Guideline Implementation: Energy-Generating Devices, Part 1—Electrosurgery 1.4

SHERYL P. EDER, MSN, RN, CNOR, CRCST

Continuing Education Contact Hours

The contact hours for this article expire March 31, 2020. Pricing is subject to change.

Purpose/Goal

To provide the learner with knowledge specific to implementing recommendations for the use of electrosurgery from the AORN “Guideline for safe use of energy-generating devices.”

Objectives

1. Discuss risks associated with the use of energy-generating devices in surgery.
2. Discuss ways to mitigate the risk for injury associated with the use of electrosurgical units (ESUs).
3. Describe precautions to take for a surgical patient with an implanted electronic device.
4. Identify items that should be documented related to energy-generating device use.

Accreditation

AORN is accredited with distinction as a provider of continuing nursing education by the American Nurses Credentialing Center’s Commission on Accreditation.

Approvals

This program meets criteria for CNOR and CRNFA recertification, as well as other CE requirements.

Conflict-of-Interest Disclosures

Sheryl P. Eder, MSN, RN, CNOR, CRCST, has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.

The behavioral objectives for this program were created by Liz Cowperthwaite, BA, senior managing editor, and Helen Starbuck Pashley, MA, BSN, CNOR, clinical editor, with consultation from Susan Bakewell, MS, RN-BC, director, Perioperative Education. Ms Cowperthwaite, Ms Starbuck Pashley, and Ms Bakewell have no declared affiliations that could be perceived as posing potential conflicts of interest in the publication of this article.

Sponsorship or Commercial Support

No sponsorship or commercial support was received for this article.

Disclaimer

AORN recognizes these activities as CE for RNs. This recognition does not imply that AORN or the American Nurses Credentialing Center approves or endorses products mentioned in the activity.
Guideline Implementation: Energy-Generating Devices, Part 1—Electrosurgery

SHERYL P. EDER, MSN, RN, CNOR, CRCST

ABSTRACT

Energy-generating devices are standard equipment in the surgical suite, with electrosurgical units being the most common type of electrical device used in the OR. Prevention of injuries to patients and personnel related to the use of energy-generating devices is a key component of the perioperative nurse’s role. The AORN “Guideline for safe use of energy-generating devices” provides guidance on the use and maintenance of devices that deliver energy in the forms of radiofrequency waves, ultrasound waves, or lasers. This article focuses on key points of the guideline, which address precautions specific to electrosurgical units, patients with implanted electronic devices, and minimally invasive surgery, and documentation of the use of energy-generating devices. Perioperative RNs should review the complete guideline for additional information and for guidance when writing and updating policies and procedures. AORN J 105 (March 2017) 300-310. © AORN, Inc, 2017. http://dx.doi.org/10.1016/j.aorn.2017.01.004

Key words: electrosurgery, electrocautery, energy-generating devices, lasers, patient safety.

Although technological advances have improved the safety of energy-generating devices used in surgery, patient and personnel injuries from the improper use of these devices continue to be a concern. Energy-generating equipment, such as electrosurgical units (ESUs), lasers, and argon beam coagulators used for tissue dissection and coagulation, is beneficial in the surgical suite but may also be associated with unintended injury if used incorrectly. Thermal injury may result from direct application, insulation failure, unintended discharge of electrical or laser energy, or antenna coupling (eg, inadvertent transfer of monopolar current through conductive materials). Injuries from unintended contact with energy used for surgery may result in delayed wound healing, prolonged hospitalization, permanent disability, or even death.

This topic is especially important to patients and health care practitioners because of the large number of energy-generating devices used in the OR. Each device has unique uses and precautions that perioperative team members should be aware of so they may ensure safe use and proper care of the equipment. In addition, because a patient undergoing an operative or other invasive procedure under anesthesia often has no ability to protect himself or herself from harm, the perioperative nurse’s role in the planning, coordination, safe delivery, and evaluation of nursing care for the patient includes protecting the patient from the adverse effects of improper use of energy-generating devices.

The new AORN “Guideline for safe use of energy-generating devices,” published in September 2016, combines the previous
“Guideline for electrosurgery” and “Guideline for laser surgery.” AORN guideline documents provide guidance based on an extensive literature review and in-depth evaluation of the strength and quality of the evidence available for a specific subject. The guidelines apply to inpatient and ambulatory settings and are adaptable to all areas where operative and other invasive procedures may be performed.

Topics addressed in the guideline include patient and personnel safety considerations for all energy-generating devices and specific safety guidance for ESUs and ESU accessories, lasers, phacoemulsification devices, and argon beam coagulators. This article elaborates on key takeaways from the guideline document that are specific to the use of ESUs. A subsequent article will address the key points of this guideline related to lasers and other energy-generating devices. Perioperative RNs should review the complete guideline for additional information and for guidance when writing and updating policies and procedures.

Key takeaways from the AORN “Guideline for safe use of energy-generating devices” that are addressed in this article include the following points:

- Perioperative personnel should take precautions to mitigate the risk for injury when
  - ESUs are used,
  - the patient has an implanted electronic device, and
  - electrosurgery is used during minimally invasive surgery.
- The use of any energy-generating device should be documented (Figure 1).

The following scenario highlights the key takeaways and other aspects of the AORN guideline. Each key takeaway is then discussed in more detail.

**SCENARIO**

Ms D, a 48-year-old woman, is admitted to the outpatient surgery unit at Goodcare Regional Hospital to undergo a laparoscopic cholecystectomy under general anesthesia. In the preoperative holding area, the surgeon marks the surgical site, obtains consent, and verifies the patient’s identity with the patient, the RN circulator, and the anesthesia team. It is 6:15 AM, and Ms D states that she has been NPO since 7 PM the previous evening. She has no known medication allergies, is not wearing jewelry, and has no removable dental work. Her history includes failed back surgery syndrome, and she has an implanted spinal cord stimulator with the generator site in the right buttock.

The RN circulator and the certified RN anesthetist (CRNA) take Ms D to the OR. Ms D transfers herself from the stretcher to the OR bed with assistance from the RN circulator and CRNA and is placed in the supine position. After the induction of general anesthesia and intubation, the RN circulator and CRNA ensure the patient is properly positioned with protection of bony prominences and confirm the placement of upper and lower warming blankets to aid in the prevention of intraoperative hypothermia. The RN circulator documents the presence of the spinal cord stimulator and the location of the generator in the patient record. She applies the ESU electrode to the patient’s left buttock, well away from the generator site, and documents the ESU number in the patient record, along with documentation that the skin at the site of ESU dispersive pad placement is clean, dry, and free of damage. The RN circulator then preps the surgical site with a chlorhexidine gluconate and alcohol solution, which before the application of the sterile drapes is allowed to dry fully to prevent ignition of alcohol vapors by the ESU.

After the surgical technologist places disposable surgical drapes to establish the sterile field, he secures the ESU cords and laparoscopy cords to the drape with a blunt metal towel clamp and directs the cords to the laparoscopy boom at the head of the bed, where the RN circulator attaches them to the camera, ESU, and light source. As the remainder of the team scrubs, the RN circulator protects the foot pedals from moisture by putting them in impervious covers and places the pedals in proximity to the operating surgeon’s foot. The RN circulator then ensures all devices are grounded and attached to their respective consoles and assists the rest of the surgical team with gowning. After all surgical preparations are complete, the team performs the time out to confirm the patient’s identity, the correct site and procedure, and implant and allergy status.

After the surgeon places the trocars and insufflates the patient’s abdomen, he finds the gallbladder to be inflamed and adherent to the liver bed. He dissects and lyses adjacent adhesions with a moderate amount of bleeding. During the procedure, the surgeon asks for the ESU settings to be increased on two occasions to control the bleeding, which the RN circulator carries out after verbal verification with the surgeon.

After a thorough inspection and irrigation of the liver bed with warm fluids to promote hemostasis, the surgeon suctions the abdomen clear of fluid, expels the insufflation gases from the abdominal cavity, and closes the laparoscopy port sites. The RN circulator documents that the site of the ESU dispersive pad is clear of redness and irritation. The anesthesia professional extubates the patient in the OR, and the RN circulator and anesthesia professional transfer Ms D to the postanesthesia care unit (PACU) in stable condition.
Ms D’s initial postoperative course is unremarkable except for pain that is treated with IV hydromorphone. Approximately 30 minutes after her admission to the PACU, Ms D says she is experiencing pain at the site of one of the electrocardiogram (ECG) leads. On inspection, the PACU RN notes that one of the ECG sites has blistering and circumferential erythema. After consultation with the anesthesia professional, the PACU RN documents the blister in the patient record as a probable allergic reaction to the ECG lead adhesive. The surgeon is notified, and he orders treatment of the area with silver sulfadiazine cream. The patient is discharged with instructions to return to the surgeon’s office for a postoperative visit in two weeks. The PACU RN instructs Ms D’s mother and sister, who are at the bedside, to observe Ms D for increasing pain, fever, or bleeding at the surgical sites and to clean the blistered area with clean water and reapply the silver sulfadiazine cream as needed.

Ms D returns to the hospital 36 hours later with increased abdominal pain, fever, nausea, and vomiting. The site of the ECG reaction has sloughed, and the resulting wound is consistent with a third-degree burn. The emergency room physician conducts a physical examination and finds the patient has a distended, tight, and painful abdomen. A complete blood count reveals a white blood cell count of 22,000, and a radiograph shows free air in the peritoneal cavity. Her surgeon is notified, and Ms D is taken to surgery for an exploratory laparotomy. Findings include gross peritoneal pus and a small perforation of the bowel in a site remote from the area of the previous surgical dissection. The surgeon repairs the perforation and copiously irrigates the bowel with warm saline. The anesthesia professional administers IV antibiotics as ordered. The surgeon debrides the ECG site wound, and the surgical technologist applies a wet-to-dry dressing. After six days, Ms D is discharged home, and she recovers with no additional sequelae.

In accordance with the policy of Goodcare Regional Hospital, personnel in the quality and risk management department coordinate a root cause analysis to investigate the adverse event. The location of the perforation was distant from the surgical site, so a possible cause is stray energy discharge from the ESU during dissection of the gallbladder from the liver bed. This is determined to be especially likely after interviews with the surgeon, surgical technologist, and perioperative RN reveal that there were two occasions on which the ESU setting was increased. The sterile processing department manager arranges for a serial examination of the insulated instruments used in laparoscopy and discovers several instruments in the facility that have damaged insulation, any of which may have provided an alternate pathway for the ESU current. All the damaged devices are sent to the facility instrument repair service, and a new policy is implemented to require insulation testing for all insulated instruments after decontamination and before sterilization.

The placement of the cords off the head of the bed and crossing over the ECG leads supports the conclusion that...
antennae coupling occurred, causing the intraoperative burn. Recognizing that energy-generating devices are used in nearly every type of surgery, the quality and risk management department personnel coordinate a review to identify and refine the facility’s practices for the use of all energy-generating devices. A multidisciplinary quality improvement team is formed to review various aspects of the safe use of energy-generating devices.

The perioperative nurses, surgical technologists, a biomedical engineer, and sterile processing technologists on the team review the manufacturers’ instructions for use for all the energy-generating devices in use in the OR, including reusable and disposable accessories and instruments. One of the perioperative RNs also conducts a literature search to identify possible causes of inadvertent injury related to the use of energy-generating devices. In reviewing the materials, the team discovers practices that could increase risk in the OR. For example, personnel have been observed using the ESU generator console as a prep stand or as a surface on which to place solutions and other items. This places the equipment at risk of fluid ingress into the machine or overheating of the console because of blocked ventilation openings.

They also discover that looping electrosurgery cords through a metal towel clamp to secure them to the drape may increase the risk of coupling and potential burn injuries to the patient. The team realizes that insulation damage leading to failure could occur at any time during the use cycle, so although the sterile processing personnel have instituted insulation testing after every use, a visual inspection of the insulation should be performed at the sterile field. The perioperative nurses, who were previously aware that the ESU dispersive pad should be placed well away from any implanted devices, learn from the research that placement considerations should also include keeping the ESU dispersive pad as close to the surgical site as possible while preventing the electrical current from crossing over the implant on the way to the surgical site.

Some of the surgeons and anesthesia professionals on the team are surprised to learn that antenna coupling may occur when cardiac-monitoring cords, neuromuscular-monitoring cords, and pulse oximetry cords are near ESU cords and the surgical site. In addition, the perioperative RN presents research to the group supporting the efficacy of lower power settings for all energy-generating devices; lower power settings are associated with less risk for injury, less postoperative pain, less thermal tissue damage, and better coagulation of blood vessels. In addition, the potential for electromagnetic interference with implanted electronic devices increases with higher settings for electrosurgical devices.

At a final meeting, the team discusses implementation of best practices and reinforcement of the best practices already in place. Not all of the recommended implementations directly relate to the patient in this case, but practices that could result in harm to other patients have been identified, so proactive changes in practice are proposed. The teams agree to:

- continue fire safety practices that include requiring complete drying of prep solutions before activation of energy-generating devices, limiting the use of alcohol near the surgical site, and using moist sponges near the surgical site, especially in the oxygen-enriched area near the face;
- use bipolar current, when possible, to reduce the potential for fire, especially in high-risk scenarios such as head and neck surgeries where supplemental oxygen is being used;
- ensure anesthesia professionals temporarily stop the delivery of oxygen before activating the ESU to decrease the chance of combustion as a result of an oxygen enriched environment;
- conduct a visual inspection of the instrument insulation at the sterile field before use;
- use the lowest effective power settings for all energy-generating devices, including laser and phacoemulsification devices;
- consider replacing the device or accessories before increasing power settings, in the event that normal power settings are ineffective;
- ensure the room setup permits placement of equipment cords and the ESU cord as far from each other as possible, or at a 90-degree angle, to prevent antenna coupling;
- use sterile nonmetallic clamps to secure cords on the surgical field; and
- document proper ESU dispersive pad placement, which is especially important in the presence of implanted electronic devices.

KEY TAKEAWAYS DISCUSSION

The key takeaways from the AORN “Guideline for safe use of energy-generating devices” address precautions specific to ESUs, patients with implanted electronic devices, and minimally invasive surgery, in addition to documentation of energy-generating device use. These takeaways do not cover the entire guideline. Rather, they help the reader focus on important or new information that should be implemented into perioperative practice.

Precautions for Use of ESUs

Energy-generating devices, especially ESUs, are among the most commonly used pieces of equipment in the perioperative setting. Though the use of these devices provides
Patients and perioperative personnel with benefits, such as quicker dissection with less bleeding, proper precautions should be taken to help ensure their use does not have unintended effects. For example, the nurse in the scenario addressed well-known risk factors by ensuring the patient was not wearing jewelry and by documenting and communicating the presence of an implant. To prevent an indirect coupling burn, the location of the implant was considered in the placement of the ESU dispersive pad. The lesser-known problem of antenna coupling causing a burn at the ECG site may have been prevented had the perioperative team had full awareness of the risks, which they might have gained through examination of the manufacturer’s instructions for use of the device and a review of the literature. With adequate understanding of the risks, possible preventive interventions may have included checking to ensure the ESU dispersive pad was in place and undamaged and replacing the generator rather than increasing the power settings after the standard settings proved to be inadequate for coagulation during the procedure.

Fire safety precautions are significant for nearly all energy-generating devices, because these devices can act as an ignition source. In the scenario, the perioperative nurse ensured the flammable prep solutions were dry before draping to help prevent a fire. Other interventions include using alternatives to monopolar devices in procedures in which there is high risk for fire, using water-soluble lubricants when needed in the sterile field, using moist sponges near the ignition source, avoiding the use of alcohol on the sterile field, and temporarily stopping the delivery of oxygen before activating an energy-generating device near the head, face, or neck.

Although the perioperative RN in the scenario executed good general precautions for electrical safety, such as using fluid-resistant covers for the foot pedals and ensuring all devices were grounded and attached to their respective consoles, having all the wires and cords passing off the same area of the bed put the patient at risk for antenna coupling. The surgical technologist properly secured the cords and wires; however, use of conductive towel clamps on the cords also increased the risk for electrical interference. In addition, even though insulation damage may not always be visible, an inspection of insulated instruments at the sterile field may aid in detection of damage that could allow the release of stray current.

What Else Is in the Guideline?
Read the AORN “Guideline for safe use of energy-generating devices” to learn what the evidence says about the following issues:

- What actions should be taken after an injury or equipment failure during the use of an energy-generating device? (Recommendation I.k.)
- What elements should be included in policies and procedures for the use of energy-generating devices? (Recommendation I.l.)
- What types of technologies should be used when neuromonitoring electrodes are present? (Recommendation II.d.1.)
- What interventions should be performed for a patient with a cardiac implanted electronic device? (Recommendation II.e.4.)
- What interventions should be performed for a patient with a cochlear implant? (Recommendation II.e.6.)
- What corrective measures should be taken if inadequate contact between the dispersive electrode and the patient occurs? (Recommendation II.i.3.)

References
Implanted Electronic Devices

The nurse in the scenario acted prudently in the management of this patient’s implant by noting its location and taking precautions in placing the ESU dispersive pad to prevent the flow of energy through the electronic implant. Not discussed in the scenario is the potential for electromagnetic interference with monopolar ESU and implanted devices, such as cardiac implanted electronic devices and nerve stimulators. Monopolar energy is associated with the improper firing of implanted electronic devices such as stimulators and cardiac defibrillators or pacemakers. Clinicians should consider the use of bipolar or ultrasonic devices rather than monopolar devices to prevent interference with implanted devices. The use of magnets to prevent misfiring of implanted cardiac devices is a common practice; unfortunately, not all implanted devices respond to magnets in the same way. Recommendations include a thorough assessment of the type of device along with consultation with the device representative as part of the preoperative workup when possible.

Avoidance of crossing cords from the ESU or other energy-generating device over the implantable device may reduce the potential for electromagnetic interference. An additional precaution for the use of monopolar energy and an ESU dispersive pad is consideration of characteristics of the energy generated by the monopolar device. Monopolar energy will take the shortest direct route from the surgery site to the dispersive pad, so perioperative personnel must consider placing the pad in an area that does not permit the energy to cross over the leads, generator, or other conductive materials.

Minimally Invasive Surgery

Minimally invasive surgery provides patients with an option that shortens healing time, decreases scarring, decreases hospitalization time, and is associated with less pain than open procedures. In the scenario, the RN circulator ensured that the ESU dispersive pad placement was away from the site of the implant on a well-muscled area free of tissue damage to protect the patient from return electrode burns. Unfortunately, the root cause analysis revealed a lapse in the inspection and maintenance of insulation of the reusable instruments, resulting in unintended thermal damage and causing significant injury to the patient. Some precautions related to energy-generating devices and minimally invasive surgery include:

- use of a conductive trocar system;
- routine examination of insulated devices to ensure there is no unintended contact with electrical energy; and
- use of active electrode-monitoring instrumentation systems, devices that continuously monitor the integrity of the instrument throughout the procedure to ensure stray energy is not inadvertently discharged to adjacent tissues.

Documentation

Although documentation of the ESU settings is no longer a recommendation in the guideline, documentation should focus on permitting traceability of the generator to the patient and the presence or absence of generator-induced tissue damage. This includes documenting the generator serial or identification number, the location of the ESU dispersive pad, and the condition of the skin before application and after removal of the pad.

CONCLUSION

The safe use of energy-generating devices in the OR requires a multidisciplinary approach that includes all members of the surgical team as well as personnel from other departments, such as sterile processing, biomedical engineering, and risk management. The AORN “Guideline for safe use of energy-generating devices” provides a framework based on current research to support development and implementation of processes that protect patients and perioperative personnel from harm and promote optimal efficacy in the use of these devices. Perioperative personnel should review the guideline and use it as a resource to confirm that policies and procedures reflect current best practices in the use of energy-generating devices.

References


Sheryl P. Eder, MSN, RN, CNOR, CRCST, is a professor of Nursing at Southern Technical College, Fort Myers, FL. Ms Eder has no declared affiliation that could be perceived as posing a potential conflict of interest in the publication of this article.
Continuing Education: Guideline Implementation: Energy-Generating Devices, Part 1—Electrosurgery 1.4

PURPOSE/GOAL
To provide the learner with knowledge specific to implementing recommendations for the use of electrosurgery from the AORN “Guideline for safe use of energy-generating devices.”

OBJECTIVES
1. Discuss risks associated with the use of energy-generating devices in surgery.
2. Discuss ways to mitigate the risk for injury associated with the use of electrosurgical units (ESUs).
3. Describe precautions to take for a surgical patient with an implanted electronic device.
4. Identify items that should be documented related to energy-generating device use.

The Examination and Learner Evaluation are printed here for your convenience. To receive continuing education credit, you must complete the online Examination and Learner Evaluation at http://www.aornjournal.org/content/cme.

QUESTIONS
1. During the use of energy-generating devices, electro-thermal injury may result from
   1. antenna coupling.
   2. direct application of the device.
   3. insulation failure.
   4. unintended discharge of energy.
      a. 1 and 2
      b. 3 and 4
      c. 1, 3, and 4
      d. 1, 2, 3, and 4
   a. 1 and 2 b. 3 and 4 c. 1, 3, and 4 d. 1, 2, 3, and 4

2. Each type of energy-generating device has unique uses and precautions that the perioperative team should be aware of to help ensure safe use and proper care of the equipment.
   a. true
   b. false

3. The ESU dispersive pad should be placed
   1. away from any implanted electronic devices.
   2. close to the surgical site.
   3. far from the surgical site.
   a. 1 and 3
   b. 2 and 4
   c. 1, 2, and 4
   d. 1, 2, 3, and 4

4. Lower power settings for energy-generating devices are associated with
   1. antenna coupling.
   2. better coagulation of blood vessels.
   3. greater likelihood of electromagnetic interference with implanted electronic devices.
   4. less thermal tissue damage.
      a. 1 and 3
      b. 2 and 4
      c. 1, 2, and 3
      d. 1, 2, 3, and 4

5. To prevent antenna coupling, equipment cords and the ESU cord should be
   a. placed as close to each other as possible.
   b. placed as far from each other as possible or at a 90-degree angle.
c. looped through a metal towel clamp and secured to the drape.
d. looped through a nonmetallic clamp and secured at a 45-degree angle.

6. Fire safety precautions to take when an energy-generating device will be used include
   1. avoiding the use of alcohol on the sterile field.
   2. ensuring prep solutions are dry before the patient is draped.
   3. temporarily stopping oxygen delivery before the device is activated near the head, neck, or face.
   4. using alternatives to monopolar devices when fire risk is high.
      a. 1 and 3         b. 2 and 4
      c. 2, 3, and 4     d. 1, 2, 3, and 4

7. General precautions for electrical safety include
   1. ensuring devices are grounded and attached to their respective consoles.
   2. having all wires and cords pass off the same area of the OR bed.
   3. using a conductive towel clamp on the electrical cords.
   4. using fluid-resistant covers on foot pedals.
      a. 1 and 4         b. 2 and 3
      c. 1, 2, and 4     d. 1, 2, 3, and 4

8. Bipolar energy is associated with the improper firing of implanted electronic devices such as stimulators and cardiac defibrillators or pacemakers.
   a. true            b. false

9. Monopolar energy will take the shortest direct route from the surgery site to the dispersive pad.
   a. true            b. false

10. When an ESU is used, it is important to document the
    1. ESU settings.
    2. generator serial or identification number.
    3. location of the dispersive pad.
    4. patient’s skin condition before application and after removal of the dispersive pad.
       a. 1 and 2         b. 3 and 4
       c. 2, 3, and 4     d. 1, 2, 3, and 4
Continuing Education: Guideline Implementation: Energy-Generating Devices, Part 1—Electrosurgery

This evaluation is used to determine the extent to which this continuing education program met your learning needs. The evaluation is printed here for your convenience. To receive continuing education credit, you must complete the online Examination and Learner Evaluation at http://www.aornjournal.org/content/cme. Rate the items as described below.

**OBJECTIVES**

To what extent were the following objectives of this continuing education program achieved?

1. Discuss risks associated with the use of energy-generating devices in surgery.
   *Low 1. 2. 3. 4. 5. High*

2. Discuss ways to mitigate the risk for injury associated with the use of electrosurgical units (ESUs).
   *Low 1. 2. 3. 4. 5. High*

3. Describe precautions to take for a surgical patient with an implanted electronic device.
   *Low 1. 2. 3. 4. 5. High*

4. Identify items that should be documented related to energy-generating device use.
   *Low 1. 2. 3. 4. 5. High*

**CONTENT**

5. To what extent did this article increase your knowledge of the subject matter?
   *Low 1. 2. 3. 4. 5. High*

6. To what extent were your individual objectives met?
   *Low 1. 2. 3. 4. 5. High*

7. Will you be able to use the information from this article in your work setting?
   1. Yes 2. No

8. Will you change your practice as a result of reading this article? (If yes, answer question #8A. If no, answer question #8B.)

   8A. How will you change your practice? *(Select all that apply)*
   1. I will provide education to my team regarding why change is needed.
   2. I will work with management to change/implement a policy and procedure.
   3. I will plan an informational meeting with physicians to seek their input and acceptance of the need for change.
   4. I will implement change and evaluate the effect of the change at regular intervals until the change is incorporated as best practice.
   5. Other: __________________________________

   8B. If you will not change your practice as a result of reading this article, why? *(Select all that apply)*
   1. The content of the article is not relevant to my practice.
   2. I do not have enough time to teach others about the purpose of the needed change.
   3. I do not have management support to make a change.
   4. Other: ________________________________