

# Clinical Concepts in Medical Suction: Infection Control for Vacuum Regulators

By Patricia Carroll RN,BC, CEN, RRT, MS  
Educational Medical Consultants,  
Meriden, CT

## Introduction

Infection control and prevention is gaining renewed focus in healthcare today. Clinicians and administrators are developing a new understanding of the true cost of healthcare-associated infections (HAI) and are actively seeking ways to reduce the infection risk.

## Problem Statement

The challenge is to enhance patient safety with a cost-efficient approach using evidence-based guidance to develop best practices in the cleaning and disinfection of vacuum regulation devices.

An effective disinfection program relies on selecting suitable chemical disinfectants and using them diligently in well-designed protocols based on clinical practice guidelines.<sup>1</sup>

In fact, the Centers for Disease Control (CDC) states, "Infection-control professionals should ensure that institutional policies are consistent with national guidelines."<sup>2</sup>

## Previous Options

A wide variety of disinfectants have been used in environmental cleaning. Unfortunately, our approach has been "largely based on history and tradition and much less on proven effectiveness."<sup>1</sup>

## Clinical Excellence Solution

The Clinical Excellence solution is based on clinical practice guidelines and literature from the Centers for Disease Control (CDC) and Prevention, the Association for Professionals in Infection Control and the World Health Organization. (WHO)

## Foundation

In 1968, Earle Spaulding devised a classification system that provides a rational approach to disinfecting and sterilizing patient care items and equipment. The CDC points out "this classification system is so clear and logical that it has been retained, refined, and successfully used by infection control professionals and others when planning methods of disinfection or sterilization."<sup>3</sup>

| Spaulding Classification <sup>3</sup>  |   |   |
|--|---|---|
| Type   | Definition  | Examples  |
| <i>Critical Items</i><br>Sterile   | High risk for infection with any contamination; objects that enter sterile tissue or the vascular system  | Surgical instruments, cardiac and urinary catheters, implants, and ultrasound probes used in sterile body cavities  |
| <i>Semicritical Items</i><br>Free from microorganisms via high-level disinfection  | Contact mucous membranes or nonintact skin  | Respiratory therapy and anesthesia equipment, some endoscopes, laryngoscope blades, esophageal manometry probes, cystoscopes  |
| <i>Noncritical Items</i><br>Decontaminate where they are used with low-level disinfectants<br><br>Single-use disposable towels impregnated with a disinfectant can be used for low-level disinfection when spot-cleaning is needed | Virtually no risk has been documented for transmission of infectious agents to patients through noncritical items<br><br>Contact intact skin but not mucous membranes | <i>Patient-care items:</i><br>bedpans, blood pressure cuffs, crutches, computers<br><br><i>Environmental surfaces:</i> bed rails, some food utensils, bedside tables, patient furniture, floors |

The CDC notes there have been some concerns about the Spaulding Classification. While the concerns have been applied to endoscopes, their analysis is not limited to these devices.<sup>2,3</sup>

*Sterilization... can be too time-consuming for routine use between patients... Additionally, evidence that sterilization of these items improves patient care by reducing the infection risk is lacking.*

## Recommendations

### Recommendation 1

It is important to note the difference between the vacuum regulator connected to the wall and suction ports in endoscopes.<sup>2,3</sup> Vacuum [suction] regulators are patient care items in the environment, classified as noncritical in the Spaulding Classification.<sup>2,3</sup> Depending on use, endoscopes are classified as critical or semicritical items, requiring a higher level of disinfection.<sup>2,3</sup>

In a study of suctioning equipment of orally intubated patients, Sole and colleagues discovered that after 24 hours of use, most suction equipment had potential pathogens for ventilator-associated pneumonia: tonsil suction device, 94% were contaminated; suction tubing, 83% were contaminated; and the distal connection of the in-line endotracheal suction catheter: 61% were contaminated. The devices were colonized with many of the same pathogens cultured from oral secretions and/or sputum.<sup>4</sup> This contamination comes from the patient; there is no evidence there is any contamination from the regulator. "Organisms cultured from the equipment were the same as those found in oral secretions and sputum."<sup>4</sup>

### Recommendation 2

Vacuum [suction] regulators and the outside of clean suction canisters are considered to be part of environmental cleaning, along with the bedside table, over-bed table, TV remote control and call bell. A leading hospital clinical protocol assigns this cleaning to housekeeping staff, with instructions to use an approved quaternary ammonium compound or a bleach wipe (depending on decontamination need).<sup>5</sup> The same protocol includes portable suction devices in routine cleaning between patient use, with the same disinfectant as recommended for regulators.<sup>5</sup>

The authors of the CDC guidelines<sup>2,3</sup> recently published a guidance article regarding the role of hospital surfaces in transmitting emerging healthcare-associated pathogens.<sup>6</sup> They name "suction equipment" along with bed rails, bedside tables and surfaces of ventilators and computers as sites of environmental colonization. They summarize, "The CDC [guidelines]...should form the basis for institutional policies regarding surface disinfection."<sup>6pS31</sup>

### Recommendation 3

The World Health Organization supports classifying suction equipment as environmental surfaces, even after use in isolation rooms. In the *Practical Guidelines for Infection Control in Health Care Facilities*, WHO recommends cleaning suction equipment and ventilator "with detergent and water, dry, and disinfect with 70% alcohol."<sup>7</sup>

### Recommendation 4

Published standards from the NFPA and ECRI call for trap bottles and filters between the collection canister and the regulator.<sup>8,9</sup> A trap bottle is "a mechanism preventing spillage of liquid contents into the source of suction if the bottle overfills."<sup>8</sup> ECRI states that inlet filters are not needed to protect pipelines because "suction canisters...have overflow valves and/or filters to prevent most materials from being inadvertently drawn into the vacuum system."<sup>9</sup> Leading manufacturers include both microbial filters and shutoff filters in the lids of disposable collection canisters, further protecting the regulator.

## Implementation

Key to implementing Clinical Excellence is to establish clear protocols and procedures stating that vacuum [suction] regulators are classified by accepted national and international agency guidelines and experts as environmental surfaces.<sup>2,3,6,7</sup>

- Clearly outline who is responsible for cleaning and disinfecting environmental surfaces and when they need to be cleaned and/or disinfected.
- Teach which disinfectant should be used under different clinical conditions such as isolation and terminal cleaning.
- Carefully and regularly monitor cleaning procedures to ensure cleaning and disinfection is done thoroughly, completely and correctly.
- Use suction canisters that contain microbial filters and place overflow traps between the canister and regulator for added safety.

## Summary

In infection control and prevention, more is not necessarily better. Rooms cannot be made sterile, and patients are not sterile. No published guidelines recommend treating suction equipment as any higher level than noncritical in the Spaulding Classification.

Clinical leaders will make a clear distinction between regulators and other elements of the environment compared with those particular supplies that are introduced into the body, such as suction catheters and endoscopes that clearly require a higher level of disinfection and sterilization.

## References

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*About the author:* Patricia Carroll is a recognized expert on clinical uses of medical suction. She has published articles on endotracheal and nasogastric suction and chest drainage in the professional literature, and won the Will Solimene Award for Excellence from the New England chapter of the American Medical Writers' Association for the monograph *The Principles of Vacuum and its Use in the Hospital Environment*. She wrote the Infection Control chapter of the textbook *Foundations of Respiratory Care*.

