25 exp intravascular catheter/ (50997)
- 26 exp blood vessel catheterization/ (27335)
- 27 exp injection site/ (8370)
- 28 exp injection device/ (2303)
- 29 (heart adj2 catheter\*).tw,kw. (12242)
- 30 (cardiac adj2 catheter\*).tw,kw. (26449)
- 31 (arter\* adj3 line).tw,kw. (2630)

- 32 (catheter\* adj3 port\*).tw,kw. (2686)
- 33 (catheter\* adj3 vascular).tw,kw. (2867)
- 34 (vascular adj3 access).tw,kw. (14995)
- 35 (intra-arterial adj3 line\*).tw,kw. (60)
- 36 (intraarterial adj3 line\*).tw,kw. (16)
- 37 "port a cath?".tw,kw. (731)
- 38 portacath\*.tw,kw. (158)
- 39 (reservoir\* adj3 venous\*).tw,kw. (432)
- 40 device remov\*.tw,kw. (1504)
- 41 (catheter\* adj3 remov\*).tw,kw. (12019)
- 42 (line\* adj3 remov\*).tw,kw. (1884)
- 43 (catheter\* adj3 obstruct\*).tw,kw. (1)
- 44 (catheter\* adj3 insert\*).tw,kw. (19510)
- 45 (line\* adj3 insert\*).tw,kw. (3377)
- 46 (line\* adj3 fail\*).tw,kw. (5782)
- 47 (catheter\* adj3 fail\*).tw,kw. (2115)
- 48 (catheter\* adj3 in-dwell\*).tw,kw. (188)
- 49 (line\* adj3 in-dwell\*).tw,kw. (9)
- 50 (line\* adj3 indwell\*).tw,kw. (300)
- 51 (catheter\* adj3 indwell\*).tw,kw. (11204)
- 52 (catheter\* adj3 central venous\*).tw,kw. (17857)
- 53 (catheter\* adj3 peripheral).tw,kw. (2717)
- 54 picc.tw,kw. (2392)
- 55 (arter\* adj3 catheter\*).tw,kw. (16563)
- 56 dialock\*.tw,kw. (21)
- 57 vectra\*.tw,kw. (450)
- 58 (vascular adj3 access).tw,kw. (14995)
- 59 (arter\* adj3 access\*).tw,kw. (6594)
- 60 (vein\* adj3 access\*).tw,kw. (2260)
- 61 broviac.tw,kw. (428)
- 62 (central adj3 catheter\*).tw,kw. (21482)
- 63 (central adj3 line\*).tw,kw. (9191)
- 64 cv cath\*.tw,kw. (88)
- 65 groshong.tw,kw. (157)
- 66 pediasat.tw,kw. (18)
- 67 vortex.tw,kw. (5902)

- 68 (catheter\* adj3 vein?).tw,kw. (5673)
- 69 (catheter\* adj3 arter\*).tw,kw. (16563)
- 70 (tunneled adj3 catheter\*).tw,kw. (2048)
- 71 (line? adj3 vein?).tw,kw. (629)
- 72 (line\* adj3 arter\*).tw,kw. (3809)
- 73 (catheter\* adj3 subclavian\*).tw,kw. (1729)
- 74 (line?\* adj3 subclavian\*).tw,kw. (157)
- 75 double lumen\*.tw,kw. (4197)
- 76 avalon elite.tw,kw. (45)
- 77 dual lumen.tw,kw. (782)
- 78 (catheter\* adj3 thrombos\*).tw,kw. (1990)
- 79 (catheter\* adj3 occlusion\*).tw,kw. (2134)
- 80 (catheter\* adj3 migrat\*).tw,kw. (1074)
- 81 (catheter adj3 infection\*).tw,kw. (8761)
- 82 (catheter\* adj3 fracture\*).tw,kw. (524)
- 83 (catheter\* adj3 leakage\*).tw,kw. (412)
- 84 (catheter\* adj3 dislocat\*).tw,kw. (359)
- 85 (catheter\* adj3 complication\*).tw,kw. (6841)
- 86 (line? adj3 thrombos\*).tw,kw. (234)
- 87 (line? adj3 occlusion\*).tw,kw. (200)
- 88 (line? adj3 migrat\*).tw,kw. (1151)
- 89 (line? adj3 infection\*).tw,kw. (4239)
- 90 (line\* adj3 fracture\*).tw,kw. (3279)
- 91 (line\* adj3 leakage\*).tw,kw. (330)
- 92 (insert\* adj3 peripheral).tw,kw. (720)
- 93 (catheter\* adj3 nurs\*).tw,kw. (485)
- 94 avalon elite.tw,kw. (45)
- 95 dual lumen.tw,kw. (782)
- 96 double lumen\*.mp,kw. (4902)
- 97 (iv adj3 peripher\*).tw,kw. (1095)
- 98 (intra-venous adj3 peripher\*).mp,kw. (4)
- 99 (intravenous adj3 peripher\*).tw,kw. (1833)
- 100 (peripheral\* adj3 catheter\*).tw,kw. (4740)
- 101 (peripheral\* adj3 line?).tw,kw. (2212)
- 102 (difficult\* adj2 vein?).tw,kw. (207)
- 103 (vein\* adj3 find\*).tw,kw. (960)

- 104 (heart adj3 catheter\*).tw,kw. (13030)
- 105 (heart adj3 line\*).tw,kw. (1417)
- 106 (cardiac adj3 line\*).tw,kw. (1862)
- 107 (cardiac adj3 catheter\*).tw,kw. (27300)
- 108 infusion pump\*.tw,kw. (4513)
- 109 or/1-108 (324073)
- 110 exp phlebotomy/ (9755)
- 111 puncture/ (20109)
- 112 exp artery puncture/ (2108)
- 113 exp vein puncture/ (6175)
- 114 (vein\* adj3 puncture\*).tw,kw. (1294)
- 115 (arter\* adj3 puncture\*).tw,kw. (3162)
- 116 (blood vessel\* adj3 puncture\*).tw,kw. (69)
- 117 venipuncture\*.mp,kw. (4606)
- 118 veni-puncture\*.mp,kw. (14)
- 119 phlebotom\*.tw,kw. (9864)
- 120 venesection.tw,kw. (816)
- 121 (catheter\* adj3 insert\*).tw,kw. (19510)
- 122 (catheter\* adj3 place\*).tw,kw. (19977)
- 123 (line\* adj3 insert\*).tw,kw. (3377)
- 124 (line\* adj3 place\*).tw,kw. (4718)
- 125 or/1-124 (374709)
- 126 education/ (374832)
- 127 vocational education/ (9665)
- 128 continuing education/ (30323)
- 129 educational model/ (7865)
- 130 education program/ (47485)
- 131 clinical education/ (12756)
- 132 in service training/ (15056)
- 133 teaching/ (83219)
- 134 curriculum/ (79080)
- 135 exp accreditation/ (57893)
- 136 exp simulation training/ (3329)
- 137 mentor/ (2846)
- 138 teacher/ (30204)
- 139 learning/ (176613)



- 140 self-directed learning/ (847)
- 141 problem based learning/ (6461)
- 142 educat\*.mp. (1200956)
- 143 ((staff? or profession\*) adj2 develop\*).mp. (22602)
- 144 train\*.mp. (693929)
- 145 preceptorship\*.mp. (1194)
- 146 preceptor-ship\*.mp. (5)
- 147 teaching\*.mp. (214484)
- 148 curricul\*.mp. (105501)
- 149 (workshop? or work shop?).mp. (66276)
- 150 seminar?.mp. (11641)
- 151 orientation?.mp. (165698)
- 152 conferenc\*.mp. (1223417)
- 153 colloquium\*.mp. (896)
- 154 learn\*.mp. (522945)
- 155 elearn\*.mp. (568)
- 156 instruction\*.mp. (76842)
- 157 mentor\*.mp. (19760)
- 158 coaching?.mp. (7265)
- 159 knowledge\*.mp. (797607)
- 160 abilit\*.mp. (1033768)
- 161 skill?.mp. (231265)
- 162 simulation?.mp. (404716)
- 163 accredit\*.mp. (48798)
- 164 or/126-163 (5244252)
- 165 exp paramedical education/ (84937)
- 166 exp health personnel attitude/ (171259)
- 167 exp health care personnel/ (1373519)
- 168 exp hospital personnel/ (99233)
- 169 medical profession/ (22801)
- 170 paramedical profession/ (1860)
- 171 social work/ (21647)
- 172 psychologist/ (11843)
- 173 social worker/ (9839)
- 174 licensed practical nurse/ (193)
- 175 exp nurse/ (160084)

- 176 nursing staff/ (66256)
- 177 exp nursing/ (344059)
- 178 practical nursing/ (120)
- 179 exp health educator/ (2352)
- 180 exp administrative personnel/ (28425)
- 181 (health\* adj2 provider?).mp. (74592)
- 182 (hospital\* adj2 provider?).mp. (1819)
- 183 (health\* adj2 staff?).mp. (8543)
- 184 (hospital\* adj2 staff?).mp. (9332)
- 185 (health\* adj2 personnel?).mp. (223860)
- 186 (hospital\* adj2 personnel?).mp. (25445)
- 187 (health\* adj2 employe\*).mp. (6542)
- 188 (hospital\* adj2 employe\*).mp. (2670)
- 189 (health\* adj2 profession\*).mp. (124173)
- 190 (hospital\* adj2 profession\*).mp. (1536)
- 191 (health\* adj2 occupation?).mp. (1072)
- 192 (hospital\* adj2 occupation?).mp. (105)
- 193 (health\* adj2 practitioner?).mp. (63544)
- 194 (hospital\* adj2 practitioner?).mp. (1390)
- 195 (health\* adj2 worker?).mp. (49047)
- 196 (hospital\* adj2 worker?).mp. (2115)
- 197 nurs\*.mp. (724658)
- 198 (patient care? adj2 team?).mp. (1071)
- 199 (health\* adj2 educator?).mp. (4282)
- 200 (social adj2 worker?).mp. (17650)
- 201 (support\* adj2 (worker? or staff?)).mp. (7310)
- 202 interdisciplinary.mp,kw. (57043)
- 203 inter-disciplinary.mp,kw. (957)
- 204 multidisciplinary.mp,kw. (116774)
- 205 multi-disciplinary.mp,kw. (12263)
- 206 (collaborative adj3 practice\*).mp,kw. (2588)
- 207 or/166-206 (2149093)
- 208 125 and 164 and 207 (14723)
- 209 exp patient education/ (106781)
- 210 exp caregiver/ (69340)
- 211 family/ (88317)

- 212 nuclear family/ (2614)
- 213 exp sibling/ (40244)
- 214 exp spouse/ (16389)
- 215 exp first-degree relative/ (265189)
- 216 patient education.tw. (23614)
- 217 patient\* education\*.mp. (115000)
- 218 patient\* train\*.mp. (1383)
- 219 family educat\*.mp. (1846)
- 220 family train\*.mp. (176)
- 221 sibling\*.mp. (70560)
- 222 care giver\*.mp. (4382)
- 223 caregiver\*.mp. (99047)
- 224 spouse\*.mp. (26218)
- 225 selfcare.mp. (711)
- 226 self care.mp. (57543)
- 227 or/209-226 (633510)
- 228 109 and 227 (4231)
- 229 208 or 228 (17638)
- 230 limit 229 to yr="2013 -Current" (9813)
- 231 limit 230 to english language (9626)
- 232 limit 231 to (books or chapter or conference abstract or conference paper or "conference review" or letter or short survey) (6229)
- 233 231 not 232 (3397)

**Database: Emcare**

**Search strategy:**

- 1 vascular access device/ (510)
- 2 vascular equipment/ (167)
- 3 exp vascular access/ (7897)
- 4 exp cannulation/ (12193)
- 5 exp catheter removal/ (2130)
- 6 device removal/ (6823)
- 7 exp central venous catheter/ (7128)
- 8 intravenous catheter/ (2534)
- 9 exp vein catheterization/ (4714)
- 10 exp central venous catheterization/ (3167)

- 11 exp catheter complication/ (8061)
- 12 exp catheter care/ (350)
- 13 exp double lumen catheter/ (87)
- 14 exp midline catheter/ (24)
- 15 exp peripheral venous catheter/ (245)
- 16 exp peripherally inserted central venous catheter/ (1169)
- 17 exp catheter infection/ (5824)
- 18 cannula/ (3175)
- 19 catheters, indwelling/ (2196)
- 20 heart catheter/ (1301)
- 21 exp heart catheterization/ (14542)
- 22 exp artery catheterization/ (3499)
- 23 exp infusion pump/ (2574)
- 24 catheters, indwelling/ (2196)
- 25 exp intravascular catheter/ (18346)
- 26 exp blood vessel catheterization/ (9733)
- 27 exp injection site/ (2316)
- 28 exp injection device/ (0)
- 29 (heart adj2 catheter\*).tw,kw. (1633)
- 30 (cardiac adj2 catheter\*).tw,kw. (4685)
- 31 (arter\* adj3 line).tw,kw. (666)
- 32 (catheter\* adj3 port\*).tw,kw. (545)
- 33 (catheter\* adj3 vascular).tw,kw. (621)
- 34 (vascular adj3 access).tw,kw. (3291)
- 35 (intra-arterial adj3 line\*).tw,kw. (11)
- 36 (intraarterial adj3 line\*).tw,kw. (1)
- 37 "port a cath?".tw,kw. (98)
- 38 portacath\*.tw,kw. (23)
- 39 (reservoir\* adj3 venous\*).tw,kw. (149)
- 40 device remov\*.tw,kw. (327)
- 41 (catheter\* adj3 remov\*).tw,kw. (2038)
- 42 (line\* adj3 remov\*).tw,kw. (293)
- 43 (catheter\* adj3 obstruct\*).tw,kw. (0)
- 44 (catheter\* adj3 insert\*).tw,kw. (5027)
- 45 (line\* adj3 insert\*).tw,kw. (623)
- 46 (line\* adj3 fail\*).tw,kw. (873)

- 47 (catheter\* adj3 fail\*).tw,kw. (480)
- 48 (catheter\* adj3 in-dwell\*).tw,kw. (33)
- 49 (line\* adj3 in-dwell\*).tw,kw. (5)
- 50 (line\* adj3 indwell\*).tw,kw. (51)
- 51 (catheter\* adj3 indwell\*).tw,kw. (2036)
- 52 (catheter\* adj3 central venous\*).tw,kw. (5092)
- 53 (catheter\* adj3 peripheral).tw,kw. (997)
- 54 picc.tw,kw. (723)
- 55 (arter\* adj3 catheter\*).tw,kw. (4032)
- 56 dialock\*.tw,kw. (5)
- 57 vectra\*.tw,kw. (54)
- 58 (vascular adj3 access).tw,kw. (3291)
- 59 (arter\* adj3 access\*).tw,kw. (1373)
- 60 (vein\* adj3 access\*).tw,kw. (456)
- 61 broviac.tw,kw. (38)
- 62 (central adj3 catheter\*).tw,kw. (6211)
- 63 (central adj3 line\*).tw,kw. (2521)
- 64 cv cath\*.tw,kw. (17)
- 65 groshong.tw,kw. (24)
- 66 pediasat.tw,kw. (7)
- 67 vortex.tw,kw. (1166)
- 68 (catheter\* adj3 vein?).tw,kw. (1100)
- 69 (catheter\* adj3 arter\*).tw,kw. (4032)
- 70 (tunneled adj3 catheter\*).tw,kw. (480)
- 71 (line? adj3 vein?).tw,kw. (79)
- 72 (line\* adj3 arter\*).tw,kw. (914)
- 73 (catheter\* adj3 subclavian\*).tw,kw. (359)
- 74 (line?\* adj3 subclavian\*).tw,kw. (21)
- 75 double lumen\*.tw,kw. (1092)
- 76 avalon elite.tw,kw. (13)
- 77 dual lumen.tw,kw. (173)
- 78 (catheter\* adj3 thrombos\*).tw,kw. (405)
- 79 (catheter\* adj3 occlusion\*).tw,kw. (453)
- 80 (catheter\* adj3 migrat\*).tw,kw. (260)
- 81 (catheter adj3 infection\*).tw,kw. (2396)
- 82 (catheter\* adj3 fracture\*).tw,kw. (139)

- 83 (catheter\* adj3 leakage\*).tw,kw. (77)
- 84 (catheter\* adj3 dislocat\*).tw,kw. (86)
- 85 (catheter\* adj3 complication\*).tw,kw. (1501)
- 86 (line? adj3 thrombos\*).tw,kw. (41)
- 87 (line? adj3 occlusion\*).tw,kw. (48)
- 88 (line? adj3 migrat\*).tw,kw. (159)
- 89 (line? adj3 infection\*).tw,kw. (1072)
- 90 (line\* adj3 fracture\*).tw,kw. (1289)
- 91 (line\* adj3 leakage\*).tw,kw. (53)
- 92 (insert\* adj3 peripheral).tw,kw. (236)
- 93 (catheter\* adj3 nurs\*).tw,kw. (167)
- 94 avalon elite.tw,kw. (13)
- 95 dual lumen.tw,kw. (173)
- 96 double lumen\*.mp,kw. (1383)
- 97 (iv adj3 peripher\*).tw,kw. (297)
- 98 (intra-venous adj3 peripher\*).mp,kw. (3)
- 99 (intravenous adj3 peripher\*).tw,kw. (687)
- 100 (peripheral\* adj3 catheter\*).tw,kw. (1803)
- 101 (peripheral\* adj3 line?).tw,kw. (285)
- 102 (difficult\* adj2 vein?).tw,kw. (42)
- 103 (vein\* adj3 find\*).tw,kw. (190)
- 104 (heart adj3 catheter\*).tw,kw. (1771)
- 105 (heart adj3 line\*).tw,kw. (238)
- 106 (cardiac adj3 line\*).tw,kw. (240)
- 107 (cardiac adj3 catheter\*).tw,kw. (4901)
- 108 infusion pump\*.tw,kw. (1128)
- 109 or/1-108 (84929)
- 110 exp phlebotomy/ (2150)
- 111 puncture/ (5420)
- 112 exp artery puncture/ (915)
- 113 exp vein puncture/ (2171)
- 114 (vein\* adj3 puncture\*).tw,kw. (268)
- 115 (arter\* adj3 puncture\*).tw,kw. (807)
- 116 (blood vessel\* adj3 puncture\*).tw,kw. (22)
- 117 venipuncture\*.mp,kw. (1010)
- 118 veni-puncture\*.mp,kw. (0)

- 119 phlebotom\*.tw,kw. (1346)
- 120 venesection.tw,kw. (90)
- 121 (catheter\* adj3 insert\*).tw,kw. (5027)
- 122 (catheter\* adj3 place\*).tw,kw. (4720)
- 123 (line\* adj3 insert\*).tw,kw. (623)
- 124 (line\* adj3 place\*).tw,kw. (1037)
- 125 or/1-124 (95716)
- 126 education/ (140897)
- 127 vocational education/ (5439)
- 128 continuing education/ (16506)
- 129 educational model/ (1602)
- 130 education program/ (27619)
- 131 clinical education/ (6819)
- 132 in service training/ (1470)
- 133 teaching/ (40467)
- 134 curriculum/ (31045)
- 135 exp accreditation/ (23851)
- 136 exp simulation training/ (977)
- 137 mentor/ (1002)
- 138 teacher/ (29294)
- 139 learning/ (76142)
- 140 self-directed learning/ (973)
- 141 problem based learning/ (1330)
- 142 educat\*.mp. (443686)
- 143 ((staff? or profession\*) adj2 develop\*).mp. (13399)
- 144 train\*.mp. (244099)
- 145 preceptorship\*.mp. (681)
- 146 preceptor-ship\*.mp. (1)
- 147 teaching\*.mp. (69242)
- 148 curricul\*.mp. (38788)
- 149 (workshop? or work shop?).mp. (14514)
- 150 seminar?.mp. (3455)
- 151 orientation?.mp. (39804)
- 152 conferenc\*.mp. (133792)
- 153 colloquium\*.mp. (164)
- 154 learn\*.mp. (164202)

- 155 elearn\*.mp. (200)
- 156 instruction\*.mp. (29583)
- 157 mentor\*.mp. (9053)
- 158 coaching?.mp. (4372)
- 159 knowledge\*.mp. (234250)
- 160 abilit\*.mp. (199436)
- 161 skill?.mp. (112462)
- 162 simulation?.mp. (84216)
- 163 accredit\*.mp. (18105)
- 164 or/126-163 (1297131)
- 165 exp paramedical education/ (31729)
- 166 exp health personnel attitude/ (49636)
- 167 exp health care personnel/ (643698)
- 168 exp hospital personnel/ (35774)
- 169 medical profession/ (8805)
- 170 paramedical profession/ (719)
- 171 social work/ (15249)
- 172 psychologist/ (7858)
- 173 social worker/ (8379)
- 174 licensed practical nurse/ (147)
- 175 exp nurse/ (136052)
- 176 nursing staff/ (24037)
- 177 exp nursing/ (141390)
- 178 practical nursing/ (150)
- 179 exp health educator/ (2288)
- 180 exp administrative personnel/ (9451)
- 181 (health\* adj2 provider?).mp. (35557)
- 182 (hospital\* adj2 provider?).mp. (770)
- 183 (health\* adj2 staff?).mp. (4179)
- 184 (hospital\* adj2 staff?).mp. (3072)
- 185 (health\* adj2 personnel?).mp. (89694)
- 186 (hospital\* adj2 personnel?).mp. (8792)
- 187 (health\* adj2 employe\*).mp. (3161)
- 188 (hospital\* adj2 employe\*).mp. (862)
- 189 (health\* adj2 profession\*).mp. (60374)
- 190 (hospital\* adj2 profession\*).mp. (601)



- 191 (health\* adj2 occupation?).mp. (479)
- 192 (hospital\* adj2 occupation?).mp. (29)
- 193 (health\* adj2 practitioner?).mp. (34915)
- 194 (hospital\* adj2 practitioner?).mp. (497)
- 195 (health\* adj2 worker?).mp. (20490)
- 196 (hospital\* adj2 worker?).mp. (689)
- 197 nurs\*.mp. (298491)
- 198 (patient care? adj2 team?).mp. (574)
- 199 (health\* adj2 educator?).mp. (2289)
- 200 (social adj2 worker?).mp. (10354)
- 201 (support\* adj2 (worker? or staff?)).mp. (3852)
- 202 interdisciplinary.mp,kw. (18982)
- 203 inter-disciplinary.mp,kw. (348)
- 204 multidisciplinary.mp,kw. (34897)
- 205 multi-disciplinary.mp,kw. (2842)
- 206 (collaborative adj3 practice\*).mp,kw. (1570)
- 207 or/166-206 (870623)
- 208 125 and 164 and 207 (4621)
- 209 exp patient education/ (37656)
- 210 exp caregiver/ (41125)
- 211 family/ (16876)
- 212 nuclear family/ (648)
- 213 exp sibling/ (9403)
- 214 exp spouse/ (8062)
- 215 exp first-degree relative/ (984)
- 216 patient education.tw. (8298)
- 217 patient\* education\*.mp. (39294)
- 218 patient\* train\*.mp. (403)
- 219 family educat\*.mp. (694)
- 220 family train\*.mp. (83)
- 221 sibling\*.mp. (12017)
- 222 care giver\*.mp. (1411)
- 223 caregiver\*.mp. (50225)
- 224 spouse\*.mp. (10073)
- 225 selfcare.mp. (253)
- 226 self care.mp. (25519)

- 227 or/209-226 (145125)
- 228 109 and 227 (988)
- 229 208 or 228 (5204)
- 230 limit 229 to yr="2013 -Current" (2103)
- 231 limit 230 to english language (1993)

**Database: Epub Ahead of Print**  
**Search Strategy:**

- 1 (catheter\* adj3 port\*).mp,kw. (129)
- 2 (catheter\* adj3 vascular).mp,kw. (166)
- 3 (vascular adj3 access).mp,kw. (1232)
- 4 (intra-arterial adj3 line\*).mp,kw. (1)
- 5 (intraarterial adj3 line\*).mp,kw. (1)
- 6 "port a cath?".mp,kw. (39)
- 7 portacath\*.mp,kw. (9)
- 8 (reservoir\* adj3 venous\*).mp,kw. (11)
- 9 device remov\*.mp,kw. (146)
- 10 (catheter\* adj3 remov\*).mp,kw. (822)
- 11 (line\* adj3 remov\*).mp,kw. (211)
- 12 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 13 (catheter\* adj3 insert\*).mp,kw. (1364)
- 14 (line\* adj3 insert\*).mp,kw. (265)
- 15 (line\* adj3 fail\*).mp,kw. (529)
- 16 (catheter\* adj3 fail\*).mp,kw. (162)
- 17 (intravenous adj3 administrat\*).mp,kw. (2601)
- 18 (catheter\* adj3 in-dwell\*).mp,kw. (8)
- 19 (line\* adj3 in-dwell\*).mp,kw. (1)
- 20 (line\* adj3 indwell\*).mp,kw. (11)
- 21 (catheter\* adj3 indwell\*).mp,kw. (674)
- 22 (catheter\* adj3 central venous\*).mp,kw. (1468)
- 23 (catheter\* adj3 peripheral).mp,kw. (247)
- 24 picc.mp,kw. (174)
- 25 (arter\* adj3 catheter\*).mp,kw. (799)
- 26 dialock\*.mp,kw. (3)
- 27 vectra\*.mp,kw. (41)
- 28 (arter\* adj3 access\*).mp,kw. (576)

- 29 (vein\* adj3 access\*).mp,kw. (190)
- 30 broviac.mp,kw. (20)
- 31 (central adj3 catheter\*).mp,kw. (1726)
- 32 (central adj3 line\*).mp,kw. (784)
- 33 cv cath\*.mp,kw. (6)
- 34 groshong.mp,kw. (7)
- 35 pediasat.mp,kw. (1)
- 36 vortex.mp,kw. (5283)
- 37 (catheter\* adj3 vein?).mp,kw. (339)
- 38 (catheter\* adj3 arter\*).mp,kw. (799)
- 39 (tunneled adj3 catheter\*).mp,kw. (158)
- 40 (line? adj3 vein?).mp,kw. (44)
- 41 (line\* adj3 arter\*).mp,kw. (180)
- 42 (catheter\* adj3 subclavian\*).mp,kw. (105)
- 43 (line?\* adj3 subclavian\*).mp,kw. (8)
- 44 double lumen\*.mp,kw. (299)
- 45 avalon elite.mp,kw. (4)
- 46 dual lumen.mp,kw. (65)
- 47 (catheter\* adj3 thrombos\*).mp,kw. (146)
- 48 (catheter\* adj3 occlusion\*).mp,kw. (128)
- 49 (catheter\* adj3 migrat\*).mp,kw. (91)
- 50 (catheter adj3 infection\*).mp,kw. (610)
- 51 (catheter\* adj3 fracture\*).mp,kw. (61)
- 52 (catheter\* adj3 leakage\*).mp,kw. (29)
- 53 (catheter\* adj3 dislocat\*).mp,kw. (14)
- 54 (catheter\* adj3 complication\*).mp,kw. (528)
- 55 (line? adj3 thrombos\*).mp,kw. (15)
- 56 (line? adj3 occlusion\*).mp,kw. (12)
- 57 (line? adj3 migrat\*).mp,kw. (113)
- 58 (line? adj3 infection\*).mp,kw. (363)
- 59 (line\* adj3 fracture\*).mp,kw. (394)
- 60 (line\* adj3 leakage\*).mp,kw. (45)
- 61 (insert\* adj3 peripheral).mp,kw. (75)
- 62 (catheter\* adj3 nurs\*).mp,kw. (43)
- 63 avalon elite.mp,kw. (4)
- 64 dual lumen.mp,kw. (65)

- 65 double lumen\*.mp,kw. (299)
- 66 (iv adj3 peripher\*).mp,kw. (79)
- 67 (intra-venous adj3 peripher\*).mp,kw. (0)
- 68 (intravenous adj3 peripher\*).mp,kw. (176)
- 69 (peripheral\* adj3 catheter\*).mp,kw. (431)
- 70 (peripheral\* adj3 line?).mp,kw. (115)
- 71 (difficult\* adj2 vein?).mp,kw. (19)
- 72 (vein? adj2 punctur\*).mp,kw. (61)
- 73 (vein\* adj3 find\*).mp,kw. (52)
- 74 midline.mp,kw. (3423)
- 75 (arter\* adj3 line\*).mp,kw. (180)
- 76 (catheter\* adj3 cardiac).mp,kw. (1464)
- 77 (line\* adj3 cardiac).mp,kw. (124)
- 78 (line\* adj3 heart).mp,kw. (91)
- 79 (catheter\* adj3 heart).mp,kw. (703)
- 80 phlebotom\*.mp,kw. (646)
- 81 apheresis.mp,kw. (519)
- 82 puncture\*.tw,kw. (4490)
- 83 venipuncture\*.mp,kw. (281)
- 84 veni-puncture\*.mp,kw. (1)
- 85 venesection\*.mp,kw. (78)
- 86 (catheter\* adj2 insert\*).mp,kw. (1195)
- 87 (line\* adj2 plac\*).mp,kw. (269)
- 88 (line\* adj2 insert\*).mp,kw. (189)
- 89 (catheter\* adj2 plac\*).mp,kw. (992)
- 90 or/1-89 (29503)
- 91 (health\* adj2 provider?).mp,kw. (9546)
- 92 (health\* adj2 staff?).mp,kw. (1051)
- 93 (health\* adj2 personnel?).mp,kw. (1154)
- 94 (health\* adj2 employe\*).mp,kw. (595)
- 95 (health\* adj2 profession\*).mp,kw. (15074)
- 96 (health\* adj2 occupation?).mp,kw. (130)
- 97 (health\* adj2 practitioner?).mp,kw. (1493)
- 98 (profession\* adj2 role?).mp,kw. (511)
- 99 nurs\*.mp,kw. (40980)
- 100 (care? adj2 team?).mp,kw. (2158)

- 101 (care? adj2 continuit\*).mp,kw. (877)
- 102 ((inter-profession\* or interprofession\*) adj2 team?).mp,kw. (324)
- 103 ((inter-disciplinar\* or interdisciplinar\*) adj2 team?).mp,kw. (706)
- 104 ((multi-disciplinar\* or multidisciplinar\*) adj2 team?).mp,kw. (3443)
- 105 consultant?.mp,kw. (2516)
- 106 counsellor?.mp,kw. (289)
- 107 researcher?.mp,kw. (29802)
- 108 (research adj2 personnel?).mp,kw. (100)
- 109 (consumer? adj2 advoca\*).mp,kw. (52)
- 110 leader\*.mp,kw. (9239)
- 111 volunteer?.mp,kw. (13833)
- 112 educator?.mp,kw. (3566)
- 113 (education\* adj2 personnel?).mp,kw. (44)
- 114 facult\*.mp,kw. (7572)
- 115 professor?.mp,kw. (3142)
- 116 teacher?.mp,kw. (6075)
- 117 (social adj2 worker?).mp,kw. (1091)
- 118 (support\* adj2 (worker? or staff?)).mp,kw. (834)
- 119 (peer\* adj2 worker\*).mp,kw. (69)
- 120 (communit\* adj2 worker?).mp,kw. (873)
- 121 (lay adj2 profession\*).mp,kw. (59)
- 122 nonprofession\*.mp,kw. (99)
- 123 (child\* adj2 protective).mp,kw. (181)
- 124 (daycare? adj2 worker?).mp,kw. (3)
- 125 (home adj1 visitor?).mp,kw. (53)
- 126 (health\* adj2 student?).mp,kw. (1554)
- 127 (health\* adj2 student\*).mp,kw. (1571)
- 128 (medic\* adj2 student\*).mp,kw. (5707)
- 129 or/91-128 (140208)
- 130 educat\*.mp,kw. (77322)
- 131 ((staff? or profession\*) adj2 develop\*).mp,kw. (2132)
- 132 (clinical adj2 clerkship?).mp,kw. (122)
- 133 fellow\*.mp,kw. (4354)
- 134 train\*.mp,kw. (74849)
- 135 preceptorship\*.mp,kw. (95)
- 136 preceptor-ship\*.mp,kw. (1)

- 137 teaching\*.mp,kw. (17199)
- 138 curricul\*.mp,kw. (7444)
- 139 course?.mp,kw. (56155)
- 140 module?.mp,kw. (10607)
- 141 (workshop? or work shop?).mp,kw. (5602)
- 142 seminar?.mp,kw. (900)
- 143 orientation?.mp,kw. (29334)
- 144 session?.mp,kw. (24568)
- 145 round?.mp,kw. (9765)
- 146 webinar?.mp,kw. (114)
- 147 videoconferenc\*.mp,kw. (300)
- 148 video-conferenc\*.mp,kw. (128)
- 149 audioconferenc\*.mp,kw. (0)
- 150 audio-conferenc\*.mp,kw. (2)
- 151 teleconferenc\*.mp,kw. (146)
- 152 tele-conferenc\*.mp,kw. (3)
- 153 conferenc\*.mp,kw. (10074)
- 154 colloquium\*.mp,kw. (129)
- 155 webcast\*.mp,kw. (23)
- 156 web-cast\*.mp,kw. (1)
- 157 learn\*.mp,kw. (62982)
- 158 elearn\*.mp,kw. (65)
- 159 instruction\*.mp,kw. (8287)
- 160 mentor\*.mp,kw. (2512)
- 161 coaching?.mp,kw. (1190)
- 162 knowledge\*.mp,kw. (106406)
- 163 abilit\*.mp,kw. (112349)
- 164 competen\*.mp,kw. (13757)
- 165 skill?.mp,kw. (25314)
- 166 simulation?.mp,kw. (106297)
- 167 licenc\*.mp,kw. (381)
- 168 licensure?.mp,kw. (501)
- 169 credential\*.mp,kw. (545)
- 170 accredit\*.mp,kw. (2784)
- 171 certificat\*.mp,kw. (3265)
- 172 practicum?.mp,kw. (108)

- 173 sibling\*.mp,kw. (4321)
- 174 or/130-172 (593217)
- 175 care giver\*.mp,kw. (315)
- 176 caregiver\*.mp,kw. (9909)
- 177 spouse\*.mp,kw. (1772)
- 178 carer?.mp,kw. (2170)
- 179 (patient\* adj2 educat\*).mp,kw. (4262)
- 180 (patient? adj2 train\*).mp,kw. (1040)
- 181 (famil\* adj2 educat\*).mp,kw. (839)
- 182 (famil\* adj2 train\*).mp,kw. (328)
- 183 selfcare.mp,kw. (18)
- 184 self care.mp,kw. (2560)
- 185 qualitative stud\*.mp,kw. (7127)
- 186 qualitative research\*.mp,kw. (4132)
- 187 or/175-186 (30432)
- 188 90 and 187 (151)
- 189 90 and 129 and 174 (447)
- 190 188 or 189 (553)
- 191 limit 190 to (english language and yr="2013 -Current") (429)

**Recommendation Question 4: Should blood draws from a vascular access device versus blood draws from venipuncture be recommended?**

Original Search Strategy (January 2013 – January 2019)

Update Search 1: January 2019 – November 2020

Update Search 2: November 2020 – April 2021

*\*Note: the same original search strategy was used to complete the update searches.*

Databases:

- Cumulative Index to Nursing and Allied Health (CINAHL)
- Medline
- Cochrane Central
- Cochrane Database of Systematic Reviews
- Embase
- Emcare
- Epub ahead of print

**Database: CINAHL**

**Search Strategy:**

Search ID#	Search Terms	Search Options	Last Run Via	Results
S130	S103 AND S129	Limiters - Published Date: 20120101-20191231; English Language; Peer Reviewed Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,270
S129	S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113 OR S114 OR S115 OR S116 OR S117 OR S118 OR S119 OR S120 OR S121 OR S122 OR S123 OR S124 OR S125 OR S126 OR S127 OR 129	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	53,724
S128	blood culture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,479
S127	apheresis	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	899



			Advanced Search Database - CINAHL with Full Text	
S126	blood N2 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,188
S125	(MH "Blood Component Removal+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,977
S124	blood N3 test*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	13,248
S123	blood sampl*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	17,017
S122	blood N3 sampl*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	20,020

			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S121	TX blood collect*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,363
S120	blood N3 collect*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10,583
S119	TX (blood draw*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,760
S118	(blood N3 draw*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,877

S117	punctur* N3 "blood vessel"*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7
S116	punctur* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	523
S115	TX difficult* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	367
S114	puncture* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	181
S113	venesection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	62

			CINAHL with Full Text	
S112	venipunctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,699
S111	phlebotom*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,798
S110	(MH "Punctures")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,106
S109	(MH "Phlebotomists")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	136
S108	(MH "Cordocentesis")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	122

			Advanced Search Database - CINAHL with Full Text	
S107	(MH "Blood Specimen Collection+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,017
S106	(MH "Phlebotomy")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,106
S105	(MH "Venipuncture+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,267
S104	(MH "Arterial Puncture")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	107
S103	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	81,165

	S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97 OR S98 OR S99 OR S100 OR S101 OR S102		Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S102	heart N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	7,147

			CINAHL with Full Text	
S101	heart N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	214
S100	(MH "Heart Catheterization")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,439
S99	peripheral* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	350
S98	peripheral* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,969
S97	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	1

			Advanced Search Database - CINAHL with Full Text	
S96	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1
S95	iv N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	247
S94	double lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	508
S93	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	109
S92	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	3



			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S91	catheter* N3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,366
S90	catheter* adj3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S89	insert* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	278
S88	line* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	607

S87	line* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	38
S86	line* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,396
S85	line* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	129
S84	line* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	44
S83	line* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	38

			CINAHL with Full Text	
S82	catheter* N3 complication*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,126
S81	catheter* N3 dislocat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	36
S80	catheter* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	60
S79	catheter* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	98
S78	catheter* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	7,123

			Advanced Search Database - CINAHL with Full Text	
S77	catheter* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	162
S76	catheter* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	803
S75	catheter* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	685
S74	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	109
S73	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	3

			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S72	double lumen*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	508
S71	line?* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10
S70	catheter* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	226
S69	line* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	611

S68	line* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	125
S67	catheter* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,657
S66	tunneled N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	394
S65	catheter* adj3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S64	vortex	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	289

			CINAHL with Full Text	
S63	pediasat	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S62	groshong	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	19
S61	cv cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S60	central N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,272
S59	central N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	8,936

			Advanced Search Database - CINAHL with Full Text	
S58	broviac	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	54
S57	vein* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	334
S56	arter* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	924
S55	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,204
S54	dialock*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	1



			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S53	vecetra*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	29
S52	arter* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,657
S51	picc	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	925
S50	catheter* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,784

S49	catheter* N3 central venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,810
S48	catheter* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,688
S47	line* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	40
S46	line* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	25
S45	catheter* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	131

			CINAHL with Full Text	
S44	intravenous N3 administrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	11,289
S43	catheter* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	402
S42	line* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	822
S41	line* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	549
S40	catheter* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	4,182

			Advanced Search Database - CINAHL with Full Text	
S39	(catheter* N3 abstract*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	70
S38	line* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	214
S37	lineN3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S36	catheter* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,891
S35	device remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	3,807

			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S34	reservoir* N3 venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	85
S33	portacath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	15
S32	port a cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	90
S31	intraarterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6

S30	intra-arterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	13
S29	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,204
S28	catheter* N3 vascular	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,117
S27	catheter* N3 port*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	331
S26	arter* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	611

			CINAHL with Full Text	
S25	MH "Device Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,647
S24	MH "Catheter Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	619
S23	(MH "Administration, Intravenous+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,520
S22	(MH "Infusions, Intravenous")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	8,715
S21	MH "Injections, Intravenous"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	4,137

			Advanced Search Database - CINAHL with Full Text	
S20	MH "Injections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10,042
S19	(MH "Injection Sites")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	618
S18	MH "Catheter Occlusion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	559
S17	MH "Catheter-Related Bloodstream Infections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,145
S16	MH "Catheter-Related Infections+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	6,026



			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S15	(MH "Catheter Placement Determination")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	353
S14	(MH "Venous Cutdown")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	34
S13	(MH "Catheter Care, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,510
S12	(MH "Catheter Care")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	946

S11	MH "Peripherally Inserted Central Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,107
S10	MH "Central Venous Catheters+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,530
S9	MH "Arterial Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	236
S8	(MH "Catheters, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,636
S7	(MH "Catheters")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database -	4,268

			CINAHL with Full Text	
S6	(MH "Vascular Access Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,265
S5	MH "Catheters, Vascular+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,636
S4	MH "Vascular Access Devices, Implantable"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	364
S3	(MH "Infusion Devices, Intermittent")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	154
S2	(MH "Infusion Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	5,249

			Advanced Search Database - CINAHL with Full Text	
S1	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	980

**Database: Medline**

**Search strategy:**

- 1 catheters/ (4154)
- 2 Cannula/ (343)
- 3 catheters, indwelling/ (17934)
- 4 exp vascular access devices/ (4249)
- 5 catheter obstruction/ (208)
- 6 catheterization, central venous/ (14291)
- 7 exp catheterization, peripheral/ (10680)
- 8 exp cardiac catheterization/ (48356)
- 9 exp administration, intravenous/ (138285)
- 10 exp infusions, intravenous/ (53144)
- 11 exp injections, intravenous/ (80794)
- 12 Infusion Pumps/ (5198)
- 13 exp Catheter-Related Infections/ (4233)
- 14 exp Device Removal/ (11864)
- 15 (catheter\* adj3 port\*).mp,kw. (1894)
- 16 (catheter\* adj3 vascular).mp,kw. (2056)
- 17 (vascular adj3 access).mp,kw. (10358)
- 18 (intra-arterial adj3 line\*).mp,kw. (39)
- 19 (intraarterial adj3 line\*).mp,kw. (16)
- 20 "port a cath?".mp,kw. (464)
- 21 portacath\*.mp,kw. (77)

- 22 (reservoir\* adj3 venous\*).mp,kw. (322)
- 23 device remov\*.mp,kw. (12577)
- 24 (catheter\* adj3 remov\*).mp,kw. (7170)
- 25 (line\* adj3 remov\*).mp,kw. (1276)
- 26 (catheter\* adj3 obstruct\*).mp,kw. (2)
- 27 (catheter\* adj3 insert\*).mp,kw. (12620)
- 28 (line\* adj3 insert\*).mp,kw. (2223)
- 29 (line\* adj3 fail\*).mp,kw. (3659)
- 30 (catheter\* adj3 fail\*).mp,kw. (1336)
- 31 (intravenous adj3 administrat\*).mp,kw. (48454)
- 32 (catheter\* adj3 in-dwell\*).mp,kw. (128)
- 33 (line\* adj3 in-dwell\*).mp,kw. (7)
- 34 (line\* adj3 indwell\*).mp,kw. (194)
- 35 (catheter\* adj3 indwell\*).mp,kw. (23559)
- 36 (catheter\* adj3 central venous\*).mp,kw. (20809)
- 37 (catheter\* adj3 peripheral).mp,kw. (9490)
- 38 picc.mp,kw. (1000)
- 39 (arter\* adj3 catheter\*).mp,kw. (12230)
- 40 dialock\*.mp,kw. (18)
- 41 vectra\*.mp,kw. (160)
- 42 (arter\* adj3 access\*).mp,kw. (4065)
- 43 (vein\* adj3 access\*).mp,kw. (1307)
- 44 broviac.mp,kw. (328)
- 45 (central adj3 catheter\*).mp,kw. (22041)
- 46 (central adj3 line\*).mp,kw. (5407)
- 47 cv cath\*.mp,kw. (57)
- 48 groshong.mp,kw. (98)
- 49 pediasat.mp,kw. (11)
- 50 vortex.mp,kw. (8297)
- 51 (catheter\* adj3 vein?).mp,kw. (4157)
- 52 (catheter\* adj3 arter\*).mp,kw. (12230)
- 53 (tunneled adj3 catheter\*).mp,kw. (1240)
- 54 (line? adj3 vein?).mp,kw. (388)
- 55 (line\* adj3 arter\*).mp,kw. (2339)
- 56 (catheter\* adj3 subclavian\*).mp,kw. (1495)
- 57 (line?\* adj3 subclavian\*).mp,kw. (92)

- 58 double lumen\*.mp,kw. (2987)
- 59 avalon elite.mp,kw. (32)
- 60 dual lumen.mp,kw. (473)
- 61 (catheter\* adj3 thrombos\*).mp,kw. (1334)
- 62 (catheter\* adj3 occlusion\*).mp,kw. (1458)
- 63 (catheter\* adj3 migrat\*).mp,kw. (761)
- 64 (catheter adj3 infection\*).mp,kw. (8643)
- 65 (catheter\* adj3 fracture\*).mp,kw. (369)
- 66 (catheter\* adj3 leakage\*).mp,kw. (240)
- 67 (catheter\* adj3 dislocat\*).mp,kw. (236)
- 68 (catheter\* adj3 complication\*).mp,kw. (4710)
- 69 (line? adj3 thrombos\*).mp,kw. (124)
- 70 (line? adj3 occlusion\*).mp,kw. (123)
- 71 (line? adj3 migrat\*).mp,kw. (766)
- 72 (line? adj3 infection\*).mp,kw. (2828)
- 73 (line\* adj3 fracture\*).mp,kw. (2744)
- 74 (line\* adj3 leakage\*).mp,kw. (245)
- 75 (insert\* adj3 peripheral).mp,kw. (502)
- 76 (catheter\* adj3 nurs\*).mp,kw. (338)
- 77 avalon elite.mp,kw. (32)
- 78 dual lumen.mp,kw. (473)
- 79 double lumen\*.mp,kw. (2987)
- 80 (iv adj3 peripher\*).mp,kw. (700)
- 81 (intra-venous adj3 peripher\*).mp,kw. (2)
- 82 (intravenous adj3 peripher\*).mp,kw. (1346)
- 83 (peripheral\* adj3 catheter\*).mp,kw. (10141)
- 84 (peripheral\* adj3 line?).mp,kw. (1581)
- 85 (difficult\* adj2 vein?).mp,kw. (130)
- 86 (vein? adj2 punctur\*).mp,kw. (611)
- 87 (vein\* adj3 find\*).mp,kw. (641)
- 88 midline.mp,kw. (30359)
- 89 (arter\* adj3 line\*).mp,kw. (2339)
- 90 (catheter\* adj3 cardiac).mp,kw. (57402)
- 91 (line\* adj3 cardiac).mp,kw. (1288)
- 92 (line\* adj3 heart).mp,kw. (1112)
- 93 (catheter\* adj3 heart).mp,kw. (8439)

- 94 or/1-93 (389677)
- 95 exp blood specimen collection/ (14747)
- 96 exp cordocentesis/ (440)
- 97 exp petrosal sinus sampling/ (197)
- 98 exp phlebotomy/ (5463)
- 99 Punctures/ (12869)
- 100 Blood Component Removal/ (4410)
- 101 exp Blood Culture/ (445)
- 102 Hematologic Tests/ (8838)
- 103 (blood adj3 collect\*).mp,kw. (69033)
- 104 (blood adj3 draw\*).mp,kw. (15485)
- 105 (blood adj3 sampl\*).mp,kw. (161951)
- 106 (blood adj3 test\*).mp,kw. (59413)
- 107 phlebotom\*.mp,kw. (10157)
- 108 apheresis.mp,kw. (6577)
- 109 puncture\*.tw,kw. (42551)
- 110 venipuncture\*.mp,kw. (3234)
- 111 veni-puncture\*.mp,kw. (8)
- 112 venesection\*.mp,kw. (741)
- 113 or/95-112 (324415)
- 114 94 and 113 (18139)
- 115 limit 114 to (english language and yr="2013 -Current") (3812)
- 116 exp animals/ not (exp animals/ and humans/) (4535562)
- 117 115 not 116 (3159)
- 118 limit 115 to humans (2543)
- 119 117 or 118 (3159)

**Database: CCRCT**

**Search Strategy:**

- 1 catheters/ (204)
- 2 Cannula/ (35)
- 3 catheters, indwelling/ (959)
- 4 exp vascular access devices/ (234)
- 5 catheter obstruction/ (15)

- 6 catheterization, central venous/ (745)
- 7 exp catheterization, peripheral/ (840)
- 8 exp cardiac catheterization/ (2573)
- 9 exp administration, intravenous/ (17507)
- 10 exp infusions, intravenous/ (9796)
- 11 exp injections, intravenous/ (7461)
- 12 Infusion Pumps/ (458)
- 13 exp Catheter-Related Infections/ (254)
- 14 exp Device Removal/ (365)
- 15 (catheter\* adj3 port\*).mp,kw. (195)
- 16 (catheter\* adj3 vascular).mp,kw. (223)
- 17 (vascular adj3 access).mp,kw. (1287)
- 18 (intra-arterial adj3 line\*).mp,kw. (8)
- 19 (intraarterial adj3 line\*).mp,kw. (1)
- 20 "port a cath?".mp,kw. (29)
- 21 portacath\*.mp,kw. (2)
- 22 (reservoir\* adj3 venous\*).mp,kw. (57)
- 23 device remov\*.mp,kw. (846)
- 24 (catheter\* adj3 remov\*).mp,kw. (1387)
- 25 (line\* adj3 remov\*).mp,kw. (95)
- 26 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 27 (catheter\* adj3 insert\*).mp,kw. (2382)
- 28 (line\* adj3 insert\*).mp,kw. (200)
- 29 (line\* adj3 fail\*).mp,kw. (782)
- 30 (catheter\* adj3 fail\*).mp,kw. (416)
- 31 (intravenous adj3 administrat\*).mp,kw. (28253)
- 32 (catheter\* adj3 in-dwell\*).mp,kw. (47)
- 33 (line\* adj3 in-dwell\*).mp,kw. (5)
- 34 (line\* adj3 indwell\*).mp,kw. (21)
- 35 (catheter\* adj3 indwell\*).mp,kw. (1728)
- 36 (catheter\* adj3 central venous\*).mp,kw. (1899)
- 37 (catheter\* adj3 peripheral).mp,kw. (1063)
- 38 picc.mp,kw. (199)
- 39 (arter\* adj3 catheter\*).mp,kw. (1849)
- 40 dialock\*.mp,kw. (0)
- 41 vectra\*.mp,kw. (44)



- 42 (arter\* adj3 access\*).mp,kw. (486)
- 43 (vein\* adj3 access\*).mp,kw. (230)
- 44 broviac.mp,kw. (14)
- 45 (central adj3 catheter\*).mp,kw. (2072)
- 46 (central adj3 line\*).mp,kw. (469)
- 47 cv cath\*.mp,kw. (4)
- 48 groshong.mp,kw. (14)
- 49 pediasat.mp,kw. (1)
- 50 vortex.mp,kw. (54)
- 51 (catheter\* adj3 vein?).mp,kw. (819)
- 52 (catheter\* adj3 arter\*).mp,kw. (1849)
- 53 (tunneled adj3 catheter\*).mp,kw. (192)
- 54 (line? adj3 vein?).mp,kw. (56)
- 55 (line\* adj3 arter\*).mp,kw. (495)
- 56 (catheter\* adj3 subclavian\*).mp,kw. (184)
- 57 (line?\* adj3 subclavian\*).mp,kw. (9)
- 58 double lumen\*.mp,kw. (492)
- 59 avalon elite.mp,kw. (0)
- 60 dual lumen.mp,kw. (43)
- 61 (catheter\* adj3 thrombos\*).mp,kw. (324)
- 62 (catheter\* adj3 occlusion\*).mp,kw. (276)
- 63 (catheter\* adj3 migrat\*).mp,kw. (90)
- 64 (catheter adj3 infection\*).mp,kw. (1286)
- 65 (catheter\* adj3 fracture\*).mp,kw. (38)
- 66 (catheter\* adj3 leakage\*).mp,kw. (60)
- 67 (catheter\* adj3 dislocat\*).mp,kw. (33)
- 68 (catheter\* adj3 complication\*).mp,kw. (1325)
- 69 (line? adj3 thrombos\*).mp,kw. (21)
- 70 (line? adj3 occlusion\*).mp,kw. (17)
- 71 (line? adj3 migrat\*).mp,kw. (14)
- 72 (line? adj3 infection\*).mp,kw. (234)
- 73 (line\* adj3 fracture\*).mp,kw. (126)
- 74 (line\* adj3 leakage\*).mp,kw. (34)
- 75 (insert\* adj3 peripheral).mp,kw. (131)
- 76 (catheter\* adj3 nurs\*).mp,kw. (160)
- 77 avalon elite.mp,kw. (0)

- 78 dual lumen.mp,kw. (43)
- 79 double lumen\*.mp,kw. (492)
- 80 (iv adj3 peripher\*).mp,kw. (168)
- 81 (intra-venous adj3 peripher\*).mp,kw. (0)
- 82 (intravenous adj3 peripher\*).mp,kw. (433)
- 83 (peripheral\* adj3 catheter\*).mp,kw. (1216)
- 84 (peripheral\* adj3 line?).mp,kw. (126)
- 85 (difficult\* adj2 vein?).mp,kw. (36)
- 86 (vein? adj2 punctur\*).mp,kw. (390)
- 87 (vein\* adj3 find\*).mp,kw. (44)
- 88 midline.mp,kw. (1441)
- 89 (arter\* adj3 line\*).mp,kw. (495)
- 90 (catheter\* adj3 cardiac).mp,kw. (2115)
- 91 (line\* adj3 cardiac).mp,kw. (60)
- 92 (line\* adj3 heart).mp,kw. (202)
- 93 (catheter\* adj3 heart).mp,kw. (1407)
- 94 or/1-93 (60396)
- 95 exp blood specimen collection/ (625)
- 96 exp cordocentesis/ (6)
- 97 exp petrosal sinus sampling/ (3)
- 98 exp phlebotomy/ (396)
- 99 Punctures/ (397)
- 100 Blood Component Removal/ (199)
- 101 exp Blood Culture/ (0)
- 102 Hematologic Tests/ (184)
- 103 (blood adj3 collect\*).ti,ab. (11326)
- 104 (blood adj3 draw\*).ti,ab. (4226)
- 105 (blood adj3 sampl\*).ti,ab. (25654)
- 106 (blood adj3 test\*).ti,ab. (6671)
- 107 phlebotom\*.ti,ab. (472)
- 108 apheresis.ti,ab. (871)
- 109 puncture\*.ti,ab. (3856)
- 110 venipuncture\*.ti,ab. (648)
- 111 veni-puncture\*.ti,ab. (1)
- 112 venesection\*.ti,ab. (75)
- 113 or/95-112 (41573)

- 114 94 and 113 (4128)
- 115 limit 114 to (english language and yr="2013 -Current") (1232)
- 116 limit 115 to conference (127)
- 117 115 not 116 (1105)

## **Database: Cochrane Database of Systematic Reviews**

### **Search Strategy:**

- 1 (catheter\* adj3 port\*).mp,kw. (24)
- 2 (catheter\* adj3 vascular).mp,kw. (32)
- 3 (vascular adj3 access).mp,kw. (94)
- 4 (intra-arterial adj3 line\*).mp,kw. (2)
- 5 (intraarterial adj3 line\*).mp,kw. (0)
- 6 "port a cath?".mp,kw. (19)
- 7 portacath\*.mp,kw. (9)
- 8 (reservoir\* adj3 venous\*).mp,kw. (2)
- 9 device remov\*.mp,kw. (33)
- 10 (catheter\* adj3 remov\*).mp,kw. (106)
- 11 (line\* adj3 remov\*).mp,kw. (19)
- 12 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 13 (catheter\* adj3 insert\*).mp,kw. (199)
- 14 (line\* adj3 insert\*).mp,kw. (43)
- 15 (line\* adj3 fail\*).mp,kw. (50)
- 16 (catheter\* adj3 fail\*).mp,kw. (36)
- 17 (intravenous adj3 administrat\*).mp,kw. (472)
- 18 (catheter\* adj3 in-dwell\*).mp,kw. (13)
- 19 (line\* adj3 in-dwell\*).mp,kw. (0)
- 20 (line\* adj3 indwell\*).mp,kw. (7)
- 21 (catheter\* adj3 indwell\*).mp,kw. (109)
- 22 (catheter\* adj3 central venous\*).mp,kw. (134)
- 23 (catheter\* adj3 peripheral).mp,kw. (60)
- 24 picc.mp,kw. (19)
- 25 (arter\* adj3 catheter\*).mp,kw. (83)
- 26 dialock\*.mp,kw. (0)
- 27 vectra\*.mp,kw. (1)
- 28 (arter\* adj3 access\*).mp,kw. (29)

- 29 (vein\* adj3 access\*).mp,kw. (16)
- 30 broviac.mp,kw. (11)
- 31 (central adj3 catheter\*).mp,kw. (144)
- 32 (central adj3 line\*).mp,kw. (97)
- 33 cv cath\*.mp,kw. (0)
- 34 groshong.mp,kw. (1)
- 35 pediasat.mp,kw. (0)
- 36 vortex.mp,kw. (4)
- 37 (catheter\* adj3 vein?).mp,kw. (33)
- 38 (catheter\* adj3 arter\*).mp,kw. (83)
- 39 (tunneled adj3 catheter\*).mp,kw. (2)
- 40 (line? adj3 vein?).mp,kw. (6)
- 41 (line\* adj3 arter\*).mp,kw. (29)
- 42 (catheter\* adj3 subclavian\*).mp,kw. (11)
- 43 (line?\* adj3 subclavian\*).mp,kw. (1)
- 44 double lumen\*.mp,kw. (10)
- 45 avalon elite.mp,kw. (0)
- 46 dual lumen.mp,kw. (2)
- 47 (catheter\* adj3 thrombos\*).mp,kw. (36)
- 48 (catheter\* adj3 occlusion\*).mp,kw. (28)
- 49 (catheter\* adj3 migrat\*).mp,kw. (10)
- 50 (catheter adj3 infection\*).mp,kw. (105)
- 51 (catheter\* adj3 fracture\*).mp,kw. (3)
- 52 (catheter\* adj3 leakage\*).mp,kw. (6)
- 53 (catheter\* adj3 dislocat\*).mp,kw. (4)
- 54 (catheter\* adj3 complication\*).mp,kw. (59)
- 55 (line? adj3 thrombos\*).mp,kw. (5)
- 56 (line? adj3 occlusion\*).mp,kw. (3)
- 57 (line? adj3 migrat\*).mp,kw. (2)
- 58 (line? adj3 infection\*).mp,kw. (31)
- 59 (line\* adj3 fracture\*).mp,kw. (13)
- 60 (line\* adj3 leakage\*).mp,kw. (1)
- 61 (insert\* adj3 peripheral).mp,kw. (19)
- 62 (catheter\* adj3 nurs\*).mp,kw. (5)
- 63 avalon elite.mp,kw. (0)
- 64 dual lumen.mp,kw. (2)

- 65 double lumen\*.mp,kw. (10)
- 66 (iv adj3 peripher\*).mp,kw. (5)
- 67 (intra-venous adj3 peripher\*).mp,kw. (0)
- 68 (intravenous adj3 peripher\*).mp,kw. (20)
- 69 (peripheral\* adj3 catheter\*).mp,kw. (72)
- 70 (peripheral\* adj3 line?).mp,kw. (23)
- 71 (difficult\* adj2 vein?).mp,kw. (3)
- 72 (vein? adj2 punctur\*).mp,kw. (7)
- 73 (vein\* adj3 find\*).mp,kw. (4)
- 74 midline.mp,kw. (150)
- 75 (arter\* adj3 line\*).mp,kw. (29)
- 76 (catheter\* adj3 cardiac).mp,kw. (37)
- 77 (line\* adj3 cardiac).mp,kw. (1)
- 78 (line\* adj3 heart).mp,kw. (10)
- 79 (catheter\* adj3 heart).mp,kw. (17)
- 80 or/1-79 (1240)
- 81 (blood adj3 collect\*).mp,kw. (124)
- 82 (blood adj3 draw\*).mp,kw. (48)
- 83 (blood adj3 sampl\*).mp,kw. (273)
- 84 (blood adj3 test\*).mp,kw. (378)
- 85 phlebotom\*.mp,kw. (38)
- 86 apheresis.mp,kw. (40)
- 87 puncture\*.tw,kw. (270)
- 88 venipuncture\*.mp,kw. (31)
- 89 veni-puncture\*.mp,kw. (0)
- 90 venesection\*.mp,kw. (6)
- 91 or/81-90 (960)
- 92 80 and 91 (251)
- 93 limit 92 to full systematic reviews (225)

### **Database: Embase**

#### **Search Strategy:**

- 1 vascular access device/ (1088)
- 2 vascular equipment/ (504)
- 3 exp vascular access/ (23120)

- 4 exp cannulation/ (36657)
- 5 exp catheter removal/ (6142)
- 6 device removal/ (17518)
- 7 exp central venous catheter/ (21263)
- 8 intravenous catheter/ (6176)
- 9 exp vein catheterization/ (13519)
- 10 exp central venous catheterization/ (8753)
- 11 exp catheter complication/ (21614)
- 12 exp catheter care/ (572)
- 13 exp double lumen catheter/ (414)
- 14 exp midline catheter/ (61)
- 15 exp peripheral venous catheter/ (681)
- 16 exp peripherally inserted central venous catheter/ (2642)
- 17 exp catheter infection/ (15986)
- 18 cannula/ (9948)
- 19 catheters, indwelling/ (10588)
- 20 heart catheter/ (3797)
- 21 exp heart catheterization/ (55813)
- 22 exp artery catheterization/ (9422)
- 23 exp infusion pump/ (8009)
- 24 catheters, indwelling/ (10588)
- 25 exp intravascular catheter/ (50682)
- 26 exp blood vessel catheterization/ (27252)
- 27 exp injection site/ (8327)
- 28 exp injection device/ (2260)
- 29 (heart adj2 catheter\*).tw,kw. (12209)
- 30 (cardiac adj2 catheter\*).tw,kw. (26413)
- 31 (arter\* adj3 line).tw,kw. (2621)
- 32 (catheter\* adj3 port\*).tw,kw. (2678)
- 33 (catheter\* adj3 vascular).tw,kw. (2854)
- 34 (vascular adj3 access).tw,kw. (14881)
- 35 (intra-arterial adj3 line\*).tw,kw. (60)
- 36 (intraarterial adj3 line\*).tw,kw. (16)
- 37 "port a cath?".tw,kw. (728)
- 38 portacath\*.tw,kw. (157)
- 39 (reservoir\* adj3 venous\*).tw,kw. (430)

- 40 device remov\*.tw,kw. (1496)
- 41 (catheter\* adj3 remov\*).tw,kw. (11959)
- 42 (line\* adj3 remov\*).tw,kw. (1875)
- 43 (catheter\* adj3 obstruct\*).tw,kw. (1)
- 44 (catheter\* adj3 insert\*).tw,kw. (19377)
- 45 (line\* adj3 insert\*).tw,kw. (3346)
- 46 (line\* adj3 fail\*).tw,kw. (5733)
- 47 (catheter\* adj3 fail\*).tw,kw. (2096)
- 48 (catheter\* adj3 in-dwell\*).tw,kw. (188)
- 49 (line\* adj3 in-dwell\*).tw,kw. (9)
- 50 (line\* adj3 indwell\*).tw,kw. (300)
- 51 (catheter\* adj3 indwell\*).tw,kw. (11183)
- 52 (catheter\* adj3 central venous\*).tw,kw. (17769)
- 53 (catheter\* adj3 peripheral).tw,kw. (2652)
- 54 picc.tw,kw. (2314)
- 55 (arter\* adj3 catheter\*).tw,kw. (16526)
- 56 dialock\*.tw,kw. (21)
- 57 vectra\*.tw,kw. (437)
- 58 (vascular adj3 access).tw,kw. (14881)
- 59 (arter\* adj3 access\*).tw,kw. (6570)
- 60 (vein\* adj3 access\*).tw,kw. (2242)
- 61 broviac.tw,kw. (427)
- 62 (central adj3 catheter\*).tw,kw. (21344)
- 63 (central adj3 line\*).tw,kw. (9131)
- 64 cv cath\*.tw,kw. (88)
- 65 groshong.tw,kw. (155)
- 66 pediasat.tw,kw. (18)
- 67 vortex.tw,kw. (5840)
- 68 (catheter\* adj3 vein?).tw,kw. (5649)
- 69 (catheter\* adj3 arter\*).tw,kw. (16526)
- 70 (tunneled adj3 catheter\*).tw,kw. (2033)
- 71 (line? adj3 vein?).tw,kw. (628)
- 72 (line\* adj3 arter\*).tw,kw. (3797)
- 73 (catheter\* adj3 subclavian\*).tw,kw. (1727)
- 74 (line?\* adj3 subclavian\*).tw,kw. (157)
- 75 double lumen\*.tw,kw. (4178)

- 76 avalon elite.tw,kw. (44)
- 77 dual lumen.tw,kw. (777)
- 78 (catheter\* adj3 thrombos\*).tw,kw. (1976)
- 79 (catheter\* adj3 occlusion\*).tw,kw. (2121)
- 80 (catheter\* adj3 migrat\*).tw,kw. (1067)
- 81 (catheter adj3 infection\*).tw,kw. (8709)
- 82 (catheter\* adj3 fracture\*).tw,kw. (523)
- 83 (catheter\* adj3 leakage\*).tw,kw. (411)
- 84 (catheter\* adj3 dislocat\*).tw,kw. (355)
- 85 (catheter\* adj3 complication\*).tw,kw. (6799)
- 86 (line? adj3 thrombos\*).tw,kw. (233)
- 87 (line? adj3 occlusion\*).tw,kw. (197)
- 88 (line? adj3 migrat\*).tw,kw. (1149)
- 89 (line? adj3 infection\*).tw,kw. (4206)
- 90 (line\* adj3 fracture\*).tw,kw. (3264)
- 91 (line\* adj3 leakage\*).tw,kw. (328)
- 92 (insert\* adj3 peripheral).tw,kw. (703)
- 93 (catheter\* adj3 nurs\*).tw,kw. (475)
- 94 avalon elite.tw,kw. (44)
- 95 dual lumen.tw,kw. (777)
- 96 double lumen\*.mp,kw. (4878)
- 97 (iv adj3 peripher\*).tw,kw. (1087)
- 98 (intra-venous adj3 peripher\*).mp,kw. (3)
- 99 (intravenous adj3 peripher\*).tw,kw. (1801)
- 100 (peripheral\* adj3 catheter\*).tw,kw. (4636)
- 101 (peripheral\* adj3 line?).tw,kw. (2205)
- 102 (difficult\* adj2 vein?).tw,kw. (203)
- 103 (vein\* adj3 find\*).tw,kw. (958)
- 104 (heart adj3 catheter\*).tw,kw. (12997)
- 105 (heart adj3 line\*).tw,kw. (1413)
- 106 (cardiac adj3 line\*).tw,kw. (1859)
- 107 (cardiac adj3 catheter\*).tw,kw. (27259)
- 108 infusion pump\*.tw,kw. (4498)
- 109 or/1-108 (322738)
- 110 exp blood sampling/ (183419)
- 111 exp phlebotomy/ (9720)



- 112 exp apheresis/ (56164)
- 113 puncture/ (20050)
- 114 exp artery puncture/ (2094)
- 115 exp vein puncture/ (6145)
- 116 (vein\* adj3 puncture\*).tw,kw. (1287)
- 117 (arter\* adj3 puncture\*).tw,kw. (3150)
- 118 (blood vessel\* adj3 puncture\*).tw,kw. (69)
- 119 venipuncture\*.mp,kw. (4587)
- 120 veni-puncture\*.mp,kw. (13)
- 121 phlebotom\*.tw,kw. (9817)
- 122 (blood adj3 collect\*).tw,kw. (93468)
- 123 (blood adj3 sampl\*).tw,kw. (238515)
- 124 (blood adj3 draw\*).tw,kw. (24861)
- 125 (blood adj3 test\*).tw,kw. (64281)
- 126 venesection.tw,kw. (813)
- 127 or/110-126 (507003)
- 128 109 and 127 (18498)
- 129 limit 128 to yr="2013 -Current" (7316)
- 130 limit 129 to english language (7098)
- 131 limit 130 to (books or chapter or conference abstract or conference paper or "conference review" or letter or short survey) (3795)
- 132 130 not 131 (3303)
- 133 (exp animals/ or exp animal experimentation/ or nonhuman/) not ((exp animals/ or exp animal experimentation/ or nonhuman/) and exp human/) (6092408)
- 134 132 not 133 (2901)
- 135 limit 132 to human (2860)
- 136 134 or 135 (2901)

**Database: Emcare**

**Search Strategy:**

- 1 vascular access device/ (508)
- 2 vascular equipment/ (167)
- 3 exp vascular access/ (7867)
- 4 exp cannulation/ (12153)
- 5 exp catheter removal/ (2117)

- 6 device removal/ (6784)
- 7 exp central venous catheter/ (7123)
- 8 intravenous catheter/ (2534)
- 9 exp vein catheterization/ (4706)
- 10 exp central venous catheterization/ (3162)
- 11 exp catheter complication/ (8030)
- 12 exp catheter care/ (350)
- 13 exp double lumen catheter/ (87)
- 14 exp midline catheter/ (24)
- 15 exp peripheral venous catheter/ (244)
- 16 exp peripherally inserted central venous catheter/ (1167)
- 17 exp catheter infection/ (5806)
- 18 cannula/ (3175)
- 19 catheters, indwelling/ (2196)
- 20 heart catheter/ (1301)
- 21 exp heart catheterization/ (14498)
- 22 exp artery catheterization/ (3490)
- 23 exp infusion pump/ (2573)
- 24 catheters, indwelling/ (2196)
- 25 exp intravascular catheter/ (18338)
- 26 exp blood vessel catheterization/ (9712)
- 27 exp injection site/ (2311)
- 28 exp injection device/ (0)
- 29 (heart adj2 catheter\*).tw,kw. (1622)
- 30 (cardiac adj2 catheter\*).tw,kw. (4673)
- 31 (arter\* adj3 line).tw,kw. (663)
- 32 (catheter\* adj3 port\*).tw,kw. (544)
- 33 (catheter\* adj3 vascular).tw,kw. (621)
- 34 (vascular adj3 access).tw,kw. (3280)
- 35 (intra-arterial adj3 line\*).tw,kw. (11)
- 36 (intraarterial adj3 line\*).tw,kw. (1)
- 37 "port a cath?".tw,kw. (98)
- 38 portacath\*.tw,kw. (22)
- 39 (reservoir\* adj3 venous\*).tw,kw. (149)
- 40 device remov\*.tw,kw. (323)
- 41 (catheter\* adj3 remov\*).tw,kw. (2031)

- 42 (line\* adj3 remov\*).tw,kw. (292)
- 43 (catheter\* adj3 obstruct\*).tw,kw. (0)
- 44 (catheter\* adj3 insert\*).tw,kw. (5007)
- 45 (line\* adj3 insert\*).tw,kw. (622)
- 46 (line\* adj3 fail\*).tw,kw. (870)
- 47 (catheter\* adj3 fail\*).tw,kw. (480)
- 48 (catheter\* adj3 in-dwell\*).tw,kw. (33)
- 49 (line\* adj3 in-dwell\*).tw,kw. (5)
- 50 (line\* adj3 indwell\*).tw,kw. (51)
- 51 (catheter\* adj3 indwell\*).tw,kw. (2028)
- 52 (catheter\* adj3 central venous\*).tw,kw. (5074)
- 53 (catheter\* adj3 peripheral).tw,kw. (990)
- 54 picc.tw,kw. (717)
- 55 (arter\* adj3 catheter\*).tw,kw. (4022)
- 56 dialock\*.tw,kw. (5)
- 57 vectra\*.tw,kw. (54)
- 58 (vascular adj3 access).tw,kw. (3280)
- 59 (arter\* adj3 access\*).tw,kw. (1368)
- 60 (vein\* adj3 access\*).tw,kw. (455)
- 61 broviac.tw,kw. (38)
- 62 (central adj3 catheter\*).tw,kw. (6186)
- 63 (central adj3 line\*).tw,kw. (2509)
- 64 cv cath\*.tw,kw. (17)
- 65 groshong.tw,kw. (23)
- 66 pediasat.tw,kw. (7)
- 67 vortex.tw,kw. (1164)
- 68 (catheter\* adj3 vein?).tw,kw. (1098)
- 69 (catheter\* adj3 arter\*).tw,kw. (4022)
- 70 (tunneled adj3 catheter\*).tw,kw. (477)
- 71 (line? adj3 vein?).tw,kw. (78)
- 72 (line\* adj3 arter\*).tw,kw. (911)
- 73 (catheter\* adj3 subclavian\*).tw,kw. (359)
- 74 (line?\* adj3 subclavian\*).tw,kw. (21)
- 75 double lumen\*.tw,kw. (1089)
- 76 avalon elite.tw,kw. (13)
- 77 dual lumen.tw,kw. (173)

- 78 (catheter\* adj3 thrombos\*).tw,kw. (404)
- 79 (catheter\* adj3 occlusion\*).tw,kw. (452)
- 80 (catheter\* adj3 migrat\*).tw,kw. (259)
- 81 (catheter adj3 infection\*).tw,kw. (2391)
- 82 (catheter\* adj3 fracture\*).tw,kw. (138)
- 83 (catheter\* adj3 leakage\*).tw,kw. (76)
- 84 (catheter\* adj3 dislocat\*).tw,kw. (86)
- 85 (catheter\* adj3 complication\*).tw,kw. (1494)
- 86 (line? adj3 thrombos\*).tw,kw. (41)
- 87 (line? adj3 occlusion\*).tw,kw. (47)
- 88 (line? adj3 migrat\*).tw,kw. (159)
- 89 (line? adj3 infection\*).tw,kw. (1067)
- 90 (line\* adj3 fracture\*).tw,kw. (1288)
- 91 (line\* adj3 leakage\*).tw,kw. (53)
- 92 (insert\* adj3 peripheral).tw,kw. (235)
- 93 (catheter\* adj3 nurs\*).tw,kw. (167)
- 94 avalon elite.tw,kw. (13)
- 95 dual lumen.tw,kw. (173)
- 96 double lumen\*.mp,kw. (1380)
- 97 (iv adj3 peripher\*).tw,kw. (296)
- 98 (intra-venous adj3 peripher\*).mp,kw. (3)
- 99 (intravenous adj3 peripher\*).tw,kw. (685)
- 100 (peripheral\* adj3 catheter\*).tw,kw. (1791)
- 101 (peripheral\* adj3 line?).tw,kw. (284)
- 102 (difficult\* adj2 vein?).tw,kw. (42)
- 103 (vein\* adj3 find\*).tw,kw. (190)
- 104 (heart adj3 catheter\*).tw,kw. (1759)
- 105 (heart adj3 line\*).tw,kw. (238)
- 106 (cardiac adj3 line\*).tw,kw. (239)
- 107 (cardiac adj3 catheter\*).tw,kw. (4888)
- 108 infusion pump\*.tw,kw. (1127)
- 109 or/1-108 (84687)
- 110 exp blood sampling/ (38773)
- 111 exp phlebotomy/ (2143)
- 112 exp apheresis/ (8097)
- 113 puncture/ (5413)

- 114 exp artery puncture/ (912)
- 115 exp vein puncture/ (2161)
- 116 (vein\* adj3 puncture\*).tw,kw. (268)
- 117 (arter\* adj3 puncture\*).tw,kw. (805)
- 118 (blood vessel\* adj3 puncture\*).tw,kw. (22)
- 119 venipuncture\*.mp,kw. (1007)
- 120 veni-puncture\*.mp,kw. (0)
- 121 phlebotom\*.tw,kw. (1339)
- 122 (blood adj3 collect\*).tw,kw. (12738)
- 123 (blood adj3 sampl\*).tw,kw. (34385)
- 124 (blood adj3 draw\*).tw,kw. (4347)
- 125 (blood adj3 test\*).tw,kw. (10550)
- 126 venesection.tw,kw. (90)
- 127 or/110-126 (82303)
- 128 109 and 127 (4630)
- 129 limit 128 to yr="2013 -Current" (1535)
- 130 limit 129 to english language (1447)
- 131 limit 130 to (books or chapter or conference abstract or conference paper or "conference review" or letter or short survey) (145)
- 132 130 not 131 (1302)
- 133 (exp animals/ or exp animal experimentation/ or nonhuman/) not ((exp animals/ or exp animal experimentation/ or nonhuman/) and exp human/) (405278)
- 134 132 not 133 (1218)
- 135 limit 132 to human (1192)
- 136 134 or 135 (1218)

## **Database: Epub Ahead of Print**

### **Search Strategy:**

- 1 (catheter\* adj3 port\*).mp,kw. (132)
- 2 (catheter\* adj3 vascular).mp,kw. (163)
- 3 (vascular adj3 access).mp,kw. (1257)
- 4 (intra-arterial adj3 line\*).mp,kw. (1)
- 5 (intraarterial adj3 line\*).mp,kw. (1)
- 6 "port a cath?".mp,kw. (38)
- 7 portacath\*.mp,kw. (9)

- 8 (reservoir\* adj3 venous\*).mp,kw. (12)
- 9 device remov\*.mp,kw. (143)
- 10 (catheter\* adj3 remov\*).mp,kw. (821)
- 11 (line\* adj3 remov\*).mp,kw. (208)
- 12 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 13 (catheter\* adj3 insert\*).mp,kw. (1363)
- 14 (line\* adj3 insert\*).mp,kw. (264)
- 15 (line\* adj3 fail\*).mp,kw. (529)
- 16 (catheter\* adj3 fail\*).mp,kw. (163)
- 17 (intravenous adj3 administrat\*).mp,kw. (2628)
- 18 (catheter\* adj3 in-dwell\*).mp,kw. (8)
- 19 (line\* adj3 in-dwell\*).mp,kw. (1)
- 20 (line\* adj3 indwell\*).mp,kw. (11)
- 21 (catheter\* adj3 indwell\*).mp,kw. (680)
- 22 (catheter\* adj3 central venous\*).mp,kw. (1481)
- 23 (catheter\* adj3 peripheral).mp,kw. (246)
- 24 picc.mp,kw. (172)
- 25 (arter\* adj3 catheter\*).mp,kw. (794)
- 26 dialock\*.mp,kw. (3)
- 27 vectra\*.mp,kw. (43)
- 28 (arter\* adj3 access\*).mp,kw. (574)
- 29 (vein\* adj3 access\*).mp,kw. (189)
- 30 broviac.mp,kw. (20)
- 31 (central adj3 catheter\*).mp,kw. (1741)
- 32 (central adj3 line\*).mp,kw. (788)
- 33 cv cath\*.mp,kw. (6)
- 34 groshong.mp,kw. (8)
- 35 pediasat.mp,kw. (1)
- 36 vortex.mp,kw. (5251)
- 37 (catheter\* adj3 vein?).mp,kw. (339)
- 38 (catheter\* adj3 arter\*).mp,kw. (794)
- 39 (tunneled adj3 catheter\*).mp,kw. (164)
- 40 (line? adj3 vein?).mp,kw. (46)
- 41 (line\* adj3 arter\*).mp,kw. (180)
- 42 (catheter\* adj3 subclavian\*).mp,kw. (104)
- 43 (line?\* adj3 subclavian\*).mp,kw. (8)

- 44 double lumen\*.mp,kw. (291)
- 45 avalon elite.mp,kw. (4)
- 46 dual lumen.mp,kw. (64)
- 47 (catheter\* adj3 thrombos\*).mp,kw. (147)
- 48 (catheter\* adj3 occlusion\*).mp,kw. (129)
- 49 (catheter\* adj3 migrat\*).mp,kw. (95)
- 50 (catheter adj3 infection\*).mp,kw. (605)
- 51 (catheter\* adj3 fracture\*).mp,kw. (61)
- 52 (catheter\* adj3 leakage\*).mp,kw. (29)
- 53 (catheter\* adj3 dislocat\*).mp,kw. (14)
- 54 (catheter\* adj3 complication\*).mp,kw. (527)
- 55 (line? adj3 thrombos\*).mp,kw. (14)
- 56 (line? adj3 occlusion\*).mp,kw. (11)
- 57 (line? adj3 migrat\*).mp,kw. (114)
- 58 (line? adj3 infection\*).mp,kw. (367)
- 59 (line\* adj3 fracture\*).mp,kw. (396)
- 60 (line\* adj3 leakage\*).mp,kw. (43)
- 61 (insert\* adj3 peripheral).mp,kw. (75)
- 62 (catheter\* adj3 nurs\*).mp,kw. (41)
- 63 avalon elite.mp,kw. (4)
- 64 dual lumen.mp,kw. (64)
- 65 double lumen\*.mp,kw. (291)
- 66 (iv adj3 peripher\*).mp,kw. (79)
- 67 (intra-venous adj3 peripher\*).mp,kw. (0)
- 68 (intravenous adj3 peripher\*).mp,kw. (171)
- 69 (peripheral\* adj3 catheter\*).mp,kw. (436)
- 70 (peripheral\* adj3 line?).mp,kw. (116)
- 71 (difficult\* adj2 vein?).mp,kw. (19)
- 72 (vein? adj2 punctur\*).mp,kw. (62)
- 73 (vein\* adj3 find\*).mp,kw. (51)
- 74 midline.mp,kw. (3394)
- 75 (arter\* adj3 line\*).mp,kw. (180)
- 76 (catheter\* adj3 cardiac).mp,kw. (1464)
- 77 (line\* adj3 cardiac).mp,kw. (123)
- 78 (line\* adj3 heart).mp,kw. (92)
- 79 (catheter\* adj3 heart).mp,kw. (705)

- 80 or/1-79 (23445)
- 81 (blood adj3 collect\*).mp,kw. (6752)
- 82 (blood adj3 draw\*).mp,kw. (1419)
- 83 (blood adj3 sampl\*).mp,kw. (16424)
- 84 (blood adj3 test\*).mp,kw. (4838)
- 85 phlebotom\*.mp,kw. (658)
- 86 apheresis.mp,kw. (528)
- 87 puncture\*.tw,kw. (4472)
- 88 venipuncture\*.mp,kw. (279)
- 89 veni-puncture\*.mp,kw. (1)
- 90 venesection\*.mp,kw. (81)
- 91 or/81-90 (29146)
- 92 80 and 91 (887)
- 93 limit 92 to (english language and yr="2013 -Current") (610)

**Recommendation Question 5: Should the daily review of peripheral vascular access devices by health providers be recommended?**

Original Search Strategy (January 2013 – December 2018)

Update Search 1: December 2018 – November 2020

Update Search 2: November 2020 – April 2021

*\*Note: the same original search strategy was used to complete the update searches.*

Databases:

- Cumulative Index to Nursing and Allied Health (CINAHL)
- Medline
- Cochrane Central
- Cochrane Database of Systematic Reviews
- Embase
- Emcare
- Epub ahead of print

**Database: CINAHL**

**Search Strategy:**



Search ID#	Search Terms	Search Options	Last Run Via	Results
S147	S143 AND S145	Limiters - Published Date: 20130101-20181231; English Language; Peer Reviewed Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,120
S146	S143 AND S145	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,335
S145	S11 OR S144	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	41,667
S144	S120 OR S121 OR S122 OR S123 OR S124 OR S125 OR S126 OR S127 OR S128 OR S129 OR S130 OR S131 OR S132 OR S133 OR S134 OR S135 OR S136 OR S137 OR S138 OR S139 OR S140 OR S141 OR S142	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	28,325
S143	S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	76,687

	S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113 OR S114 OR S115 OR S116 OR S117 OR S118 OR S119		Search Screen - Advanced Search Database - CINAHL with Full Text	
S142	nurs* N3 bundle*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	75

			Database - CINAHL with Full Text	
S141	care N3 bundle*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	831
S140	daily N3 round*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	254
S139	TX daily N3 review*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,600
S138	TX daily N3 asses*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,838
S137	line* care	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	179

			Database - CINAHL with Full Text	
S136	catheter* care	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,924
S135	TX duration* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	859
S134	TX duration* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	724
S133	TX dwell* N3 day*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	232
S132	TX dwell* N3 time	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	1,214

			Database - CINAHL with Full Text	
S131	TX line* N3 exchang* OR TX catheter* N3 exchang* OR TX prompt* N3 exchang*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	732
S130	TX line* N3 replac* OR TX catheter* N3 replac* OR TX prompt* N3 replac*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,625
S129	TX delay* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	351
S128	TX peripher* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	234
S127	TX time* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	4,052

			Database - CINAHL with Full Text	
S126	TX prompt N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	307
S125	TX catheter* N2 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,372
S124	TX line* N2 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	893
S123	(MH "Catheter Removal")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	616
S122	(MH "Device Removal")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	3,601

			Database - CINAHL with Full Text	
S121	(MH "Catheter Care, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,509
S120	(MH "Catheter Care")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	940
S119	punctur* N3 "blood vessel"*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7
S118	punctur* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	515
S117	TX vein* N3 find*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	526

			Database - CINAHL with Full Text	
S116	TX difficult* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	365
S115	puncture* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	179
S114	vein* N3 find*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	129
S113	vein* N3 punctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	190
S112	peripheral* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	346



			Database - CINAHL with Full Text	
S111	peripheral* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,936
S110	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1
S109	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1
S108	iv N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	245
S107	double lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	504

			Database - CINAHL with Full Text	
S106	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	109
S105	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3
S104	catheter* N3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,355
S103	catheter* N3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,355
S102	insert* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	274

			Database - CINAHL with Full Text	
S101	line* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	605
S100	line* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	38
S99	line* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,376
S98	line* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	126
S97	line* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	44

			Database - CINAHL with Full Text	
S96	line* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	38
S95	catheter* N3 complication*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,098
S94	catheter* N3 dislocat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	35
S93	catheter* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	60
S92	catheter* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	98

			Database - CINAHL with Full Text	
S91	catheter* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,070
S90	catheter* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	160
S89	catheter* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	797
S88	catheter* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	679
S87	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	109

			Database - CINAHL with Full Text	
S86	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3
S85	double lumen*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	504
S84	line?* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10
S83	catheter* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	226
S82	line* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	606

			Database - CINAHL with Full Text	
S81	line* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	122
S80	catheter* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,635
S79	tunneled N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	390
S78	catheter* adj3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S77	vortex	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	288

			Database - CINAHL with Full Text	
S76	pediasat	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S75	groshong	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	19
S74	cv cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S73	central N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,244
S72	central N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	8,884



			Database - CINAHL with Full Text	
S71	broviac	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	54
S70	vein* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	332
S69	arter* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	908
S68	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,178
S67	dialock*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	1

			Database - CINAHL with Full Text	
S66	vectra*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	29
S65	arter* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,635
S64	picc	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	919
S63	catheter* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,756
S62	catheter* N3 central venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	7,765

			Database - CINAHL with Full Text	
S61	catheter* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,661
S60	line* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	40
S59	line* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	25
S58	catheter* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	132
S57	intravenous N3 administrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	11,159

			Database - CINAHL with Full Text	
S56	catheter* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	395
S55	line* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	813
S54	line* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	545
S53	catheter* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,124
S52	(catheter* N3 abstract*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	68

			Database - CINAHL with Full Text	
S51	venesection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	62
S50	venipunctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,690
S49	phlebotom*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,786
S48	reservoir* N3 venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	85
S47	portacath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	14

			Database - CINAHL with Full Text	
S46	port a cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	90
S45	intraarterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6
S44	intra-arterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	13
S43	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,178
S42	catheter* N3 vascular	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	3,109

			Database - CINAHL with Full Text	
S41	catheter* N3 port*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	328
S40	arter* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	606
S39	(MH "Punctures")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,079
S38	(MH "Administration, Intravenous+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,427
S37	(MH "Infusions, Intravenous")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	8,670

			Database - CINAHL with Full Text	
S36	MH "Injections, Intravenous"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,123
S35	MH "Injections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	9,996
S34	(MH "Injection Sites")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	614
S33	(MH "Arterial Puncture")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	105
S32	(MH "Blood Specimen Collection")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	2,771



			Database - CINAHL with Full Text	
S31	(MH "Phlebotomists")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	135
S30	(MH "Phlebotomy")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,097
S29	(MH "Venipuncture+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,250
S28	MH "Catheter Occlusion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	556
S27	MH "Catheter-Related Bloodstream Infections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	1,131

			Database - CINAHL with Full Text	
S26	MH "Catheter-Related Infections+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,978
S25	(MH "Catheter Placement Determination")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	352
S24	(MH "Venous Cutdown")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	34
S23	MH "Peripherally Inserted Central Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,101
S22	MH "Central Venous Catheters+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	3,510

			Database - CINAHL with Full Text	
S21	MH "Arterial Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	235
S20	(MH "Catheters, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,611
S19	(MH "Catheters")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,223
S18	(MH "Vascular Access Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,230
S17	MH "Catheters, Vascular+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	5,611

			Database - CINAHL with Full Text	
S16	MH "Vascular Access Devices, Implantable"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	362
S15	(MH "Infusion Devices, Intermittent")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	154
S14	(MH "Infusion Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,215
S13	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	979
S12	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	979

			Database - CINAHL with Full Text	
S11	S7 AND S10	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	13,626
S10	S8 OR S9	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	160,555
S9	(MH "Time Factors")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	142,123
S8	time factor* OR timing	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	160,555
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	403,170

			Database - CINAHL with Full Text	
S6	risk assessment	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	82,170
S5	quality improvement*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	50,487
S4	nursing care	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	47,386
S3	(MH "Risk Assessment")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	76,480
S2	(MH "Quality Improvement+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	50,891

			Database - CINAHL with Full Text	
S1	(MH "Nursing Care+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	259,031

**Database: Medline**

**Search Strategy:**

- 1 exp Vascular Access Devices/ (4189)
- 2 catheters/ (4097)
- 3 cannula/ (326)
- 4 catheter obstruction/ (203)
- 5 catheters, indwelling/ (17888)
- 6 central venous catheters/ (1712)
- 7 exp catheterization, peripheral/ (10637)
- 8 exp Phlebotomy/ (5449)
- 9 injections, intravenous/ (80732)
- 10 infusions, intravenous/ (53028)
- 11 exp administration, intravenous/ (137945)
- 12 Punctures/ (12827)
- 13 (arter\* adj3 line).mp,kw. (1396)
- 14 (catheter\* adj3 port\*).mp,kw. (1758)
- 15 (catheter\* adj3 vascular).mp,kw. (1889)
- 16 (vascular adj3 access).mp,kw. (9046)
- 17 (intra-arterial adj3 line\*).mp,kw. (38)
- 18 (intraarterial adj3 line\*).mp,kw. (15)
- 19 "port a cath?".mp,kw. (425)
- 20 portacath\*.mp,kw. (68)
- 21 (reservoir\* adj3 venous\*).mp,kw. (309)
- 22 phlebotom\*.mp,kw. (9449)

- 23 venesection\*.mp,kw. (659)
- 24 venipunctur\*.mp,kw. (2945)
- 25 (catheter\* adj3 obstruct\*).mp,kw. (2)
- 26 (catheter\* adj3 insert\*).mp,kw. (11200)
- 27 (line\* adj3 insert\*).mp,kw. (1950)
- 28 (line\* adj3 fail\*).mp,kw. (3111)
- 29 (catheter\* adj3 fail\*).mp,kw. (1168)
- 30 (intravenous adj3 administrat\*).mp,kw. (45562)
- 31 (catheter\* adj3 in-dwell\*).mp,kw. (119)
- 32 (line\* adj3 in-dwell\*).mp,kw. (6)
- 33 (line\* adj3 indwell\*).mp,kw. (181)
- 34 (catheter\* adj3 indwell\*).mp,kw. (22816)
- 35 (catheter\* adj3 central venous\*).mp,kw. (19242)
- 36 (catheter\* adj3 peripheral).mp,kw. (9199)
- 37 picc.mp,kw. (818)
- 38 (arter\* adj3 catheter\*).mp,kw. (11408)
- 39 dialock\*.mp,kw. (15)
- 40 vectra\*.mp,kw. (116)
- 41 (vascular adj3 access).mp,kw. (9046)
- 42 (arter\* adj3 access\*).mp,kw. (3470)
- 43 (vein\* adj3 access\*).mp,kw. (1113)
- 44 broviac.mp,kw. (308)
- 45 (central adj3 catheter\*).mp,kw. (20206)
- 46 (central adj3 line\*).mp,kw. (4584)
- 47 cv cath\*.mp,kw. (51)
- 48 groshong.mp,kw. (90)
- 49 pediasat.mp,kw. (9)
- 50 vortex.mp,kw. (3016)
- 51 (catheter\* adj3 vein?).mp,kw. (3802)
- 52 (catheter\* adj3 arter\*).mp,kw. (11408)
- 53 (tunneled adj3 catheter\*).mp,kw. (1067)
- 54 (line? adj3 vein?).mp,kw. (341)
- 55 (line\* adj3 arter\*).mp,kw. (2151)
- 56 (catheter\* adj3 subclavian\*).mp,kw. (1390)
- 57 (line?\* adj3 subclavian\*).mp,kw. (84)
- 58 double lumen\*.mp,kw. (2681)



- 59 avalon elite.mp,kw. (28)
- 60 dual lumen.mp,kw. (406)
- 61 (catheter\* adj3 thrombos\*).mp,kw. (1176)
- 62 (catheter\* adj3 occlusion\*).mp,kw. (1323)
- 63 (catheter\* adj3 migrat\*).mp,kw. (664)
- 64 (catheter adj3 infection\*).mp,kw. (7978)
- 65 (catheter\* adj3 fracture\*).mp,kw. (308)
- 66 (catheter\* adj3 leakage\*).mp,kw. (210)
- 67 (catheter\* adj3 dislocat\*).mp,kw. (221)
- 68 (catheter\* adj3 complication\*).mp,kw. (4161)
- 69 (line? adj3 thrombos\*).mp,kw. (107)
- 70 (line? adj3 occlusion\*).mp,kw. (109)
- 71 (line? adj3 migrat\*).mp,kw. (650)
- 72 (line? adj3 infection\*).mp,kw. (2445)
- 73 (line\* adj3 fracture\*).mp,kw. (2332)
- 74 (line\* adj3 leakage\*).mp,kw. (201)
- 75 (insert\* adj3 peripheral).mp,kw. (425)
- 76 (catheter\* adj3 nurs\*).mp,kw. (297)
- 77 avalon elite.mp,kw. (28)
- 78 dual lumen.mp,kw. (406)
- 79 double lumen\*.mp,kw. (2681)
- 80 (iv adj3 peripher\*).mp,kw. (616)
- 81 (intra-venous adj3 peripher\*).mp,kw. (2)
- 82 (intravenous adj3 peripher\*).mp,kw. (1168)
- 83 (peripheral\* adj3 catheter\*).mp,kw. (9656)
- 84 (peripheral\* adj3 line?).mp,kw. (1459)
- 85 (difficult\* adj2 vein?).mp,kw. (110)
- 86 (vein? adj2 punctur\*).mp,kw. (546)
- 87 (vein\* adj3 find\*).mp,kw. (586)
- 88 (puncture\* adj3 vein?).mp,kw. (0)
- 89 (punctur\* adj arter\*).mp,kw. (36)
- 90 (punctur\* adj3 blood vessel\*).mp,kw. (48)
- 91 or/1-90 (291027)
- 92 exp Device Removal/ (11770)
- 93 exp Nursing Assessment/ (32039)
- 94 exp Patient Care Bundles/ (504)

- 95 exp Quality Improvement/ (19274)
- 96 (line\* adj3 remov\*).mp,kw. (1064)
- 97 (catheter\* adj3 remov\*).mp,kw. (6314)
- 98 (peripher\* adj3 remov\*).mp,kw. (486)
- 99 (prompt adj3 remov\*).mp,kw. (398)
- 100 (delay\* adj3 remov\*).mp,kw. (680)
- 101 (daily adj3 review\*).mp,kw. (513)
- 102 (daily adj3 assess\*).mp,kw. (4741)
- 103 (replace\* adj3 time).mp,kw. (1464)
- 104 (dwell\* adj3 time).mp,kw. (2161)
- 105 (exchang\* adj3 catheter\*).mp,kw. (587)
- 106 (exchang\* adj3 line\*).mp,kw. (618)
- 107 catheter duration.mp,kw. (175)
- 108 line duration\*.mp,kw. (9)
- 109 (catheter adj2 care).mp,kw. (641)
- 110 (line adj2 care).mp,kw. (507)
- 111 every day.mp,kw. (9276)
- 112 quality improv\*.mp,kw. (37670)
- 113 or/92-112 (110278)
- 114 113 and 91 (7872)
- 115 exp Risk Assessment/ (237307)
- 116 (risk adj2 assess\*).mp,kw. (278175)
- 117 115 or 116 (281043)
- 118 exp Time Factors/ (1137664)
- 119 time factor\*.mp,kw. (1139287)
- 120 118 or 119 (1139287)
- 121 91 and 117 and 120 (752)
- 122 114 or 121 (8550)
- 123 limit 122 to (english language and yr="2013 -Current") (2393)

**Database: CCRCT**

**Search Strategy:**

- 1 exp Vascular Access Devices/ (230)
- 2 catheters/ (202)
- 3 cannula/ (34)

- 4 catheter obstruction/ (15)
- 5 catheters, indwelling/ (957)
- 6 central venous catheters/ (92)
- 7 exp catheterization, peripheral/ (832)
- 8 exp Phlebotomy/ (393)
- 9 injections, intravenous/ (7453)
- 10 infusions, intravenous/ (9784)
- 11 exp administration, intravenous/ (17472)
- 12 Punctures/ (394)
- 13 (arter\* adj3 line).mp,kw. (346)
- 14 (catheter\* adj3 port\*).mp,kw. (195)
- 15 (catheter\* adj3 vascular).mp,kw. (219)
- 16 (vascular adj3 access).mp,kw. (1250)
- 17 (intra-arterial adj3 line\*).mp,kw. (8)
- 18 (intraarterial adj3 line\*).mp,kw. (1)
- 19 "port a cath?".mp,kw. (29)
- 20 portacath\*.mp,kw. (2)
- 21 (reservoir\* adj3 venous\*).mp,kw. (57)
- 22 phlebotom\*.mp,kw. (776)
- 23 venesection\*.mp,kw. (76)
- 24 venipunctur\*.mp,kw. (646)
- 25 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 26 (catheter\* adj3 insert\*).mp,kw. (2356)
- 27 (line\* adj3 insert\*).mp,kw. (198)
- 28 (line\* adj3 fail\*).mp,kw. (773)
- 29 (catheter\* adj3 fail\*).mp,kw. (411)
- 30 (intravenous adj3 administrat\*).mp,kw. (27684)
- 31 (catheter\* adj3 in-dwell\*).mp,kw. (46)
- 32 (line\* adj3 in-dwell\*).mp,kw. (5)
- 33 (line\* adj3 indwell\*).mp,kw. (21)
- 34 (catheter\* adj3 indwell\*).mp,kw. (1717)
- 35 (catheter\* adj3 central venous\*).mp,kw. (1878)
- 36 (catheter\* adj3 peripheral).mp,kw. (1053)
- 37 picc.mpp,kw. (196)
- 38 (arter\* adj3 catheter\*).mp,kw. (1838)
- 39 dialock\*.mp,kw. (0)

- 40 vectra\*.mp,kw. (43)
- 41 (vascular adj3 access).mp,kw. (1250)
- 42 (arter\* adj3 access\*).mp,kw. (478)
- 43 (vein\* adj3 access\*).mp,kw. (227)
- 44 broviac.mp,kw. (14)
- 45 (central adj3 catheter\*).mp,kw. (2050)
- 46 (central adj3 line\*).mp,kw. (463)
- 47 cv cath\*.mp,kw. (4)
- 48 groshong.mp,kw. (14)
- 49 pediasat.mp,kw. (1)
- 50 vortex.mp,kw. (54)
- 51 (catheter\* adj3 vein?).mp,kw. (807)
- 52 (catheter\* adj3 arter\*).mp,kw. (1838)
- 53 (tunneled adj3 catheter\*).mp,kw. (183)
- 54 (line? adj3 vein?).mp,kw. (55)
- 55 (line\* adj3 arter\*).mp,kw. (492)
- 56 (catheter\* adj3 subclavian\*).mp,kw. (183)
- 57 (line?\* adj3 subclavian\*).mp,kw. (7)
- 58 double lumen\*.mp,kw. (482)
- 59 avalon elite.mp,kw. (0)
- 60 dual lumen.mp,kw. (43)
- 61 (catheter\* adj3 thrombos\*).mp,kw. (320)
- 62 (catheter\* adj3 occlusion\*).mp,kw. (276)
- 63 (catheter\* adj3 migrat\*).mp,kw. (90)
- 64 (catheter adj3 infection\*).mp,kw. (1260)
- 65 (catheter\* adj3 fracture\*).mp,kw. (37)
- 66 (catheter\* adj3 leakage\*).mp,kw. (59)
- 67 (catheter\* adj3 dislocat\*).mp,kw. (32)
- 68 (catheter\* adj3 complication\*).mp,kw. (1296)
- 69 (line? adj3 thrombos\*).mp,kw. (21)
- 70 (line? adj3 occlusion\*).mp,kw. (17)
- 71 (line? adj3 migrat\*).mp,kw. (14)
- 72 (line? adj3 infection\*).mp,kw. (230)
- 73 (line\* adj3 fracture\*).mp,kw. (124)
- 74 (line\* adj3 leakage\*).mp,kw. (33)
- 75 (insert\* adj3 peripheral).mp,kw. (129)

- 76 (catheter\* adj3 nurs\*).mp,kw. (160)
- 77 avalon elite.mp,kw. (0)
- 78 dual lumen.mp,kw. (43)
- 79 double lumen\*.mp,kw. (482)
- 80 (iv adj3 peripher\*).mp,kw. (168)
- 81 (intra-venous adj3 peripher\*).mp,kw. (0)
- 82 (intravenous adj3 peripher\*).mp,kw. (428)
- 83 (peripheral\* adj3 catheter\*).mp,kw. (1203)
- 84 (peripheral\* adj3 line?).mp,kw. (126)
- 85 (difficult\* adj2 vein?).mp,kw. (36)
- 86 (vein? adj2 punctur\*).mp,kw. (373)
- 87 (vein\* adj3 find\*).mp,kw. (44)
- 88 (puncture\* adj3 vein?).mp,kw. (0)
- 89 (punctur\* adj arter\*).mp,kw. (31)
- 90 (punctur\* adj3 blood vessel\*).mp,kw. (26)
- 91 or/1-90 (54703)
- 92 exp Device Removal/ (362)
- 93 exp Nursing Assessment/ (497)
- 94 exp Patient Care Bundles/ (15)
- 95 exp Quality Improvement/ (541)
- 96 (line\* adj3 remov\*).mp,kw. (94)
- 97 (catheter\* adj3 remov\*).mp,kw. (1376)
- 98 (peripher\* adj3 remov\*).mp,kw. (37)
- 99 (prompt adj3 remov\*).mp,kw. (12)
- 100 (delay\* adj3 remov\*).mp,kw. (91)
- 101 (daily adj3 review\*).mp,kw. (132)
- 102 (daily adj3 assess\*).mp,kw. (3436)
- 103 (replace\* adj3 time).mp,kw. (272)
- 104 (dwell\* adj3 time).mp,kw. (248)
- 105 (exchang\* adj3 catheter\*).mp,kw. (76)
- 106 (exchang\* adj3 line\*).mp,kw. (14)
- 107 catheter duration.mp,kw. (43)
- 108 line duration\*.mp,kw. (4)
- 109 (catheter adj2 care).mp,kw. (172)
- 110 (line adj2 care).mp,kw. (213)
- 111 every day.mp,kw. (3222)

- 112 quality improv\*.mp,kw. (2459)
- 113 or/92-112 (12419)
- 114 113 and 91 (1455)
- 115 exp Risk Assessment/ (8226)
- 116 (risk adj2 assess\*).mp,kw. (20030)
- 117 115 or 116 (20052)
- 118 exp Time Factors/ (60911)
- 119 time factor\*.mp,kw. (61672)
- 120 118 or 119 (61672)
- 121 91 and 117 and 120 (136)
- 122 114 or 121 (1585)
- 123 limit 122 to (english language and yr="2013 -Current") (562)

#### **Database: Cochrane Database of Systematic Reviews**

##### **Search Strategy:**

- 1 (arter\* adj3 line).mp,kw. (22)
- 2 (catheter\* adj3 port\*).mp,kw. (24)
- 3 (catheter\* adj3 vascular).mp,kw. (32)
- 4 (vascular adj3 access).mp,kw. (93)
- 5 (intra-arterial adj3 line\*).mp,kw. (2)
- 6 (intraarterial adj3 line\*).mp,kw. (0)
- 7 "port a cath?".mp,kw. (19)
- 8 portacath\*.mp,kw. (9)
- 9 (reservoir\* adj3 venous\*).mp,kw. (2)
- 10 phlebotom\*.mp,kw. (38)
- 11 venesection\*.mp,kw. (6)
- 12 venipunctur\*.mp,kw. (32)
- 13 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 14 (catheter\* adj3 insert\*).mp,kw. (198)
- 15 (line\* adj3 insert\*).mp,kw. (43)
- 16 (line\* adj3 fail\*).mp,kw. (48)
- 17 (catheter\* adj3 fail\*).mp,kw. (36)
- 18 (intravenous adj3 administrat\*).mp,kw. (461)
- 19 (catheter\* adj3 in-dwell\*).mp,kw. (13)
- 20 (line\* adj3 in-dwell\*).mp,kw. (0)
- 21 (line\* adj3 indwell\*).mp,kw. (7)

- 22 (catheter\* adj3 indwell\*).mp,kw. (109)
- 23 (catheter\* adj3 central venous\*).mp,kw. (134)
- 24 (catheter\* adj3 peripheral).mp,kw. (59)
- 25 picc.mp,kw. (19)
- 26 (arter\* adj3 catheter\*).mp,kw. (83)
- 27 dialock\*.mp,kw. (0)
- 28 vectra\*.mp,kw. (1)
- 29 (vascular adj3 access).mp,kw. (93)
- 30 (arter\* adj3 access\*).mp,kw. (29)
- 31 (vein\* adj3 access\*).mp,kw. (16)
- 32 broviac.mp,kw. (11)
- 33 (central adj3 catheter\*).mp,kw. (144)
- 34 (central adj3 line\*).mp,kw. (97)
- 35 cv cath\*.mp,kw. (0)
- 36 groshong.mp,kw. (1)
- 37 pediasat.mp,kw. (0)
- 38 vortex.mp,kw. (4)
- 39 (catheter\* adj3 vein?).mp,kw. (33)
- 40 (catheter\* adj3 arter\*).mp,kw. (83)
- 41 (tunneled adj3 catheter\*).mp,kw. (2)
- 42 (line? adj3 vein?).mp,kw. (6)
- 43 (line\* adj3 arter\*).mp,kw. (29)
- 44 (catheter\* adj3 subclavian\*).mp,kw. (11)
- 45 (line?\* adj3 subclavian\*).mp,kw. (1)
- 46 double lumen\*.mp,kw. (10)
- 47 avalon elite.mp,kw. (0)
- 48 dual lumen.mp,kw. (2)
- 49 (catheter\* adj3 thrombos\*).mp,kw. (36)
- 50 (catheter\* adj3 occlusion\*).mp,kw. (28)
- 51 (catheter\* adj3 migrat\*).mp,kw. (10)
- 52 (catheter adj3 infection\*).mp,kw. (105)
- 53 (catheter\* adj3 fracture\*).mp,kw. (3)
- 54 (catheter\* adj3 leakage\*).mp,kw. (6)
- 55 (catheter\* adj3 dislocat\*).mp,kw. (4)
- 56 (catheter\* adj3 complication\*).mp,kw. (59)
- 57 (line? adj3 thrombos\*).mp,kw. (5)

- 58 (line? adj3 occlusion\*).mp,kw. (3)
- 59 (line? adj3 migrat\*).mp,kw. (2)
- 60 (line? adj3 infection\*).mp,kw. (32)
- 61 (line\* adj3 fracture\*).mp,kw. (12)
- 62 (line\* adj3 leakage\*).mp,kw. (1)
- 63 (insert\* adj3 peripheral).mp,kw. (19)
- 64 (catheter\* adj3 nurs\*).mp,kw. (5)
- 65 avalon elite.mp,kw. (0)
- 66 dual lumen.mp,kw. (2)
- 67 double lumen\*.mp,kw. (10)
- 68 (iv adj3 peripher\*).mp,kw. (5)
- 69 (intra-venous adj3 peripher\*).mp,kw. (0)
- 70 (intravenous adj3 peripher\*).mp,kw. (20)
- 71 (peripheral\* adj3 catheter\*).mp,kw. (71)
- 72 (peripheral\* adj3 line?).mp,kw. (23)
- 73 (difficult\* adj2 vein?).mp,kw. (3)
- 74 (vein? adj2 punctur\*).mp,kw. (7)
- 75 (vein\* adj3 find\*).mp,kw. (4)
- 76 (puncture\* adj3 vein?).mp,kw. (8)
- 77 (punctur\* adj arter\*).mp,kw. (2)
- 78 (punctur\* adj3 blood vessel\*).mp,kw. (2)
- 79 or/1-78 (1061)
- 80 (line\* adj3 remov\*).mp,kw. (19)
- 81 (catheter\* adj3 remov\*).mp,kw. (105)
- 82 (peripher\* adj3 remov\*).mp,kw. (13)
- 83 (prompt adj3 remov\*).mp,kw. (7)
- 84 (delay\* adj3 remov\*).mp,kw. (16)
- 85 (daily adj3 review\*).mp,kw. (47)
- 86 (daily adj3 assess\*).mp,kw. (139)
- 87 (replace\* adj3 time).mp,kw. (19)
- 88 (dwell\* adj3 time).mp,kw. (24)
- 89 (exchang\* adj3 catheter\*).mp,kw. (3)
- 90 (exchang\* adj3 line\*).mp,kw. (1)
- 91 catheter duration.mp,kw. (10)
- 92 line duration\*.mp,kw. (0)
- 93 (catheter adj2 care).mp,kw. (24)



- 94 (line adj2 care).mp,kw. (15)
- 95 every day.mp,kw. (185)
- 96 or/80-95 (559)
- 97 quality improv\*.mp,kw. (138)
- 98 (risk adj2 assess\*).mp,kw. (7661)
- 99 97 or 98 (7679)
- 100 time factor\*.mp,kw. (386)
- 101 99 and 100 (355)
- 102 96 or 101 (878)
- 103 79 and 102 (193)
- 104 limit 103 to full systematic reviews (177)

**Database: Embase**

**Search Strategy:**

- 1 vascular access device/ (1074)
- 2 vascular equipment/ (498)
- 3 exp vascular access/ (22927)
- 4 exp cannulation/ (36376)
- 5 exp catheter removal/ (6077)
- 6 exp central venous catheter/ (21066)
- 7 intravenous catheter/ (6137)
- 8 exp vein catheterization/ (13457)
- 9 exp central venous catheterization/ (8717)
- 10 exp catheter complication/ (21453)
- 11 exp catheter care/ (569)
- 12 exp double lumen catheter/ (408)
- 13 exp midline catheter/ (58)
- 14 exp peripheral venous catheter/ (666)
- 15 exp peripherally inserted central venous catheter/ (2599)
- 16 exp catheter infection/ (15887)
- 17 exp apheresis/ (55887)
- 18 exp apheresis device/ (892)
- 19 cannula/ (9886)
- 20 exp vein puncture/ (6081)
- 21 exp blood collection tube/ (849)

- 22 catheters, indwelling/ (10529)
- 23 exp Phlebotomy/ (9673)
- 24 (arter\* adj3 line).tw,kw. (2617)
- 25 (catheter\* adj3 port\*).tw,kw. (2661)
- 26 (catheter\* adj3 vascular).tw,kw. (2841)
- 27 (vascular adj3 access).tw,kw. (14795)
- 28 (intra-arterial adj3 line\*).tw,kw. (60)
- 29 (intraarterial adj3 line\*).tw,kw. (16)
- 30 "port a cath?".tw,kw. (723)
- 31 portacath\*.tw,kw. (156)
- 32 (reservoir\* adj3 venous\*).tw,kw. (429)
- 33 phlebotom\*.tw,kw. (9784)
- 34 venesection\*.tw,kw. (895)
- 35 venipunctur\*.tw,kw. (4544)
- 36 (catheter\* adj3 obstruct\*).tw,kw. (1)
- 37 (catheter\* adj3 insert\*).tw,kw. (19255)
- 38 (line\* adj3 insert\*).tw,kw. (3328)
- 39 (line\* adj3 fail\*).tw,kw. (5689)
- 40 (catheter\* adj3 fail\*).tw,kw. (2089)
- 41 (catheter\* adj3 in-dwell\*).tw,kw. (188)
- 42 (line\* adj3 in-dwell\*).tw,kw. (9)
- 43 (line\* adj3 indwell\*).tw,kw. (297)
- 44 (catheter\* adj3 indwell\*).tw,kw. (11115)
- 45 (catheter\* adj3 central venous\*).tw,kw. (17646)
- 46 (catheter\* adj3 peripheral).tw,kw. (2625)
- 47 picc.tw,kw. (2285)
- 48 (arter\* adj3 catheter\*).tw,kw. (16483)
- 49 dialock\*.tw,kw. (21)
- 50 vectra\*.tw,kw. (429)
- 51 (vascular adj3 access).tw,kw. (14795)
- 52 (arter\* adj3 access\*).tw,kw. (6514)
- 53 (vein\* adj3 access\*).tw,kw. (2220)
- 54 broviac.tw,kw. (427)
- 55 (central adj3 catheter\*).tw,kw. (21185)
- 56 (central adj3 line\*).tw,kw. (9062)
- 57 cv cath\*.tw,kw. (87)

- 58 groshong.tw,kw. (153)
- 59 pediasat.tw,kw. (18)
- 60 vortex.tw,kw. (5749)
- 61 (catheter\* adj3 vein?).tw,kw. (5621)
- 62 (catheter\* adj3 arter\*).tw,kw. (16483)
- 63 (tunneled adj3 catheter\*).tw,kw. (2023)
- 64 (line? adj3 vein?).tw,kw. (623)
- 65 (line\* adj3 arter\*).tw,kw. (3792)
- 66 (catheter\* adj3 subclavian\*).tw,kw. (1723)
- 67 (line?\* adj3 subclavian\*).tw,kw. (157)
- 68 double lumen\*.tw,kw. (4154)
- 69 avalon elite.tw,kw. (44)
- 70 dual lumen.tw,kw. (777)
- 71 (catheter\* adj3 thrombos\*).tw,kw. (1967)
- 72 (catheter\* adj3 occlusion\*).tw,kw. (2112)
- 73 (catheter\* adj3 migrat\*).tw,kw. (1061)
- 74 (catheter adj3 infection\*).tw,kw. (8661)
- 75 (catheter\* adj3 fracture\*).tw,kw. (518)
- 76 (catheter\* adj3 leakage\*).tw,kw. (406)
- 77 (catheter\* adj3 dislocat\*).tw,kw. (351)
- 78 (catheter\* adj3 complication\*).tw,kw. (6752)
- 79 (line? adj3 thrombos\*).tw,kw. (232)
- 80 (line? adj3 occlusion\*).tw,kw. (197)
- 81 (line? adj3 migrat\*).tw,kw. (1137)
- 82 (line? adj3 infection\*).tw,kw. (4169)
- 83 (line\* adj3 fracture\*).tw,kw. (3243)
- 84 (line\* adj3 leakage\*).tw,kw. (329)
- 85 (insert\* adj3 peripheral).tw,kw. (694)
- 86 (catheter\* adj3 nurs\*).tw,kw. (471)
- 87 avalon elite.tw,kw. (44)
- 88 dual lumen.tw,kw. (777)
- 89 double lumen\*.mp,kw. (4845)
- 90 (iv adj3 peripher\*).tw,kw. (1079)
- 91 (intra-venous adj3 peripher\*).mp,kw. (3)
- 92 (intravenous adj3 peripher\*).tw,kw. (1781)
- 93 (peripheral\* adj3 catheter\*).tw,kw. (4583)

- 94 (peripheral\* adj3 line?).tw,kw. (2186)
- 95 (difficult\* adj2 vein?).tw,kw. (203)
- 96 (vein\* adj3 find\*).tw,kw. (949)
- 97 (puncture\* adj3 vein?).tw,kw. (0)
- 98 (punctur\* adj3 blood vessel\*).tw,kw. (83)
- 99 (vein\* adj3 find\*).tw,kw. (949)
- 100 (punctur\* adj3 arter\*).tw,kw. (3173)
- 101 (vein? adj3 punctur\*).tw,kw. (1339)
- 102 (difficult\* adj3 vein?).tw,kw. (444)
- 103 or/1-102 (271420)
- 104 exp device removal/ (24849)
- 105 exp nursing assessment/ (30235)
- 106 exp care bundle/ (945)
- 107 exp time factor/ (23659)
- 108 (line\* adj3 remov\*).mp,kw. (1856)
- 109 (catheter\* adj3 remov\*).mp,kw. (14803)
- 110 (peripher\* adj3 remov\*).mp,kw. (655)
- 111 (prompt adj3 remov\*).mp,kw. (593)
- 112 (delay\* adj3 remov\*).mp,kw. (1034)
- 113 (daily adj3 review\*).mp,kw. (1239)
- 114 (daily adj3 assess\*).mp,kw. (9235)
- 115 (replace\* adj3 time).mp,kw. (2428)
- 116 (dwell\* adj3 time).mp,kw. (3573)
- 117 (exchang\* adj3 catheter\*).mp,kw. (1063)
- 118 (exchang\* adj3 line\*).mp,kw. (829)
- 119 catheter duration.mp,kw. (376)
- 120 line duration\*.mp,kw. (38)
- 121 (catheter adj2 care).mp,kw. (1308)
- 122 (line adj2 care).mp,kw. (1121)
- 123 every day.mp,kw. (16993)
- 124 time factor\*.tw,kw. (2500)
- 125 or/104-124 (130575)
- 126 103 and 125 (15869)
- 127 limit 126 to (english language and yr="2013 -Current") (7068)
- 128 limit 127 to (books or chapter or conference abstract or conference paper or "conference review" or letter or note or short survey) (3142)

129 127 not 128 (3926)

## **Database: Emcare**

### **Search Strategy:**

- 1 vascular access device/ (508)
- 2 vascular equipment/ (167)
- 3 exp vascular access/ (7776)
- 4 exp cannulation/ (12043)
- 5 exp catheter removal/ (2095)
- 6 exp central venous catheter/ (7118)
- 7 intravenous catheter/ (2534)
- 8 exp vein catheterization/ (4687)
- 9 exp central venous catheterization/ (3150)
- 10 exp catheter complication/ (7979)
- 11 exp catheter care/ (348)
- 12 exp double lumen catheter/ (87)
- 13 exp midline catheter/ (24)
- 14 exp peripheral venous catheter/ (243)
- 15 exp peripherally inserted central venous catheter/ (1165)
- 16 exp catheter infection/ (5775)
- 17 exp apheresis/ (8073)
- 18 exp apheresis device/ (92)
- 19 cannula/ (3173)
- 20 exp vein puncture/ (2153)
- 21 exp blood collection tube/ (71)
- 22 catheters, indwelling/ (2196)
- 23 exp Phlebotomy/ (2132)
- 24 (arter\* adj3 line).tw,kw. (660)
- 25 (catheter\* adj3 port\*).tw,kw. (541)
- 26 (catheter\* adj3 vascular).tw,kw. (619)
- 27 (vascular adj3 access).tw,kw. (3243)
- 28 (intra-arterial adj3 line\*).tw,kw. (11)
- 29 (intraarterial adj3 line\*).tw,kw. (1)
- 30 "port a cath?".tw,kw. (98)
- 31 portacath\*.tw,kw. (22)

- 32 (reservoir\* adj3 venous\*).tw,kw. (149)
- 33 phlebotom\*.tw,kw. (1325)
- 34 venesection\*.tw,kw. (98)
- 35 venipunctur\*.tw,kw. (1005)
- 36 (catheter\* adj3 obstruct\*).tw,kw. (0)
- 37 (catheter\* adj3 insert\*).tw,kw. (4978)
- 38 (line\* adj3 insert\*).tw,kw. (616)
- 39 (line\* adj3 fail\*).tw,kw. (862)
- 40 (catheter\* adj3 fail\*).tw,kw. (477)
- 41 (catheter\* adj3 in-dwell\*).tw,kw. (33)
- 42 (line\* adj3 in-dwell\*).tw,kw. (5)
- 43 (line\* adj3 indwell\*).tw,kw. (51)
- 44 (catheter\* adj3 indwell\*).tw,kw. (2016)
- 45 (catheter\* adj3 central venous\*).tw,kw. (5048)
- 46 (catheter\* adj3 peripheral).tw,kw. (983)
- 47 picc.tw,kw. (712)
- 48 (arter\* adj3 catheter\*).tw,kw. (4006)
- 49 dialock\*.tw,kw. (5)
- 50 vectra\*.tw,kw. (54)
- 51 (vascular adj3 access).tw,kw. (3243)
- 52 (arter\* adj3 access\*).tw,kw. (1349)
- 53 (vein\* adj3 access\*).tw,kw. (449)
- 54 broviac.tw,kw. (38)
- 55 (central adj3 catheter\*).tw,kw. (6151)
- 56 (central adj3 line\*).tw,kw. (2488)
- 57 cv cath\*.tw,kw. (17)
- 58 groshong.tw,kw. (23)
- 59 pediasat.tw,kw. (7)
- 60 vortex.tw,kw. (1158)
- 61 (catheter\* adj3 vein?).tw,kw. (1092)
- 62 (catheter\* adj3 arter\*).tw,kw. (4006)
- 63 (tunneled adj3 catheter\*).tw,kw. (475)
- 64 (line? adj3 vein?).tw,kw. (77)
- 65 (line\* adj3 arter\*).tw,kw. (906)
- 66 (catheter\* adj3 subclavian\*).tw,kw. (356)
- 67 (line?\* adj3 subclavian\*).tw,kw. (21)

- 68 double lumen\*.tw,kw. (1086)
- 69 avalon elite.tw,kw. (13)
- 70 dual lumen.tw,kw. (173)
- 71 (catheter\* adj3 thrombos\*).tw,kw. (402)
- 72 (catheter\* adj3 occlusion\*).tw,kw. (451)
- 73 (catheter\* adj3 migrat\*).tw,kw. (257)
- 74 (catheter adj3 infection\*).tw,kw. (2385)
- 75 (catheter\* adj3 fracture\*).tw,kw. (137)
- 76 (catheter\* adj3 leakage\*).tw,kw. (74)
- 77 (catheter\* adj3 dislocat\*).tw,kw. (86)
- 78 (catheter\* adj3 complication\*).tw,kw. (1474)
- 79 (line? adj3 thrombos\*).tw,kw. (41)
- 80 (line? adj3 occlusion\*).tw,kw. (47)
- 81 (line? adj3 migrat\*).tw,kw. (158)
- 82 (line? adj3 infection\*).tw,kw. (1055)
- 83 (line\* adj3 fracture\*).tw,kw. (1282)
- 84 (line\* adj3 leakage\*).tw,kw. (53)
- 85 (insert\* adj3 peripheral).tw,kw. (233)
- 86 (catheter\* adj3 nurs\*).tw,kw. (165)
- 87 avalon elite.tw,kw. (13)
- 88 dual lumen.tw,kw. (173)
- 89 double lumen\*.mp,kw. (1377)
- 90 (iv adj3 peripher\*).tw,kw. (296)
- 91 (intra-venous adj3 peripher\*).mp,kw. (3)
- 92 (intravenous adj3 peripher\*).tw,kw. (679)
- 93 (peripheral\* adj3 catheter\*).tw,kw. (1776)
- 94 (peripheral\* adj3 line?).tw,kw. (281)
- 95 (difficult\* adj2 vein?).tw,kw. (42)
- 96 (vein\* adj3 find\*).tw,kw. (188)
- 97 (puncture\* adj3 vein?).tw,kw. (0)
- 98 (punctur\* adj3 blood vessel\*).tw,kw. (25)
- 99 (vein\* adj3 find\*).tw,kw. (188)
- 100 (punctur\* adj3 arter\*).tw,kw. (808)
- 101 (vein? adj3 punctur\*).tw,kw. (278)
- 102 (difficult\* adj3 vein?).tw,kw. (88)
- 103 or/1-102 (61905)

- 104 exp device removal/ (9435)
- 105 exp nursing assessment/ (5707)
- 106 exp care bundle/ (315)
- 107 exp time factor/ (805)
- 108 (line\* adj3 remov\*).mp,kw. (292)
- 109 (catheter\* adj3 remov\*).mp,kw. (3176)
- 110 (peripher\* adj3 remov\*).mp,kw. (80)
- 111 (prompt adj3 remov\*).mp,kw. (131)
- 112 (delay\* adj3 remov\*).mp,kw. (198)
- 113 (daily adj3 review\*).mp,kw. (274)
- 114 (daily adj3 assess\*).mp,kw. (2898)
- 115 (replace\* adj3 time).mp,kw. (503)
- 116 (dwell\* adj3 time).mp,kw. (869)
- 117 (exchang\* adj3 catheter\*).mp,kw. (320)
- 118 (exchang\* adj3 line\*).mp,kw. (192)
- 119 catheter duration.mp,kw. (80)
- 120 line duration\*.mp,kw. (7)
- 121 (catheter adj2 care).mp,kw. (502)
- 122 (line adj2 care).mp,kw. (396)
- 123 every day.mp,kw. (4005)
- 124 time factor\*.tw,kw. (580)
- 125 or/104-124 (27981)
- 126 103 and 125 (4516)
- 127 limit 126 to (english language and yr="2013 -Current") (1965)

### **Database: Epub Ahead of Print**

#### **Search Strategy:**

- 1 (arter\* adj3 line).mp,kw. (123)
- 2 (catheter\* adj3 port\*).mp,kw. (130)
- 3 (catheter\* adj3 vascular).mp,kw. (158)
- 4 (vascular adj3 access).mp,kw. (1235)
- 5 (intra-arterial adj3 line\*).mp,kw. (1)
- 6 (intraarterial adj3 line\*).mp,kw. (1)
- 7 "port a cath?".mp,kw. (35)
- 8 portacath\*.mp,kw. (8)



- 9 (reservoir\* adj3 venous\*).mp,kw. (10)
- 10 phlebotom\*.mp,kw. (665)
- 11 venesection\*.mp,kw. (80)
- 12 venipunctur\*.mp,kw. (274)
- 13 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 14 (catheter\* adj3 insert\*).mp,kw. (1337)
- 15 (line\* adj3 insert\*).mp,kw. (264)
- 16 (line\* adj3 fail\*).mp,kw. (531)
- 17 (catheter\* adj3 fail\*).mp,kw. (166)
- 18 (intravenous adj3 administrat\*).mp,kw. (2582)
- 19 (catheter\* adj3 in-dwell\*).mp,kw. (9)
- 20 (line\* adj3 in-dwell\*).mp,kw. (1)
- 21 (line\* adj3 indwell\*).mp,kw. (10)
- 22 (catheter\* adj3 indwell\*).mp,kw. (669)
- 23 (catheter\* adj3 central venous\*).mp,kw. (1443)
- 24 (catheter\* adj3 peripheral).mp,kw. (246)
- 25 picc.mp,kw. (167)
- 26 (arter\* adj3 catheter\*).mp,kw. (775)
- 27 dialock\*.mp,kw. (3)
- 28 vectra\*.mp,kw. (40)
- 29 (vascular adj3 access).mp,kw. (1235)
- 30 (arter\* adj3 access\*).mp,kw. (554)
- 31 (vein\* adj3 access\*).mp,kw. (183)
- 32 broviac.mp,kw. (20)
- 33 (central adj3 catheter\*).mp,kw. (1697)
- 34 (central adj3 line\*).mp,kw. (779)
- 35 cv cath\*.mp,kw. (5)
- 36 groshong.mp,kw. (7)
- 37 pediasat.mp,kw. (1)
- 38 vortex.mp,kw. (5228)
- 39 (catheter\* adj3 vein?).mp,kw. (340)
- 40 (catheter\* adj3 arter\*).mp,kw. (775)
- 41 (tunneled adj3 catheter\*).mp,kw. (165)
- 42 (line? adj3 vein?).mp,kw. (43)
- 43 (line\* adj3 arter\*).mp,kw. (177)
- 44 (catheter\* adj3 subclavian\*).mp,kw. (101)

- 45 (line?\* adj3 subclavian\*).mp,kw. (8)
- 46 double lumen\*.mp,kw. (287)
- 47 avalon elite.mp,kw. (2)
- 48 dual lumen.mp,kw. (63)
- 49 (catheter\* adj3 thrombos\*).mp,kw. (150)
- 50 (catheter\* adj3 occlusion\*).mp,kw. (123)
- 51 (catheter\* adj3 migrat\*).mp,kw. (94)
- 52 (catheter adj3 infection\*).mp,kw. (602)
- 53 (catheter\* adj3 fracture\*).mp,kw. (60)
- 54 (catheter\* adj3 leakage\*).mp,kw. (30)
- 55 (catheter\* adj3 dislocat\*).mp,kw. (14)
- 56 (catheter\* adj3 complication\*).mp,kw. (527)
- 57 (line? adj3 thrombos\*).mp,kw. (17)
- 58 (line? adj3 occlusion\*).mp,kw. (14)
- 59 (line? adj3 migrat\*).mp,kw. (107)
- 60 (line? adj3 infection\*).mp,kw. (357)
- 61 (line\* adj3 fracture\*).mp,kw. (394)
- 62 (line\* adj3 leakage\*).mp,kw. (43)
- 63 (insert\* adj3 peripheral).mp,kw. (71)
- 64 (catheter\* adj3 nurs\*).mp,kw. (37)
- 65 avalon elite.mp,kw. (2)
- 66 dual lumen.mp,kw. (63)
- 67 double lumen\*.mp,kw. (287)
- 68 (iv adj3 peripher\*).mp,kw. (81)
- 69 (intra-venous adj3 peripher\*).mp,kw. (0)
- 70 (intravenous adj3 peripher\*).mp,kw. (172)
- 71 (peripheral\* adj3 catheter\*).mp,kw. (426)
- 72 (peripheral\* adj3 line?).mp,kw. (115)
- 73 (difficult\* adj2 vein?).mp,kw. (18)
- 74 (vein? adj2 punctur\*).mp,kw. (61)
- 75 (vein\* adj3 find\*).mp,kw. (53)
- 76 (puncture\* adj3 vein?).mp,kw. (71)
- 77 (punctur\* adj arter\*).mp,kw. (4)
- 78 (punctur\* adj3 blood vessel\*).mp,kw. (4)
- 79 or/1-78 (18084)
- 80 (line\* adj3 remov\*).mp,kw. (206)

- 81 (catheter\* adj3 remov\*).mp,kw. (813)
- 82 (peripher\* adj3 remov\*).mp,kw. (43)
- 83 (prompt adj3 remov\*).mp,kw. (69)
- 84 (delay\* adj3 remov\*).mp,kw. (104)
- 85 (daily adj3 review\*).mp,kw. (97)
- 86 (daily adj3 assess\*).mp,kw. (703)
- 87 (replace\* adj3 time).mp,kw. (191)
- 88 (dwell\* adj3 time).mp,kw. (565)
- 89 (exchang\* adj3 catheter\*).mp,kw. (85)
- 90 (exchang\* adj3 line\*).mp,kw. (140)
- 91 catheter duration.mp,kw. (22)
- 92 line duration\*.mp,kw. (1)
- 93 (catheter adj2 care).mp,kw. (54)
- 94 (line adj2 care).mp,kw. (101)
- 95 every day.mp,kw. (1386)
- 96 or/80-95 (4508)
- 97 quality improv\*.mp,kw. (6181)
- 98 (risk adj2 assess\*).mp,kw. (12547)
- 99 97 or 98 (18605)
- 100 time factor\*.mp,kw. (199)
- 101 99 and 100 (5)
- 102 96 or 101 (4513)
- 103 79 and 102 (559)
- 104 limit 103 to (english language and yr="2013 -Current") (394)

**Recommendation Question 6: Should the use of visualization technologies (e.g., ultrasound and vein finders) for the insertion of peripheral vascular access devices be recommended?**

Original Search Strategy (January 2013 – November 2018)

Update Search 1: November 2018 – November 2020

Update Search 2: November 2020 – April 2021

*\*Note: the same original search strategy was used to complete the update searches.*

Databases:

- Cumulative Index to Nursing and Allied Health (CINAHL)
- Medline

- Cochrane Central
- Cochrane Database of Systematic Reviews
- Embase
- Emcare
- Epub ahead of print

**Database: CINAHL**

**Search Strategy:**

Search ID#	Search Terms	Search Options	Last Run Via	Results
S136	S119 AND S134	Limiters - Published Date: 20130101-20181231; English Language Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,740
S135	S119 AND S134	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,706
S134	S120 OR S121 OR S122 OR S123 OR S124 OR S125 OR S126 OR S127 OR S128 OR S129 OR S130 OR S131 OR S132 OR S133	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	132,080

S133	echograph*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	383
S132	ultra-sonic*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	11
S131	ultrasonic*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,666
S130	guid* N3 technolog*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	809
S129	TX vein* N3 find*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	524

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S128	guid* adj3 technolog*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S127	ultra-sound*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	80
S126	visualization* N3 technol*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	106
S125	ultrasound*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	47,697

			Database - CINAHL with Full Text	
S124	ultra-sonog*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	42
S123	ultrasonog*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	83,002
S122	(MH "Imaging, Three-Dimensional+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,997
S121	(MH "Ultrasonics+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,506

S120	(MH "Ultrasonography+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	77,172
S119	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	81,255



	OR S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113 OR S114 OR S115 OR S116 OR S117 OR S118			
S118	2 N3 attempt*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	980
S117	TX "two N3 attempt*" OR 2 attempt**	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	175
S116	punctur* N3 "blood vessel"*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7
S115	punctur* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research	511

			Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S114	TX vein* N3 find*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	524
S113	TX difficult* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	365
S112	puncture* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	178
S111	vein* N3 find*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	128

			Database - CINAHL with Full Text	
S110	vein* N3 punctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	189
S109	peripheral* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	342
S108	peripheral* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,901
S107	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1

S106	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1
S105	iv N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	245
S104	double lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	501
S103	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	109
S102	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	3

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S101	catheter* N3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,349
S100	catheter* adj3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S99	insert* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	269
S98	line* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	604

			Database - CINAHL with Full Text	
S97	line* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	36
S96	line* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,365
S95	line* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	127
S94	line* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	44

S93	line* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	38
S92	catheter* N3 complication*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,084
S91	catheter* N3 dislocat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	35
S90	catheter* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	60
S89	catheter* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	98

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S88	catheter* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,024
S87	catheter* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	160
S86	catheter* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	792
S85	catheter* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	675



			Database - CINAHL with Full Text	
S84	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	109
S83	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3
S82	double lumen*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	501
S81	line?* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10

S80	catheter* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	225
S79	line* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	601
S78	line* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	122
S77	catheter* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,624
S76	tunneled N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	390

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S75	catheter* adj3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S74	vortex	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	285
S73	pediasat	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S72	groshong	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	19

			Database - CINAHL with Full Text	
S71	cv cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S70	central N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,223
S69	central N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	8,843
S68	broviac	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	54

S67	vein* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	330
S66	arter* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	896
S65	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,148
S64	dialock*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1
S63	vectra*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	29

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S62	arter* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,624
S61	picc	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	916
S60	catheter* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,724
S59	catheter* N3 central venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	7,732

			Database - CINAHL with Full Text	
S58	catheter* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,648
S57	line* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	40
S56	line* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	24
S55	catheter* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	130

S54	intravenous N3 administrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	11,081
S53	catheter* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	391
S52	line* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	800
S51	line* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	537
S50	catheter* N3 insert*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	4,095



			Search Screen - Advanced Search Database - CINAHL with Full Text	
S49	(catheter* N3 abstract*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	68
S48	venesection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	62
S47	venipunctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,685
S46	phlebotom*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	1,776

			Database - CINAHL with Full Text	
S45	line* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	212
S44	lineN3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S43	catheter* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,845
S42	device remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,724

S41	reservoir* N3 venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	84
S40	portacath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	14
S39	port a cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	90
S38	intraarterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6
S37	intra-arterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	12

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S36	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,148
S35	catheter* N3 vascular	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,096
S34	catheter* N3 port*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	328
S33	arter* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	601

			Database - CINAHL with Full Text	
S32	(MH "Punctures")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,067
S31	MH "Device Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,567
S30	MH "Catheter Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	610
S29	(MH "Administration, Intravenous+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	6,367

S28	(MH "Infusions, Intravenous")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	8,639
S27	MH "Injections, Intravenous"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,117
S26	MH "Injections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	9,959
S25	(MH "Injection Sites")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	609
S24	(MH "Arterial Puncture")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	102

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S23	(MH "Blood Specimen Collection")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,749
S22	(MH "Phlebotomists")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	133
S21	(MH "Phlebotomy")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,094
S20	(MH "Venipuncture+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	2,244

			Database - CINAHL with Full Text	
S19	MH "Catheter Occlusion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	554
S18	MH "Catheter-Related Bloodstream Infections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,112
S17	MH "Catheter-Related Infections+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,936
S16	(MH "Catheter Placement Determination")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	350



S15	(MH "Venous Cutdown")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	34
S14	(MH "Catheter Care, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,505
S13	(MH "Catheter Care")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	936
S12	MH "Peripherally Inserted Central Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,097
S11	MH "Central Venous Catheters+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	3,490

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S10	MH "Arterial Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	233
S9	(MH "Catheters, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,582
S8	(MH "Catheters")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,196
S7	(MH "Vascular Access Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	7,188

			Database - CINAHL with Full Text	
S6	MH "Catheters, Vascular+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,582
S5	MH "Vascular Access Devices, Implantable"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	360
S4	(MH "Infusion Devices, Intermittent")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	154
S3	(MH "Infusion Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,183

S2	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	979
S1	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	979

**Database: Medline**

**Search Strategy:**

- 1 exp Vascular Access Devices/ (4131)
- 2 catheters/ (4059)
- 3 cannula/ (309)
- 4 catheter obstruction/ (197)
- 5 catheters, indwelling/ (17846)
- 6 central venous catheters/ (1684)
- 7 exp catheterization, peripheral/ (10585)
- 8 exp Phlebotomy/ (5436)
- 9 injections, intravenous/ (80684)
- 10 infusions, intravenous/ (52958)
- 11 exp administration, intravenous/ (137729)
- 12 exp Device Removal/ (11695)
- 13 Punctures/ (12790)
- 14 (arter\* adj3 line).mp,kw. (1395)
- 15 (catheter\* adj3 port\*).mp,kw. (1752)
- 16 (catheter\* adj3 vascular).mp,kw. (1886)

- 17 (vascular adj3 access).mp,kw. (9004)
- 18 (intra-arterial adj3 line\*).mp,kw. (38)
- 19 (intraarterial adj3 line\*).mp,kw. (15)
- 20 "port a cath?".mp,kw. (424)
- 21 portacath\*.mp,kw. (68)
- 22 (reservoir\* adj3 venous\*).mp,kw. (309)
- 23 device remov\*.mp,kw. (12262)
- 24 (catheter\* adj3 remov\*).mp,kw. (6289)
- 25 (line\* adj3 remov\*).mp,kw. (1059)
- 26 phlebotom\*.mp,kw. (9421)
- 27 venesection\*.mp,kw. (656)
- 28 venipunctur\*.mp,kw. (2929)
- 29 (catheter\* adj3 obstruct\*).mp,kw. (2)
- 30 (catheter\* adj3 insert\*).mp,kw. (11163)
- 31 (line\* adj3 insert\*).mp,kw. (1937)
- 32 (line\* adj3 fail\*).mp,kw. (3105)
- 33 (catheter\* adj3 fail\*).mp,kw. (1164)
- 34 (intravenous adj3 administrat\*).mp,kw. (45389)
- 35 (catheter\* adj3 in-dwell\*).mp,kw. (119)
- 36 (line\* adj3 in-dwell\*).mp,kw. (6)
- 37 (line\* adj3 indwell\*).mp,kw. (181)
- 38 (catheter\* adj3 indwell\*).mp,kw. (22770)
- 39 (catheter\* adj3 central venous\*).mp,kw. (19170)
- 40 (catheter\* adj3 peripheral).mp,kw. (9141)
- 41 picc.mp,kw. (813)
- 42 (arter\* adj3 catheter\*).mp,kw. (11390)
- 43 dialock\*.mp,kw. (15)
- 44 vectra\*.mp,kw. (114)
- 45 (vascular adj3 access).mp,kw. (9004)
- 46 (arter\* adj3 access\*).mp,kw. (3451)
- 47 (vein\* adj3 access\*).mp,kw. (1107)
- 48 broviac.mp,kw. (307)
- 49 (central adj3 catheter\*).mp,kw. (20129)
- 50 (central adj3 line\*).mp,kw. (4561)
- 51 cv cath\*.mp,kw. (50)
- 52 groshong.mp,kw. (90)

- 53 pediasat.mp,kw. (9)
- 54 vortex.mp,kw. (2999)
- 55 (catheter\* adj3 vein?).mp,kw. (3793)
- 56 (catheter\* adj3 arter\*).mp,kw. (11390)
- 57 (tunneled adj3 catheter\*).mp,kw. (1058)
- 58 (line? adj3 vein?).mp,kw. (340)
- 59 (line\* adj3 arter\*).mp,kw. (2148)
- 60 (catheter\* adj3 subclavian\*).mp,kw. (1387)
- 61 (line?\* adj3 subclavian\*).mp,kw. (84)
- 62 double lumen\*.mp,kw. (2676)
- 63 avalon elite.mp,kw. (27)
- 64 dual lumen.mp,kw. (404)
- 65 (catheter\* adj3 thrombos\*).mp,kw. (1170)
- 66 (catheter\* adj3 occlusion\*).mp,kw. (1320)
- 67 (catheter\* adj3 migrat\*).mp,kw. (661)
- 68 (catheter adj3 infection\*).mp,kw. (7927)
- 69 (catheter\* adj3 fracture\*).mp,kw. (308)
- 70 (catheter\* adj3 leakage\*).mp,kw. (209)
- 71 (catheter\* adj3 dislocat\*).mp,kw. (218)
- 72 (catheter\* adj3 complication\*).mp,kw. (4151)
- 73 (line? adj3 thrombos\*).mp,kw. (107)
- 74 (line? adj3 occlusion\*).mp,kw. (109)
- 75 (line? adj3 migrat\*).mp,kw. (649)
- 76 (line? adj3 infection\*).mp,kw. (2435)
- 77 (line\* adj3 fracture\*).mp,kw. (2327)
- 78 (line\* adj3 leakage\*).mp,kw. (200)
- 79 (insert\* adj3 peripheral).mp,kw. (422)
- 80 (catheter\* adj3 nurs\*).mp,kw. (297)
- 81 avalon elite.mp,kw. (27)
- 82 dual lumen.mp,kw. (404)
- 83 double lumen\*.mp,kw. (2676)
- 84 (iv adj3 peripher\*).mp,kw. (615)
- 85 (intra-venous adj3 peripher\*).mp,kw. (2)
- 86 (intravenous adj3 peripher\*).mp,kw. (1158)
- 87 (peripheral\* adj3 catheter\*).mp,kw. (9598)
- 88 (peripheral\* adj3 line?).mp,kw. (1454)

- 89 (difficult\* adj2 vein?).mp,kw. (110)
- 90 (vein? adj2 punctur\*).mp,kw. (546)
- 91 (vein\* adj3 find\*).mp,kw. (585)
- 92 (puncture\* adj3 vein?).mp,kw. (0)
- 93 (punctur\* adj arter\*).mp,kw. (36)
- 94 (punctur\* adj3 blood vessel\*).mp,kw. (48)
- 95 or/1-94 (304130)
- 96 exp Ultrasonography/ (405133)
- 97 exp ultrasonography, interventional/ (22033)
- 98 exp Imaging, Three-Dimensional/ (70952)
- 99 exp Ultrasonics/ (23563)
- 100 ultrasonog\*.mp,kw. (294760)
- 101 ultra-sonog\*.mp,kw. (314)
- 102 ultrasound\*.mp,kw. (189117)
- 103 ultra-sound\*.mp,kw. (508)
- 104 (visualization\* adj3 technol\*).mp,kw. (309)
- 105 (guidance adj3 technolog\*).mp,kw. (251)
- 106 (vein\* adj3 find\*).mp,kw. (585)
- 107 ultrasonic\*.mp,kw. (62482)
- 108 ultra-sonic.mp,kw. (75)
- 109 echograph\*.mp,kw. (9825)
- 110 or/96-109 (593535)
- 111 95 and 110 (17527)
- 112 limit 111 to english language (15393)
- 113 limit 112 to yr="2013 -Current" (4529)
- 114 animals/ not (animals/ and humans/) (4477708)
- 115 113 not 114 (4203)
- 116 limit 113 to humans (4135)
- 117 115 or 116 (4204)

**Database: CCRCT**

**Search Strategy:**

- 1 exp Vascular Access Devices/ (227)
- 2 catheters/ (198)
- 3 cannula/ (30)

- 4 catheter obstruction/ (15)
- 5 catheters, indwelling/ (953)
- 6 central venous catheters/ (90)
- 7 exp catheterization, peripheral/ (830)
- 8 exp Phlebotomy/ (392)
- 9 injections, intravenous/ (7445)
- 10 infusions, intravenous/ (9770)
- 11 exp administration, intravenous/ (17440)
- 12 exp Device Removal/ (361)
- 13 Punctures/ (391)
- 14 (arter\* adj3 line).mp,kw. (346)
- 15 (catheter\* adj3 port\*).mp,kw. (194)
- 16 (catheter\* adj3 vascular).mp,kw. (217)
- 17 (vascular adj3 access).mp,kw. (1235)
- 18 (intra-arterial adj3 line\*).mp,kw. (8)
- 19 (intraarterial adj3 line\*).mp,kw. (1)
- 20 "port a cath?".mp,kw. (29)
- 21 portacath\*.mp,kw. (2)
- 22 (reservoir\* adj3 venous\*).mp,kw. (57)
- 23 device remov\*.mp,kw. (817)
- 24 (catheter\* adj3 remov\*).mp,kw. (1369)
- 25 (line\* adj3 remov\*).mp,kw. (93)
- 26 phlebotom\*.mp,kw. (769)
- 27 venesection\*.mp,kw. (75)
- 28 venipunctur\*.mp,kw. (642)
- 29 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 30 (catheter\* adj3 insert\*).mp,kw. (2337)
- 31 (line\* adj3 insert\*).mp,kw. (196)
- 32 (line\* adj3 fail\*).mp,kw. (767)
- 33 (catheter\* adj3 fail\*).mp,kw. (407)
- 34 (intravenous adj3 administrat\*).mp,kw. (27560)
- 35 (catheter\* adj3 in-dwell\*).mp,kw. (46)
- 36 (line\* adj3 in-dwell\*).mp,kw. (5)
- 37 (line\* adj3 indwell\*).mp,kw. (21)
- 38 (catheter\* adj3 indwell\*).mp,kw. (1706)
- 39 (catheter\* adj3 central venous\*).mp,kw. (1852)



- 40 (catheter\* adj3 peripheral).mp,kw. (1042)
- 41 picc.mp,kw. (191)
- 42 (arter\* adj3 catheter\*).mp,kw. (1826)
- 43 dialock\*.mp,kw. (0)
- 44 vectra\*.mp,kw. (41)
- 45 (vascular adj3 access).mp,kw. (1235)
- 46 (arter\* adj3 access\*).mp,kw. (475)
- 47 (vein\* adj3 access\*).mp,kw. (223)
- 48 broviac.mp,kw. (14)
- 49 (central adj3 catheter\*).mp,kw. (2023)
- 50 (central adj3 line\*).mp,kw. (459)
- 51 cv cath\*.mp,kw. (4)
- 52 groshong.mp,kw. (14)
- 53 pediasat.mp,kw. (1)
- 54 vortex.mp,kw. (54)
- 55 (catheter\* adj3 vein?).mp,kw. (802)
- 56 (catheter\* adj3 arter\*).mp,kw. (1826)
- 57 (tunneled adj3 catheter\*).mp,kw. (181)
- 58 (line? adj3 vein?).mp,kw. (54)
- 59 (line\* adj3 arter\*).mp,kw. (491)
- 60 (catheter\* adj3 subclavian\*).mp,kw. (183)
- 61 (line?\* adj3 subclavian\*).mp,kw. (6)
- 62 double lumen\*.mp,kw. (479)
- 63 avalon elite.mp,kw. (0)
- 64 dual lumen.mp,kw. (43)
- 65 (catheter\* adj3 thrombos\*).mp,kw. (319)
- 66 (catheter\* adj3 occlusion\*).mp,kw. (273)
- 67 (catheter\* adj3 migrat\*).mp,kw. (89)
- 68 (catheter adj3 infection\*).mp,kw. (1251)
- 69 (catheter\* adj3 fracture\*).mp,kw. (36)
- 70 (catheter\* adj3 leakage\*).mp,kw. (59)
- 71 (catheter\* adj3 dislocat\*).mp,kw. (31)
- 72 (catheter\* adj3 complication\*).mp,kw. (1277)
- 73 (line? adj3 thrombos\*).mp,kw. (21)
- 74 (line? adj3 occlusion\*).mp,kw. (17)
- 75 (line? adj3 migrat\*).mp,kw. (14)

- 76 (line? adj3 infection\*).mp,kw. (230)
- 77 (line\* adj3 fracture\*).mp,kw. (124)
- 78 (line\* adj3 leakage\*).mp,kw. (33)
- 79 (insert\* adj3 peripheral).mp,kw. (128)
- 80 (catheter\* adj3 nurs\*).mp,kw. (159)
- 81 avalon elite.mp,kw. (0)
- 82 dual lumen.mp,kw. (43)
- 83 double lumen\*.mp,kw. (479)
- 84 (iv adj3 peripher\*).mp,kw. (167)
- 85 (intra-venous adj3 peripher\*).mp,kw. (0)
- 86 (intravenous adj3 peripher\*).mp,kw. (420)
- 87 (peripheral\* adj3 catheter\*).mp,kw. (1186)
- 88 (peripheral\* adj3 line?).mp,kw. (126)
- 89 (difficult\* adj2 vein?).mp,kw. (36)
- 90 (vein? adj2 punctur\*).mp,kw. (365)
- 91 (vein\* adj3 find\*).mp,kw. (44)
- 92 (puncture\* adj3 vein?).mp,kw. (0)
- 93 (punctur\* adj arter\*).mp,kw. (31)
- 94 (punctur\* adj3 blood vessel\*).mp,kw. (26)
- 95 or/1-94 (55696)
- 96 exp Ultrasonography/ (12843)
- 97 exp ultrasonography, interventional/ (1573)
- 98 exp Imaging, Three-Dimensional/ (1154)
- 99 exp Ultrasonics/ (288)
- 100 ultrasonog\*.mp,kw. (12879)
- 101 ultra-sonog\*.mp,kw. (38)
- 102 ultrasound\*.mp,kw. (19526)
- 103 ultra-sound\*.mp,kw. (80)
- 104 (visualization\* adj3 technol\*).mp,kw. (28)
- 105 (guidance adj3 technolog\*).mp,kw. (28)
- 106 (vein\* adj3 find\*).mp,kw. (44)
- 107 ultrasonic\*.mp,kw. (2692)
- 108 ultra-sonic.mp,kw. (3)
- 109 echograph\*.mp,kw. (4890)
- 110 or/96-109 (34619)
- 111 95 and 110 (2821)

- 112 limit 111 to english language (2347)
- 113 limit 112 to yr="2013 -Current" (1191)

## **Database: Cochrane Database of Systematic Reviews**

### **Search Strategy:**

- 1 (arter\* adj3 line).mp,kw. (22)
- 2 (catheter\* adj3 port\*).mp,kw. (24)
- 3 (catheter\* adj3 vascular).mp,kw. (32)
- 4 (vascular adj3 access).mp,kw. (91)
- 5 (intra-arterial adj3 line\*).mp,kw. (2)
- 6 (intraarterial adj3 line\*).mp,kw. (0)
- 7 "port a cath?".mp,kw. (19)
- 8 portacath\*.mp,kw. (9)
- 9 (reservoir\* adj3 venous\*).mp,kw. (2)
- 10 device remov\*.mp,kw. (33)
- 11 (catheter\* adj3 remov\*).mp,kw. (105)
- 12 (line\* adj3 remov\*).mp,kw. (19)
- 13 phlebotom\*.mp,kw. (38)
- 14 venesection\*.mp,kw. (6)
- 15 venipunctur\*.mp,kw. (31)
- 16 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 17 (catheter\* adj3 insert\*).mp,kw. (197)
- 18 (line\* adj3 insert\*).mp,kw. (43)
- 19 (line\* adj3 fail\*).mp,kw. (48)
- 20 (catheter\* adj3 fail\*).mp,kw. (36)
- 21 (intravenous adj3 administrat\*).mp,kw. (460)
- 22 (catheter\* adj3 in-dwell\*).mp,kw. (13)
- 23 (line\* adj3 in-dwell\*).mp,kw. (0)
- 24 (line\* adj3 indwell\*).mp,kw. (7)
- 25 (catheter\* adj3 indwell\*).mp,kw. (109)
- 26 (catheter\* adj3 central venous\*).mp,kw. (133)
- 27 (catheter\* adj3 peripheral).mp,kw. (59)
- 28 picc.mp,kw. (19)
- 29 (arter\* adj3 catheter\*).mp,kw. (82)
- 30 dialock\*.mp,kw. (0)

- 31 vectra\*.mp,kw. (1)
- 32 (vascular adj3 access).mp,kw. (91)
- 33 (arter\* adj3 access\*).mp,kw. (30)
- 34 (vein\* adj3 access\*).mp,kw. (16)
- 35 broviac.mp,kw. (11)
- 36 (central adj3 catheter\*).mp,kw. (143)
- 37 (central adj3 line\*).mp,kw. (97)
- 38 cv cath\*.mp,kw. (0)
- 39 groshong.mp,kw. (1)
- 40 pediasat.mp,kw. (0)
- 41 vortex.mp,kw. (4)
- 42 (catheter\* adj3 vein?).mp,kw. (33)
- 43 (catheter\* adj3 arter\*).mp,kw. (82)
- 44 (tunneled adj3 catheter\*).mp,kw. (2)
- 45 (line? adj3 vein?).mp,kw. (6)
- 46 (line\* adj3 arter\*).mp,kw. (29)
- 47 (catheter\* adj3 subclavian\*).mp,kw. (11)
- 48 (line?\* adj3 subclavian\*).mp,kw. (1)
- 49 double lumen\*.mp,kw. (10)
- 50 avalon elite.mp,kw. (0)
- 51 dual lumen.mp,kw. (2)
- 52 (catheter\* adj3 thrombos\*).mp,kw. (36)
- 53 (catheter\* adj3 occlusion\*).mp,kw. (28)
- 54 (catheter\* adj3 migrat\*).mp,kw. (10)
- 55 (catheter adj3 infection\*).mp,kw. (105)
- 56 (catheter\* adj3 fracture\*).mp,kw. (3)
- 57 (catheter\* adj3 leakage\*).mp,kw. (6)
- 58 (catheter\* adj3 dislocat\*).mp,kw. (4)
- 59 (catheter\* adj3 complication\*).mp,kw. (59)
- 60 (line? adj3 thrombos\*).mp,kw. (5)
- 61 (line? adj3 occlusion\*).mp,kw. (3)
- 62 (line? adj3 migrat\*).mp,kw. (2)
- 63 (line? adj3 infection\*).mp,kw. (32)
- 64 (line\* adj3 fracture\*).mp,kw. (12)
- 65 (line\* adj3 leakage\*).mp,kw. (1)
- 66 (insert\* adj3 peripheral).mp,kw. (19)

- 67 (catheter\* adj3 nurs\*).mp,kw. (5)
- 68 avalon elite.mp,kw. (0)
- 69 dual lumen.mp,kw. (2)
- 70 double lumen\*.mp,kw. (10)
- 71 (iv adj3 peripher\*).mp,kw. (5)
- 72 (intra-venous adj3 peripher\*).mp,kw. (0)
- 73 (intravenous adj3 peripher\*).mp,kw. (20)
- 74 (peripheral\* adj3 catheter\*).mp,kw. (71)
- 75 (peripheral\* adj3 line?).mp,kw. (23)
- 76 (difficult\* adj2 vein?).mp,kw. (3)
- 77 (vein? adj2 punctur\*).mp,kw. (7)
- 78 (vein\* adj3 find\*).mp,kw. (4)
- 79 (puncture\* adj3 vein?).mp,kw. (0)
- 80 (punctur\* adj arter\*).mp,kw. (2)
- 81 (punctur\* adj3 blood vessel\*).mp,kw. (2)
- 82 or/1-81 (1099)
- 83 ultrasonog\*.mp,kw. (393)
- 84 ultra-sonog\*.mp,kw. (3)
- 85 ultrasound\*.mp,kw. (1177)
- 86 ultra-sound\*.mp,kw. (8)
- 87 (visualization\* adj3 technol\*).mp,kw. (0)
- 88 (guidance adj3 technolog\*).mp,kw. (4)
- 89 (vein\* adj3 find\*).mp,kw. (4)
- 90 ultrasonic\*.mp,kw. (146)
- 91 ultra-sonic.mp,kw. (1)
- 92 echograph\*.mp,kw. (52)
- 93 or/83-92 (1369)
- 94 82 and 93 (244)
- 95 limit 94 to full systematic reviews (207)

## **Database: Embase**

### **Search Strategy:**

- 1 vascular access device/ (1057)
- 2 vascular equipment/ (494)
- 3 exp vascular access/ (22767)

- 4 exp cannulation/ (36138)
- 5 exp catheter removal/ (6022)
- 6 device removal/ (17138)
- 7 exp central venous catheter/ (20881)
- 8 intravenous catheter/ (6095)
- 9 exp vein catheterization/ (13395)
- 10 exp central venous catheterization/ (8675)
- 11 exp catheter complication/ (21289)
- 12 exp catheter care/ (564)
- 13 exp double lumen catheter/ (393)
- 14 exp midline catheter/ (56)
- 15 exp peripheral venous catheter/ (648)
- 16 exp peripherally inserted central venous catheter/ (2570)
- 17 exp catheter infection/ (15767)
- 18 exp apheresis/ (55631)
- 19 exp apheresis device/ (882)
- 20 cannula/ (9797)
- 21 exp vein puncture/ (6051)
- 22 exp blood collection tube/ (822)
- 23 catheters, indwelling/ (10486)
- 24 exp Phlebotomy/ (9615)
- 25 (arter\* adj3 line).tw,kw. (2603)
- 26 (catheter\* adj3 port\*).tw,kw. (2655)
- 27 (catheter\* adj3 vascular).tw,kw. (2837)
- 28 (vascular adj3 access).tw,kw. (14690)
- 29 (intra-arterial adj3 line\*).tw,kw. (60)
- 30 (intraarterial adj3 line\*).tw,kw. (16)
- 31 "port a cath?".tw,kw. (721)
- 32 portacath\*.tw,kw. (155)
- 33 (reservoir\* adj3 venous\*).tw,kw. (429)
- 34 device remov\*.tw,kw. (1467)
- 35 (catheter\* adj3 remov\*).tw,kw. (11831)
- 36 (line\* adj3 remov\*).tw,kw. (1850)
- 37 phlebotom\*.tw,kw. (9728)
- 38 venesection\*.tw,kw. (894)
- 39 venipunctur\*.tw,kw. (4533)

- 40 (catheter\* adj3 abstract\*).tw,kw. (1)
- 41 (catheter\* adj3 insert\*).tw,kw. (19171)
- 42 (line\* adj3 insert\*).tw,kw. (3311)
- 43 (line\* adj3 fail\*).tw,kw. (5642)
- 44 (catheter\* adj3 fail\*).tw,kw. (2080)
- 45 (catheter\* adj3 in-dwell\*).tw,kw. (187)
- 46 (line\* adj3 in-dwell\*).tw,kw. (9)
- 47 (line\* adj3 indwell\*).tw,kw. (295)
- 48 (catheter\* adj3 indwell\*).tw,kw. (11065)
- 49 (catheter\* adj3 central venous\*).tw,kw. (17545)
- 50 (catheter\* adj3 peripheral).tw,kw. (2607)
- 51 picc.tw,kw. (2265)
- 52 (arter\* adj3 catheter\*).tw,kw. (16422)
- 53 dialock\*.tw,kw. (21)
- 54 vectra\*.tw,kw. (428)
- 55 (vascular adj3 access).tw,kw. (14690)
- 56 (arter\* adj3 access\*).tw,kw. (6471)
- 57 (vein\* adj3 access\*).tw,kw. (2205)
- 58 broviac.tw,kw. (426)
- 59 (central adj3 catheter\*).tw,kw. (21063)
- 60 (central adj3 line\*).tw,kw. (8991)
- 61 cv cath\*.tw,kw. (87)
- 62 groshong.tw,kw. (153)
- 63 pediasat.tw,kw. (18)
- 64 vortex.tw,kw. (5669)
- 65 (catheter\* adj3 vein?).tw,kw. (5605)
- 66 (catheter\* adj3 arter\*).tw,kw. (16422)
- 67 (tunneled adj3 catheter\*).tw,kw. (2008)
- 68 (line? adj3 vein?).tw,kw. (623)
- 69 (line\* adj3 arter\*).tw,kw. (3774)
- 70 (catheter\* adj3 subclavian\*).tw,kw. (1721)
- 71 (line?\* adj3 subclavian\*).tw,kw. (157)
- 72 double lumen\*.tw,kw. (4137)
- 73 avalon elite.tw,kw. (44)
- 74 dual lumen.tw,kw. (769)
- 75 (catheter\* adj3 thrombos\*).tw,kw. (1956)

- 76 (catheter\* adj3 occlusion\*).tw,kw. (2101)
- 77 (catheter\* adj3 migrat\*).tw,kw. (1058)
- 78 (catheter adj3 infection\*).tw,kw. (8617)
- 79 (catheter\* adj3 fracture\*).tw,kw. (516)
- 80 (catheter\* adj3 leakage\*).tw,kw. (405)
- 81 (catheter\* adj3 dislocat\*).tw,kw. (351)
- 82 (catheter\* adj3 complication\*).tw,kw. (6723)
- 83 (line? adj3 thrombos\*).tw,kw. (231)
- 84 (line? adj3 occlusion\*).tw,kw. (197)
- 85 (line? adj3 migrat\*).tw,kw. (1133)
- 86 (line? adj3 infection\*).tw,kw. (4136)
- 87 (line\* adj3 fracture\*).tw,kw. (3225)
- 88 (line\* adj3 leakage\*).tw,kw. (326)
- 89 (insert\* adj3 peripheral).tw,kw. (691)
- 90 (catheter\* adj3 nurs\*).tw,kw. (470)
- 91 avalon elite.tw,kw. (44)
- 92 dual lumen.tw,kw. (769)
- 93 double lumen\*.mp,kw. (4814)
- 94 (iv adj3 peripher\*).tw,kw. (1076)
- 95 (intra-venous adj3 peripher\*).mp,kw. (3)
- 96 (intravenous adj3 peripher\*).tw,kw. (1765)
- 97 (peripheral\* adj3 catheter\*).tw,kw. (4545)
- 98 (peripheral\* adj3 line?).tw,kw. (2178)
- 99 (difficult\* adj2 vein?).tw,kw. (202)
- 100 (vein? adj2 punctur\*).tw,kw. (1023)
- 101 (vein\* adj3 find\*).tw,kw. (946)
- 102 (puncture\* adj3 vein?).tw,kw. (0)
- 103 (punctur\* adj arter\*).tw,kw. (58)
- 104 (punctur\* adj3 blood vessel\*).tw,kw. (82)
- 105 (vein\* adj3 find\*).tw,kw. (946)
- 106 or/1-104 (289309)
- 107 exp ultrasound/ (158972)
- 108 echography/ (289921)
- 109 exp three dimensional imaging/ (91586)
- 110 exp interventional ultrasonography/ (1697)
- 111 real time echography/ (4644)



- 112 intravascular ultrasound/ (13689)
- 113 doppler ultrasonography/ (3631)
- 114 echograph\*.tw,kw. (12219)
- 115 ultra-sonic.tw,kw. (129)
- 116 ultrasonic\*.mp,kw. (58296)
- 117 ultrasound\*.tw,kw. (345591)
- 118 ultra-sonog\*.tw,kw. (723)
- 119 ultrasonog\*.tw,kw. (146904)
- 120 ultra-sound\*.mp,kw. (1296)
- 121 (visualization\* adj3 technol\*).mp,kw. (541)
- 122 (guidance adj3 technolog\*).mp,kw. (488)
- 123 (vein\* adj3 find\*).tw,kw. (946)
- 124 or/107-123 (742647)
- 125 106 and 124 (21648)
- 126 limit 125 to yr="2013 -Current" (10593)
- 127 limit 126 to english language (10272)
- 128 limit 127 to (books or chapter or conference abstract or conference paper or "conference review" or letter or note or short survey) (4727)
- 129 127 not 128 (5545)

### **Database: Epub Ahead of Print**

#### **Search Strategy:**

- 1 (arter\* adj3 line).mp,kw. (117)
- 2 (catheter\* adj3 port\*).mp,kw. (130)
- 3 (catheter\* adj3 vascular).mp,kw. (153)
- 4 (vascular adj3 access).mp,kw. (1202)
- 5 (intra-arterial adj3 line\*).mp,kw. (1)
- 6 (intraarterial adj3 line\*).mp,kw. (1)
- 7 "port a cath?".mp,kw. (34)
- 8 portacath\*.mp,kw. (7)
- 9 (reservoir\* adj3 venous\*).mp,kw. (10)
- 10 device remov\*.mp,kw. (139)
- 11 (catheter\* adj3 remov\*).mp,kw. (806)
- 12 (line\* adj3 remov\*).mp,kw. (206)
- 13 phlebotom\*.mp,kw. (651)

- 14 venesection\*.mp,kw. (73)
- 15 venipunctur\*.mp,kw. (282)
- 16 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 17 (catheter\* adj3 insert\*).mp,kw. (1322)
- 18 (line\* adj3 insert\*).mp,kw. (264)
- 19 (line\* adj3 fail\*).mp,kw. (520)
- 20 (catheter\* adj3 fail\*).mp,kw. (167)
- 21 (intravenous adj3 administrat\*).mp,kw. (2572)
- 22 (catheter\* adj3 in-dwell\*).mp,kw. (9)
- 23 (line\* adj3 in-dwell\*).mp,kw. (1)
- 24 (line\* adj3 indwell\*).mp,kw. (10)
- 25 (catheter\* adj3 indwell\*).mp,kw. (650)
- 26 (catheter\* adj3 central venous\*).mp,kw. (1439)
- 27 (catheter\* adj3 peripheral).mp,kw. (241)
- 28 picc.mp,kw. (163)
- 29 (arter\* adj3 catheter\*).mp,kw. (769)
- 30 dialock\*.mp,kw. (3)
- 31 vectra\*.mp,kw. (41)
- 32 (vascular adj3 access).mp,kw. (1202)
- 33 (arter\* adj3 access\*).mp,kw. (551)
- 34 (vein\* adj3 access\*).mp,kw. (186)
- 35 broviac.mp,kw. (20)
- 36 (central adj3 catheter\*).mp,kw. (1692)
- 37 (central adj3 line\*).mp,kw. (773)
- 38 cv cath\*.mp,kw. (6)
- 39 groshong.mp,kw. (7)
- 40 pediasat.mp,kw. (1)
- 41 vortex.mp,kw. (5178)
- 42 (catheter\* adj3 vein?).mp,kw. (335)
- 43 (catheter\* adj3 arter\*).mp,kw. (769)
- 44 (tunneled adj3 catheter\*).mp,kw. (168)
- 45 (line? adj3 vein?).mp,kw. (41)
- 46 (line\* adj3 arter\*).mp,kw. (172)
- 47 (catheter\* adj3 subclavian\*).mp,kw. (103)
- 48 (line?\* adj3 subclavian\*).mp,kw. (8)
- 49 double lumen\*.mp,kw. (284)

- 50 avalon elite.mp,kw. (3)
- 51 dual lumen.mp,kw. (62)
- 52 (catheter\* adj3 thrombos\*).mp,kw. (151)
- 53 (catheter\* adj3 occlusion\*).mp,kw. (124)
- 54 (catheter\* adj3 migrat\*).mp,kw. (93)
- 55 (catheter adj3 infection\*).mp,kw. (608)
- 56 (catheter\* adj3 fracture\*).mp,kw. (56)
- 57 (catheter\* adj3 leakage\*).mp,kw. (30)
- 58 (catheter\* adj3 dislocat\*).mp,kw. (17)
- 59 (catheter\* adj3 complication\*).mp,kw. (514)
- 60 (line? adj3 thrombos\*).mp,kw. (17)
- 61 (line? adj3 occlusion\*).mp,kw. (13)
- 62 (line? adj3 migrat\*).mp,kw. (106)
- 63 (line? adj3 infection\*).mp,kw. (360)
- 64 (line\* adj3 fracture\*).mp,kw. (385)
- 65 (line\* adj3 leakage\*).mp,kw. (42)
- 66 (insert\* adj3 peripheral).mp,kw. (72)
- 67 (catheter\* adj3 nurs\*).mp,kw. (36)
- 68 avalon elite.mp,kw. (3)
- 69 dual lumen.mp,kw. (62)
- 70 double lumen\*.mp,kw. (284)
- 71 (iv adj3 peripher\*).mp,kw. (81)
- 72 (intra-venous adj3 peripher\*).mp,kw. (0)
- 73 (intravenous adj3 peripher\*).mp,kw. (169)
- 74 (peripheral\* adj3 catheter\*).mp,kw. (415)
- 75 (peripheral\* adj3 line?).mp,kw. (111)
- 76 (difficult\* adj2 vein?).mp,kw. (18)
- 77 (vein? adj2 punctur\*).mp,kw. (58)
- 78 (vein\* adj3 find\*).mp,kw. (52)
- 79 (puncture\* adj3 vein?).mp,kw. (0)
- 80 (punctur\* adj arter\*).mp,kw. (4)
- 81 (punctur\* adj3 blood vessel\*).mp,kw. (4)
- 82 or/1-81 (18615)
- 83 ultrasonog\*.mp,kw. (12626)
- 84 ultra-sonog\*.mp,kw. (54)
- 85 ultrasound\*.mp,kw. (33218)

- 86 ultra-sound\*.mp,kw. (74)
- 87 (visualization\* adj3 technol\*).mp,kw. (77)
- 88 (guidance adj3 technolog\*).mp,kw. (60)
- 89 (vein\* adj3 find\*).mp,kw. (52)
- 90 ultrasonic\*.mp,kw. (8856)
- 91 ultra-sonic.mp,kw. (14)
- 92 echograph\*.mp,kw. (390)
- 93 or/83-92 (48784)
- 94 82 and 93 (1172)
- 95 limit 94 to (english language and yr="2013 -Current") (873)

**Recommendation Question 7: Should pain management strategies (including pharmacological and non-pharmacological strategies) during the insertion of a vascular access device be recommended?**

Original Search Strategy (January 2013 – March 2019)

Update Search 1: March 2019 – November 2020

Update Search 2: November 2020 – April 2021

*\*Note: the same original search strategy was used to complete the update searches.*

Databases:

- Cumulative Index to Nursing and Allied Health (CINAHL)
- Medline
- Cochrane Central
- Cochrane Database of Systematic Reviews
- Embase
- Emcare
- Epub ahead of print
- PsycInfo

**Database: CINAHL**

**Search Strategy:**

Search ID#	Search Terms	Search Options	Last Run Via	Results
S155	S136 OR S153	Limiters - Publication Type: Meta Analysis, Meta Synthesis,	Interface - EBSCOhost Research	<b>89</b>

		Systematic Review Search modes - Boolean/Phrase	Databases Search Screen - Advanced Search Database - CINAHL with Full Text	
S154	S136 OR S153	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,960
S153	S115 AND S152	Limiters - Published Date: 20130101-20191231; English Language; Peer Reviewed Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,492
S152	S137 OR S138 OR S139 OR S140 OR S141 OR S142 OR S143 OR S144 OR S145 OR S146 OR S147 OR S148 OR S149 OR S150 OR S151	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	127,716
S151	pain* N4 (nondrug* OR non drug*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	74

			Database - CINAHL with Full Text	
S150	Pain* AND (child* N3 (position* OR comfort*))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	132
S149	Pain* AND ( patient* N3 (position* OR comfort*))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,914
S148	Pain* N2 (relax* OR music* OR touch* OR laugh*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	700
S147	Pain* N2 (touch* OR laugh* OR complementary OR ointment* OR cream)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	441

S146	( distract* OR deep breath* OR pacifier* OR suck* OR swaddl* OR sucrose* OR sweet* ) AND Pain*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,198
S145	needle* N4 pain*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	457
S144	procedur* N2 sedat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,121
S143	Pain* N2 (control* OR measur* OR reliev* OR acute)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	71,925
S142	Pain* N2 (manag* OR procedur* OR percept*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	26,819

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S141	(MH "Nociceptive Pain+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	531
S140	(MH "Pain Measurement")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	42,928
S139	(MH "Treatment Related Pain")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,077
S138	(MH "Pain Management")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	3,773



			Database - CINAHL with Full Text	
S137	(MH "Pain")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	63,024
S136	S115 AND S135	Limiters - Published Date: 20130101-20191231; English Language; Peer Reviewed Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,040
S135	S116 OR S117 OR S118 OR S119 OR S120 OR S121 OR S122 OR S123 OR S124 OR S125 OR S126 OR S127 OR S128 OR S129 OR S130 OR S131 OR S132 OR S133 OR S134	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	148,178
S134	( midazolam OR angel ) OR ( fentanyl OR tetracaine ) OR ( amethocaine OR prilocaine ) OR ametop*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	9,331

S133	elma	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7
S132	anesth* N2 local* OR anaesth* N2 local* OR analg* N2 local*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	12,908
S131	anesth* N2 topic* OR anaesth* N2 topic* OR analg* N2 topic*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,199
S130	anesth* N2 topic* OR anaesth* N2 topic*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	959
S129	(MH "Antiinflammatory Agents+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	55,485

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S128	(MH "Analgesics+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	44,810
S127	(MH "Analgesics, Opioid")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	14,008
S126	(MH "Analgesics, Nonnarcotic+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	34,959
S125	(MH "Narcotics")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	10,240

			Database - CINAHL with Full Text	
S124	(MH "Anesthetics, Local+") OR (MH "Benzocaine") OR (MH "Cocaine") OR (MH "EMLA Cream") OR (MH "Lidocaine") OR (MH "Procaine") OR (MH "Tetracaine")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	15,253
S123	(MH "Anesthesia, General")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	8,586
S122	(MH "Anesthesia, Local")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,602
S121	(MH "Sedation")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	4,058

S120	(MH "Conscious Sedation")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,773
S119	(MH "Electronarcosis")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	15
S118	(MH "Analgesia")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,743
S117	(MH "Anesthesia")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	11,355
S116	(MH "Anesthesia and Analgesia")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	32

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S115	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86 OR S87 OR S88 OR S89 OR S90 OR S91 OR S92 OR S93 OR S94 OR S95 OR S96 OR S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	104,417

	S107 OR S108 OR S109 OR S110 OR S111 OR S112 OR S113 OR S114			
S114	(blood N2 draw*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,831
S113	punctur* N4 needl*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	541
S112	(line* N2 insert*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	454
S111	(line* N2 plac*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	702

S110	(catheter* N2 insert*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3,947
S109	(catheter* N2 plac*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,751
S108	(blood N2 collect*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10,013
S107	apheresis	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	910
S106	blood N2 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	1,200



			Search Screen - Advanced Search Database - CINAHL with Full Text	
S105	punctur* N3 "blood vessel"*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7
S104	punctur* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	526
S103	immunization* or immunisation*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	29,970
S102	puncture* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	182

			Database - CINAHL with Full Text	
S101	venesection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	63
S100	venipunctur*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,709
S99	phlebotom*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,808
S98	(MH "Punctures") OR(MH "Immunization")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	21,283

S97	(MH "Phlebotomists")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	137
S96	(MH "Cordocentesis")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	122
S95	(MH "Blood Specimen Collection+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,081
S94	(MH "Phlebotomy")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,110
S93	(MH "Venipuncture+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	2,277

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S92	(MH "Arterial Puncture")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	107
S91	heart N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	7,207
S90	heart N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	215
S89	(MH "Heart Catheterization")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	6,490

			Database - CINAHL with Full Text	
S88	peripheral* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	353
S87	peripheral* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5,015
S86	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1
S85	intra-venous N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1

S84	iv N3 peripher*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	253
S83	double lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	511
S82	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	110
S81	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3
S80	catheter* N3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	1,369

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S79	catheter* adj3 nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	0
S78	insert* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	285
S77	line* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	610
S76	line* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	38

			Database - CINAHL with Full Text	
S75	line* N3 infection*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	1,415
S74	line* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	131
S73	line* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	45
S72	line* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	39



S71	catheter* N3 dislocat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	36
S70	catheter* N3 leakage*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	60
S69	catheter* N3 fracture*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	98
S68	catheter* N3 migrat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	163
S67	catheter* N3 occlusion*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	808

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S66	catheter* N3 thrombos*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	688
S65	dual lumen	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	110
S64	avalon elite	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	3
S63	double lumen*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	511

			Database - CINAHL with Full Text	
S62	line?* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	10
S61	catheter* N3 subclavian*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	227
S60	line* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	611
S59	line* N3 vein*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	127

S58	catheter* N3 arter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	2,674
S57	tunneled N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	402
S56	vortex	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	291
S55	pediasat	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	5
S54	groshong	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S53	cv cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S52	central N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S51	central N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	9,011
S50	broviac	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S49	vein* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S48	arter* N3 access*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S47	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S46	dialock*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S45	vectra*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S44	arter* N3 catheter*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S43	picc	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S42	catheter* N3 peripheral	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S41	catheter* N3 central venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S40	catheter* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S39	line* N3 indwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S38	line* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S37	catheter* N3 in-dwell*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display



			Database - CINAHL with Full Text	
S36	catheter* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S35	line* N3 fail*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S34	(catheter* N3 abstract*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S33	line* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S32	lineN3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S31	catheter* N3 remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S30	device remov*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S29	reservoir* N3 venous*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S28	portacath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S27	port a cath*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S26	intraarterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S25	intra-arterial N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S24	vascular N3 access	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S23	catheter* N3 vascular	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S22	catheter* N3 port*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S21	arter* N3 line*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S20	MH "Device Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S19	MH "Catheter Removal"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S18	MH "Injections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S17	(MH "Injection Sites")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S16	MH "Catheter Occlusion"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S15	MH "Catheter-Related Bloodstream Infections"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display

			Search Screen - Advanced Search Database - CINAHL with Full Text	
S14	(MH "Catheter Placement Determination")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S13	(MH "Venous Cutdown")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S12	(MH "Catheter Care, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S11	(MH "Catheter Care")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	Display

			Database - CINAHL with Full Text	
S10	MH "Peripherally Inserted Central Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S9	MH "Central Venous Catheters+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S8	MH "Arterial Catheters"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S7	(MH "Catheters, Vascular+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

S6	(MH "Catheters")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S5	(MH "Vascular Access Devices+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S4	MH "Catheters, Vascular+"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S3	MH "Vascular Access Devices, Implantable"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display
S2	(MH "Needles")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases	Display



			Search Screen - Advanced Search Database - CINAHL with Full Text	
S1	(MH "Intravenous Therapy Equipment and Supplies")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL with Full Text	Display

**Database: Medline**

**Search Strategy:**

- 1 "Anesthesia and Analgesia"/ (3689)
- 2 anesthesia, local/ (16528)
- 3 Anesthesia/ (61096)
- 4 Anesthesia, General/ (38253)
- 5 exp Anesthesia, Cardiac Procedures/ (45)
- 6 Electroacupuncture/ (3510)
- 7 Hypnosis, Anesthetic/ (551)
- 8 Conscious Sedation/ (8381)
- 9 Deep Sedation/ (1098)
- 10 Analgesia/ (19144)
- 11 exp anesthetics, local/ (101521)
- 12 benzocaine/ or benzyl alcohol/ or bupivacaine/ or carticaine/ or cocaine/ or dibucaine/ or diphenhydramine/ or ethyl chloride/ or etidocaine/ or levobupivacaine/ or lidocaine/ or lidocaine, prilocaine drug combination/ or mepivacaine/ or prilocaine/ or procaine/ or propoxycaine/ or ropivacaine/ or tetracaine/ or tetrodotxin/ or trimecaine/ (90018)
- 13 exp Anesthetics, General/ (120452)
- 14 anesthetics, general/ or desflurane/ or enflurane/ or ether/ or halothane/ or isoflurane/ or methoxyflurane/ or nitrous oxide/ or sevoflurane/ or trichloroethylene/ or xenon/ (50778)
- 15 exp Anesthetics, Combined/ (2822)

- 16 Lidocaine, Prilocaine Drug Combination/ (881)
- 17 exp Narcotics/ (116978)
- 18 exp Analgesics, Opioid/ (109000)
- 19 alfentanil/ or alphaprodine/ or buprenorphine/ or buprenorphine, naloxone drug combination/ or butorphanol/ or codeine/ or dextromoramide/ or dextropropoxyphene/ or dihydromorphone/ or diphenoxylate/ or "enkephalin, ala(2)-mephe(4)-gly(5)-"/ or "enkephalin, d-penicillamine (2,5)-"/ or ethylketocyclazocine/ or ethylmorphine/ or etorphine/ or fentanyl/ or heroin/ or hydrocodone/ or hydromorphone/ or levorphanol/ or meperidine/ or meptazinol/ or methadone/ or methadyl acetate/ or morphine/ or nalbuphine/ or opiate alkaloids/ or opium/ or oxycodone/ or oxymorphone/ or pentazocine/ or phenazocine/ or phenoperidine/ or piritramide/ or promedol/ or remifentanil/ or sufentanil/ or tapentadol/ or tilidine/ or tramadol/ (93160)
- 20 exp Analgesics, Non-Narcotic/ (322088)
- 21 analgesics, non-narcotic/ or "3,4-dichloro-n-methyl-n-(2-(1-pyrrolidinyl)-cyclohexyl)-benzeneacetamide, (trans)-isomer"/ or acetaminophen/ or amantadine/ or amitriptyline/ or carbachol/ or carbamazepine/ or cyclazocine/ or dexmedetomidine/ or dihydroergotamine/ or dronabinol/ or ergotamine/ or glafenine/ or ibuprofen/ or interleukin-2/ or medetomidine/ or methotrimeprazine/ or milnacipran/ or nefopam/ or nitrous oxide/ or phenacetin/ or pizotyline/ or quinine/ (140932)
- 22 Analgesics/ (46258)
- 23 Analgesics, Short-Acting/ (9)
- 24 exp Anti-Inflammatory Agents, Non-Steroidal/ (196239)
- 25 5-methoxypsoralen/ or adalimumab/ or algestone acetophenide/ or beclomethasone/ or benzydamine/ or betamethasone/ or betamethasone valerate/ or budesonide/ or clobetasol/ or clofazimine/ or corticosterone/ or cortisone/ or desonide/ or desoximetasone/ or dexamethasone/ or dexamethasone isonicotinate/ or diflucortolone/ or fludrocortisone/ or flufenamic acid/ or flumethasone/ or fluocinolone acetonide/ or fluocinonide/ or fluocortolone/ or fluorometholone/ or fluprednisolone/ or flurandrenolone/ or fluticasone/ or glycyrrhetic acid/ or glycyrrhizic acid/ or halcinonide/ or heparinoids/ or hydrocortisone/ or lycopene/ or methylprednisolone/ or methylprednisolone acetate/ or methylprednisolone hemisuccinate/ or mometasone furoate/ or nedocromil/ or paramethasone/ or prednisolone/ or prednisone/ or tilorone/ or tobramycin, dexamethasone drug combination/ or triamcinolone/ or triamcinolone acetonide/ (265617)
- 26 exp Cyclooxygenase Inhibitors/ (124384)
- 27 "4,5-dihydro-1-(3-(trifluoromethyl)phenyl)-1h-pyrazol-3-amine"/ or aspirin/ or diclofenac/ or diflunisal/ or fenoprofen/ or flurbiprofen/ or ibuprofen/ or indomethacin/ or indoprofen/ or ketoprofen/ or ketorolac/ or ketorolac tromethamine/ or masoprocol/ or meclofenamic acid/ or mefenamic acid/ or naproxen/ or niflumic acid/ or oxaprozin/ or piroxicam/ or salicylates/ or sodium salicylate/ or sulindac/ or suprofen/ or tolmetin/ (109100)

- 28 Tranquilizing Agents/ (11853)
- 29 "Hypnotics and Sedatives"/ (27935)
- 30 (anesthe\* adj2 topic\*).mp,kw. (2996)
- 31 (anaesthe\* adj2 topic\*).mp,kw. (923)
- 32 (analge\* adj2 topic\*).mp,kw. (455)
- 33 (anesthe\* adj2 local\*).mp,kw. (57447)
- 34 (anaesthe\* adj2 local\*).mp,kw. (10854)
- 35 (analge\* adj2 topic\*).mp,kw. (455)
- 36 elma\*.mp,kw. (230)
- 37 midazolam.mp,kw. (12441)
- 38 fentanyl.mp,kw. (19220)
- 39 amethocaine\*.mp,kw. (161)
- 40 prilocaine.mp,kw. (2465)
- 41 tetracaine.mp,kw. (3222)
- 42 angel.mp,kw. (822)
- 43 ametop.mp,kw. (42)
- 44 or/1-43 (1005157)
- 45 Pain/ (127628)
- 46 exp Pain Management/ (29796)
- 47 exp Pain Measurement/ (80097)
- 48 exp Pain, Procedural/ (170)
- 49 exp Pain Perception/ (4216)
- 50 exp Acute Pain/ (1681)
- 51 (pain\* adj2 manag\*).mp,kw. (45118)
- 52 (pain\* adj2 procedur\*).mp,kw. (4049)
- 53 (pain\* adj2 percept\*).mp,kw. (7758)
- 54 (pain\* adj2 control\*).mp,kw. (15645)
- 55 (pain\* adj2 measur\*).mp,kw. (84653)
- 56 (pain\* adj2 relie\*).mp,kw. (35696)
- 57 (pain\* adj2 acute).mp,kw. (16290)
- 58 (procedur\* adj2 sedat\*).mp,kw. (1365)
- 59 (pain\* adj2 reduc\*).mp,kw. (21395)
- 60 (needle\* adj4 pain).mp,kw. (766)
- 61 (distract\* and pain\*).mp,kw. (2071)
- 62 (deep breath\* and pain).mp,kw. (201)
- 63 (pacifier\* and pain\*).mp,kw. (122)

- 64 (patient\* position\* and pain\*).mp,kw. (672)
- 65 (patient\* comfort\* and pain\*).mp,kw. (1080)
- 66 ((child\* adj3 position\*) and pain\*).mp,kw. (33)
- 67 ((child\* adj3 comfort\*) and pain\*).mp,kw. (94)
- 68 (suck\* and pain\*).mp,kw. (402)
- 69 (swaddl\* and pain\*).mp,kw. (65)
- 70 (sucrose\* and pain\*).mp,kw. (692)
- 71 sweet\*.mp. and pain\*.mp,kw. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms] (651)
- 72 (pain\* adj2 ointment\*).mp,kw. (26)
- 73 (pain\* adj2 cream).mp,kw. (46)
- 74 (pain\* adj2 relax\*).mp,kw. (182)
- 75 (pain\* adj2 music\*).mp,kw. (201)
- 76 (pain\* adj2 therapeutic touch).mp,kw. (9)
- 77 (pain\* adj2 patient\* education\*).mp,kw. (76)
- 78 (pain\* adj2 laugh\*).mp,kw. (3)
- 79 (complementary\* and pain\*).mp,kw. (4254)
- 80 ("non-drug\*" adj4 pain\*).mp,kw. (27)
- 81 (nondrug\* adj4 pain\*).mp,kw. (25)
- 82 ((needle\* or immuni\* or vaccin\* or inject\* or procedure\* or intervention\*) adj5 (pain\* or distress\* or discomfort or fear\* or fright\* or anxious or anxiet\*)).mp. (35309)
- 83 or/45-82 (277364)
- 84 catheters/ (4207)
- 85 Cannula/ (367)
- 86 catheters, indwelling/ (18010)
- 87 exp vascular access devices/ (4361)
- 88 catheter obstruction/ (215)
- 89 catheterization, central venous/ (14381)
- 90 exp catheterization, peripheral/ (10762)
- 91 exp cardiac catheterization/ (48548)
- 92 exp needles/ (14419)
- 93 exp Catheter-Related Infections/ (4310)
- 94 exp blood specimen collection/ (14798)
- 95 exp cordocentesis/ (440)

- 96 exp petrosal sinus sampling/ (197)
- 97 exp phlebotomy/ (5479)
- 98 Punctures/ (12915)
- 99 exp Immunization/ (166208)
- 100 immunization\*.mp,kw. (142790)
- 101 immunisation\*.mp,kw. (9322)
- 102 (catheter\* adj3 port\*).mp,kw. (1771)
- 103 (catheter\* adj3 vascular).mp,kw. (1897)
- 104 (vascular adj3 access).mp,kw. (9205)
- 105 (intra-arterial adj3 line\*).mp,kw. (38)
- 106 (intraarterial adj3 line\*).mp,kw. (15)
- 107 "port a cath?".mp,kw. (427)
- 108 portacath\*.mp,kw. (68)
- 109 (reservoir\* adj3 venous\*).mp,kw. (311)
- 110 device remov\*.mp,kw. (12540)
- 111 (catheter\* adj3 remov\*).mp,kw. (6381)
- 112 (line\* adj3 remov\*).mp,kw. (1073)
- 113 (catheter\* adj3 obstruct\*).mp,kw. (2)
- 114 (catheter\* adj3 insert\*).mp,kw. (11317)
- 115 (line\* adj3 insert\*).mp,kw. (1969)
- 116 (line\* adj3 fail\*).mp,kw. (3147)
- 117 (catheter\* adj3 fail\*).mp,kw. (1179)
- 118 (catheter\* adj3 in-dwell\*).mp,kw. (120)
- 119 (line\* adj3 in-dwell\*).mp,kw. (6)
- 120 (line\* adj3 indwell\*).mp,kw. (183)
- 121 (catheter\* adj3 indwell\*).mp,kw. (22972)
- 122 (catheter\* adj3 central venous\*).mp,kw. (19463)
- 123 (catheter\* adj3 peripheral).mp,kw. (9326)
- 124 picc.mp,kw. (843)
- 125 (arter\* adj3 catheter\*).mp,kw. (11471)
- 126 dialock\*.mp,kw. (15)
- 127 vectra\*.mp,kw. (120)
- 128 (arter\* adj3 access\*).mp,kw. (3522)
- 129 (vein\* adj3 access\*).mp,kw. (1136)
- 130 broviac.mp,kw. (308)
- 131 (central adj3 catheter\*).mp,kw. (20442)

- 132 (central adj3 line\*).mp,kw. (4665)
- 133 cv cath\*.mp,kw. (51)
- 134 groshong.mp,kw. (92)
- 135 pediasat.mp,kw. (9)
- 136 vortex.mp,kw. (3076)
- 137 (catheter\* adj3 vein?).mp,kw. (3830)
- 138 (catheter\* adj3 arter\*).mp,kw. (11471)
- 139 (tunneled adj3 catheter\*).mp,kw. (1086)
- 140 (line? adj3 vein?).mp,kw. (347)
- 141 (line\* adj3 arter\*).mp,kw. (2168)
- 142 (catheter\* adj3 subclavian\*).mp,kw. (1392)
- 143 (line?\* adj3 subclavian\*).mp,kw. (84)
- 144 double lumen\*.mp,kw. (2706)
- 145 avalon elite.mp,kw. (28)
- 146 dual lumen.mp,kw. (410)
- 147 (catheter\* adj3 thrombos\*).mp,kw. (1200)
- 148 (catheter\* adj3 occlusion\*).mp,kw. (1336)
- 149 (catheter\* adj3 migrat\*).mp,kw. (672)
- 150 (catheter adj3 infection\*).mp,kw. (8124)
- 151 (catheter\* adj3 fracture\*).mp,kw. (308)
- 152 (catheter\* adj3 leakage\*).mp,kw. (212)
- 153 (catheter\* adj3 dislocat\*).mp,kw. (223)
- 154 (catheter\* adj3 complication\*).mp,kw. (4207)
- 155 (line? adj3 thrombos\*).mp,kw. (109)
- 156 (line? adj3 occlusion\*).mp,kw. (112)
- 157 (line? adj3 migrat\*).mp,kw. (658)
- 158 (line? adj3 infection\*).mp,kw. (2487)
- 159 (line\* adj3 fracture\*).mp,kw. (2371)
- 160 (line\* adj3 leakage\*).mp,kw. (203)
- 161 (insert\* adj3 peripheral).mp,kw. (432)
- 162 (catheter\* adj3 nurs\*).mp,kw. (299)
- 163 avalon elite.mp,kw. (28)
- 164 dual lumen.mp,kw. (410)
- 165 double lumen\*.mp,kw. (2706)
- 166 (iv adj3 peripher\*).mp,kw. (623)
- 167 (intra-venous adj3 peripher\*).mp,kw. (2)

- 168 (intravenous adj3 peripher\*).mp,kw. (1181)
- 169 (peripheral\* adj3 catheter\*).mp,kw. (9792)
- 170 (peripheral\* adj3 line?).mp,kw. (1476)
- 171 (difficult\* adj2 vein?).mp,kw. (112)
- 172 (vein? adj2 punctur\*).mp,kw. (551)
- 173 (vein\* adj3 find\*).mp,kw. (592)
- 174 midline.mp,kw. (27120)
- 175 (arter\* adj3 line\*).mp,kw. (2168)
- 176 (catheter\* adj3 cardiac).mp,kw. (56172)
- 177 (line\* adj3 cardiac).mp,kw. (1173)
- 178 (line\* adj3 heart).mp,kw. (1024)
- 179 (catheter\* adj3 heart).mp,kw. (7766)
- 180 (finger adj3 prick\*).mp,kw. (900)
- 181 thoracocentes\*.mp,kw. (615)
- 182 thoracentes\*.mp,kw. (1562)
- 183 paracentes\*.mp,kw. (4025)
- 184 phlebotom\*.mp,kw. (9556)
- 185 apheresis.mp,kw. (6080)
- 186 puncture\*.tw,kw. (38269)
- 187 venipuncture\*.mp,kw. (2972)
- 188 veni-puncture\*.mp,kw. (7)
- 189 venesection\*.mp,kw. (662)
- 190 (catheter\* adj2 insert\*).mp,kw. (9523)
- 191 (line\* adj2 plac\*).mp,kw. (1824)
- 192 (line\* adj2 insert\*).mp,kw. (1488)
- 193 (catheter\* adj2 plac\*).mp,kw. (9820)
- 194 (insert\* adj2 vascular access\*).mp,kw. (25)
- 195 (blood adj2 collect\*).mp,kw. (35508)
- 196 or/84-195 (533815)
- 197 44 or 83 (1199760)
- 198 196 and 197 (29744)
- 199 limit 198 to (english language and yr="2013 -Current") (5649)
- 200 exp animals/ not (exp humans/ and exp animals/) (4552221)
- 201 limit 199 to humans (4543)
- 202 199 not 200 (4581)
- 203 201 or 202 (4581)

- 204 Review/ (2323090)
- 205 (systematic\* adj3 (review? or study or studies or overview?)).mp,kw. (144449)
- 206 Meta-Analysis/ (97619)
- 207 exp Meta-Analysis as Topic/ (17407)
- 208 meta analysis.pt. (97619)
- 209 "scientific integrity review".pt. (246)
- 210 meta-anal\*.mp,kw. (143084)
- 211 metaanal\*.mp,kw. (2175)
- 212 metanal\*.mp,kw. (415)
- 213 review.pt. (2323090)
- 214 exp "Review Literature as Topic"/ (11969)
- 215 review?.mp,kw. (2771215)
- 216 or/204-215 (2840755)
- 217 203 and 216 (767)
- 218 limit 203 to (meta analysis or "scientific integrity review" or "systematic review" or systematic reviews as topic) (142)
- 219 limit 203 to "reviews (best balance of sensitivity and specificity)" (568)
- 220 218 or 219 (569)
- 221 217 or 220 (787)

## **Database: CCRCT**

### **Search Strategy:**

- 1 "Anesthesia and Analgesia"/ (0)
- 2 anesthesia, local/ (1988)
- 3 Anesthesia/ (1482)
- 4 Anesthesia, General/ (4517)
- 5 exp Anesthesia, Cardiac Procedures/ (0)
- 6 Electroacupuncture/ (707)
- 7 Hypnosis, Anesthetic/ (46)
- 8 Conscious Sedation/ (1326)
- 9 Deep Sedation/ (135)
- 10 Analgesia/ (1815)
- 11 exp anesthetics, local/ (13684)
- 12 benzocaine/ or benzyl alcohol/ or bupivacaine/ or carticaine/ or cocaine/ or dibucaine/ or diphenhydramine/ or ethyl chloride/ or etidocaine/ or levobupivacaine/ or lidocaine/ or lidocaine, prilocaine



- drug combination/ or mepivacaine/ or prilocaine/ or procaine/ or propoxycaine/ or ropivacaine/ or tetracaine/ or tetrodotoxin/ or trimecaine/ (13496)
- 13 exp Anesthetics, General/ (16446)
- 14 anesthetics, general/ or desflurane/ or enflurane/ or ether/ or halothane/ or isoflurane/ or methoxyflurane/ or nitrous oxide/ or sevoflurane/ or trichloroethylene/ or xenon/ (4791)
- 15 exp Anesthetics, Combined/ (829)
- 16 Lidocaine, Prilocaine Drug Combination/ (359)
- 17 exp Narcotics/ (16105)
- 18 exp Analgesics, Opioid/ (15910)
- 19 alfentanil/ or alphaprodine/ or buprenorphine/ or buprenorphine, naloxone drug combination/ or butorphanol/ or codeine/ or dextromoramide/ or dextropropoxyphene/ or dihydromorphone/ or diphenoxylate/ or "enkephalin, ala(2)-mephe(4)-gly(5)-"/ or "enkephalin, d-penicillamine (2,5)-"/ or ethylketocyclazocine/ or ethylmorphine/ or etorphine/ or fentanyl/ or heroin/ or hydrocodone/ or hydromorphone/ or levorphanol/ or meperidine/ or meptazinol/ or methadone/ or methadyl acetate/ or morphine/ or nalbuphine/ or opiate alkaloids/ or opium/ or oxycodone/ or oxymorphone/ or pentazocine/ or phenazocine/ or phenoperidine/ or piritramide/ or promedol/ or remifentanil/ or sufentanil/ or tapentadol/ or tilidine/ or tramadol/ (15752)
- 20 exp Analgesics, Non-Narcotic/ (26682)
- 21 analgesics, non-narcotic/ or "3,4-dichloro-n-methyl-n-(2-(1-pyrrolidinyl)-cyclohexyl)-benzeneacetamide, (trans)-isomer"/ or acetaminophen/ or amantadine/ or amitriptyline/ or carbachol/ or carbamazepine/ or cyclazocine/ or dexmedetomidine/ or dihydroergotamine/ or dronabinol/ or ergotamine/ or glafenine/ or ibuprofen/ or interleukin-2/ or medetomidine/ or methotrimeprazine/ or milnacipran/ or nefopam/ or nitrous oxide/ or phenacetin/ or pizotyline/ or quinine/ (11904)
- 22 Analgesics/ (4450)
- 23 Analgesics, Short-Acting/ (0)
- 24 exp Anti-Inflammatory Agents, Non-Steroidal/ (17624)
- 25 5-methoxypsoralen/ or adalimumab/ or algestone acetophenide/ or beclomethasone/ or benzydamine/ or betamethasone/ or betamethasone valerate/ or budesonide/ or clobetasol/ or clofazimine/ or corticosterone/ or cortisone/ or desonide/ or desoximetasone/ or dexamethasone/ or dexamethasone isonicotinate/ or diflucortolone/ or fludrocortisone/ or flufenamic acid/ or flumethasone/ or fluocinolone acetonide/ or fluocinonide/ or fluocortolone/ or fluorometholone/ or fluprednisolone/ or flurandrenolone/ or fluticasone/ or glycyrrhetic acid/ or glycyrrhizic acid/ or halcinonide/ or heparinoids/ or hydrocortisone/ or lycopene/ or methylprednisolone/ or methylprednisolone acetate/ or methylprednisolone hemisuccinate/ or mometasone furoate/ or nedocromil/ or paramethasone/ or prednisolone/ or prednisone/ or tilorone/ or tobramycin, dexamethasone drug combination/ or triamcinolone/ or triamcinolone acetonide/ (23255)

- 26 exp Cyclooxygenase Inhibitors/ (14219)
- 27 "4,5-dihydro-1-(3-(trifluoromethyl)phenyl)-1h-pyrazol-3-amine"/ or aspirin/ or diclofenac/ or diflunisal/ or fenoprofen/ or flurbiprofen/ or ibuprofen/ or indomethacin/ or indoprofen/ or ketoprofen/ or ketorolac/ or ketorolac tromethamine/ or masoprocol/ or meclofenamic acid/ or mefenamic acid/ or naproxen/ or niflumic acid/ or oxaprozin/ or piroxicam/ or salicylates/ or sodium salicylate/ or sulindac/ or suprofen/ or tolmetin/ (13503)
- 28 Tranquilizing Agents/ (502)
- 29 "Hypnotics and Sedatives"/ (3346)
- 30 (anesthe\* adj2 topic\*).mp,kw. (1301)
- 31 (anaesthe\* adj2 topic\*).mp,kw. (416)
- 32 (analge\* adj2 topic\*).mp,kw. (280)
- 33 (anesthe\* adj2 local\*).mp,kw. (13814)
- 34 (anaesthe\* adj2 local\*).mp,kw. (2969)
- 35 (analge\* adj2 topic\*).mp,kw. (280)
- 36 elma\*.mp,kw. (15)
- 37 midazolam.mp,kw. (6804)
- 38 fentanyl.mp,kw. (10811)
- 39 amethocaine\*.mp,kw. (82)
- 40 prilocaine.mp,kw. (1059)
- 41 tetracaine.mp,kw. (594)
- 42 angel.mp,kw. (29)
- 43 ametop.mp,kw. (45)
- 44 or/1-43 (99174)
- 45 Pain/ (10745)
- 46 exp Pain Management/ (2782)
- 47 exp Pain Measurement/ (19638)
- 48 exp Pain, Procedural/ (0)
- 49 exp Pain Perception/ (350)
- 50 exp Acute Pain/ (448)
- 51 (pain\* adj2 manag\*).mp,kw. (8581)
- 52 (pain\* adj2 procedur\*).mp,kw. (3254)
- 53 (pain\* adj2 percept\*).mp,kw. (2577)
- 54 (pain\* adj2 control\*).mp,kw. (9447)
- 55 (pain\* adj2 measur\*).mp,kw. (24670)
- 56 (pain\* adj2 relie\*).mp,kw. (13553)
- 57 (pain\* adj2 acute).mp,kw. (3670)

- 58 (procedur\* adj2 sedat\*).mp,kw. (770)
- 59 (pain\* adj2 reduc\*).mp,kw. (14893)
- 60 (needle\* adj4 pain).mp,kw. (899)
- 61 (distract\* and pain\*).mp,kw. (573)
- 62 (deep breath\* and pain).mp,kw. (122)
- 63 (pacifier\* and pain\*).mp,kw. (78)
- 64 (patient\* position\* and pain\*).mp,kw. (216)
- 65 (patient\* comfort\* and pain\*).mp,kw. (801)
- 66 ((child\* adj3 position\*) and pain\*).mp,kw. (19)
- 67 ((child\* adj3 comfort\*) and pain\*).mp,kw. (43)
- 68 (suck\* and pain\*).mp,kw. (144)
- 69 (swaddl\* and pain\*).mp,kw. (37)
- 70 (sucrose\* and pain\*).mp,kw. (358)
- 71 sweet\*.mp. and pain\*.mp,kw. [mp=title, original title, abstract, mesh headings, heading words, keyword] (145)
- 72 (pain\* adj2 ointment\*).mp,kw. (309)
- 73 (pain\* adj2 cream).mp,kw. (208)
- 74 (pain\* adj2 relax\*).mp,kw. (397)
- 75 (pain\* adj2 music\*).mp,kw. (359)
- 76 (pain\* adj2 therapeutic touch).mp,kw. (51)
- 77 (pain\* adj2 patient\* education\*).mp,kw. (600)
- 78 (pain\* adj2 laugh\*).mp,kw. (10)
- 79 (complementary\* and pain\*).mp,kw. (789)
- 80 ("non-drug\*" adj4 pain\*).mp,kw. (23)
- 81 (nondrug\* adj4 pain\*).mp,kw. (11)
- 82 ((needle\* or immuni\* or vaccin\* or inject\* or procedure\* or intervention\*) adj5 (pain\* or distress\* or discomfort or fear\* or fright\* or anxious or anxiet\*)).mp. (26628)
- 83 or/45-82 (70904)
- 84 catheters/ (206)
- 85 Cannula/ (36)
- 86 catheters, indwelling/ (961)
- 87 exp vascular access devices/ (238)
- 88 catheter obstruction/ (16)
- 89 catheterization, central venous/ (747)
- 90 exp catheterization, peripheral/ (842)
- 91 exp cardiac catheterization/ (2578)

- 92 exp needles/ (1052)
- 93 exp Catheter-Related Infections/ (256)
- 94 exp blood specimen collection/ (624)
- 95 exp cordocentesis/ (6)
- 96 exp petrosal sinus sampling/ (3)
- 97 exp phlebotomy/ (397)
- 98 Punctures/ (403)
- 99 exp Immunization/ (4482)
- 100 immunization\*.mp,kw. (6156)
- 101 immunisation\*.mp,kw. (587)
- 102 (catheter\* adj3 port\*).mp,kw. (181)
- 103 (catheter\* adj3 vascular).mp,kw. (212)
- 104 (vascular adj3 access).mp,kw. (1284)
- 105 (intra-arterial adj3 line\*).mp,kw. (7)
- 106 (intraarterial adj3 line\*).mp,kw. (1)
- 107 "port a cath?".mp,kw. (28)
- 108 portacath\*.mp,kw. (2)
- 109 (reservoir\* adj3 venous\*).mp,kw. (53)
- 110 device remov\*.mp,kw. (860)
- 111 (catheter\* adj3 remov\*).mp,kw. (1307)
- 112 (line\* adj3 remov\*).mp,kw. (90)
- 113 (catheter\* adj3 abstract\*).mp,kw. (0)
- 114 (catheter\* adj3 insert\*).mp,kw. (2202)
- 115 (line\* adj3 insert\*).mp,kw. (186)
- 116 (line\* adj3 fail\*).mp,kw. (713)
- 117 (catheter\* adj3 fail\*).mp,kw. (380)
- 118 (catheter\* adj3 in-dwell\*).mp,kw. (41)
- 119 (line\* adj3 in-dwell\*).mp,kw. (4)
- 120 (line\* adj3 indwell\*).mp,kw. (21)
- 121 (catheter\* adj3 indwell\*).mp,kw. (1690)
- 122 (catheter\* adj3 central venous\*).mp,kw. (1868)
- 123 (catheter\* adj3 peripheral).mp,kw. (1039)
- 124 picc.mp,kw. (175)
- 125 (arter\* adj3 catheter\*).mp,kw. (1824)
- 126 dialock\*.mp,kw. (0)
- 127 vectra\*.mp,kw. (38)

- 128 (arter\* adj3 access\*).mp,kw. (438)
- 129 (vein\* adj3 access\*).mp,kw. (217)
- 130 broviac.mp,kw. (14)
- 131 (central adj3 catheter\*).mp,kw. (2040)
- 132 (central adj3 line\*).mp,kw. (436)
- 133 cv cath\*.mp,kw. (4)
- 134 groshong.mp,kw. (13)
- 135 pediasat.mp,kw. (1)
- 136 vortex.mp,kw. (52)
- 137 (catheter\* adj3 vein?).mp,kw. (796)
- 138 (catheter\* adj3 arter\*).mp,kw. (1824)
- 139 (tunneled adj3 catheter\*).mp,kw. (186)
- 140 (line? adj3 vein?).mp,kw. (55)
- 141 (line\* adj3 arter\*).mp,kw. (483)
- 142 (catheter\* adj3 subclavian\*).mp,kw. (176)
- 143 (line?\* adj3 subclavian\*).mp,kw. (8)
- 144 double lumen\*.mp,kw. (476)
- 145 avalon elite.mp,kw. (0)
- 146 dual lumen.mp,kw. (41)
- 147 (catheter\* adj3 thrombos\*).mp,kw. (319)
- 148 (catheter\* adj3 occlusion\*).mp,kw. (272)
- 149 (catheter\* adj3 migrat\*).mp,kw. (89)
- 150 (catheter adj3 infection\*).mp,kw. (1284)
- 151 (catheter\* adj3 fracture\*).mp,kw. (36)
- 152 (catheter\* adj3 leakage\*).mp,kw. (54)
- 153 (catheter\* adj3 dislocat\*).mp,kw. (32)
- 154 (catheter\* adj3 complication\*).mp,kw. (1294)
- 155 (line? adj3 thrombos\*).mp,kw. (20)
- 156 (line? adj3 occlusion\*).mp,kw. (15)
- 157 (line? adj3 migrat\*).mp,kw. (12)
- 158 (line? adj3 infection\*).mp,kw. (217)
- 159 (line\* adj3 fracture\*).mp,kw. (119)
- 160 (line\* adj3 leakage\*).mp,kw. (29)
- 161 (insert\* adj3 peripheral).mp,kw. (124)
- 162 (catheter\* adj3 nurs\*).mp,kw. (159)
- 163 avalon elite.mp,kw. (0)

- 164 dual lumen.mp,kw. (41)
- 165 double lumen\*.mp,kw. (476)
- 166 (iv adj3 peripher\*).mp,kw. (160)
- 167 (intra-venous adj3 peripher\*).mp,kw. (0)
- 168 (intravenous adj3 peripher\*).mp,kw. (436)
- 169 (peripheral\* adj3 catheter\*).mp,kw. (1179)
- 170 (peripheral\* adj3 line?).mp,kw. (117)
- 171 (difficult\* adj2 vein?).mp,kw. (32)
- 172 (vein? adj2 punctur\*).mp,kw. (396)
- 173 (vein\* adj3 find\*).mp,kw. (41)
- 174 midline.mp,kw. (1273)
- 175 (arter\* adj3 line\*).mp,kw. (483)
- 176 (catheter\* adj3 cardiac).mp,kw. (2073)
- 177 (line\* adj3 cardiac).mp,kw. (57)
- 178 (line\* adj3 heart).mp,kw. (198)
- 179 (catheter\* adj3 heart).mp,kw. (1418)
- 180 (finger adj3 prick\*).mp,kw. (224)
- 181 thoracocentes\*.mp,kw. (88)
- 182 thoracentes\*.mp,kw. (71)
- 183 paracentes\*.mp,kw. (466)
- 184 phlebotom\*.mp,kw. (795)
- 185 apheresis.mp,kw. (902)
- 186 puncture\*.tw,kw. (4051)
- 187 venipuncture\*.mp,kw. (616)
- 188 veni-puncture\*.mp,kw. (2)
- 189 venesection\*.mp,kw. (68)
- 190 (catheter\* adj2 insert\*).mp,kw. (1985)
- 191 (line\* adj2 plac\*).mp,kw. (628)
- 192 (line\* adj2 insert\*).mp,kw. (155)
- 193 (catheter\* adj2 plac\*).mp,kw. (1942)
- 194 (insert\* adj2 vascular access\*).mp,kw. (7)
- 195 (blood adj2 collect\*).mp,kw. (8775)
- 196 or/84-195 (42802)
- 197 44 or 83 (144733)
- 198 196 and 197 (7616)
- 199 limit 198 to (english language and yr="2013 -Current") (2033)

## Database: Cochrane Database of Systematic Reviews

### Search Strategy:

- 1 (anesthe\* adj2 topic\*).mp,kw. (11)
- 2 (anaesthe\* adj2 topic\*).mp,kw. (63)
- 3 (analge\* adj2 topic\*).mp,kw. (37)
- 4 (anesthe\* adj2 local\*).mp,kw. (121)
- 5 (anaesthe\* adj2 local\*).mp,kw. (405)
- 6 (analge\* adj2 topic\*).mp,kw. (37)
- 7 elma\*.mp,kw. (51)
- 8 midazolam.mp,kw. (130)
- 9 fentanyl.mp,kw. (173)
- 10 amethocaine\*.mp,kw. (8)
- 11 prilocaine.mp,kw. (38)
- 12 tetracaine.mp,kw. (21)
- 13 angel.mp,kw. (46)
- 14 ametop.mp,kw. (1)
- 15 (pain\* adj2 manag\*).mp,kw. (450)
- 16 (pain\* adj2 procedur\*).mp,kw. (161)
- 17 (pain\* adj2 percept\*).mp,kw. (144)
- 18 (pain\* adj2 control\*).mp,kw. (354)
- 19 (pain\* adj2 measur\*).mp,kw. (883)
- 20 (pain\* adj2 relie\*).mp,kw. (960)
- 21 (pain\* adj2 acute).mp,kw. (420)
- 22 (procedur\* adj2 sedat\*).mp,kw. (25)
- 23 (pain\* adj2 reduc\*).mp,kw. (915)
- 24 (needle\* adj4 pain).mp,kw. (39)
- 25 (distract\* and pain\*).mp,kw. (117)
- 26 (deep breath\* and pain).mp,kw. (29)
- 27 (pacifier\* and pain\*).mp,kw. (21)
- 28 (patient\* position\* and pain\*).mp,kw. (38)
- 29 (patient\* comfort\* and pain\*).mp,kw. (66)
- 30 ((child\* adj3 position\*) and pain\*).mp,kw. (6)
- 31 ((child\* adj3 comfort\*) and pain\*).mp,kw. (14)
- 32 (suck\* and pain\*).mp,kw. (91)
- 33 (swaddl\* and pain\*).mp,kw. (15)



- 34 (sucrose\* and pain\*).mp,kw. (53)
- 35 (sweet\* and pain\*).mp,kw. (131)
- 36 (pain\* adj2 ointment\*).mp,kw. (1)
- 37 (pain\* adj2 cream).mp,kw. (5)
- 38 (pain\* adj2 relax\*).mp,kw. (17)
- 39 (pain\* adj2 music\*).mp,kw. (7)
- 40 (pain\* adj2 therapeutic touch).mp,kw. (0)
- 41 (pain\* adj2 patient\* education\*).mp,kw. (8)
- 42 (pain\* adj2 laugh\*).mp,kw. (0)
- 43 (complementary\* and pain\*).mp,kw. (796)
- 44 ("non-drug\*" adj4 pain\*).mp,kw. (6)
- 45 (nondrug\* adj4 pain\*).mp,kw. (0)
- 46 ((needle\* or immuni\* or vaccin\* or inject\* or procedure\* or intervention\*) adj5 (pain\* or distress\* or discomfort or fear\* or fright\* or anxious or anxiet\*)).mp. (1295)
- 47 or/1-46 (3121)
- 48 immunization\*.mp,kw. (140)
- 49 immunisation\*.mp,kw. (205)
- 50 (catheter\* adj3 port\*).mp,kw. (24)
- 51 (catheter\* adj3 vascular).mp,kw. (31)
- 52 (vascular adj3 access).mp,kw. (95)
- 53 (intra-arterial adj3 line\*).mp,kw. (2)
- 54 (intraarterial adj3 line\*).mp,kw. (0)
- 55 "port a cath?".mp,kw. (19)
- 56 portacath\*.mp,kw. (9)
- 57 (reservoir\* adj3 venous\*).mp,kw. (2)
- 58 device remov\*.mp,kw. (33)
- 59 (catheter\* adj3 remov\*).mp,kw. (107)
- 60 (line\* adj3 remov\*).mp,kw. (19)
- 61 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 62 (catheter\* adj3 insert\*).mp,kw. (199)
- 63 (line\* adj3 insert\*).mp,kw. (43)
- 64 (line\* adj3 fail\*).mp,kw. (50)
- 65 (catheter\* adj3 fail\*).mp,kw. (37)
- 66 (catheter\* adj3 in-dwell\*).mp,kw. (13)
- 67 (line\* adj3 in-dwell\*).mp,kw. (0)
- 68 (line\* adj3 indwell\*).mp,kw. (7)



- 69 (catheter\* adj3 indwell\*).mp,kw. (111)
- 70 (catheter\* adj3 central venous\*).mp,kw. (133)
- 71 (catheter\* adj3 peripheral).mp,kw. (60)
- 72 picc.mp,kw. (19)
- 73 (arter\* adj3 catheter\*).mp,kw. (83)
- 74 dialock\*.mp,kw. (0)
- 75 vectra\*.mp,kw. (1)
- 76 (arter\* adj3 access\*).mp,kw. (29)
- 77 (vein\* adj3 access\*).mp,kw. (16)
- 78 broviac.mp,kw. (11)
- 79 (central adj3 catheter\*).mp,kw. (144)
- 80 (central adj3 line\*).mp,kw. (97)
- 81 cv cath\*.mp,kw. (0)
- 82 groshong.mp,kw. (1)
- 83 pediasat.mp,kw. (0)
- 84 vortex.mp,kw. (4)
- 85 (catheter\* adj3 vein?).mp,kw. (33)
- 86 (catheter\* adj3 arter\*).mp,kw. (83)
- 87 (tunneled adj3 catheter\*).mp,kw. (2)
- 88 (line? adj3 vein?).mp,kw. (6)
- 89 (line\* adj3 arter\*).mp,kw. (29)
- 90 (catheter\* adj3 subclavian\*).mp,kw. (11)
- 91 (line?\* adj3 subclavian\*).mp,kw. (1)
- 92 double lumen\*.mp,kw. (10)
- 93 avalon elite.mp,kw. (0)
- 94 dual lumen.mp,kw. (2)
- 95 (catheter\* adj3 thrombos\*).mp,kw. (36)
- 96 (catheter\* adj3 occlusion\*).mp,kw. (28)
- 97 (catheter\* adj3 migrat\*).mp,kw. (10)
- 98 (catheter adj3 infection\*).mp,kw. (106)
- 99 (catheter\* adj3 fracture\*).mp,kw. (3)
- 100 (catheter\* adj3 leakage\*).mp,kw. (7)
- 101 (catheter\* adj3 dislocat\*).mp,kw. (4)
- 102 (catheter\* adj3 complication\*).mp,kw. (60)
- 103 (line? adj3 thrombos\*).mp,kw. (5)
- 104 (line? adj3 occlusion\*).mp,kw. (3)

- 105 (line? adj3 migrat\*).mp,kw. (2)
- 106 (line? adj3 infection\*).mp,kw. (31)
- 107 (line\* adj3 fracture\*).mp,kw. (13)
- 108 (line\* adj3 leakage\*).mp,kw. (1)
- 109 (insert\* adj3 peripheral).mp,kw. (18)
- 110 (catheter\* adj3 nurs\*).mp,kw. (5)
- 111 avalon elite.mp,kw. (0)
- 112 dual lumen.mp,kw. (2)
- 113 double lumen\*.mp,kw. (10)
- 114 (iv adj3 peripher\*).mp,kw. (5)
- 115 (intra-venous adj3 peripher\*).mp,kw. (0)
- 116 (intravenous adj3 peripher\*).mp,kw. (20)
- 117 (peripheral\* adj3 catheter\*).mp,kw. (71)
- 118 (peripheral\* adj3 line?).mp,kw. (24)
- 119 (difficult\* adj2 vein?).mp,kw. (3)
- 120 (vein? adj2 punctur\*).mp,kw. (7)
- 121 (vein\* adj3 find\*).mp,kw. (4)
- 122 midline.mp,kw. (151)
- 123 (arter\* adj3 line\*).mp,kw. (29)
- 124 (catheter\* adj3 cardiac).mp,kw. (38)
- 125 (line\* adj3 cardiac).mp,kw. (1)
- 126 (line\* adj3 heart).mp,kw. (10)
- 127 (catheter\* adj3 heart).mp,kw. (17)
- 128 (finger adj3 prick\*).mp,kw. (12)
- 129 thoracocentes\*.mp,kw. (15)
- 130 thoracentes\*.mp,kw. (8)
- 131 paracentes\*.mp,kw. (31)
- 132 phlebotom\*.mp,kw. (38)
- 133 apheresis.mp,kw. (40)
- 134 puncture\*.tw,kw. (270)
- 135 venipuncture\*.mp,kw. (31)
- 136 veni-puncture\*.mp,kw. (0)
- 137 venesection\*.mp,kw. (6)
- 138 (catheter\* adj2 insert\*).mp,kw. (158)
- 139 (line\* adj2 plac\*).mp,kw. (40)
- 140 (line\* adj2 insert\*).mp,kw. (32)

- 141 (catheter\* adj2 plac\*).mp,kw. (118)
- 142 (insert\* adj2 vascular access\*).mp,kw. (2)
- 143 (blood adj2 collect\*).mp,kw. (99)
- 144 or/48-143 (1464)
- 145 47 and 144 (529)
- 146 limit 145 to (full systematic reviews and last 8 years) (355)

## **Database: Embase**

### **Search Strategy:**

- 1 pain/ (285205)
- 2 exp pain assessment/ (147285)
- 3 exp pain measurement/ (11074)
- 4 exp nociception/ (68253)
- 5 exp injection pain/ (5548)
- 6 exp injection site pain/ (8257)
- 7 exp procedural pain/ (356)
- 8 exp skin pain/ (2260)
- 9 exp vein pain/ (54)
- 10 (pain\* adj2 assessment\*).tw,kw. (12738)
- 11 (pain\* adj2 measurement\*).tw,kw. (3771)
- 12 nociception.tw,kw. (14604)
- 13 (injection\* adj2 pain\*).tw,kw. (4750)
- 14 (procedur\* adj2 pain).tw,kw. (5004)
- 15 (skin adj2 pain\*).tw,kw. (2912)
- 16 (vein adj2 pain\*).tw,kw. (101)
- 17 (pain\* adj2 manag\*).tw,kw. (40959)
- 18 (pain\* adj2 control\*).tw,kw. (27636)
- 19 (pain\* adj2 procedur\*).tw,kw. (7466)
- 20 (pain\* adj2 percept\*).tw,kw. (10573)
- 21 (pain\* adj2 relie\*).tw,kw. (59941)
- 22 (pain\* adj2 acute\*).tw,kw. (27198)
- 23 (pain\* adj2 sedat\*).tw,kw. (1555)
- 24 (pain\* adj2 reduct\*).tw,kw. (15274)
- 25 (pain\* adj2 distract\*).tw,kw. (354)
- 26 (pain\* adj2 deep breath\*).tw,kw. (34)

- 27 (pain\* adj2 pacifier\*).tw,kw. (8)
- 28 (pain\* adj2 suck\*).tw,kw. (24)
- 29 (pain\* adj2 swaddl\*).tw,kw. (5)
- 30 (pain\* adj2 sucrose\*).tw,kw. (59)
- 31 (pain\* adj2 sweet\*).tw,kw. (17)
- 32 (pain\* adj2 ointment\*).tw,kw. (44)
- 33 (pain\* adj2 cream\*).tw,kw. (122)
- 34 (pain\* adj2 relax\*).tw,kw. (318)
- 35 (pain\* adj2 music\*).tw,kw. (298)
- 36 (pain\* adj2 touch\*).tw,kw. (841)
- 37 (pain\* adj2 laugh\*).tw,kw. (4)
- 38 (pain\* adj2 complementary\*).tw,kw. (96)
- 39 ((patiet\* or child\*) adj3 (position\* or comfort)).tw,kw. (1903)
- 40 (nondrug adj4 pain\*).tw,kw. (39)
- 41 (non-drug\* adj4 pain).tw,kw. (58)
- 42 (patient\* education and pain\*).tw,kw. (2745)
- 43 exp local anesthesia/ (34939)
- 44 (local adj2 (anesth\* or anaesth\*)).tw,kw. (54554)
- 45 (topical adj2 (anesth\* or anaesth\*)).tw,kw. (5257)
- 46 exp lidocaine plus prilocaine/ (209)
- 47 exp local anesthetic agent/ (217361)
- 48 or/1-47 (756345)
- 49 vascular access device/ (1117)
- 50 vascular equipment/ (500)
- 51 exp vascular access/ (23205)
- 52 exp cannulation/ (36783)
- 53 exp catheter removal/ (6157)
- 54 exp central venous catheter/ (21370)
- 55 intravenous catheter/ (6213)
- 56 exp vein catheterization/ (13522)
- 57 exp central venous catheterization/ (8749)
- 58 exp catheter complication/ (21691)
- 59 exp catheter care/ (578)
- 60 exp double lumen catheter/ (418)
- 61 exp midline catheter/ (71)
- 62 exp peripheral venous catheter/ (705)

- 63 exp peripherally inserted central venous catheter/ (2702)
- 64 exp catheter infection/ (16050)
- 65 exp apheresis/ (60271)
- 66 exp apheresis device/ (1090)
- 67 cannula/ (9996)
- 68 exp vein puncture/ (6186)
- 69 exp blood collection tube/ (887)
- 70 catheters, indwelling/ (10588)
- 71 exp Phlebotomy/ (9748)
- 72 (arter\* adj3 line).tw,kw. (2624)
- 73 (catheter\* adj3 port\*).tw,kw. (2686)
- 74 (catheter\* adj3 vascular).tw,kw. (2874)
- 75 (vascular adj3 access).tw,kw. (15007)
- 76 (intra-arterial adj3 line\*).tw,kw. (60)
- 77 (intraarterial adj3 line\*).tw,kw. (16)
- 78 "port a cath?".tw,kw. (736)
- 79 portacath\*.tw,kw. (158)
- 80 (reservoir\* adj3 venous\*).tw,kw. (432)
- 81 phlebotom\*.tw,kw. (9887)
- 82 venesection\*.tw,kw. (901)
- 83 venipunctur\*.tw,kw. (4618)
- 84 (catheter\* adj3 obstruct\*).tw,kw. (1)
- 85 (catheter\* adj3 insert\*).tw,kw. (19500)
- 86 (line\* adj3 insert\*).tw,kw. (3384)
- 87 (line\* adj3 fail\*).tw,kw. (5796)
- 88 (catheter\* adj3 fail\*).tw,kw. (2113)
- 89 (catheter\* adj3 in-dwell\*).tw,kw. (188)
- 90 (line\* adj3 in-dwell\*).tw,kw. (9)
- 91 (line\* adj3 indwell\*).tw,kw. (301)
- 92 (catheter\* adj3 indwell\*).tw,kw. (11205)
- 93 (catheter\* adj3 central venous\*).tw,kw. (17856)
- 94 (catheter\* adj3 peripheral).tw,kw. (2721)
- 95 picc.tw,kw. (2402)
- 96 (arter\* adj3 catheter\*).tw,kw. (16543)
- 97 dialock\*.tw,kw. (21)
- 98 vectra\*.tw,kw. (455)

- 99 (vascular adj3 access).tw,kw. (15007)
- 100 (arter\* adj3 access\*).tw,kw. (6624)
- 101 (vein\* adj3 access\*).tw,kw. (2272)
- 102 broviac.tw,kw. (429)
- 103 (central adj3 catheter\*).tw,kw. (21497)
- 104 (central adj3 line\*).tw,kw. (9210)
- 105 cv cath\*.tw,kw. (86)
- 106 groshong.tw,kw. (157)
- 107 pediasat.tw,kw. (18)
- 108 vortex.tw,kw. (5964)
- 109 (catheter\* adj3 vein?).tw,kw. (5674)
- 110 (catheter\* adj3 arter\*).tw,kw. (16543)
- 111 (tunneled adj3 catheter\*).tw,kw. (2047)
- 112 (line? adj3 vein?).tw,kw. (631)
- 113 (line\* adj3 arter\*).tw,kw. (3803)
- 114 (catheter\* adj3 subclavian\*).tw,kw. (1730)
- 115 (line?\* adj3 subclavian\*).tw,kw. (158)
- 116 double lumen\*.tw,kw. (4183)
- 117 avalon elite.tw,kw. (46)
- 118 dual lumen.tw,kw. (782)
- 119 (catheter\* adj3 thrombos\*).tw,kw. (1993)
- 120 (catheter\* adj3 occlusion\*).tw,kw. (2133)
- 121 (catheter\* adj3 migrat\*).tw,kw. (1071)
- 122 (catheter adj3 infection\*).tw,kw. (8771)
- 123 (catheter\* adj3 fracture\*).tw,kw. (524)
- 124 (catheter\* adj3 leakage\*).tw,kw. (411)
- 125 (catheter\* adj3 dislocat\*).tw,kw. (358)
- 126 (catheter\* adj3 complication\*).tw,kw. (6847)
- 127 (line? adj3 thrombos\*).tw,kw. (238)
- 128 (line? adj3 occlusion\*).tw,kw. (204)
- 129 (line? adj3 migrat\*).tw,kw. (1151)
- 130 (line? adj3 infection\*).tw,kw. (4254)
- 131 (line\* adj3 fracture\*).tw,kw. (3281)
- 132 (line\* adj3 leakage\*).tw,kw. (329)
- 133 (insert\* adj3 peripheral).tw,kw. (721)
- 134 (catheter\* adj3 nurs\*).tw,kw. (487)

- 135 avalon elite.tw,kw. (46)
- 136 dual lumen.tw,kw. (782)
- 137 double lumen\*.mp,kw. (4886)
- 138 (iv adj3 peripher\*).tw,kw. (1099)
- 139 (intra-venous adj3 peripher\*).mp,kw. (4)
- 140 (intravenous adj3 peripher\*).tw,kw. (1839)
- 141 (peripheral\* adj3 catheter\*).tw,kw. (4752)
- 142 (peripheral\* adj3 line?).tw,kw. (2217)
- 143 (difficult\* adj2 vein?).tw,kw. (207)
- 144 (vein\* adj3 find\*).tw,kw. (958)
- 145 (punctur\* adj3 blood vessel\*).tw,kw. (83)
- 146 (vein\* adj3 find\*).tw,kw. (958)
- 147 (punctur\* adj3 arter\*).tw,kw. (3220)
- 148 (vein? adj3 punctur\*).tw,kw. (1358)
- 149 (difficult\* adj3 vein?).tw,kw. (448)
- 150 (puncture\* adj3 vein?).tw,kw. (1295)
- 151 blood collect\*.tw,kw. (13054)
- 152 (insert\* adj2 (line\* or catheter\* or vascular access\*)).tw,kw. (18937)
- 153 (place\* adj2 (line\* or catheter\* or vascular access\*)).tw,kw. (19802)
- 154 veni-puncture\*.tw,kw. (14)
- 155 venipuncture\*.tw,kw. (4614)
- 156 venesection\*.mp,kw. (901)
- 157 immunization/ (88542)
- 158 (immunization or immunisation).tw,kw. (110911)
- 159 vaccination/ (126472)
- 160 vaccinat\*.tw,kw. (161635)
- 161 or/49-160 (600667)
- 162 48 and 161 (23996)
- 163 limit 162 to (english language and yr="2013 -Current") (9464)
- 164 limit 163 to (books or chapter or conference abstract or conference paper or "conference review" or letter or short survey) (4297)
- 165 163 not 164 (5167)
- 166 (exp animals/ or exp animal experimentation/ or nonhuman/) not ((exp animals/ or exp animal experimentation/ or nonhuman/) and exp human/) (6115935)
- 167 165 not 166 (4881)
- 168 (systematic adj3 review\*).mp. (266927)

- 169 review/ (2319239)
- 170 "systematic review"/ (193899)
- 171 exp meta analysis/ (157138)
- 172 exp "meta analysis (topic)"/ (38972)
- 173 network meta-analysis/ (1567)
- 174 review.pt. (2406168)
- 175 meta-analy\*.mp,kw. (252059)
- 176 metanaly\*.mp,kw. (655)
- 177 (systematic\* adj3 (review? or study or studies or overview?)).mp,kw. (294862)
- 178 or/169-177 (2763174)
- 179 167 and 178 (702)

### **Database: Emcare**

#### **Search Strategy:**

- 1 pain/ (118631)
- 2 exp pain assessment/ (66658)
- 3 exp pain measurement/ (1079)
- 4 exp nociception/ (20713)
- 5 exp injection pain/ (1813)
- 6 exp injection site pain/ (2540)
- 7 exp procedural pain/ (0)
- 8 exp skin pain/ (585)
- 9 exp vein pain/ (11)
- 10 (pain\* adj2 assessment\*).tw,kw. (5460)
- 11 (pain\* adj2 measurement\*).tw,kw. (1754)
- 12 nociception.tw,kw. (2331)
- 13 (injection\* adj2 pain\*).tw,kw. (1479)
- 14 (procedur\* adj2 pain).tw,kw. (1758)
- 15 (skin adj2 pain\*).tw,kw. (555)
- 16 (vein adj2 pain\*).tw,kw. (31)
- 17 (pain\* adj2 manag\*).tw,kw. (18361)
- 18 (pain\* adj2 control\*).tw,kw. (9145)
- 19 (pain\* adj2 procedur\*).tw,kw. (2605)
- 20 (pain\* adj2 percept\*).tw,kw. (3460)
- 21 (pain\* adj2 relie\*).tw,kw. (20916)



- 22 (pain\* adj2 acute\*).tw,kw. (9108)
- 23 (pain\* adj2 sedat\*).tw,kw. (633)
- 24 (pain\* adj2 reduct\*).tw,kw. (5784)
- 25 (pain\* adj2 distract\*).tw,kw. (179)
- 26 (pain\* adj2 deep breath\*).tw,kw. (6)
- 27 (pain\* adj2 pacifier\*).tw,kw. (7)
- 28 (pain\* adj2 suck\*).tw,kw. (6)
- 29 (pain\* adj2 swaddl\*).tw,kw. (3)
- 30 (pain\* adj2 sucrose\*).tw,kw. (33)
- 31 (pain\* adj2 sweet\*).tw,kw. (2)
- 32 (pain\* adj2 ointment\*).tw,kw. (10)
- 33 (pain\* adj2 cream\*).tw,kw. (41)
- 34 (pain\* adj2 relax\*).tw,kw. (137)
- 35 (pain\* adj2 music\*).tw,kw. (122)
- 36 (pain\* adj2 touch\*).tw,kw. (202)
- 37 (pain\* adj2 laugh\*).tw,kw. (4)
- 38 (pain\* adj2 complementary\*).tw,kw. (38)
- 39 ((patient\* or child\*) adj3 (position\* or comfort)).tw,kw. (875)
- 40 (nondrug adj4 pain\*).tw,kw. (21)
- 41 (non-drug\* adj4 pain).tw,kw. (24)
- 42 (patient\* education and pain\*).tw,kw. (1049)
- 43 exp local anesthesia/ (11570)
- 44 (local adj2 (anesth\* or anaesth\*)).tw,kw. (14170)
- 45 (topical adj2 (anesth\* or anaesth\*)).tw,kw. (1350)
- 46 exp lidocaine plus prilocaine/ (922)
- 47 exp local anesthetic agent/ (58427)
- 48 or/1-47 (247046)
- 49 vascular access device/ (510)
- 50 vascular equipment/ (167)
- 51 exp vascular access/ (7959)
- 52 exp cannulation/ (12284)
- 53 exp catheter removal/ (2149)
- 54 exp central venous catheter/ (7132)
- 55 intravenous catheter/ (2538)
- 56 exp vein catheterization/ (4724)
- 57 exp central venous catheterization/ (3171)

- 58 exp catheter complication/ (8112)
- 59 exp catheter care/ (352)
- 60 exp double lumen catheter/ (87)
- 61 exp midline catheter/ (24)
- 62 exp peripheral venous catheter/ (246)
- 63 exp peripherally inserted central venous catheter/ (1171)
- 64 exp catheter infection/ (5859)
- 65 exp apheresis/ (8146)
- 66 exp apheresis device/ (93)
- 67 cannula/ (3178)
- 68 exp vein puncture/ (2181)
- 69 exp blood collection tube/ (71)
- 70 catheters, indwelling/ (2197)
- 71 exp Phlebotomy/ (2159)
- 72 (arter\* adj3 line).tw,kw. (668)
- 73 (catheter\* adj3 port\*).tw,kw. (549)
- 74 (catheter\* adj3 vascular).tw,kw. (626)
- 75 (vascular adj3 access).tw,kw. (3322)
- 76 (intra-arterial adj3 line\*).tw,kw. (11)
- 77 (intraarterial adj3 line\*).tw,kw. (1)
- 78 "port a cath?".tw,kw. (99)
- 79 portacath\*.tw,kw. (23)
- 80 (reservoir\* adj3 venous\*).tw,kw. (149)
- 81 phlebotom\*.tw,kw. (1353)
- 82 venesection\*.tw,kw. (101)
- 83 venipunctur\*.tw,kw. (1014)
- 84 (catheter\* adj3 obstruct\*).tw,kw. (0)
- 85 (catheter\* adj3 insert\*).tw,kw. (5053)
- 86 (line\* adj3 insert\*).tw,kw. (627)
- 87 (line\* adj3 fail\*).tw,kw. (882)
- 88 (catheter\* adj3 fail\*).tw,kw. (482)
- 89 (catheter\* adj3 in-dwell\*).tw,kw. (33)
- 90 (line\* adj3 in-dwell\*).tw,kw. (5)
- 91 (line\* adj3 indwell\*).tw,kw. (52)
- 92 (catheter\* adj3 indwell\*).tw,kw. (2046)
- 93 (catheter\* adj3 central venous\*).tw,kw. (5113)

- 94 (catheter\* adj3 peripheral).tw,kw. (1009)
- 95 picc.tw,kw. (730)
- 96 (arter\* adj3 catheter\*).tw,kw. (4042)
- 97 dialock\*.tw,kw. (5)
- 98 vectra\*.tw,kw. (55)
- 99 (vascular adj3 access).tw,kw. (3322)
- 100 (arter\* adj3 access\*).tw,kw. (1386)
- 101 (vein\* adj3 access\*).tw,kw. (462)
- 102 broviac.tw,kw. (38)
- 103 (central adj3 catheter\*).tw,kw. (6241)
- 104 (central adj3 line\*).tw,kw. (2541)
- 105 cv cath\*.tw,kw. (17)
- 106 groshong.tw,kw. (24)
- 107 pediasat.tw,kw. (7)
- 108 vortex.tw,kw. (1177)
- 109 (catheter\* adj3 vein?).tw,kw. (1104)
- 110 (catheter\* adj3 arter\*).tw,kw. (4042)
- 111 (tunneled adj3 catheter\*).tw,kw. (484)
- 112 (line? adj3 vein?).tw,kw. (80)
- 113 (line\* adj3 arter\*).tw,kw. (919)
- 114 (catheter\* adj3 subclavian\*).tw,kw. (359)
- 115 (line?\* adj3 subclavian\*).tw,kw. (21)
- 116 double lumen\*.tw,kw. (1097)
- 117 avalon elite.tw,kw. (14)
- 118 dual lumen.tw,kw. (174)
- 119 (catheter\* adj3 thrombos\*).tw,kw. (406)
- 120 (catheter\* adj3 occlusion\*).tw,kw. (455)
- 121 (catheter\* adj3 migrat\*).tw,kw. (261)
- 122 (catheter adj3 infection\*).tw,kw. (2405)
- 123 (catheter\* adj3 fracture\*).tw,kw. (139)
- 124 (catheter\* adj3 leakage\*).tw,kw. (77)
- 125 (catheter\* adj3 dislocat\*).tw,kw. (86)
- 126 (catheter\* adj3 complication\*).tw,kw. (1506)
- 127 (line? adj3 thrombos\*).tw,kw. (41)
- 128 (line? adj3 occlusion\*).tw,kw. (49)
- 129 (line? adj3 migrat\*).tw,kw. (159)

- 130 (line? adj3 infection\*).tw,kw. (1084)
- 131 (line\* adj3 fracture\*).tw,kw. (1294)
- 132 (line\* adj3 leakage\*).tw,kw. (54)
- 133 (insert\* adj3 peripheral).tw,kw. (240)
- 134 (catheter\* adj3 nurs\*).tw,kw. (168)
- 135 avalon elite.tw,kw. (14)
- 136 dual lumen.tw,kw. (174)
- 137 double lumen\*.mp,kw. (1388)
- 138 (iv adj3 peripher\*).tw,kw. (300)
- 139 (intra-venous adj3 peripher\*).mp,kw. (3)
- 140 (intravenous adj3 peripher\*).tw,kw. (696)
- 141 (peripheral\* adj3 catheter\*).tw,kw. (1823)
- 142 (peripheral\* adj3 line?).tw,kw. (286)
- 143 (difficult\* adj2 vein?).tw,kw. (43)
- 144 (vein\* adj3 find\*).tw,kw. (191)
- 145 (punctur\* adj3 blood vessel\*).tw,kw. (25)
- 146 (vein\* adj3 find\*).tw,kw. (191)
- 147 (punctur\* adj3 arter\*).tw,kw. (820)
- 148 (vein? adj3 punctur\*).tw,kw. (279)
- 149 (difficult\* adj3 vein?).tw,kw. (90)
- 150 (puncture\* adj3 vein?).tw,kw. (268)
- 151 blood collect\*.tw,kw. (1859)
- 152 (insert\* adj2 (line\* or catheter\* or vascular access\*)).tw,kw. (4759)
- 153 (place\* adj2 (line\* or catheter\* or vascular access\*)).tw,kw. (4745)
- 154 veni-puncture\*.tw,kw. (0)
- 155 venipuncture\*.tw,kw. (1011)
- 156 venesection\*.mp,kw. (101)
- 157 immunization/ (16411)
- 158 (immunization or immunisation).tw,kw. (15655)
- 159 vaccination/ (25913)
- 160 vaccinat\*.tw,kw. (27969)
- 161 or/49-160 (115753)
- 162 48 and 161 (7585)
- 163 limit 162 to (english language and yr="2013 -Current") (2414)
- 164 limit 163 to (books or chapter or conference abstract or conference paper or "conference review" or letter or short survey) (155)

- 165 163 not 164 (2259)
- 166 (exp animals/ or exp animal experimentation/ or nonhuman/) not ((exp animals/ or exp animal experimentation/ or nonhuman/) and exp human/) (409585)
- 167 165 not 166 (2203)
- 168 (systematic adj3 review\*).mp. (108161)
- 169 review/ (295508)
- 170 "systematic review"/ (89446)
- 171 exp meta analysis/ (50057)
- 172 exp "meta analysis (topic)"/ (14540)
- 173 network meta-analysis/ (315)
- 174 review.pt. (620413)
- 175 meta-analy\*.mp,kw. (83329)
- 176 metanaly\*.mp,kw. (85)
- 177 (systematic\* adj3 (review? or study or studies or overview?)).mp,kw. (113917)
- 178 or/169-177 (703680)
- 179 167 and 178 (319)

### **Database: Epub Ahead of Print**

#### **Search Strategy:**

- 1 (anesthe\* adj2 topic\*).mp,kw. (326)
- 2 (anaesthe\* adj2 topic\*).mp,kw. (68)
- 3 (analge\* adj2 topic\*).mp,kw. (80)
- 4 (anesthe\* adj2 local\*).mp,kw. (3157)
- 5 (anaesthe\* adj2 local\*).mp,kw. (1187)
- 6 (analge\* adj2 topic\*).mp,kw. (80)
- 7 elma\*.mp,kw. (79)
- 8 midazolam.mp,kw. (1293)
- 9 fentanyl.mp,kw. (2102)
- 10 amethocaine\*.mp,kw. (7)
- 11 prilocaine.mp,kw. (91)
- 12 tetracaine.mp,kw. (112)
- 13 angel.mp,kw. (151)
- 14 ametop.mp,kw. (2)
- 15 (pain\* adj2 manag\*).mp,kw. (5054)
- 16 (pain\* adj2 procedur\*).mp,kw. (767)

- 17 (pain\* adj2 percept\*).mp,kw. (1093)
- 18 (pain\* adj2 control\*).mp,kw. (2819)
- 19 (pain\* adj2 measur\*).mp,kw. (1787)
- 20 (pain\* adj2 relie\*).mp,kw. (5414)
- 21 (pain\* adj2 acute).mp,kw. (2741)
- 22 (procedur\* adj2 sedat\*).mp,kw. (311)
- 23 (pain\* adj2 reduc\*).mp,kw. (4645)
- 24 (needle\* adj4 pain).mp,kw. (144)
- 25 (distract\* and pain\*).mp,kw. (357)
- 26 (deep breath\* and pain).mp,kw. (38)
- 27 (pacifier\* and pain\*).mp,kw. (7)
- 28 (patient\* position\* and pain\*).mp,kw. (66)
- 29 (patient\* comfort\* and pain\*).mp,kw. (159)
- 30 ((child\* adj3 position\*) and pain\*).mp,kw. (4)
- 31 ((child\* adj3 comfort\*) and pain\*).mp,kw. (15)
- 32 (suck\* and pain\*).mp,kw. (51)
- 33 (swaddl\* and pain\*).mp,kw. (12)
- 34 (sucrose\* and pain\*).mp,kw. (77)
- 35 (sweet\* and pain\*).mp,kw. (77)
- 36 (pain\* adj2 ointment\*).mp,kw. (4)
- 37 (pain\* adj2 cream).mp,kw. (12)
- 38 (pain\* adj2 relax\*).mp,kw. (37)
- 39 (pain\* adj2 music\*).mp,kw. (65)
- 40 (pain\* adj2 therapeutic touch).mp,kw. (3)
- 41 (pain\* adj2 patient\* education\*).mp,kw. (25)
- 42 (pain\* adj2 laugh\*).mp,kw. (1)
- 43 (complementary\* and pain\*).mp,kw. (708)
- 44 ("non-drug\*" adj4 pain\*).mp,kw. (4)
- 45 (nondrug\* adj4 pain\*).mp,kw. (7)
- 46 ((needle\* or immuni\* or vaccin\* or inject\* or procedure\* or intervention\*) adj5 (pain\* or distress\* or discomfort or fear\* or fright\* or anxious or anxiet\*)).mp. (6006)
- 47 or/1-46 (30001)
- 48 immunization\*.mp,kw. (6271)
- 49 immunisation\*.mp,kw. (768)
- 50 (catheter\* adj3 port\*).mp,kw. (117)
- 51 (catheter\* adj3 vascular).mp,kw. (163)

- 52 (vascular adj3 access).mp,kw. (1213)
- 53 (intra-arterial adj3 line\*).mp,kw. (1)
- 54 (intraarterial adj3 line\*).mp,kw. (1)
- 55 "port a cath?".mp,kw. (37)
- 56 portacath\*.mp,kw. (8)
- 57 (reservoir\* adj3 venous\*).mp,kw. (12)
- 58 device remov\*.mp,kw. (141)
- 59 (catheter\* adj3 remov\*).mp,kw. (763)
- 60 (line\* adj3 remov\*).mp,kw. (201)
- 61 (catheter\* adj3 obstruct\*).mp,kw. (0)
- 62 (catheter\* adj3 insert\*).mp,kw. (1279)
- 63 (line\* adj3 insert\*).mp,kw. (259)
- 64 (line\* adj3 fail\*).mp,kw. (525)
- 65 (catheter\* adj3 fail\*).mp,kw. (151)
- 66 (catheter\* adj3 in-dwell\*).mp,kw. (7)
- 67 (line\* adj3 in-dwell\*).mp,kw. (1)
- 68 (line\* adj3 indwell\*).mp,kw. (10)
- 69 (catheter\* adj3 indwell\*).mp,kw. (650)
- 70 (catheter\* adj3 central venous\*).mp,kw. (1376)
- 71 (catheter\* adj3 peripheral).mp,kw. (243)
- 72 picc.mp,kw. (165)
- 73 (arter\* adj3 catheter\*).mp,kw. (762)
- 74 dialock\*.mp,kw. (3)
- 75 vectra\*.mp,kw. (41)
- 76 (arter\* adj3 access\*).mp,kw. (552)
- 77 (vein\* adj3 access\*).mp,kw. (163)
- 78 broviac.mp,kw. (20)
- 79 (central adj3 catheter\*).mp,kw. (1621)
- 80 (central adj3 line\*).mp,kw. (759)
- 81 cv cath\*.mp,kw. (6)
- 82 groshong.mp,kw. (6)
- 83 pediasat.mp,kw. (1)
- 84 vortex.mp,kw. (5325)
- 85 (catheter\* adj3 vein?).mp,kw. (316)
- 86 (catheter\* adj3 arter\*).mp,kw. (762)
- 87 (tunneled adj3 catheter\*).mp,kw. (154)

- 88 (line? adj3 vein?).mp,kw. (43)
- 89 (line\* adj3 arter\*).mp,kw. (171)
- 90 (catheter\* adj3 subclavian\*).mp,kw. (91)
- 91 (line?\* adj3 subclavian\*).mp,kw. (8)
- 92 double lumen\*.mp,kw. (279)
- 93 avalon elite.mp,kw. (4)
- 94 dual lumen.mp,kw. (59)
- 95 (catheter\* adj3 thrombos\*).mp,kw. (139)
- 96 (catheter\* adj3 occlusion\*).mp,kw. (124)
- 97 (catheter\* adj3 migrat\*).mp,kw. (78)
- 98 (catheter adj3 infection\*).mp,kw. (600)
- 99 (catheter\* adj3 fracture\*).mp,kw. (50)
- 100 (catheter\* adj3 leakage\*).mp,kw. (28)
- 101 (catheter\* adj3 dislocat\*).mp,kw. (10)
- 102 (catheter\* adj3 complication\*).mp,kw. (485)
- 103 (line? adj3 thrombos\*).mp,kw. (15)
- 104 (line? adj3 occlusion\*).mp,kw. (15)
- 105 (line? adj3 migrat\*).mp,kw. (116)
- 106 (line? adj3 infection\*).mp,kw. (369)
- 107 (line\* adj3 fracture\*).mp,kw. (375)
- 108 (line\* adj3 leakage\*).mp,kw. (46)
- 109 (insert\* adj3 peripheral).mp,kw. (72)
- 110 (catheter\* adj3 nurs\*).mp,kw. (42)
- 111 avalon elite.mp,kw. (4)
- 112 dual lumen.mp,kw. (59)
- 113 double lumen\*.mp,kw. (279)
- 114 (iv adj3 peripher\*).mp,kw. (78)
- 115 (intra-venous adj3 peripher\*).mp,kw. (0)
- 116 (intravenous adj3 peripher\*).mp,kw. (175)
- 117 (peripheral\* adj3 catheter\*).mp,kw. (414)
- 118 (peripheral\* adj3 line?).mp,kw. (110)
- 119 (difficult\* adj2 vein?).mp,kw. (17)
- 120 (vein? adj2 punctur\*).mp,kw. (58)
- 121 (vein\* adj3 find\*).mp,kw. (46)
- 122 midline.mp,kw. (3151)
- 123 (arter\* adj3 line\*).mp,kw. (171)



- 124 (catheter\* adj3 cardiac).mp,kw. (1377)
- 125 (line\* adj3 cardiac).mp,kw. (122)
- 126 (line\* adj3 heart).mp,kw. (90)
- 127 (catheter\* adj3 heart).mp,kw. (661)
- 128 (finger adj3 prick\*).mp,kw. (137)
- 129 thoracocentes\*.mp,kw. (54)
- 130 thoracentes\*.mp,kw. (233)
- 131 paracentes\*.mp,kw. (384)
- 132 phlebotom\*.mp,kw. (630)
- 133 apheresis.mpp,kw. (497)
- 134 puncture\*.tw,kw. (4330)
- 135 venipuncture\*.mp,kw. (277)
- 136 veni-puncture\*.mp,kw. (1)
- 137 venesection\*.mp,kw. (75)
- 138 (catheter\* adj2 insert\*).mp,kw. (1115)
- 139 (line\* adj2 plac\*).mp,kw. (264)
- 140 (line\* adj2 insert\*).mp,kw. (182)
- 141 (catheter\* adj2 plac\*).mp,kw. (914)
- 142 (insert\* adj2 vascular access\*).mp,kw. (5)
- 143 (blood adj2 collect\*).mp,kw. (3040)
- 144 or/48-143 (36524)
- 145 47 and 144 (1006)

## **Database: PsycINFO**

### **Search Strategy:**

- 1 exp catheterization/ (353)
- 2 exp immunization/ (4289)
- 3 exp injections/ (4940)
- 4 vascular access.mp. (55)
- 5 (peripheral adj3 access).mp. (26)
- 6 venipuncture\*.mp. (278)
- 7 (blood adj3 draw\*).mp. (1222)
- 8 needle\*.mp. (5349)
- 9 immunization\*.mp. (5634)
- 10 vaccination\*.mp. (4076)

- 11 immunisation\*.mp. (229)
- 12 catheter\*.mp. (2266)
- 13 venesection\*.mp. (21)
- 14 phlebotom\*.mp. (113)
- 15 (vein adj3 find\*).mp. (23)
- 16 double lumen\*.mp. (20)
- 17 dual lumen\*.mp. (1)
- 18 avalon.mp. (16)
- 19 (line\* adj3 (thrombos\* or occlusion\* or migrat\* or infection\* or fracture\* or leakage\*)).mp. (148)
- 20 (line\* adj3 (arte\* or intra arter\* or indwell\* or in-dwell\* or vein\* or subclav\*)).mp. (31)
- 21 (line\* adj3 (insert\* or place\* or remov\* or peripheral)).mp. (520)
- 22 ((iv or intraven\* or intra-ven\*) adj3 peripheral).mp. (89)
- 23 (blood adj2 collect\*).mp. (1066)
- 24 (blood adj2 draw\*).mp. (888)
- 25 portacath\*.mp. (3)
- 26 picc.mp. (20)
- 27 cannulation\*.mp. (154)
- 28 or/1-27 (21976)
- 29 pain/ (23710)
- 30 exp pain management/ (8936)
- 31 exp Pain Measurement/ (1370)
- 32 exp Pain Perception/ (15466)
- 33 pain.tw. (88639)
- 34 (pain\* adj2 procedur\*).mp. (958)
- 35 (pain\* adj2 management\*).mp. (11687)
- 36 (pain\* adj2 measure\*).mp. (4476)
- 37 (pain\* adj2 perception\*).mp. (12095)
- 38 (pain\* adj2 nondrug\*).mp. (6)
- 39 (pain\* adj2 non drug\*).mp. (5)
- 40 (pain\* adj2 control\*).mp. (3648)
- 41 (pain\* adj2 redu\*).mp. (4246)
- 42 (pain\* adj2 inject\*).mp. (300)
- 43 (pain\* adj2 manage\*).mp. (11959)
- 44 (pain\* adj2 relie\*).mp. (4620)
- 45 (pain\* adj3 (sweet\* or deep breath\* or pacifier\* or suck\* or swaddl\* or sucrose\* or ointment\* or cream\* or relax\* or music\* or touch\* or laugh\* or complementary\*)).mp. (1188)

- 46 (pain\* adj2 distract\*).mp. (184)
- 47 emla.mp. (46)
- 48 exp analgesic drugs/ (18490)
- 49 exp Analgesia/ (4176)
- 50 exp anesthetic drugs/ (20340)
- 51 exp "anesthesia (feeling)"/ (679)
- 52 topical anesth\*.mp. (93)
- 53 local anesth\*.mp. (964)
- 54 local anaesth\*.mp. (222)
- 55 topical anaesth\*.mp. (18)
- 56 or/29-55 (125546)
- 57 28 and 56 (3062)
- 58 exp meta analysis/ (4349)
- 59 exp literature review/ (22444)
- 60 metanalys:.mp. (34)
- 61 (systematic overview: or systematic review:).mp. (25290)
- 62 (methodologic: overview: or methodologic: review:).mp. (371)
- 63 (collaborative: overview: or collaborative: review:).mp. (36)
- 64 integrative research review:.mp. (44)
- 65 research integration.mp. (93)
- 66 (handsearch: or hand search: or manual search:).mp. (1839)
- 67 mantel haenszel.mp. (522)
- 68 peto.mp. (52)
- 69 (dersimonian or der simonian).mp. (78)
- 70 fixed effect:.mp. (3195)
- 71 meta analysis.sh. (4349)
- 72 meta-anal\*.tw. (32955)
- 73 metaanal\*.tw. (626)
- 74 (systematic\* and (review\* or overview\*)).tw. (42843)
- 75 (critical\* and apprais\*).tw. (4227)
- 76 literature review.sh. (22444)
- 77 or/58-76 (96474)
- 78 57 and 77 (71)
- 79 limit 57 to "reviews (best balance of sensitivity and specificity)" (1244)
- 80 limit 79 to (english language and yr="2013 -Current") (377)
- 81 78 or 80 (415)

- 82 limit 81 to (chapter or dissertation or review-book or review-media) (32)
- 83 81 not 82 (383)