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ENVIRONMENTAL CLEANING



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P indicates a recommendation or evidence relevant to pediatric care.

MEDICAL ABBREVIATIONS & ACRONYMS

ATP – Adenosine triphosphate
CDC – Centers for Disease Control and Prevention
CJD – Creutzfeldt-Jakob disease
EPA – Environmental Protection Agency
FIFRA – Federal Insecticide, Fungicide, and Rodenticide Act
FMUV – Focused multivector ultraviolet
HAI – Health care-associated infection
ICU – Intensive care unit
IDSA – Infectious Diseases Society of America
IFU – Instructions for use

IV – Intravenous
MDRO – Multidrug-resistant organism
MRSA – Methicillin-resistant *Staphylococcus aureus*
NaOH – Sodium hydroxide
OR – Operating room
PPE – Personal protective equipment
RVA – Remote video auditing
SHEA – Society for Healthcare Epidemiology of America
SSI – Surgical site infection
VRE – Vancomycin-resistant enterococci

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GUIDELINE FOR ENVIRONMENTAL CLEANING

The Guideline for Environmental Cleaning was approved by the AORN Guidelines Advisory Board and became effective as of January 13, 2020. The recommendations in the guideline are intended to be achievable and represent what is believed to be an optimal level of practice. Policies and procedures will reflect variations in practice settings and/or clinical situations that determine the degree to which the guideline can be implemented. AORN recognizes the many diverse settings in which perioperative nurses practice; therefore, this guideline is adaptable to all areas where operative or other invasive procedures may be performed.

Purpose

This document provides guidance on the selection and use of cleaning products, cleaning procedures, personnel education and competency verification, and monitoring cleanliness through performance improvement processes. All perioperative team members have a responsibility to provide a **clean** and safe environment for patients. Perioperative and environmental services leaders can cultivate an environment in which perioperative and environmental services personnel work collaboratively to accomplish cleanliness in a culture of safety and mutual support.

Researchers have shown that cleaning practices in the operating room (OR) are not always thorough or consistent with the policies of the health care organization.¹⁻³ Jefferson et al³ observed a mean cleaning rate of 25% for objects monitored in the OR setting in six acute care hospitals. Munoz-Price et al¹ observed cleaning in 43 ORs of a large urban hospital and found only 50% of the surfaces were being cleaned. In both studies, fluorescent gel markers were used to measure cleanliness. These findings demonstrate that some ORs may not be as clean as previously thought,¹ although the literature has not defined the concept of cleanliness.

In a literature review, Ibrahim et al⁴ stated that the amount of bacteria present in the operative site is one of the most important factors associated with surgical site infection (SSI) development, although the minimum number of bacteria that causes an infection varies depending on the qualities of the organism, the host, and the procedure performed. The review authors also found that **fomites** near the surgical field may harbor bacteria. These fomites may serve as a reservoir for wound contamination through either direct contact with the patient's skin or by personnel contact with the fomite and subsequent skin-to-skin or glove-to-skin contact with the patient.

A high risk for pathogen transmission exists in the perioperative setting because of multiple contacts between perioperative team members, patients, and environmental surfaces.⁵⁻⁷ Cleaning and disinfecting the environment is a basic infection prevention principle used to reduce the likelihood that exogenous sources will contribute to health care-associated infections (HAIs).^{8,9} Operating room environmental surfaces and equipment can become contaminated with pathogens that cause SSIs, particularly if cleaning is suboptimal, and pathogens can then be transmitted to the hands of perioperative team members. Thus, thorough cleaning and **disinfection of high-touch objects** as part of a comprehensive **environmental cleaning** and disinfection program that includes hand hygiene are essential in preventing the spread of potentially pathogenic microorganisms.¹

In a prospective multifacility observational study, Loftus et al¹⁰ followed patients undergoing general anesthesia (N = 548) to identify which bacterial reservoir was associated with transmission events from intravenous (IV) tubing three-way stopcocks. The researchers sampled three bacterial reservoirs: providers' hands, the patient's axillae and nasopharynx, and two high-touch sites on the anesthesia machine. All three reservoirs contributed to transmission, although 64% of stopcock contamination was traced to the anesthesia machine. The researchers also linked the bacterial reservoirs to 30-day postoperative infections. Loftus et al¹¹ conducted a subset analysis of the previous study¹⁰ and found that gram-negative organisms caused 85% of the HAIs, with the source most often being the anesthesia machine. In two additional analyses^{12,13} of the original data,¹⁰ researchers examined the transmission of *Staphylococcus aureus* and found that two strains were frequently transmitted in the anesthesia work area and were highly transmissible, virulent, and drug resistant.

Other studies have identified microorganisms that contribute to environmental contamination of surfaces in the OR, including staphylococcal species,^{1,5,14,15} *Corynebacterium* species,¹⁴ *Micrococcus* species,^{6,14} *Bacillus* species,^{6,14} *Klebsiella pneumoniae*,^{1,16} *Pseudomonas* species,^{1,6} *Acinetobacter* species,¹ *Enterococcus* species,^{1,17} and *Escherichia coli*.¹

Environmental cleaning and disinfection includes considerations for a safe environment of care, transmission-based precautions, and hand hygiene. Although these topics are mentioned briefly where applicable (eg, standard precautions), they are addressed in other AORN guidelines,¹⁸⁻²⁰ and broader discussions are outside the scope of this document. Laundering of textiles and evaluation of self-disinfecting surfaces are also outside the scope of these recommendations.