

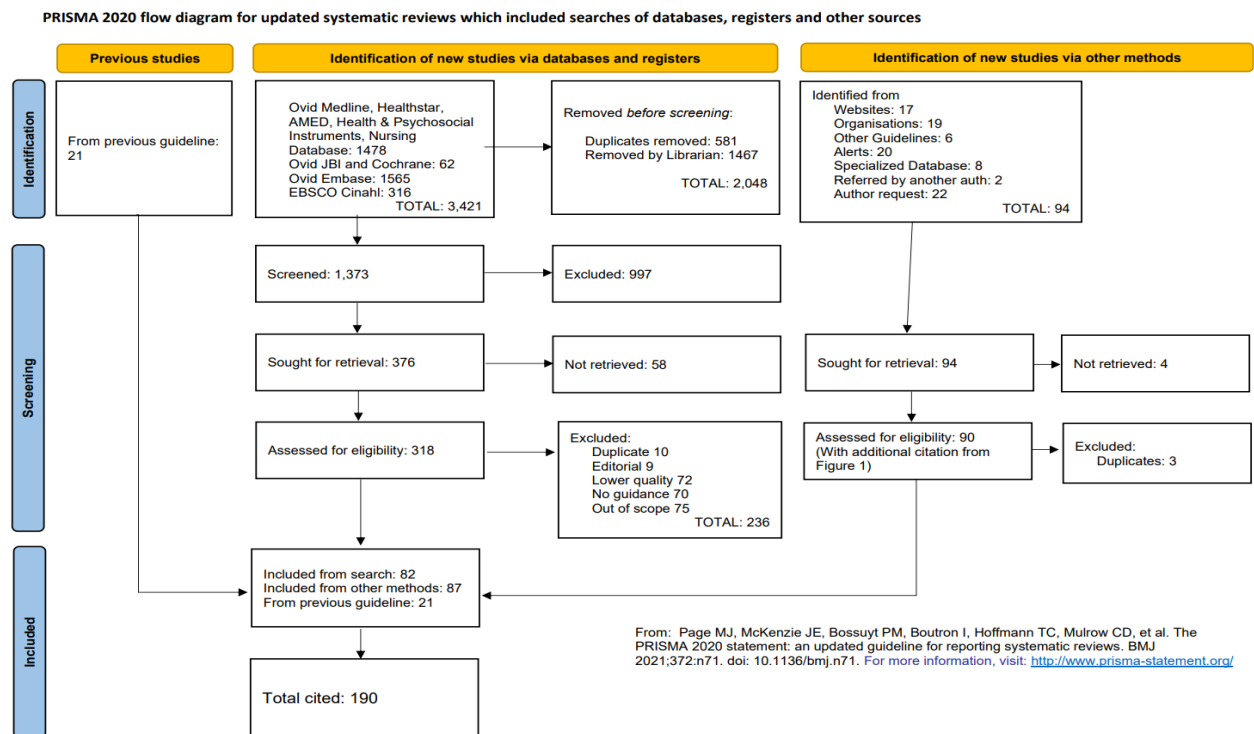


EVIDENCE REVIEW

A medical librarian with a perioperative background conducted a systematic search of the databases Ovid MEDLINE®, Ovid Embase®, EBSCO CINAHL®, and the Cochrane Database of Systematic Reviews. The search was limited to literature published in English from January, 2017 through December, 2021. At the time of the initial search, weekly alerts were created on the topics included in that search. Results from these alerts were provided to the lead author until April, 2022. The lead author requested additional articles that either did not fit the original search criteria or were discovered during the evidence appraisal process. The lead author and the medical librarian also identified relevant guidelines from government agencies, professional organizations, and standards-setting bodies.

Included were research and non-research literature in English, complete publications, and publications with dates within the time restriction when available. Historical studies were also included. Excluded were non-peer-reviewed publications and older evidence within the time restriction when more recent evidence was available. Editorials, news items, and other brief items were excluded. Low-quality evidence was excluded when higher-quality evidence was available, and literature outside the time restriction was excluded when literature within the time restriction was available. Articles identified in the search were provided to the project team for evaluation. The team consisted of the lead author and one evidence appraiser. The lead author and the evidence appraiser reviewed and critically appraised each article using the AORN Research or Non-Research Evidence Appraisal Tools as appropriate. A third appraiser was consulted if there was a disagreement between the lead author and the primary evidence appraiser. The literature was independently evaluated and appraised according to the strength and quality of the evidence. Each article was then assigned an appraisal score. The appraisal score is noted in brackets after each reference as applicable. Each recommendation rating is based on a synthesis of the collective evidence, a benefit-harm assessment, and consideration of resource use. The strength of the recommendation was determined using the AORN Evidence Rating Model and the quality and consistency of the evidence supporting a recommendation. The recommendation strength rating is noted in brackets after each recommendation. See the PRISMA 2020 flow diagram (Figure 1) below for more information about the systematic review and nature of included studies and resources.

Figure 1: PRISMA 2020 Flow Diagram



On December 2, 2021, a medical librarian with a perioperative background conducted a systematic search of 16 health science databases, the names and date coverage of which are given in Table 1. These results were screened by the medical librarian, and then the lead author.

On December 1, 2021, a medical librarian with a perioperative background conducted additional searches for relevant publications on websites of organizations selected by the author (including government departments). Full details of these supplementary searches is included in the Supplementary Content on the aorn.org web site. These results were also screened by two screeners: the medical librarian, and then the lead author.

Table 1: Databases searched and coverage

Database	Coverage
AORN Full Text Journals@Ovid	
Books@Ovid	
JBI EBP Database	Current
EBM Reviews - ACP Journal Club	1991 to Current
EBM Reviews - Cochrane Central Register of Controlled Trials	Current
EBM Reviews - Cochrane Database of Systematic Reviews	2005 to Current
EBM Reviews - Cochrane Clinical Answers	Current
AMED (Allied and Complementary Medicine)	1985 to Current
Embase	1974 to Current
Health and Psychosocial Instruments	1985 to Current
Ovid Healthstar	1999 to Current
Ovid MEDLINE(R) ALL	1946 to Current
Ovid Nursing Database	1946 to Current
EBSCOhost CINAHL	1937 to Current

Search strategy development process: The medical librarian referred to a search strategy used for the previous Guideline. A draft search strategy was developed using terms listed in the previous strategy and additional search terms identified from a meeting with the lead author. Using the MeSH Subject Headings database, additional search terms were identified and added to the search strategy. The strategy was limited following the constraints in the eligibility criteria outlined by the lead author.

Editor’s note: MEDLINE is a registered trademark of the US National Library of Medicine’s Medical Literature Analysis and Retrieval System, Bethesda, MD. Embase is a registered trademark of Elsevier B.V., Amsterdam, The Netherlands. CINAHL, Cumulative Index to Nursing and Allied Health Literature, is a registered trademark of EBSCO Industries, Birmingham, AL.

Search Strategies

Ovid (Medline, Cochrane, and Embase)

- exp "surgical procedures, operative"/ or ("preoperative care" or "perioperative care" or "intraoperative care" or "postoperative care" or anesthesia or anesthesiology or "intraoperative complications" or "postoperative complications" or "operating rooms").sh. or (surg\$ or perioperative or preoperative or postoperative or anesthesia or anaesthesi\$ or "perioperative patients" or "pediatric patients" or "paediatric patients").ti,ab,kw.
- ("venous thrombosis" or "venous thromboembolism" or thromboembolism or thrombophlebitis).sh. or ("deep vein thrombosis" or "deep venous thrombosis" or DVT or phlebothrombosis or VTE or "post-thrombotic syndrome" or "venous blood flow").ti,ab,kw.
- 1 and 2
- ("intermittent pneumatic compression devices" or Sphygmomanometer or "blood pressure monitors").sh. or (("Pneumatic Compression" adj2 (Hose or Stockings or device)) or (Elastic adj2 (Bandages or "Compression Wraps"))) or (Compression adj2 (stocking\$ or device\$ or wrap\$ or garment\$)) or (TED adj2 (hose or stocking\$))).ti,ab,kw. or ("anti-embolism stockings" or "mechanical compression" or "elastic hose" or stockinet\$ or "thrombo-embolic deterrent stockings" or "foot inflation device" or flowtron or "intermittent compression" or "intermittent pneumatic compression" or "mobile compression device" or

- "sequential compression device" or "active leg exercises" or "continuous passive motion" or "electrical calf muscle stimulation" or "blood pressure cuff").ti,ab,kw.
5. 3 and 4
 6. (((Virchow\$ or caprini or "benefit-risk assessment" or "risk analysis" or "skin assessment" or "risk-benefit assessment" or "risks and benefits" or "preferred assessment tool") and (hypercoagulability or lithotomy or thrombophilia or "venous stasis" or "postthrombotic syndrome" or "vessel wall injury" or "anesthesia modality" or "anesthesia type" or "procedure length" or "length of procedure" or "HbS disease" or "sickle cell anemia" or "sickle cell disease" or "sickle cell disorder")).ti,ab,kw. or ("perioperative nursing" or "nursing process" or "nursing assessment" or "risk factors" or "risk assessment").sh.) and ("endothelium, vascular"/in or ("anemia, sickle cell" or "patient positioning" or thrombophilia or "postthrombotic syndrome").sh.)
 7. 3 and 6
 8. ("COVID-19".de,sh,hw. or ("2019 novel coronavirus" or "SARS-COV-2" or "Coronavirus disease 2019" or COVID or "COVID-19 pandemic").ti,ab,kw.) and 6
 9. 3 and 8
 10. (("thrombosis prevention" or "perioperative thromboprophylaxis" or thromboprophylaxis).ti,ab,kw. and ("primary prevention".sh. or (interventions or activities or prophylaxis).ti,ab,kw.)) or ("venous thrombosis"/pc or "venous thromboembolism"/pc or thromboembolism/pc or thrombophlebitis/pc)
 11. 1 and 10
 12. (("optimal technique" or "best practice") and ("VTE prophylaxis device" and ("lower extremity" or sequential or simultaneous or cycle or inflation or timing or "mechanism of prevention" or "venous stasis" or pooling))).ti,ab,kw.
 13. 3 and 12
 14. ("thromboembolic complication" or "pulmonary embolism" or stroke\$).ti,ab,kw. or "pulmonary embolism"/pc or stroke/pc
 15. 3 and 14
 16. (rivaroxaban or warfarin or "fibrinolytic agents" or hirudins).sh. or exp anticoagulants/ or exp heparin/ or exp "thrombolytic therapy"/ or chemoprophylaxis.ti,ab,kw.
 17. 3 and 16
 18. ("stockings,compression"/ae or "stockings,compression".sh. or ("Compression Stockings" or "Elastic Stockings").ti,ab,kw.) and ("incorrect size" or "incorrect placement" or "venous filling" or "nerve injury" or "skin injury").ti,ab,kw.
 19. 1 and 18
 20. ("early ambulation"/ae, nu, td or "early ambulation".sh. or ("accelerated ambulation" or "early mobilization").ti,ab,kw.) and (benefits or harms or "foot exercises" or "ankle exercises" or "bundled care" or bundles).ti,ab,kw.
 21. 2 and 20
 22. contraindications.sh. and 4
 23. 5 or 7 or 8 or 9 or 11 or 13 or 15 or 17 or 19 or 21 or 22
 24. 23 not (animals not humans).sh.
 25. 24 not (conference or news).pt.
 26. 25 not "OR manager".so,jn.
 27. limit 26 to english language
 28. limit 27 to yr="2017"
 29. remove duplicates from 28

EBSCOhost (CINAHL)

S1 (MM "Surgery, Operative+") OR ((MH "Intraoperative Care") OR (MH "Postoperative Care") OR (MH "Postoperative Complications") OR (MH "Preoperative Care") OR (MH "Intraoperative Complications") OR (MH "Perioperative Care")) OR (surg* or perioperative or preoperative or postoperative or anesthesia or anaesthesi* or "perioperative patients" or "pediatric patients" or "paediatric patients")

S2 ((MH "Venous Thromboembolism") OR (MH "Venous Thrombosis")) OR ("deep vein thrombosis" or "deep venous thrombosis" or DVT or phlebothrombosis or VTE or "post-thrombotic syndrome" or "venous blood flow")

S3 S1 AND S2

S4 ((MH "Compression Garments") OR (MH "Blood Pressure Cuffs")) OR (("Pneumatic Compression" N2 (Hose or Stockings or device)) OR (Elastic N2 (Bandages or "Compression Wraps")) OR (Compression N2 (stocking* or device* or wrap* or garment*)) OR (TED N2 (hose or stocking*)) OR ("anti-embolism stockings" or "mechanical compression" or "elastic hose" or stockinet* or "thromboembolic deterrent stockings" or "foot inflation device" or flowtron or "intermittent compression" or "intermittent pneumatic compression" or "mobile compression device" or "sequential compression device" or "active leg exercises" or "continuous passive motion" or "electrical calf muscle stimulation" or "blood pressure cuff"))

S5 S3 AND S4

S6 ((MH "COVID-19") OR (MH "COVID-19 Pandemic") OR (MH "SARS-CoV-2")) OR ("2019 novel coronavirus" or "Coronavirus disease 2019" or COVID)

S7 S3 AND S6

S8 (MH "Thromboembolism/PC") OR (MH "Venous Thromboembolism/PC")

S9 (("optimal technique" or "best practice")) AND (("VTE prophylaxis device" or "sequential mechanism of prevention" or "venous stasis" or pooling))

S10 (MH "Pulmonary Embolism/PC") OR "thromboembolic complication"

S11 ((MH "Fibrinolytic Agents/TU/ST") OR (MH "Thrombolytic Therapy/ST")) OR (rivaroxaban or warfarin or heparin or anticoagulants or chemoprophylaxis)

S12 ((MH "Compression Garments") OR "Compression Stockings" or "Elastic Stockings") AND ("incorrect size" or "incorrect placement" or "venous filling" or "nerve injury" or "skin injury")

S13 ((MH "Early Ambulation/AE/NU/TD") or (MH "early ambulation") or ("accelerated ambulation" or "early mobilization")) AND (benefits or harms or "foot exercises" or "ankle exercises" or "bundled care" or bundles)

S14 "contraindications"

S15 S4 AND S14

S16 ((MH "Risk Assessment") OR (MH "Nursing Assessment") OR (MH "Perioperative Nursing") OR (MH "Patient Assessment") "nursing process" or "risk factors") AND ("endothelium, vascular" or "anemia, sickle cell" or "patient positioning" or thrombophilia or "postthrombotic syndrome")

S17 (Virchow* or caprini or "benefit-risk assessment" or "risk analysis" or "skin assessment" or "risk-benefit assessment" or "risks and benefits" or "preferred assessment tool") AND (hypercoagulability or lithotomy or thrombophilia or "venous stasis" or "postthrombotic syndrome" or "vessel wall injury" or "anesthesia modality" or "anesthesia type" or "procedure length" or "length of procedure" or "HbS disease" or "sickle cell anemia" or "sickle cell disease" or "sickle cell disorder")

S18 S16 OR S17

S19 S3 AND S8

S20 S1 AND S9

S21 S10 OR S11 OR S12 OR S13

S22 S3 AND S21

S23 S3 AND S18

S24 S5 OR S7 OR S15 OR S19 OR S20 OR S22 OR S23

S25 S5 OR S7 OR S15 OR S19 OR S20 OR S22 OR S23

Limiters - Published Date: 20170101-20211231; English Language; Peer Reviewed; Exclude MEDLINE records; Human

Web Searches// All searches conducted in 2021.

12/1: Navigated to www.cms.gov> "state operations manual appendix I" in search bar> chose first result, scrolled down to find PDF of current SOM Appx L

12/1: Navigated to www.cms.gov> "state operations manual appendix I" in search bar> chose second result, scrolled down to find PDF of current SOM Appx A

12/1: Went to link <https://www.dnv.us/assurance/healthcare/standards/niaho-ac-dl.html>, clicked on "NIAHO Accreditation Requirements- Acute", created records for relevant chapters. (x3)

12/1: Searched in Google (www.google.com)> search string: "42 CFR 482"> Chose second result, for an "eCFR" document.> Saved for author screening. (x2)

12/1: Author request for AAAHC resources "on Quality management and improvement"> Navigated to PDF of most recent version of book> Reviewed table of contents> Saved resource for author screening. (x2)

12/1: Author request for AAAHC resources "on Quality management and improvement"> Navigated to PDF of most recent version of book> Executed a "word search" for "VTE" in book> Searched google.com for "aaahc toolkits"> Chose first result, for "Quality Institute Toolkits"> Scrolled to result; saved for author screening.

12/1: Author request for AAAHC resources "on Quality management and improvement"> Navigated to PDF of most recent version of book> Executed a "word search" for "VTE" in book> Saved for author screening. (x2)

12/1: Author request for "ISMP on anticoagulant safety"> Using google.com, searched "ismp anticoagulant"> Chose first result, for "Anticoagulants | Institute For Safe Medication Practices"> Scrolled to result; saved for author screening. (x2)

12/2: Used google.com to search for "aaos".> Chose first result.> From "Quality & Practice Management" drop down menu, chose "All Quality Programs & Practice Resources".> Chose "Quality Programs & Guidelines."> Chose "Tumor, Infection and Military Medicine Programs" because the description mentioned "Venous Thromboembolic Disease".> Chose "Venous Thromboembolic Disease in Elective TKA and THA (Prevention)".> Scrolled down to "Full Clinical Practice Guideline PDF on Preventing Venous Thromboembolic Disease in Patients Undergoing Elective Hip and Knee

12/2: Used google.com to search for "asco".> Chose second result, for "American Society of Clinical Oncology: ASCO Hub" (www.asco.org).> In search bar at the top of page, entered "vte" and narrowed search to "Guidelines" as type.> Saved resource for author screening

12/2: Used google.com to search for "acog".> Chose first result, for "ACOG: Home" (www.acog.org).> From "Clinical Information" TOP nav menu, chose "Policy and Position Statements".> Found nothing relevant. > Used search box at top of page to search for "vte"> Limited result type to "Committee Opinion," "Practice Bulletin," "Clinical Updates in Women's Health Care," "Obstetric Care Consensus," and "Practice Advisory" types> 36 results; saved result for author screening. (x5)

12/2: Used google.com to search for "asmbs".> Chose first result, for "American Society for Metabolic and Bariatric Surgery" (www.asmb.org).> Typed "vte" in to search bar> From first result, "VTE Prophylaxis," clicked on blue "Read More" button.> "Toolkit Resources"; saved result for author screening. (x3)

12/2: Author request for "ACCP Guidelines".> Used google.com to search "ACCP Guidelines".> Selected second result, for "Antithrombotic Guidelines, 9th Edition, Now Available - ACCP ..." (<https://www.accp.com> › report).> No bibliographic information and URL listed did not work; went back to Google results.> First result was full text of a "Pre-publication draft".> Went to publisher site for Chest publication, and searched for "antithrombotic guidelines"; saved result for author screening.

RESULTS

Studies that offer insights that can inform perioperative nursing practice in the area of medication safety were included in this review. Studies that appeared to meet the inclusion criteria were excluded if they were of lower quality, provided no guidance, were duplicates of already-included studies, full text was not available in English, the results were not applicable or generalizable to the perioperative practice setting, were the wrong setting, or wrong population. A synthesis of the study results informed construction of practice recommendations and this synthesis is described briefly in the corresponding rationales that follow each practice recommendation. Additional information about each included study is found in the [evidence table](#) that corresponds to the published guideline.

REGISTRATION

PROSPERO Registration: CRD42021292411