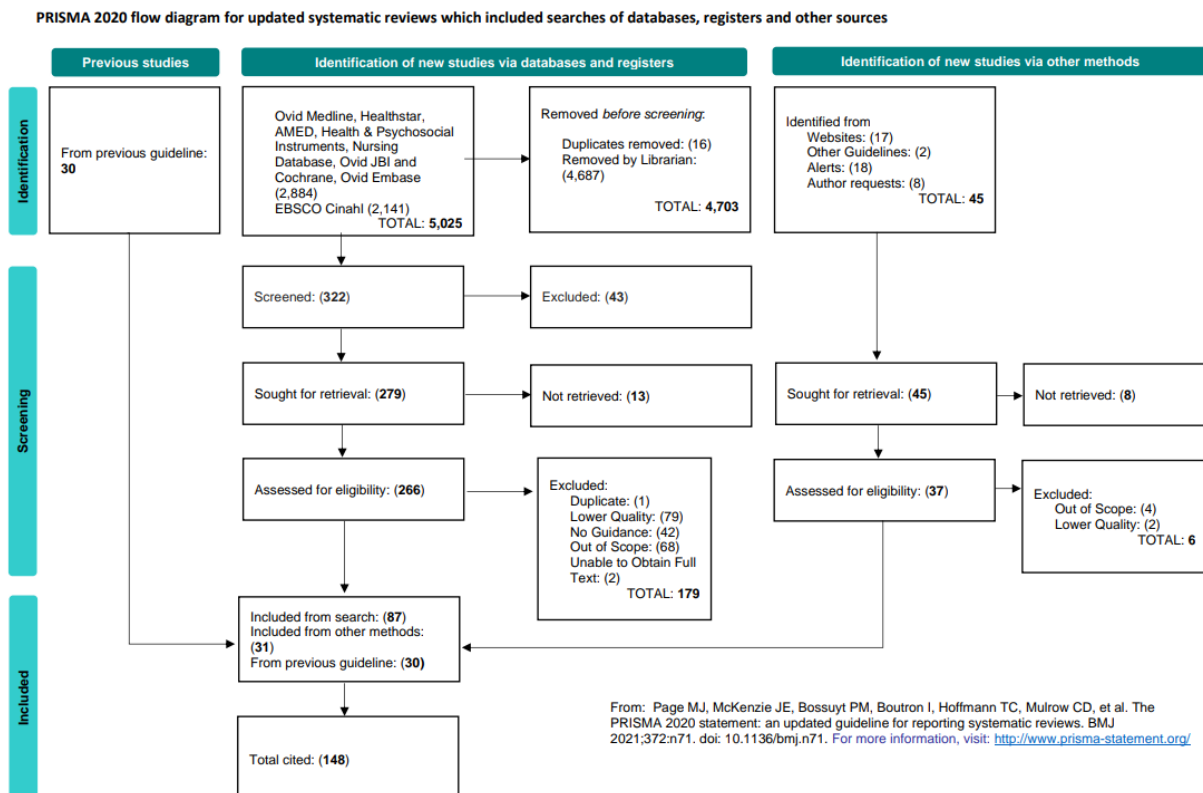## EVIDENCE REVIEW

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 October, 2017 through December, 2022. 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 July, 2023. 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 November 16, 2022, 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 6, 2022, a medical librarian with a perioperative background conducted 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	Current
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
CINAHL Complete via EBSCOhost	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)

1   ("perioperative nursing" or "operating room nursing" or "allied health personnel" or "nursing staff" or "health personnel").sh. or ("perioperative nurse" or "operating room personnel" or "scrubbed person" or "circulating nurse" or circulator).ti,ab. or ((healthcare and (Assistants or "support workers" or providers or workers)) or ("health care" and (personnel or professionals or providers))).ti,ab.

2   ("physical complaints" or "occupational safety").ti,ab.

3   (Employee and Health).ti,ab.

4   ((mechanical or postural or recurrent) adj1 "low back pain").ti,ab.

5   "occupational health".sh. or ("low back pain"/et, pc or "shoulder pain"/et, pc)

6   (ergonomics not "psychology, industrial").sh. or ("body mechanics" or posture or standing or "prolonged standing").ti,ab.

7   lifting/ae or ("moving and lifting patients" or (patients and "accidental falls")).sh.

8   ("patient lifting" or "lifting equipment" or (patient adj1 (fall$ or handling or moving))).ti,ab.

9   ("roll board" or "lateral transfer" or (positioning adj1 (device or equipment))).ti,ab.

10   "back injuries"/et, pc or "neck pain"/et, pc

11   ("accidents, occupational" or "worker's compensation").sh.

12   ("occupational accidents" or (occupational adj1 (hazards or "related injuries"))).ti,ab.

13   (hoists or "lifting and transfer equipment").ti,ab.

14   ("risk assessment" or "risk management").sh.

15   (race or "people of color" or minorit$).ti,ab. or "vulnerable populations".sh.

16   5 or 8 or 9 or 10 or 11 or 12 or 13

17   15 and 16

18   2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14

19   1 and 18

20   17 or 19

21   limit 20 to english language

22   limit 21 to yr="2017 -Current"

23   limit 22 to human

24   limit 23 to humans

25   limit 24 to cochrane library

26   limit 25 to medline records

27   limit 26 to embase records

28   limit 27 to original articles

29   limit 28 to primary source

30   limit 29 to (letters or original articles or reports or "review articles" or nursing practice or "text/reference" or best practice information sheets or recommended practices or systematic reviews or letters to the editor or journal article or clinical trial or practice guideline or case reports or clinical trial,all or controlled clinical trial or letter or monograph or position paper or report or article or article in press or clinical study or clinical trial, all or clinical trial, phase i or clinical trial, phase ii or clinical trial, phase iii or clinical trial, phase iv or comparative study or consensus development conference, nih or "corrected and republished article" or evaluation study or government publication or guideline or introductory journal article or legal case or legislation or multicenter study or observational study or pragmatic clinical trial or research support, nih, extramural or research support, nih, intramural or research support, non us gov't or research support, us gov't, non phs or research support, us gov't, phs or "systematic review" or technical report or validation study or randomized controlled trial or articles)

CINAHL Complete via EBSCOhost

| S21 | S17 OR S19 | Limiters - Publication Date: 20171001-20221131; English Language; Peer Reviewed; Exclude MEDLINE records;
[Include] Human; [Include] Publication Types: Case Study, CEU, Clinical Trial, Corrected Article, Journal Article, Legal Case, Meta Analysis, Meta Synthesis, Nursing Interventions, Practice Guidelines, Randomized Controlled Trial, Research, Standards, Statistics, Systematic Review | 4,787 |

S20	S17 OR S19	32,558
S19	S1 AND S18	32,063
S18	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	342,309
S17	S15 AND S16	629
S16	S5 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13	81,129
S15	"vulnerable populations" OR ((race or "people of color" or minorit*))	129,471
S14	(MH "Risk Assessment") OR (MH "Risk Management")	175,160
S13	(MH "Hoists") OR (MM "Lifting and Transfer Equipment")	765
S12	(MH "Occupational-Related Injuries/PC/ET") OR (occupational N1 hazards)	11,986
S11	(MH "Accidents, Occupational") OR (MH "Worker's Compensation")	8,163
S10	(MH "Neck Pain/ET/PC") OR (MH "Back Injuries/ET/PC")	2,808
S9	(MH "Patient Transfer Board") OR ("roll board" or "lateral transfer") OR (positioning N1 (device or equipment))	735
S8	(MM "Patient Handling") OR ((patient N1 (fall* or handling or moving))) OR ("patient lifting" or "lifting equipment")	5,449
S7	(MH "Accidental Falls")) OR ((patients and "accidental falls")) OR ("moving and lifting patients")	26,953
S6	(MM "Ergonomics") OR (MH "Standing") OR (MH "Body Mechanics") OR posture or "prolonged standing"	42,103
S5	((MH "Low Back Pain/ET/PC") OR (MH "Shoulder Pain/ET/PC")) OR "occupational health"	61,081
S4	((mechanical or postural or recurrent) N1 "low back pain")	478
S3	Employee and Health	32,492

S2	"physical complaints" or "occupational safety"	30,503
S1	((MH "Perioperative Nursing") OR (MM "Operating Room Personnel")) OR (("perioperative nursing" or "operating room nursing" or "allied health personnel" or "nursing staff" or "health personnel")) OR (("perioperative nurse" or "operating room personnel" or "scrubbed person" or "circulating nurse" or circulator)) OR (("health care" and (personnel or professionals or providers))) OR (((healthcare and (Assistants or "support workers" or providers or workers)))	403,547

Web Searches// All searches conducted in 2022.

12/1/2022: Used google.com to search for "niosh lifting equation," scrolled to result. 2] Saved for author review.

12/1: Used google.com to search for "prevention through design," scrolled to the NIOSH site for the program. 2] Saved for author review.

12/1: Used google.com to search for NIOSH, chose first result for cdc.gov/niosh. 2] Scrolled down, chose "and more" in "Safety & Prevention" box. 3] Scrolled to "Patient Handling" link. 4] Scrolled to "NIOSHTIC-2 Search" and followed link to "View search results on Safe Patient Handling." 5] Scrolled to result, saved for author review. (X44)

12/1: Used google.com to search for NIOSH, chose first result for cdc.gov/niosh. 2] Scrolled down, chose "and more" in "Safety & Prevention" box. 3] Scrolled to "Patient Handling" link. 4] Saved for author review.

12/1: Used google.com to navigate to osha.gov. 2] Opened "Standards" drop down menu in gray bar. 3] Chose "Law and Regulations. 4] Scrolled to result, followed link. 5] Clicked on link for "OSH Act of 1970." 6] Clicked tab for "General Duty Clause," saved for author review.

12/1: Used google.com to navigate to osha.gov. 2] Opened "Topics" drop down menu in gray bar. 3] Under "By sector" heading, chose "Healthcare." 4] Chose "Safe Patient Handling" from LEFT menu. 5] Chose "Additional resources" from LEFT menu. 6] Scrolled to result, searched catalog. 7] Saved for author review. (X4)

12/1: Used google.com to navigate to osha.gov. 2] Opened "Topics" drop down menu in gray bar. 3] Under "By sector" heading, chose "Healthcare." 4] Chose "Safe Patient Handling" from LEFT menu. 5] Scrolled to result 6] Saved for author review. (X4)

12/5: Used google.com to navigate to cms.gov. 2] Entered "patient lifts" in search bar at top RIGHT of page. 3] Scrolled to result, saved for author screening. (X2)

12/5: Used google.com to navigate to cms.gov. 2] Entered "patient moving" in search bar at top RIGHT of page. 3] Scrolled to result, saved for author screening. (X2)

12/5: Navigated to author-supplied URL to ensure currently-active URL. 2] Saved for author screening.

12/6: Used google.com to search for "american nurses association." 2] Chose result for nursingworld.org. 3] In the "Practice & Advocacy" menu, chose "Work Environment." 4] In "Work Environment" menu, chose

"Health & Safety." 5] In "Health & Safety" menu, chose "ANA Health and Safety Survey." 6] Saved result for author screening.

12/6: Used google.com to search for "american nurses association." 2] Chose result for nursingworld.org. 3] In the "Practice & Advocacy" menu, chose "Safe Patient Handling & Mobility." 4] Scrolled to expand link, "More resources on safeguarding nurse health." 5] Scrolled to result, saved for author screening. (X3)

12/6: Used google.com to search for "american nurses association." 2] Chose result for nursingworld.org. 3] In the "Practice & Advocacy" menu, chose "Position Statements." 4] Scrolled to expand "Nursing Practice" statements. 5] Scrolled to result, saved for author screening.

12/6: Used google.com to search for "Association of Occupational Health Professionals in Healthcare." 2] Chose first result. 3] Under "WORK TOOLS" menu, chose "PUBLICATIONS FOR YOUR PRACTICE," and then "GETTING STARTED MANUAL." 4] Saved result for author screening.

12/6: Used google.com to search for "Association of Occupational Health Professionals in Healthcare." 2] Chose first result. 3] Under "WORK TOOLS" menu, chose "STANDARDS." 4] Saved result for author screening.

12/6: Used google.com to search for "Association of Occupational Health Professionals in Healthcare." 2] Chose first result. 3] Under "WORK TOOLS" menu, chose "POSITION STATEMENTS." 4] Saved result for author screening.

ASPHP

12/6: Used google.com to search for "'American Association for Safe Patient Handling & Movement'." 2] Chose 3rd result, for agilelifemobility.com, because there were no matches for this org. 3] Scrolled to "American Association for Safe Patient Handling & Movement (AASPHM)," and clicked "AASPHM.org." 4] Brought me to a GoDaddy page saying "aasphm is parked free" with a "Get this domain" button. 5] Used google.com to search again, this time without the quotation marks: American Association for Safe Patient Handling & Movement. 6] Chose first result, for "Association of Safe Patient Handling Professionals." 7] Under "Resources & Tools" menu, chose "Tools and Tips." 8] Browsed results, saved for author screening. (X2)

12/6: Used google.com to search for "'American Association for Safe Patient Handling & Movement'." 2] Chose 3rd result, for agilelifemobility.com, because there were no matches for this org. 3] Scrolled to "American Association for Safe Patient Handling & Movement (AASPHM)," and clicked "AASPHM.org." 4] Brought me to a GoDaddy page saying "aasphm is parked free" with a "Get this domain" button. 5] Used google.com to search again, this time without the quotation marks: American Association for Safe Patient Handling & Movement. 6] Chose first result, for "Association of Safe Patient Handling Professionals." 7] Under "Resources & Tools" menu, chose "Links and Resources." 8] Browsed results, saved for author screening. (X3)

12/6: Used google.com to search for "'American Association for Safe Patient Handling & Movement'." 2] Chose 3rd result, for agilelifemobility.com, because there were no matches for this org. 3] Scrolled to "American Association for Safe Patient Handling & Movement (AASPHM)," and clicked "AASPHM.org." 4] Brought me to a GoDaddy page saying "aasphm is parked free" with a "Get this domain" button. 5] Used google.com to search again, this time without the quotation marks: American Association for Safe Patient Handling & Movement. 6] Chose first result, for "Association of Safe Patient Handling Professionals." 7] Under "Resources & Tools" menu, chose "Case Studies." 8] Browsed results, saved for author screening. (X2)

12/6: Used google.com to search for "National Association of Orthopaedic Nurses (NAON)." 2] Chose first result, for orthonurse.org. 3] Under "PUBLICATIONS" menu, chose "Position Statements." 4] Browsed results, saved for author screening.

RESULTS

Studies that offer insights that can inform perioperative nursing practice in the area of safe patient handling and movement and ergonomics in the perioperative setting 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: CRD42021274097