

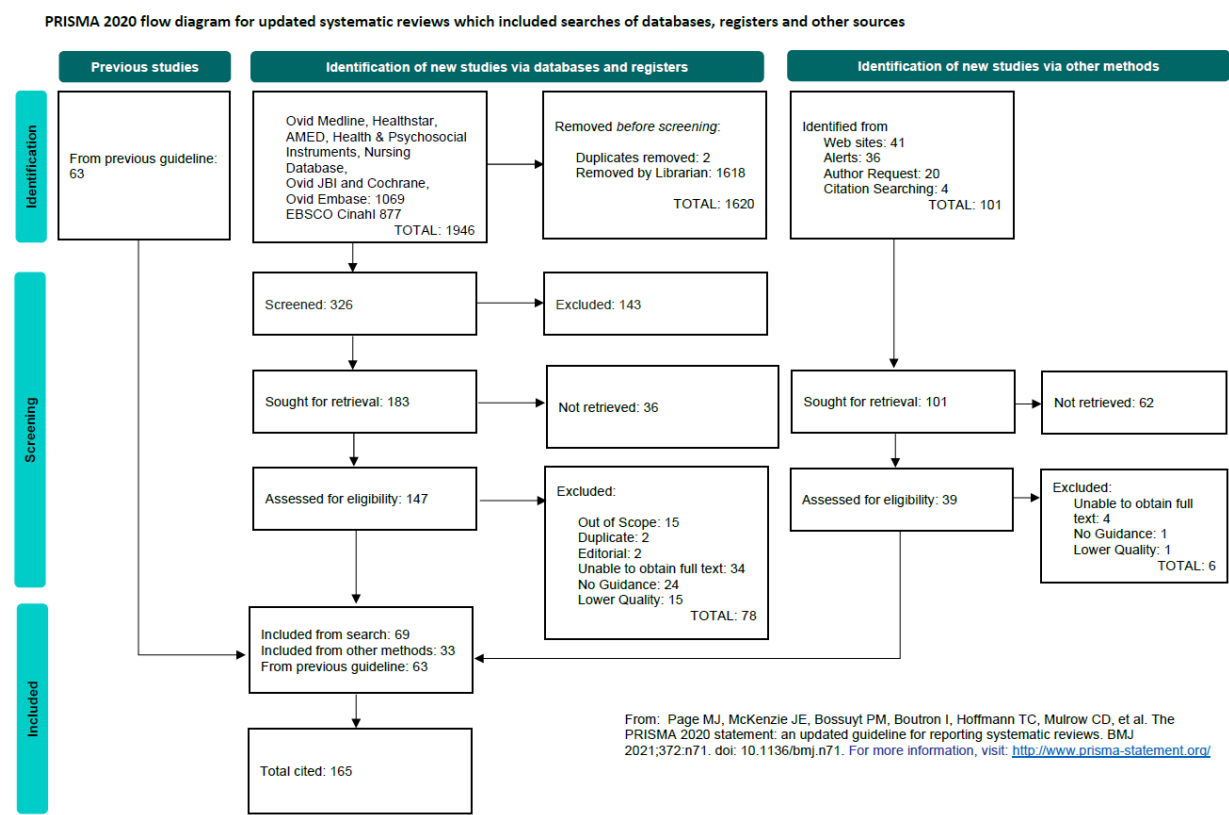
**EVIDENCE REVIEW**

The Guideline for the Safe Use of Surgical Energy Devices was approved by the AORN Guidelines Advisory Board and became effective December 18, 2025.

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 December, 2019 through December, 2024. 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, 2025. 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 12, 2024, 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.

On December 6, 2024, a medical librarian with a perioperative background conducted a systematic search of 18 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.

Table 1: Databases searched and coverage

Database	Coverage
AORN Full Text Journals@Ovid	
Books@Ovid	November 25, 2024
JB I EBP Database	Current to December 04, 2024
EBM Reviews: ACP Journal Club	1991 to November 2024
EBM Reviews: Cochrane Central Register of Controlled Trials	November 2024
EBM Reviews: Cochrane Database of Systematic Reviews	2005 to December 4, 2024
EBM Reviews: Cochrane Clinical Answers	November 2024
EBM Reviews: Cochrane Methodology Register	3rd Quarter 2012
EBM Reviews: Database of Abstracts of Reviews of Effects	1st Quarter 2016
EBM Reviews: Health Technology Assessment	4th Quarter 2016
EBM Reviews: NHS Economic Evaluation Database	1st Quarter 2016
AMED (Allied and Complementary Medicine)	1985 to October 2024
Embase	1974 to 2024 December 05
Health and Psychosocial Instruments	1985 to October 2024
Ovid Healthstar	1999 to October 2024
Ovid MEDLINE(R) ALL	1946 to December 06, 2024
Ovid Nursing Database	1946 to November Week 5 2024
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 "education, nursing" or "operating room nursing" or "patient safety").de,sh,hw. or ("surgical patients" or "circulating nurse" or "surgical staff" or "surgical technologist").ti,ab,kw. 572602
- 2 (diathermy or "argon plasma coagulation" or "radiofrequency ablation" or Electrosurgery or electrocoagulation or ligation or "Hemostasis, Surgical" or cautery).de,sh,hw. 254127

- 3 (electrocautery or thermocoagulation or "surgical diathermy" or "endocavitary fulguration" or cauterization or "ablation techniques" or "shared airway procedures" or "argon beam coagulation").ti,ab,kw. 32457
- 4 ("high-intensity focused ultrasound ablation" or "endometrial ablation techniques").de,sh,hw. 190607
- 5 1 or 2 or 3 or 4 849982
- 6 ("accident prevention" or "equipment failure analysis" or "equipment safety" or "risk management").de,sh,hw. 153876
- 7 ("shared airway safety" or "fire safety" or "device safety" or "equipment hazard" or "medical device safety" or "hospital risk reporting" or "hospital incident reporting" or "electrical safety" or "access control" or "accidental activation" or misdirection).ti,ab,kw. 11835
- 8 ((secure\$ or attach\$) and "surgical drape").ti,ab,kw. 17
- 9 ("pacemaker, artificial" or "electrodes, implanted" or metals or "Defibrillators, Implantable" or "cochlear implant" or "body piercing" or tattooing).de,sh,hw. 280405
- 10 (pacemaker or "implanted electrode" or "implantable electronic devices" or "dispersive electrode" or "Bladder stimulator" or "Metal implant" or "Tattoo ink" or piercing or "deep brain stimulator" or "spinal cord stimulator" or "cardiac implantable electronic device" or "hair clip" or braid or "hair extension" or wig or "bobby pin" or "hair enhancement").ti,ab,kw. 153621
- 11 (implant\$ and ("electronic device" or "cardioverter defibrillator")).ti,ab,kw. 53518
- 12 ("surgical equipment" or "electrical equipment and supplies" or "equipment and supplies, hospital" or "durable medical equipment" or "electric power supplies").de,sh,hw. 82722
- 13 ("power sources and settings" or grounding or "capacitive coupling" or "power supplies" or "power source" or "energy device" or "foot pedal" or "active electrode" or "return electrode" or plasmablade or ligasure).ti,ab,kw. 23830
- 14 (((advanced or radiofrequency) and "energy devices") or ("low-thermal-injury" and "electrosurgical device") or (electrosurgical and "dissection device") or (ultrasonic and (surgical or "energy device" or scalpel)) or ((monopolar or bipolar or tripolar) and energy) or ((reusable or "single-use" or disposable) and ("dispersive electrode" or grounding or dispersive) and pad)) or ((return or active) and electrode and monitoring) or (Insulat\$ and (instruments or test\$)) or (safety and (holster or cap))).ti,ab,kw. 39577
- 15 (fires or "occupational injuries" or burns or "burns, electric" or "equipment failure").de,sh,hw. 258792
- 16 ("equipment contamination").de,sh,hw. or ("thermal injury" or "occupational hazards" or "airway fires" or "surgical fires" or "device failure" or "equipment malfunction" or "equipment defects" or "alternate site injuries" or "antenna coupling").ti,ab,kw. 309044
- 17 ((assess\$ and ((skin adj5 (color or tone)) and (burn or change))) or ((burn adj3 result\$ adj5 "electrosurgical device" adj7 (dark or pigmented)) and skin)).ti,ab,kw. 645
- 18 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 1012555
- 19 5 and 18 27886
- 20 limit 19 to cochrane library 15704
- 21 limit 20 to embase records 15381
- 22 limit 21 to english language 13911
- 23 limit 22 to human 11041
- 24 limit 23 to medline records 10830
- 25 limit 24 to yr="2019 -Current" 1975
- 26 limit 25 to humans 1975

EBSCOhost (CINAHL)

S20 S5 AND S18

Limiters - Publication Date: 20190101-20241231; English Language; Peer Reviewed; Exclude MEDLINE records; Human 877

S19 S5 AND S18 8,735

S18 S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 149,500

S17 ( (assess\* and ((skin N5 (color or tone)) and (burn or change)) ) OR ( (burn N3 result\* N5 "electrosurgical device" N7 (dark or pigmented) and skin) ) 131

S16 "thermal injury" or "occupational hazards" or "airway fires" or "surgical fires" or "device failure" or "equipment malfunction" or "equipment defects" or "alternate site injuries" or "antenna coupling" 12,389

S15 (MH "Occupational-Related Injuries") OR (MH "Burns") OR (MH "Burns, Electric") OR (MH "Equipment Failure") OR (MH "Equipment Contamination") OR (MH "Fires") 48,677

S14 ( ((advanced or radiofrequency) and "energy devices") ) OR ( ("low-thermal-injury" and "electrosurgical device") ) OR ( (ultrasonic and (surgical or "energy device" or scalpel)) ) OR ( (electrosurgical and "dissection device") ) OR ( ((monopolar or bipolar or tripolar) and energy) ) OR ( ((reusable or "single-use" or disposable) and (("dispersive electrode" or grounding or dispersive) and pad)) ) OR ( ((return or active) and electrode and monitoring) ) OR ( (Insulat\* and (instruments or test\*)) ) OR ( (safety and (holster or cap)) ) 2,339

S13 "power sources and settings" or grounding or "capacitive coupling" or "power supplies" or "power source" or "energy device" or "foot pedal" or "active electrode" or "return electrode" or plasmablate or ligasure or "durable medical equipment" or "electric power supplies" 2,673

S12 (MH "Surgical Equipment and Supplies") OR (MH "Electrical Equipment and Supplies") OR (MH "Electrical Equipment and Supplies") 6,177

S11 (implant\* and ("electronic device" or "cardioverter defibrillator")) 6,376

S10 pacemaker or "implanted electrode" or "implantable electronic devices" or "dispersive electrode" or "Bladder stimulator" or "Metal implant" or "Tattoo ink" or piercing or "deep brain stimulator" or "spinal cord stimulator " or "cardiac implantable electronic device" or "hair clip" or braid or "hair extension" or wig or "bobby pin" or "hair enhancement" 18,462

S9 (MH "Electrodes, Implanted") OR (MH "Pacemaker, Artificial") OR (MH "Metals") or (MH "Defibrillators, Implantable") OR (MH "Cochlear Implant") OR (MH "Body Piercing") or (MH "Tattooing") 39,169

S8 ((secure\* or attach\*) and "surgical drape") 3

S7 "accident prevention" or "equipment failure analysis" or "shared airway safety" or "fire safety" or "device safety" or "equipment hazard" or "medical device safety" or "hospital risk reporting" or "hospital incident reporting" or "electrical safety" or "access control" or "accidental activation" or misdirection 24,279

S6 (MH "Equipment Safety") or (MH "Risk Management") 21,506

S5 S1 OR S2 OR S3 OR S4 188,423

S4 (MH "Endometrial Ablation Techniques") 286

S3 "argon plasma coagulation" or electrocautery or thermocoagulation or "surgical diathermy" or "endocavitary fulguration" or cauterization or "ablation techniques" or "shared airway procedures" or "argon beam coagulation" or "high-intensity focused ultrasound ablation" 5,847

S2 (MH "Diathermy") OR (MH "Radiofrequency Ablation") OR (MH "Electrosurgery") OR (MH "Electrocoagulation") OR (MH "Ligation") OR (MH "Hemostasis, Surgical") OR (MH "Cautery") 8,122

S1 (MH "Perioperative Nursing") OR (MH "Education, Nursing") OR (MH "Operating Room Nursing") OR (MH "Patient Safety") OR "surgical patients" or "circulating nurse" or "surgical staff" or "surgical technologist" 176,299

Web Searches// All searches conducted in 2024.

12/12: Used google.com to navigate to Assoc of Surg Technologists website, ast.org. 2] Opened "About" drop-down menu, chose "Position Statements." 3] Chose "Surgical Technologist Responsibilities." 4] Browsed results; saved for author review.

12/12: Used google.com to navigate to Assoc of Surg Technologists website, ast.org. 2] Opened "About" drop-down menu, chose "Position Statements." 3] Chose "Disinfection and Sterilization." 4] Saved for author review.

12/12: Used google.com to navigate to NFPA website, nfpa.org. 2] Entered "hospitals" in search bar. 3] Browsed results. 4] Saved for author review. (x4)

12/12: Used google.com to navigate to Assoc of Surg Technologists website, ast.org. 2] Opened "About" drop-down menu, chose "Position Statements." 3] Browsed results; saved for author review.

12/18: Used google.com to navigate to TJC website, thejointcommission.org. 2] Entered "surgical files" in search bar. 3] Browsed results. 4] Saved for author review. (x2)

12/18: Used google.com to navigate to the American College of Surgeons website, facs.org. 2] Chose "For Medical Professionals" from top Left. 3] Scrolled to "About ACS" at the very bottom of the page. 4] Scrolled to "Statements" and clicked. 5] Browsed results; saved for author review. (x2)

12/18: Used google.com to navigate to SAGES website, sages.org. 2] Opened "Publications" drop-down menu and scrolled to "SAGES Manuals." 3] Browsed results; saved for author screening.

12/18: Using google.com, navigated to SAGES, sages.org. 2] Under "Education" drop-down menu, chose "SAGES OR Video Activity." 3] Saved for author review.

12/18: Used google.com to navigate to Fundamental Use of Surgical Energy, FUSE (fuseprogram.org). 2] Saved website for author review.

12/18: Used google.com to navigate to AAMI Array, array.aami.org. 2] Entered "electrosurgery" in the search field. 3] Browsed results, saved for author screening.

12/18: Used google.com to navigate to AAMI Array, array.aami.org. 2] Entered "surgical fires" in search box. 3] Browsed results, saved for author screening.

12/23: Used google.com to search "electrosurgery site www.niosh.gov." 2] Chose first result for this document. 3] Saved for author review.

12/23: Used google.com to search "electrosurgery site www.osha.gov." 2] Chose first result for this document. 3] Followed link for "Standards." 4] Saved for author review.

12/23: Used google.com to search "electrosurgery site www.osha.gov." 2] Chose first result for this document. 3] Followed link for "Standards." 4] Chose first link, saved for author review. (x2)

12/23: Used google.com to search "electrosurgery site www.fda.gov." 2] Chose third result for this document. 3] Saved for author review.

12/26: Used google.com to navigate to ecri.org; signed in. 2] Entered "electrosurgery" in search field, and filtered for all content. 3] Browsed results; saved for author screening. (x14)

12/27: Signed in to ECRI as a member, noticed banner directing me to this resource. 2] Saved for author screening.

## PUBLICATION HISTORY

- Originally published March 1985, AORN Journal as Recommended Practices: Electrosurgery. Revised April 1991; revised July 1993.
- Revised November 1997; published January 1998, AORN Journal as Recommended Practices for Electrosurgery.

- Reformatted July 2000.
- Revised November 2003; published February 2004, AORN Journal.
- Revised November 2004; published in Standards, Recommended Practices, and Guidelines, 2005 edition. Reprinted March 2005, AORN Journal.
- Revised July 2009 for online publication in Perioperative Standards and Recommended Practices.
- Minor editing revisions made in November 2009 for publication in Perioperative Standards and Recommended Practices, 2010 edition.
- Editorial revisions made July 2012. Recommendation X was revised and approved by the Recommended Practices Advisory Board. Reformatted September 2012 for publication in Perioperative Standards and Recommended Practices, 2013 edition.
- Minor editing revisions made in November 2014 for publication as Guideline for Electrosurgery in Guidelines for Perioperative Practice, 2015 edition.
- Revised and combined with the Guideline for Laser Safety, as Guideline for Safe Use of Energy-Generating Devices, September 2016, for online publication in Guidelines for Perioperative Practice.
- Evidence ratings revised and minor editorial changes made to conform to the current AORN Evidence Rating model, September 2019, for online publication in Guidelines for Perioperative Practice.
- Revised July 2020 as the Guideline for Electrosurgical Safety for publication in Guidelines for Perioperative Practice online; separated from the Guideline for Laser Safety.
- Revised December 2025 as the Guideline for the Safe Use of Surgical Energy Devices for publication in Guidelines for Perioperative Practice online.
- Scheduled for review 2030.