

W H I T E P A P E R

---

## Coated Fabric Upholstery Materials for Healthcare Settings: Selection & Disinfection

S P O N S O R E D B Y



**Stinson**<sup>®</sup>

# Coated Fabric Upholstery Materials for **- Healthcare Settings:** **Selection & Disinfection**



This white paper has been peer-reviewed by Jane Rohde, AIA, FIIDA, ACHA, CHID, LEED AP BD+C, Green Globes CIEB Assessor, a healthcare and sustainability consultant, who is principal of JSR Associates, Inc. [www.jsrassociates.net](http://www.jsrassociates.net), and by Keri Lestage, PhD, Tech Solutions Group Manager, Clorox Professional Products – Healthcare.

# Introduction

The new landscape of hospital reporting and transparency makes choosing the right healthcare upholstery material even more important. Today, patients can influence reimbursement levels to US hospitals by participating in satisfaction surveys. Patient surveys submitted through HCAHPS (Hospital Consumers Assessment of Healthcare Providers and Systems) impact the levels of Medicaid and Medicare reimbursements.<sup>1</sup> This focus on patient satisfaction is making patient-centric design even more critical to healthcare providers, with the softness and comfort of upholstered furniture and equipment continuing to play an important role in the care setting.

Additionally, patients can view hospital scores for Healthcare Associated Infections (HAIs).<sup>2</sup> Acute care hospitals must report HAIs, and this data becomes available to patients through SIR (Standard Infection Rate) scores for each hospital, which reflect how a hospital compares to the national benchmark. This is driving continuous improvement in the level of disinfection in healthcare facilities, which will possibly lead to increased cleaning and disinfection for upholstery materials as hospitals focus on reducing infection rates.

**Upholstery product manufacturers and associations are continuously examining how a healthcare upholstery material's resistance to disinfectants can be measured and improved.**

The purpose of this white paper is to present interior designers with perspective from healthcare providers working to reduce HAIs in healthcare settings while remaining committed to patients' needs for comfort and pleasing aesthetics. In addition, this paper explores the criteria for selecting upholstery materials that resist the harsh disinfectants used by frontline healthcare workers. Upholstery product manufacturers and associations are continuously examining how a healthcare upholstery material's resistance to disinfectants can be measured and improved.

The seemingly conflicting goals of choosing a healthcare upholstery material that is pleasing and comfortable, while at the same time durable and tough enough to withstand disinfection, have created a significant design challenge.

Meeting this challenge can deliver bottom line results. Healthcare providers using an upholstery compatible with the healthcare environment can improve financial performance through favorable patient satisfaction survey scores, better HAI scores, improved return on investment for furniture and equipment, and compatibility with standard cleaning practices.

1. Hospital Consumers Assessment of Healthcare Providers and Systems website: <http://www.hcahpsonline.org/home.aspx>

2. Medicare's Hospital Compare Website: <http://www.medicare.gov/hospitalcompare/Data/Healthcare-Associated-Infections.html>

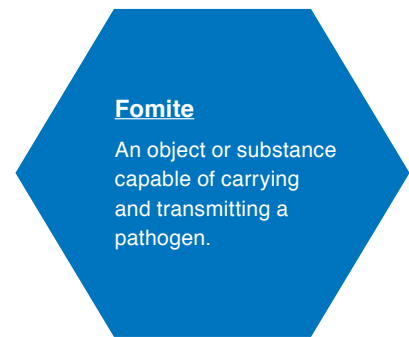
# Disinfection

## in the Healthcare Setting

Although healthcare settings are intended to be places of rest and healing, they are also fast-paced workplaces and strive to provide a sense of community where friends and family come to provide support. Pathogens in healthcare environments are a potential cause of infectious disease and may spread through contact with various surfaces. Such pathogens are of concern to all patients and medical staff, especially to those that are immunocompromised. When infectious diseases are transmitted in a healthcare setting, they are called Healthcare Associated Infections (HAIs).

### Levels of Disinfection and Sterilization

Pathogens are passed by person-to-person contact, but may also be transmitted by contact with the surfaces that we touch. When contaminated, these surfaces are called fomites - a source of HAIs.

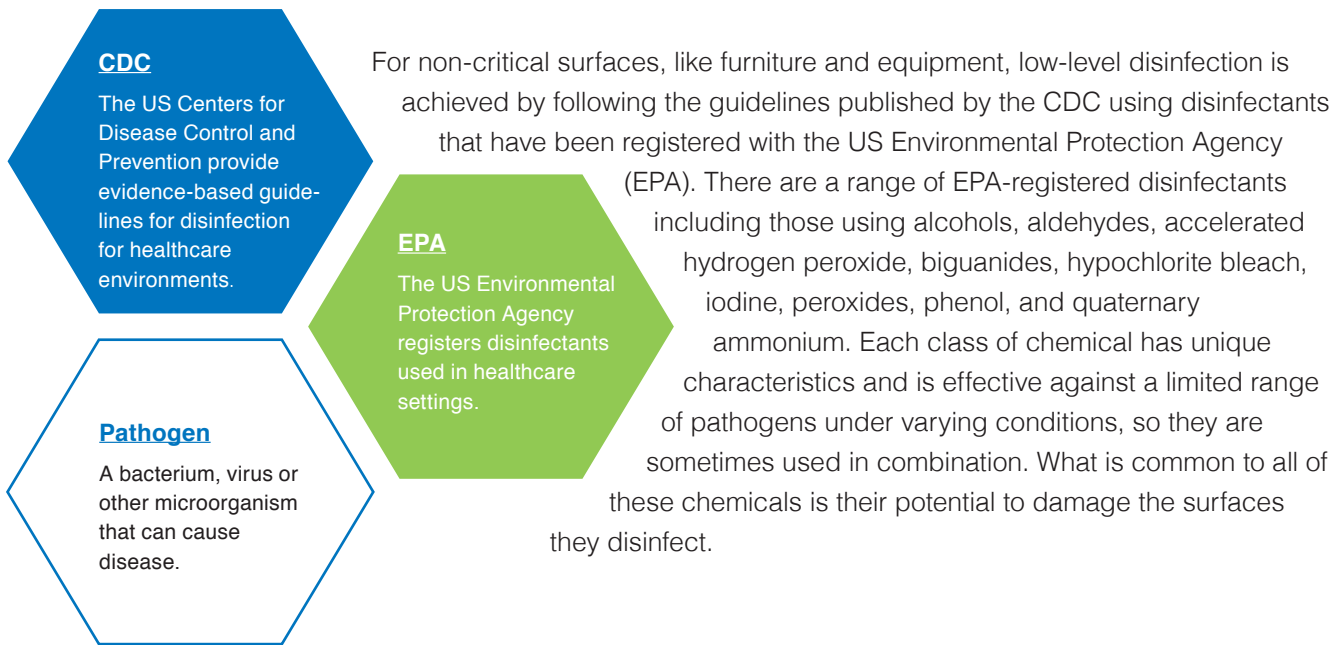


Healthcare Disinfection Classification System	
Item Type	Method of Disinfection
<b>Critical Items</b> Instruments that enter sterile tissue or the vascular system.	Sterilization
<b>Semi-critical Items</b> Instruments or items that contact mucous membranes or non-intact skin.	High-level disinfection
<b>Non-critical items</b> Items that come in contact with skin but not mucous membranes.	Low-level disinfection

In combatting HAIs, healthcare guidelines from the US Centers for Disease Control (CDC) classify healthcare surfaces by their risk level and prescribe different methods of disinfection for each level.<sup>3</sup> Critical items such as surgical instruments are sterilized. Semi-critical items such as respirator equipment

receive a high-level disinfection. Non-critical patient care items and non-critical surfaces such as furniture receive low-level disinfection. It is important to note that cleaning and disinfection are two separate but related activities in healthcare settings. For example, if there is a large spill of biohazard-type fluid or waste, the CDC recommends cleaning the waste before disinfecting the surface. Cleaning or disinfection alone would be inadequate – they are separate, complementary steps.

3. CDC Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008



## Vulnerable Healthcare Surfaces

There are many different levels of cleaning for healthcare upholstery materials. Depending on the type of facility and location of the surface within the facility, the ability of the material to withstand disinfection may vary widely. For example, waiting room chairs in an outpatient facility are likely cleaned daily, while the upholstered surface of an exam table is cleaned and disinfected many times each day. The focus of this white paper is on upholstery materials used in environments that require more frequent cleaning and disinfection.

In a patient's room, for example, non-critical surfaces that require disinfection include walls, floors, light switches, faucets, toilets, bed rails, furniture, and more. In other healthcare areas, these surfaces can include gurneys, procedure chairs, waiting area furniture, and nurses' stations. All of these surfaces, independent of the materials from which they are made, are cleaned and disinfected on a routine schedule. Many of the hard surfaces are safe to clean and disinfect with the types of disinfectants outlined above. However, fluid-impermeable softer materials such as mattress covers and vinyl upholstery can be compromised by disinfectants and the manufacturers of these products publish guidelines for proper care and cleaning to avoid damage.

**Signs of damage include cracking, delamination, and discoloration.**

Signs of damage to upholstery materials may include cracking, delamination, and discoloration. While discoloration may in and of itself appear harmless, it is a sign that the protective coating may have been breached and that further degradation of the material and eventual failure can be expected. Additionally, premature discoloration of a coated fabric undermines such interior design principles as providing beauty, comfort, and durability – those aesthetically pleasing characteristics that can impact hospital reputations and financial reimbursement levels.

## Upholstery Weak Spots

Makers of coated fabric upholstery materials used in patient room furniture and exam equipment have taken steps to ensure that their products' protective coatings can withstand many commonly used disinfectants for a period of time. Additionally, upholstery material manufacturers prescribe cleaning practices to help ensure product longevity and integrity. However, both of these safeguards face limitations in today's healthcare environments, creating the need for a more effective solution.

### FDA

The US Food and Drug Administration oversees medical equipment safety.

First, not all protective coatings appear to be equal in their resistance to disinfectants. Coated fabrics producer OMNOVA Solutions has tested a number of commonly used vinyl upholstery materials using 23 of the top hospital-grade disinfectants and found that most begin to discolor when treated in accordance with evidence-based CDC guidelines.<sup>4</sup> While there is no imminent danger from discoloration of the material, further degradation can lead to fluid ingress, a known source of contamination. The U.S Food and Drug Administration (FDA), which has responsibility for overseeing and managing medical equipment safety,<sup>5</sup> reviews such cases when they are reported and logs them into the a database of medical device reports for tracking.



## The Human Element

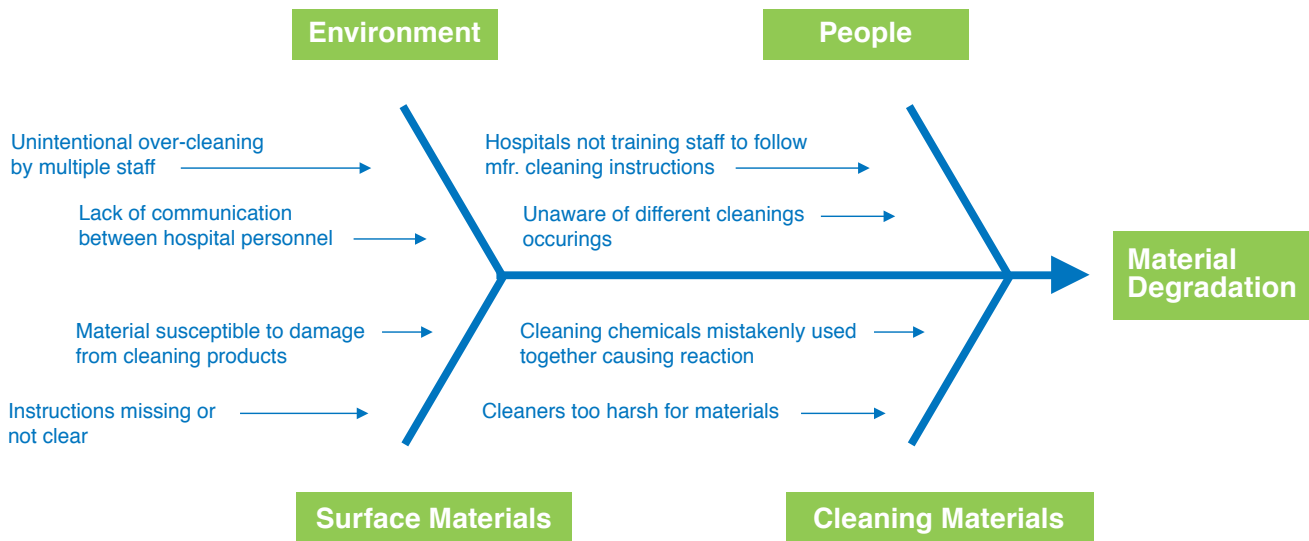
Second, cleaning instructions provided by the upholstery material manufacturer, which are typically communicated in literature, online, and in instruction manuals, are often not followed by hospital environmental services staff because such instructions may vary in some way from CDC general guidelines for cleaning and disinfection. Subsequently, environmental services staff often clean all healthcare surfaces uniformly without consideration of whether the cleaner/disinfectant used is suitable for the specific surface material. In such instances, the staff may not perform the manufacturers' recommended steps – even when these steps are simple such as a wipe down with a damp cloth following disinfection. As a result, upholstered surfaces may become degraded.

To better understand the gap between maintenance instruction and practice in healthcare environments, OMNOVA Solutions enlisted the help of the Austen BioInnovation Institute, a third-party research group, to conduct ethnographic research in a leading healthcare system in Northeast Ohio. The Institute's work identified several potential reasons why this gap is so pronounced. Issues include improperly following cleaning instructions, insufficiently resistant surface material, excessive cleaning due to lack of communication, and improper mixing of cleaning and disinfection chemicals (Figure 1).

4. OMNOVA Solutions internal testing

5. U.S. Food and Drug Administration - Damaged or Worn Covers for Medical Bed Mattresses Pose Risk of Contamination and Patient Infection: FDA Safety Communication, 2013

Underlying these issues are the challenges of staffing and training the housekeeping function in hospitals. In general, environmental services roles are at the low end of the pay scale, and turnover rates for healthcare environmental services staff are high. As measured by the American Health Care Association's Quality Report, turnover rates for hospital housekeeping were 28% in 2009,<sup>6</sup> well above the 18% average across all healthcare categories that year.<sup>7</sup> These challenges can be seen in the inconsistency in cleaning methods identified by OMNOVA's research. Finally, when hospitals are faced with an infectious outbreak, the disinfection procedures are intensified to ensure deeper and more thorough disinfection. A recent outbreak caused US hospitals to implement special protocols that added more potent disinfectants when disinfecting rooms used by patients under evaluation.<sup>8</sup> Special precautions for such cases will likely have an increased impact on disinfected surfaces and their durability.



**Figure 1.** – The causes of improper cleaning were found to be manifold in ethnographic research conducted on OMNOVA Solutions' behalf.

6. American Health Care Association 2012 Quality Report  
 7. 2009 Compdata annual turnover report

8. Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus  
<http://www.cdc.gov/vhf/ebola/healthcare-us/cleaning/hospitals.html>

# Whiteboarding

## The Preferred Healthcare Upholstery

Working with C.F. Stinson, OMNOVA Solutions has identified what it believes to be preferred characteristics for the selection of healthcare upholstery materials.

### Let's Get Physical: The Surface Requirements

The preferred healthcare upholstery material must balance critical physical characteristics to perform well in this challenging environment.



#### **Impermeable.**

Providing a barrier against pathogenic fluids is a critical component in infection control. Accordingly, the preferred healthcare upholstery material must be impermeable so that fluids do not reach the inner cushion of the furniture where they are difficult or impossible to clean and disinfect.



#### **Durable.**

Resistance to scuffs, scratches, and cracking is critical. This maintains the fluid barrier and ensures the material remains aesthetically appealing.



#### **Soft To The Touch.**

In addition to being durable, the preferred healthcare upholstery material should be soft to the touch, providing patient comfort, reassurance, and added warmth. Polyurethanes are soft, but due to reduced durability compared to vinyl, they are not always a suitable choice for demanding healthcare environments. Selecting a durable and soft-to-the-touch vinyl helps improve comfort.



#### **Minimal Or No Texture.**

Surface texture can increase a coated fabric's appeal and warmth, but deeply textured surfaces can be more challenging to clean and disinfect.



#### **Color Range.**

A versatile range of upholstery material colors is also important. Color plays an important role in reducing stress and anxiety and giving patients a sense of calmness and security. Having ample color choices provides the ability to design a healing environment with specific healthcare populations in mind.



#### **Cleanable.**

Because it affects hygienics, durability, and aesthetics, cleanability is of utmost importance. Some protective finishes are more cleanable than others. Ink, iodine, surgical pens, and other hospital fluids can create tough-to-remove stains. A protective finish that not only is proven to resist these stains but that also requires less effort in cleaning them is important to maintaining a healing and appealing environment.



## More than Meets the Eye: Characteristics Beneath the Surface

In addition to preferred physical characteristics, there are important compositional properties for healthcare upholstery materials.



### **Sustainable.**

From a sustainability perspective, coated fabric upholsteries such as vinyl have been characterized by some as being harmful to the environment and to human health. Recent improvements in the formulation and production of vinyl are addressing these concerns. Versions of vinyl with alternatives to phthalate plasticizers, no heavy metals used for stabilizers, and removal of flame retardants are becoming more widely available. The preferred vinyl material will reformulate, reduce, or remove these elements.



### **Resistance To Microbial Growth.**

Selecting an upholstery material that offers good resistance to microbes such as mold and mildew serves to help maintain the integrity of the material. However, it should be noted that any upholstery material containing an antimicrobial additive is not offering a safeguard against contamination or claiming a health benefit. Such additives are merely present to protect the product from degradation due to microbial attack.



### Resistance to Damage from Disinfectants.

The preferred healthcare upholstery will be compatible with the most commonly used disinfectants in healthcare settings. Excellent chemical resistance across a broad spectrum of disinfectants is important to maintain the integrity of the upholstery material. Resisting discoloration is a key factor. In addition to its negative impact on maintaining a pleasing environment, discoloration is a sign that the upholstery material's barrier of protective finish has been breached, signaling the beginning of degradation.

In evaluating chemical resistance, OMNOVA subjected 9 popular healthcare upholstery materials to a battery of tests designed to simulate daily cleaning and disinfection. Based on experimental design input from Clorox, a leading disinfectant supplier with decades of experience in healthcare disinfection, each of the vinyl upholstery materials went through cycles of disinfection using 23 of the leading hospital-grade disinfectants.

After the final cycle, the vinyl swatches were cleaned and a colorimeter was used to objectively measure visible change in each material's color. This testing revealed that all types of disinfectants had the potential to discolor and degrade the vinyl upholstery materials used in the tests.

BIFMA (Business and Institutional Furniture Manufacturers Association) is in the process of developing testing standards for disinfection of coated fabric. Their draft standards closely follow the above test protocol.<sup>9</sup>

The aforementioned physical and compositional characteristics provide a good foundation for the selection of coated fabric upholstery. Other industry standards and characteristics may also influence material selection, but the recommendations presented in this white paper can help refine informed choices and make for a longer-lasting, more compatible application.

---

9. BIFMA Healthcare Furniture Standard in Development (<https://www.bifma.org/?page=standardsdevelopment>)

# 5 Ways Good Healthcare Upholstery Choices Improve Healthcare's Bottom Line

A vinyl upholstery material that is soft to the touch and comfortable, compatible with the CDC guidelines for disinfection, and resistant to damage from widely used EPA-registered disinfectants may provide five business benefits for a healthcare provider:

1

A soft-to-the-touch and comfortable choice can elevate the patient experience, which contributes to the overall impression of a healthcare facility. Favorable impressions can lead to **favorable reviews and therefore improve reimbursement levels** and increase patient volume.

2

It will provide a better foundation for cleaning, helping to reduce transmission of HAIs in a healthcare environment. **By improving SIR (Standard Infection Ratings)**, hospitals can maintain patient and staff confidence and satisfaction.

3

An appropriate choice in upholstery material will require no special cleaners outside of those already being used in the healthcare environment and prescribed for use by the CDC and EPA. This means that **no additional disinfectants will need to be stocked and that training in the use of a special cleaner will not be required, saving operational costs.**

4

Being damage resistant, the preferred coated **fabric will not be easily impacted by cleaning and disinfection mishaps** or the implementation of more stringent "outbreak scenario" cleaning procedures.

5

The product will likely last longer under normal cleaning conditions, **meaning that there will be a better ROI on equipment and furniture. Less frequent replacement also reduces negative environmental impact.**

Healthcare environments pose many unique design challenges, especially when it comes to surface materials and their disinfection and cleaning. By selecting an upholstery that is compatible with known healthcare disinfection practices and that takes steps to meet the needs of the healthcare environment on its own terms, gains can be made in creating a healthy and healing environment for patients and providers.

# Sponsored by

## Stinson®

### C.F. Stinson

A family owned business for three generations, Stinson purveys innovative commercial textiles exceeding customer expectations for design, value, service and sustainability. Serving designers, architects, specifiers, end users and furniture manufacturers, Stinson is recognized as industry leader for high performance coated fabrics and textiles.



### Clorox Healthcare®

Building on a century-long legacy in cleaning and disinfecting, Clorox Healthcare® offers advanced infection prevention solutions for healthcare facilities. From comprehensive surface disinfection, including advanced ultraviolet technology, to skin antiseptics, we are committed to providing efficacious solutions to the healthcare community.



### OMNOVA Solutions

OMNOVA Solutions manufactures coated fabric upholstery for a wide range of applications in healthcare, automotive, transportation, hospitality, residential and commercial environments. OMNOVA's new **Quantum™** Health ST coated fabric upholstery sets a new standard in patient comfort and resistance to damage from disinfection.