Protect Yourself!
Choosing the most effective surgical gowns and drapes

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It’s a frightening reality in today’s OR—potentially fatal diseases such as HIV and hepatitis, not to mention drug-resistant bacteria, can be transmitted to healthcare personnel from patients.¹,² Too often OR personnel make choices based solely on comfort, fit and ease of use while ignoring barrier protection properties.

Are you taking the proper measures to protect yourself, your family and your patients every time you drape and gown? Do you thoroughly assess the amount of fluid anticipated for each procedure and choose the appropriate level of protection?

Skin is an efficient barrier, although its barrier qualities may be compromised when exposed to patients’ body fluids for prolonged periods of time during complex surgeries.¹ Also, despite the best of efforts, pre-op screenings cannot identify all patients harboring harmful bacteria or infectious diseases.³ Even small amounts of contaminated strike-through blood can possibly infect healthcare staff.¹

For these reasons, the Occupational Safety and Health Administration (OSHA) and the U.S. Centers for Disease Control and Prevention (CDC) instruct healthcare personnel to assume that all patients are seropositive for blood-borne diseases and always to employ Standard Precautions.¹
Similarly, because of increases in the incidence of infections such as methicillin-resistant *Staphylococcus aureus* (MRSA), there is concern regarding bacterial transmission through surgical gowns.\(^2\)

So how can OR professionals protect themselves? The answer is easy with a little research and planning. Be sure to select protection according to the type and duration of surgery being performed.

**AORN guidelines**


Although the AORN recommendations are nearly four pages long, they boil down to six main criteria: barrier integrity, linting, construction, flammability, comfort and cost-effectiveness.\(^4\)

**Barrier integrity**

Obtain manufacturers’ data verifying that materials used in gowns and drapes protect against the transfer of microorganisms, particulates and fluids to minimize strike-through.\(^4\)

Surgical gowns should be selected for use according to the barrier quality of the item and the wearer’s anticipated exposure to blood and body fluids. Short procedures with little or no anticipated exposure to blood or body fluids can be completed successfully using a surgical gown with minimal barrier protection.\(^4\)

As the complexity of the planned procedure increases, there may be increased potential for exposure to blood-borne pathogens.

**Could it happen to you?**

Proper protection in the operating room is more important than ever for preventing exposure to blood-borne pathogens. Estimated risk for HIV infection involving a skin cut or injury exposed to HIV-infected blood is approximately 0.3 percent.\(^{16}\) From 1981 (when the CDC began recording data) through 2006, there were 57 documented cases of seroconversion to HIV following occupational exposures.\(^{16}\) Although the numbers sound small, who wants to be one of the statistics?

According to one study, the risk of HIV exposure increased if it involved a larger quantity of blood, as indicated by 1) a device visibly contaminated with the patient’s blood, 2) a procedure that involved a needle placed directly in a vein or artery or 3) a deep injury. The risk of HIV also increased for exposures to blood from source patients with terminal illness, probably reflecting the higher titer of HIV in blood during the late stages of AIDS.\(^{16}\)

A similar study set out to determine the relative risk of exposure to contaminated patient blood during spine surgery. Using data collected from 9,724 surgical cases, of which 324 were spinal procedures, prevalence of HIV was 0.19 percent overall, versus 0.93 percent in spine patients. Healthcare workers were contaminated with patient blood in about 8 percent of all surgeries, compared with almost 32 percent of spine surgery cases. The increased risk in spine surgery occurred in regard to blood contacting intact skin.\(^{17}\)

The study concluded that healthcare personnel should always wear forearm-reinforced gowns, double gloves and eye protection.\(^{17}\)
pathogens. In these cases, select a gown with greater barrier capability.4

Linting
Barrier materials used for gowns and drapes should be as lint-free as possible. Lint particles in the environment. This bacteria-carrying lint may settle in surgical sites and wounds, resulting in an increase in postoperative patient complications.4

Construction
Seams of barrier materials should be evaluated for their ability to minimize penetration or passage of potential contaminants. Many surgical gown seams have little or no barrier property. If wicking or pressure on a seam causes liquid transfer between sterile and unsterile surfaces, one or both sides may become contaminated.4

Flammability
Gowns and drapes should be consistent with accepted flammability standards to provide the safest environment for patients and healthcare staff. Specific standards for surgical materials have not been developed. All materials used in the surgical environment will burn, given the right conditions.4

Barrier materials may be flammable, needing only a combination of heat, fuel and oxygen to ignite. Care should be taken when gowns and drapes are exposed to light and heat sources, electrosurgical devices, lasers and other power equipment. Even materials said to be flame-resistant might burn or melt when subjected to intense heat or an oxygen-rich environment.4

Comfort
Surgical gowns and drapes should be comfortable, allergen-free and contribute to the wearer’s desired body temperature. The gown fabric should have limited memory, yet be flexible enough to conform loosely to the wearer’s body. It also should protect the wearer from contamination from blood and body fluids.4

Surgical gowns and drapes should maintain an isothermic environment for patients and healthcare staff. Thermal comfort exists when there is a balance between the heat the human body loses and the heat the body generates.4

Many advances in surgical medical fabrics are in the area of synthetics, which can more easily be manipulated to achieve desirable qualities. One of the newer synthetic fabrics is Suprel®.5 Suprel is a blend of polyester for strength and polyethylene for comfort and softness. Results of informal testing at the product’s introduction at a recent AORN national meeting showed that of 3,000 nurses who tried on a Suprel gown, 95 percent preferred it to what they currently were wearing in terms of comfort.5

Cost-effectiveness
Surgical gowns and drapes should not be selected solely on the basis of cost, nor should cost be the primary consideration when making a selection. In today’s economic environment, however, it is imperative that after providing for patient and provider safety, fiscal factors be considered. A lesser-priced product that fails consistently is not cost effective. Additional volume will be required to replace the defective or poorly performing item(s).4

Industry and regulatory standards
Surgical gowns and drapes are classified as medical devices by the U.S. Food and Drug Administration (FDA). They must
meet industry and regulatory standards before the FDA will approve them for sale by manufacturers.\textsuperscript{6}

Gown and drape manufacturers must provide the FDA with specific test results that prove the products' resistance to blood and liquid penetration, resistance to tears and punctures, features for safe use in the operating room (i.e., lint-free, free of toxic ingredients and nonfast dyes), fire protection, strength and durability (particularly after being sterilized).\textsuperscript{6}

Some relevant standards used in determining the barrier performance and safe use of gowns and drapes include tests by the American Society for Testing and Materials (ASTM). They test the fabric's resistance to synthetic blood, resistance to penetration by blood-borne pathogens, air permeability, durability and resistance to tearing.\textsuperscript{6}

FDA and the Association for Advancement of Medical Instrumentation (AAMI) both confirm that ASTM tests are the definitive tests for assessing the fluid and microbial barriers of surgical fabrics.\textsuperscript{7}

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\textbf{Summary of AORN Guidelines for Selection and Use of Surgical Gowns and Drapes} \\
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- Barrier integrity \\
- Linting \\
- Construction \\
- Flammability \\
- Comfort \\
- Cost-effectiveness \\
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\caption{Summary of AORN Guidelines for Selection and Use of Surgical Gowns and Drapes}
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\textbf{Matching the gown to the procedure}

As surgical procedures advance and evolve, it becomes more critical for operating room personnel to reach for the right gown for the right procedure. For example, a gown with a low amount of protection would be well-suited for a laparoscopic procedure with a small incision; however, it could be potentially harmful to wear the same type of gown during open heart surgery.\textsuperscript{8}

Unfortunately, operating room staff do not always select the proper gown. One manufacturer survey revealed that approximately 47 percent of the time, OR staff either used the wrong gown themselves or knew of someone who did, even though the right gown was available. This practice can have a negative impact on a caregiver if they are under-protected. At the same time, over-protecting can increase costs.\textsuperscript{9}

To simplify the selection process, some vendors incorporate visual cueing features into their products. They use either color-coding or unique labeling to help surgical professionals select the proper gown for the proper procedure.\textsuperscript{9}

Color-coding makes it easy for operating room managers to quickly identify whether surgical staff members are adequately and appropriately protected.\textsuperscript{9}

In the absence of color-coding, clinicians should begin the gown selection process by answering the following four questions to determine the correct level of protection:\textsuperscript{10}

- What type of procedure is being performed?
- How long will the procedure last?
- How much fluid will be present during the case?
- What is the clinician’s role in the procedure?
Drape selection
The Association of Surgical Technologists’ “Recommended Standards of Practice for Surgical Drapes” lists the following as critical elements in surgical drape selection:11

- Only sterile drapes should be used within the sterile field.
- Drapes must be free of holes, punctures and tears in order not to compromise the microbial barrier, which results in contamination.
- Drapes should be lint-free.
- Drapes should be flame-resistant.
- Draping material should have limited memory, be flexible and easy to handle in order to conform as much as possible to the contour of the patient and operating room table.
- Drapes made of reusable woven fabric should have the same barrier characteristics as single-use non-woven disposable fabrics.
- Proper precautions must be taken in the application of drapes when the procedure calls for the use of a laser.

Another consideration in drape selection is choosing one with a good, wide adhesive (at least two inches in width) for good isolation of the surgical site.5

In addition, many manufacturers offer procedure-specific styles that can meet the demands of even the most high-risk, rigorous procedures, such as orthopedic and open heart surgeries.9

A quick look back
The use of surgical gowns and drapes evolved as a standard of practice more than a century ago. In 1939, Devenish and Miles first questioned the effectiveness of the permeable muslin cloth from which surgical gowns were made.12

Having observed that blood and saline soaked through the sleeve to the skin of the forearm, they reasoned that bacteria from the forearm could similarly pass from the surgeon to the patient. As a solution, sleeves were treated with a rubber coating. The rubber was impervious, but its use was not generally adopted because of discomfort.12
More new fabrics were introduced in the years to come. It was not until 1980, however, with a published study by Dr. Joseph D. Moylan, that the trend turned away from reusable fabrics to more protective disposables. Moylan’s study showed that the rate of infection with reusable non-barrier materials was 4.42 percent, whereas the incidence of infection with the disposable barrier fabrics was reduced to 1.98 percent. 13

Thereafter, popularity of the disposable products mushroomed,14 and today 80 percent of hospitals in the United States use single-use gowns and drapes. 11

Advice for today
Surgical fabric technology has come a long way, yet contamination from blood-borne pathogens continues to be a concern in today’s operating room. Stay safe by carefully choosing drapes, gowns and other protective gear and remaining watchful of potential risks during every surgery.

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**Single-Use or Reusable Gowns and Drapes – Which Is Better?**

The following factors should be carefully considered when determining whether to use single-use or reusable gowns and drapes.

- There are no universally adopted methods for determining the maximum number of times a reusable gown or drape may be used before losing its barrier capabilities. 1
- Reusable gowns’ ability to resist strike-through varies with the number of uses, washings and sterilization cycles. 1
- Laundry workers risk exposure to blood-borne pathogens from contaminated gowns and drapes. 1
- Single-use items can be falsely blamed for certain costs of waste disposal. Improper waste segregation, rather than use of single-use gowns and drapes, is usually the cause of increased amounts of waste. 1
- There are environmental disadvantages to both reusable and single-use systems. Neither system is clearly superior from an environmental standpoint. 11
- Accurate assessments for determining the cost-effectiveness of reusable vs. single-use products are difficult at best. Credible conclusions of costs have not been published. 1
References