



PRACTICE NEWS

Charles A. Griffis, PhD, CRNA

Lynn Reede, DNP, MBA, CRNA, FNAP

Michelle O'Rourke, MPH

Victoria Hledin, MPH

Infection Control and Patient Safety: What Is Desirable and What Is Possible During Anesthesia?

Disease outbreaks due to poor infection control practices have led to national prevention efforts focused on reducing healthcare-associated infections. These efforts have resulted in increased infection prevention and control guidance from regulatory and accrediting organizations. Infection control during anesthesia care is essential to prevent patient harm. A dilemma faced by many anesthesia professionals is how to adhere to infection control recommendations while meeting important patient safety needs during anesthesia care. The rapidity required when responding to sud-

den changes in a patient's condition to prevent harm often hinders the anesthesia professional's ability to perform infection control practices (eg, hand hygiene) when indicated. This article discusses the controversies that arise when anesthesia professionals integrate both essential infection control measures and anesthesia safety practices, and it offers potential solutions to optimize patient safety.

Keywords: Anesthesia practice, infection control, infection control guidelines, patient safety.

Infection control in anesthesia practice is an essential component of the ethical obligation that all anesthesia providers have to protect the patients for whom they care. A large percentage of surgical patients, estimated at 17%, will acquire infection traceable to their anesthesia care.¹ Underlying causes of disease transmission include inadequate hand hygiene, lapses in safe injection techniques, difficult-to-clean anesthesia equipment, and ineffective cleaning of surfaces between cases, all of which can lead to adverse events.¹⁻³ For example, a 2007 outbreak of hepatitis C was traced to the improper injection techniques involving misuse of single-dose vials of propofol in a Las Vegas endoscopy clinic, which ultimately led to the single largest patient exposure notification event in history, multiple hepatitis C infections, and 2 deaths.⁴ Since

this incident, there have been at least 59 healthcare-associated outbreaks of hepatitis B and C reported, some involving pain management and outpatient surgical settings, resulting in at least 239 known cases of iatrogenic transmission.⁵

For a variety of reasons, infection control practices may not be prioritized in anesthesia care, as evidenced by investigations documenting the potential for transmission of pathogens by anesthesia providers.^{1,3} Reasons may be high production pressure, overall task density, and the anesthesia professional's overall focus on immediate threats to patient safety, such as physiologic instability. Maintenance of oxygenation, ventilation, and blood circulation is of paramount importance, at times competing with other considerations in the care of anesthetized patients, including

infection control. Further complicating the matter, infections are a late complication, which may not manifest until several days after contact, leading providers to miss the link between their behavior and patient consequences. However, the risk of patient morbidity and mortality due to infections is all too real, with thousands of hospital-acquired infections and deaths each year.¹

Anesthesia professionals face a real dilemma adhering to infection control protocols while maintaining important patient safety standards during anesthesia; the consequences of not following infection control practices must be weighed against the potential patient harm if the anesthesia professional is diverted from providing care while performing an infection control procedure.^{6,7} For example, performing hand hygiene before and after donning

clean gloves every time the patient or equipment is touched in a busy anesthesia environment prolongs responses to patient care needs, and in rare instances may endanger patients, which may be perceived as an excuse to avoid such infection control measures. Also, being able to respond to changes in the patient's condition requires preparing drugs and equipment in advance, having supplies immediately available during cases, and being able to deliver lifesaving interventions to the patient instantly—some of which are incongruent with infection control guidelines.⁸⁻¹⁰ In considering the rapidity with which many anesthetic interventions must be accomplished to prevent patient harm, it is challenging to consistently comply with recommended infection prevention and control practices.^{1,11,12} This article addresses the struggle to practice essential infection control guidelines for anesthetized patients while concurrently tending to their often demanding safety needs during the acute care period.

Implications for Practice

Strict infection control practices are necessary to keep the anesthetizing environment free from pathogens.¹ Adhering to infection control practices while providing anesthesia is challenging because of the nature and intensity of care that anesthesia professionals provide. Patients can arrive unexpectedly for a procedure or may suddenly develop life-threatening changes that require immediate management. The need to perform hand hygiene may conflict and distract from the need to prepare emergency drugs and equipment. The anesthesia professional's ability to provide focused and timely intervention is critical to prevent patient injury or death.^{13,14} The following are a few specific examples of clinical situations in which normal infection control procedures may be difficult to achieve in anticipation of emergent patient need.

- Trauma and emergency patients may present to the healthcare facility with life-threatening conditions at unpredictable times. Equipment to secure the airway and insert central venous catheters, large-bore peripheral access devices, arterial lines, and rapid volume infusers must be prepared before the patient's arrival.¹⁵

- Inadvertent injection of local anesthetic into a blood vessel during regional anesthesia procedures can produce instant seizure and cardiovascular collapse, requiring immediate resuscitation with no time for hand hygiene or port cleansing before injecting lifesaving drugs.¹⁶

- Regurgitation of stomach contents during airway management requires immediate suction and intubation to prevent potentially fatal pulmonary aspiration.¹⁷

- Laryngospasm necessitates the immediate administration of prepared emergency medications and positive pressure ventilation to prevent hypoxia.¹⁸

- Agitated patient movement on the narrow operating room table necessitates immediate injection of a sedative agent to ameliorate the threat of a fall or surgical injury from uncontrolled movement.

Conflicting Patient Safety Requirements and Infection Control Practices

Disease outbreaks linked to poor infection control practices (eg, reuse of needles and syringes, inadequate hand hygiene) have led to the increased involvement of regulatory agencies and organizations to improve infection control practices in all healthcare settings.^{1,9,12,19} This emphasis on preventing healthcare-associated infections has resulted in increased infection prevention and control guidance from federal, state, and local agencies and accreditation organizations. Some of this guidance appears to conflict with patient safety requirements. Several other general areas of concern related to anesthesia care, along with recommended

actions, are described in the Table.

Solutions for Balancing Anesthesia Safety and Infection Control

Conscientious and dedicated anesthesia providers are challenged to meet the equally important demands of infection control measures and immediate safety needs of patients during pressured clinical care. The following recommendations are offered to assist clinicians in meeting these 2 goals consistently.

- Seek to foster a professional culture in which infection control is regarded as a moral and ethical obligation, as important as physiologic safety.¹⁰

- Prioritize all recommended infection control recommendations, and perform these without fail, except when patient safety demands instant response times to prevent immediate patient harm.^{6,7}

- Support educational programs in infection control measures for all perianesthesia personnel, to include latest novel approaches such as copper-infused surfaces and textiles.²⁰

- Work with the facility to ensure that anesthesia equipment and environmental surfaces are properly cleaned before and after each case, and at the end of each day; and that any drugs and equipment prepared in advance of patient arrival are kept clean, covered, and in aseptic conditions and are clearly labeled.^{10,21}

- Ensure that all operating room and anesthetizing locations have readily accessible sinks and areas for cleaning hands and equipment, and are stocked with supplies of materials for infection control (eg, alcohol-based sanitizer; gloves and safety needles).⁷

- Prepare requisite equipment to be immediately available while meeting infection control requirements. For instance, the laryngoscope blade can be tested, attached to the handle, and then covered until needed.⁸

- Observe strict aseptic technique with any sterile procedure.²¹

Area of infection control	Patient safety requirements	Infection control recommendations	Recommended actions balancing safety and infection control
Hand hygiene	Instant patient contact may be required to respond to sudden changes in condition and to access IV ports and airway devices.	Perform hand hygiene and don clean gloves before and after any patient or equipment contact. ^{9,22}	Double glove for invasive procedures; perform hand hygiene and change gloves at every safe opportunity. Wash soiled hands when safe to do so with soap and water. Clean the environment. ²³
Equipment availability	Laryngoscope, breathing circuits, tracheal tubes, and suction apparatus are clean and ready for use. Resuscitation equipment is present and working, and a system to suction the airway clear of secretions must be immediately available in case of airway obstruction. ²³	Endotracheal tubes, stylettes, suction equipment (suction tubing, rigid suction tips), and laryngoscope blades and handles remain in packaging until ready for patient use. ⁸ Test the laryngoscope blade and insert back into the packet until ready for use. ⁸	Prepare only necessary airway equipment 1 case at a time. As close to the time of use as possible, open endotracheal tube for only 1 patient; open 1 stylette and insert, keep in package and covered until use. Keep tested laryngoscope handles and blades accessible and covered with clean materials until immediate use is anticipated. Attach suction tubing immediately before patient arrival. Keep opened rigid suction device covered until use.
Drug and IV fluid preparation	Emergency drugs and IV fluids are immediately available for use in trauma rooms and emergent procedures.	Drugs and IV solutions are not to be prepared until needed, and should be discarded within 1 hour if not used. ¹⁰ Prepared multidose vials are to be stored out of the immediate patient care area to prevent contamination. ^{9,10,25}	Per institutional protocol and anticipated urgent need, prepare only IV and safety equipment that is absolutely required, as close to time of use as possible, labeled with date, time, and initials. Multidose vials are dedicated to 1 patient only. ⁹
Vascular access	Immediately access port or hub to inject lifesaving medications in an emergency.	Clean access port or hub (recommend needleless/closed system) or injection site on IV line for 15 seconds and allow to air-dry for 30 seconds, using 2% chlorhexidine or isopropyl alcohol 70%. ^{9,24}	Keep drugs in sterile, capped, labeled syringes, accessible in clean area. In urgent/emergent situation, inject as rapidly as indicated to prevent patient harm. Always cleanse ports and rubber stoppers before injection unless this would endanger the patient. ² Consider keeping ports covered with alcohol-containing port protectors, removing only for injection and replacing immediately, as well as per manufacturer recommendations. ²⁶

Table. Examples of Conflicting Anesthesia Safety Requirements and Infection Control Practices

Abbreviation: IV, intravenous.

- Double glove during invasive airway procedures and remove outer gloves when contaminated, followed by removal of inner gloves and hand hygiene as soon as feasible.²¹

- Actively engage with the inter-professional team to develop and implement facility policies that provide specific guidance on how to safely perform infection control procedures during anesthesia and address the negative effects of environmental factors such as excessive production pressure on safety and infection control.^{3,21}

- Support, encourage, and par-

icipate in research and quality improvement projects aimed at developing safety guidelines and best infection control practices that are applicable to the challenging environment of anesthesia clinical care.^{6,7}

Conclusion

Nurse anesthetists are ethically obligated to follow all recommended safety and infection control measures whenever possible to prevent patient harm. Safe and reasonable compromise is needed between recommended infection control measures and what is physically pos-

sible given the critical task density in anesthesia practice. Research must be undertaken to examine this situation in greater detail with the aim of establishing protocols to meet patient safety needs in various anesthesia scenarios, while integrating realistically achievable measures of infection control from national guidelines. It is critical that lifesaving interventions take place with no delay and that lifesaving drugs and equipment are prepared and immediately available for use before the patient arrives for anesthesia. A reasonable compromise means following infection control

recommendations as soon as possible in all anesthesia situations. Although the safety needs of the patient may demand immediate action, the safety needs of the patient also demand effective infection control.

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AUTHORS

Charles A. Griffis, PhD, CRNA, is an assistant professor at the University of California, Los Angeles (UCLA). He works as a faculty nurse anesthetist for the Department of Anesthesia, providing clinical service and teaching students. Dr Griffis also is faculty to the UCLA School of Nursing, and the University of Southern California Program of Nurse Anesthesia. He lectures nationally on infection control. Email: cgriffis55@gmail.com.

Lynn Reede, DNP, MBA, CRNA, FNAP, is a senior director for the American Association of Nurse Anesthetists (AANA), Park Ridge, Illinois, providing staff leadership to the AANA's Practice Committee in the development and revision of evidence-based anesthesia clinical practice guidelines, including infection control, position statements, standards, and member resources. Email: lreede@aana.com.

Michelle O'Rourke, MPH, is a professional practice analyst for the AANA, providing member and research support for Practice Committee activities. Email: morourke@aana.com.

Victoria Hledin, MPH, is a research analyst for the AANA, providing research support for Practice Committee activities. Email: vhledin@aana.com.

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