

# aahid

American Academy of  
Healthcare Interior Designers

## D01: Durability and Performance Requirements – Are Your Specifications Informed?

Sunday, October 9, 2022 - 9:30-11:45 am



V2022-09-20 TLB

**HCD**  
HEALTHCARE DESIGN  
CONFERENCE + EXPO

#HCDcon



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Exam Window September 1-30, 2023



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# Fill out your Survey cards now!

*...to be collected during Biobreak...*



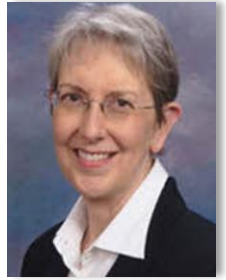
American Academy of  
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1. Our first session on this subject was HCD 2017 in Orlando Florida. How many of you have attended one or more of our AAHID DCF Education sessions?
2. Which term best describes your role in healthcare design?
3. How would you respond today? Which of the following selection criteria is your top concern?
4. Is cost a limiting factor when you are specifying durable coated fabrics? ...if so, indicate your budget price point.
5. In the last six months, have you had to remove torn, broken, ripped, delaminated, or perpetually soiled furniture items from service?
6. For the furniture items that had to be removed, who paid for those items to be repaired, reupholstered, or replaced?

## *Learning Objectives*

1. Explore optimizing selection and specification of high-performance healthcare surface materials to meet today's challenges.
2. Understand new real-world issues for surface material and relevant failures including the impact of environmental contaminants, cleaning chemicals and methods.
3. Increase knowledge of cleaning and disinfecting processes and procedures used on healthcare surfaces materials.
4. Improve your selection process for successful outcomes by evaluating multiple attributes when specifying products and materials.

**Teri Lura Bennett**, CHID EDAC CID IIDA NIHD RN, AAHID  
2022 President. Senior Interior Designer Johns Hopkins  
Health System (retired)



**Shari Solomon**, Industrial Hygienist & President,  
CleanHealth Environmental, LLC

**Barbara Dellinger**, MA, FIIDA, CHID, CID, EDAC, NCIDQ,  
Design & Research Consultant, Dellinger Consulting LLC



**Linda Gabel**, CHID, NCIDQ, Senior Interior Design-Planner,  
The Ohio State University Wexner Medical Center

**Jane Rohde**, AIA, FIIDA, ASID, ACHA, CHID, LEED AP BD+C, GGA-EB, GGF.  
Principal - JSR Associates Inc



# Facilitated Dialogue and Role Play

## Scenario: Multiple Attribute Challenges for All Stakeholders

A reenactment of “real time” forensics of healthcare furniture failure.

The Designer gets a call about a “bad” waiting room chair.

The stakeholder team identifies problems on-site to find a solution.

Includes reenactments and props; chair, cleaning cart, etc.

### Our Players;

Moderator: Jane Rohde

Owner/Clinician/Epidemiologist/Infection Preventionist: Teri Lura Bennett

Facilities Director/CHID: Linda Gabel

Furniture Manufacturers Representative: Bill Coble (Stance)

Upholstery Fabric Manufacturer Representative: Anna Stinson (Stinson)

Environmental Services: Shari Solomon





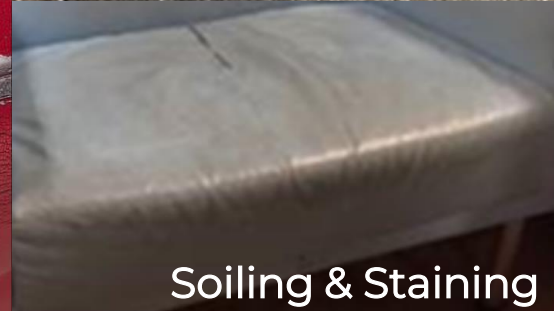
Cracking & Puddling



Exposed foam



Sunlight fading



Soiling & Staining



Delamination



## ***Jargon Alert!***

***“Fabrics”***: Upholstery materials are all referred to as fabrics, they can be **durable coated fabrics** or **woven textile fabrics**

***“Memo Tag” and “Sample Ticket”***: fabric memo samples have labels that provide information about material composition and testing; Designers generally call this a **“Memo Tag”**, while Manufacturers call this a **“Sample Ticket”**. These terms are interchangeable.

***Fabric Manufacturers*** and ***Fabric Distributors*** are not necessarily the same!

***Beware of Jargon which is not based on Healthcare Performance Criteria***

**“24/7 Performance”**

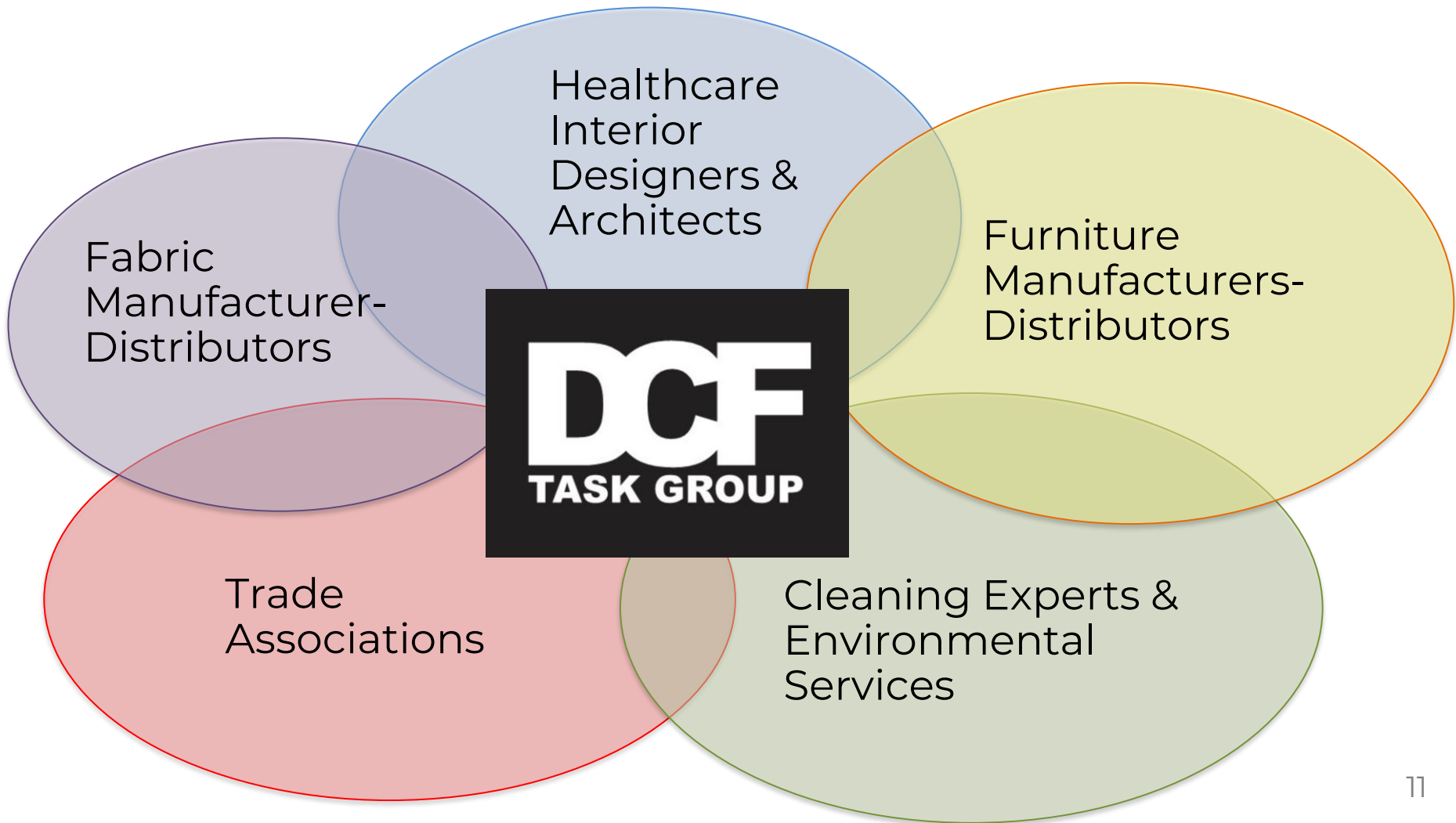
**“Heavy-Duty”**

These generic terms, commonly used to promote materials for use in healthcare, may sound good, but they are not backed by standards for third-party healthcare performance testing!

**“Beach-cleanable”**

Bleach is a disinfectant!  
Not a cleaning agent!  
Used alone it does not clean,  
and without cleaning first,  
bleach will not effectively  
disinfect!

***Think Critically - Find the Truth.***





Shari Solomon, Industrial Hygienist & President,  
CleanHealth Environmental, LLC

3. Increase knowledge of cleaning and disinfecting processes and procedures used on healthcare surfaces materials.

**Clean***Health* **Environmental**  
Risk Management Training Solutions

# Most Recent HAI Statistics (2015)

- **687,000** HAIs; **72,000** deaths during their hospitalizations.
- **1 in 31** hospital patients on any given day has at least one HAI.
- **1 in 43** nursing home residents has at least one HAI
- Patients in 2015 HAI Hospital Prevalence Survey at least **16% less likely** compared to 2011



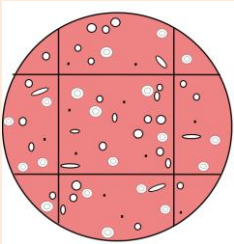
- U.S. Centers for Disease  
Control and Prevention  
(CDC)



# Cleaning vs. Sanitizing vs. Disinfecting

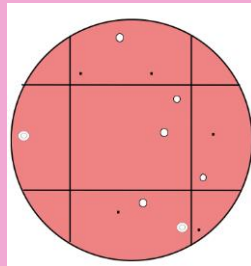
## Cleaning

- The physical removal of material (e.g., dust, soil, blood and body fluid); removes rather than kills
- A surface not cleaned effectively cannot be properly sanitized or disinfected.



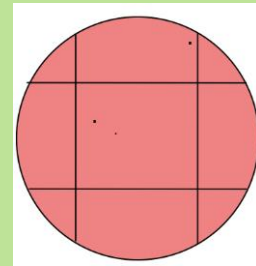
## Sanitizing

- Carry a general claim of germ control, but generally not organism specific



## Disinfecting

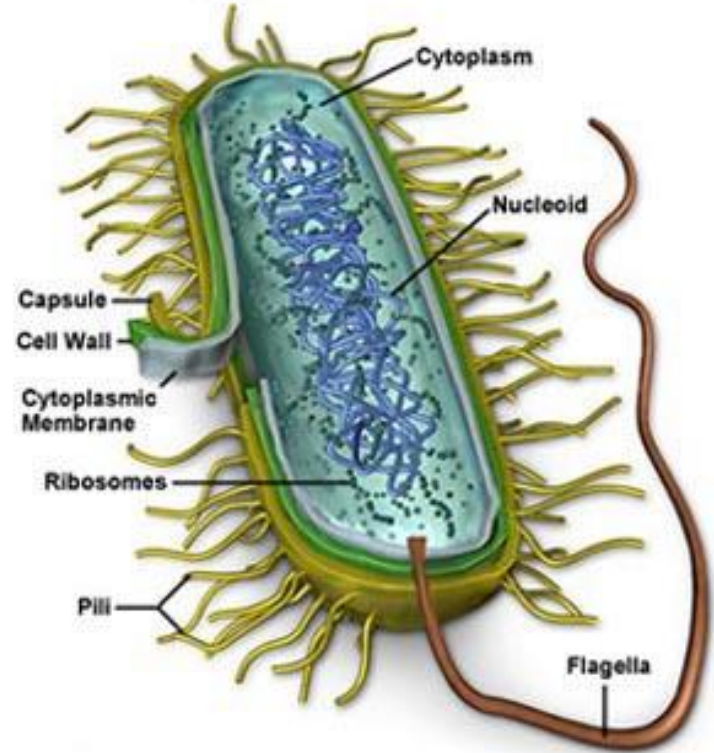
- The inactivation of pathogens.
- Most common disinfectants:
  - quaternary ammonium compounds
  - hydrogen-based
  - sodium hypochlorite



# How Disinfectants Work

To Work Properly, Disinfectants Need:

- Proper Concentration
- Dwell Time
- Kill Claims
- PROPER APPLICATION PROCESS!



**THE LABEL IS THE LAW!**

# Do You Know Your Facility's Cleaning & Disinfection Procedures?

- Selection of tools, supplies, equipment and chemicals
- Increased frequency of cleaning and disinfection in high density and high-touch areas
- Staff training
- Staff roles and responsibilities
- Cleaning and disinfection procedures
- Validation of cleanliness



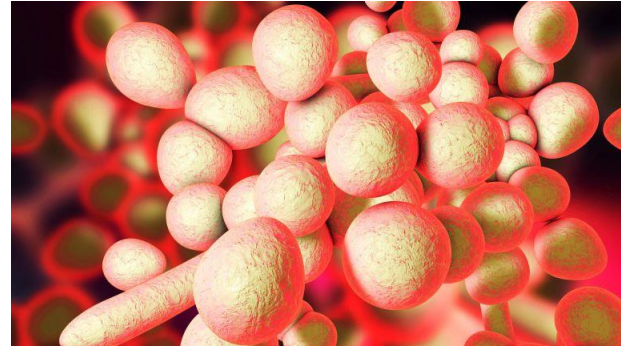
# **U.S. Centers for Disease Control and Prevention Healthcare Guidance Documents**

- Guideline for Environmental Infection Control (2003)
- Guideline for Disinfection and Sterilization (2008)
- Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic (2021)

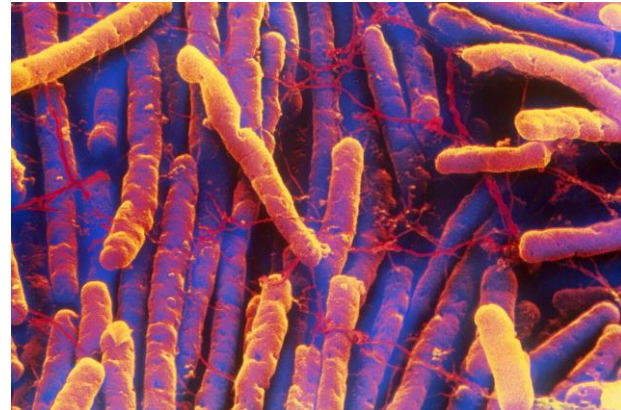


# Threat of Antibiotic Resistant Organisms (AROs)

- Estimated that in the next 30 years, deaths caused by AROs will surpass those caused by all cancers combined.
- Ability to cause severe infections, survive in the environment for prolonged periods, and spread easily between hospitalized patients and nursing home residents.



*Candida auris (C. auris)*



*Clostridioides difficile (C. diff)*



## Per the CDC....

- *C. auris* can contaminate surfaces extensively, and it is difficult to eradicate.
- To disinfect surfaces contaminated with *C. auris*, use either 10% bleach (made fresh daily) or a product with Environmental Protection Agency (EPA) approval specifically for *C. auris*.

# Monkeypox

- Spread person-to-person:
  - Primarily by “touching items” (such as clothing or linens) that previously touched the infectious rash or body fluids.
  - through a contaminated surface where virus particles may have been shed by someone infected.



# HIERARCHY OF SUSCEPTIBILITY



# Concerns Surrounding Application of Disinfectants

## Poison control sees spike in calls for cleaner, disinfectant accidents amid COVID-19 pandemic

By Richard Gertler - Tucson Sentinel, April 21, 2020

Calls related to cleaner and disinfectant exposure are up 20% compared with calls last year.

 Comments (0)



(Image: Shutterstock)

Calls to poison control centers regarding exposure to household cleaners and disinfectants have spiked amid the COVID-19 pandemic, according to a new report.

The report authors found that, from January to March this year, poison control centers received 45,550 calls related to cleaner and disinfectant exposure. That's up 20% compared with calls over the same period in 2019, according to the report, from the Centers for Disease Control and Prevention.



## CDC: Some Americans are misusing cleaning products — including drinking them — in effort to kill coronavirus

AP Wire Photo - CDC/PHN. Photo credit: AP Wire Photo - CDC/PHN

Report



U.S. & CANADA: CDC/PHN

To try to kill the novel coronavirus, some Americans are dangerously using disinfectants and cleaners, including washing food with bleach, using the products on bare skin, and inhaling and ingesting them, federal health officials reported Friday.

Health experts caution explicitly against using cleaning products in these ways.

The findings come from an online survey of 302 adults conducted by the Centers for Disease Control and Prevention in May. Thirty-nine percent had misused the cleaning products, and more than a quarter reported "an adverse health effect that they believed was a result" of the products.

# Safer Disinfectant Choices

hydrogen peroxide\*\*

citric acid

lactic acid

ethyl alcohol (also called ethanol or just alcohol)

isopropyl alcohol

peroxyacetic acid \*\*

hypochlorous acid

*\*\*The combination of hydrogen peroxide and peroxyacetic acid is a designated AOECAsthmagin, so avoid products that contain both.*



[epa.gov/saferchoice](http://epa.gov/saferchoice)

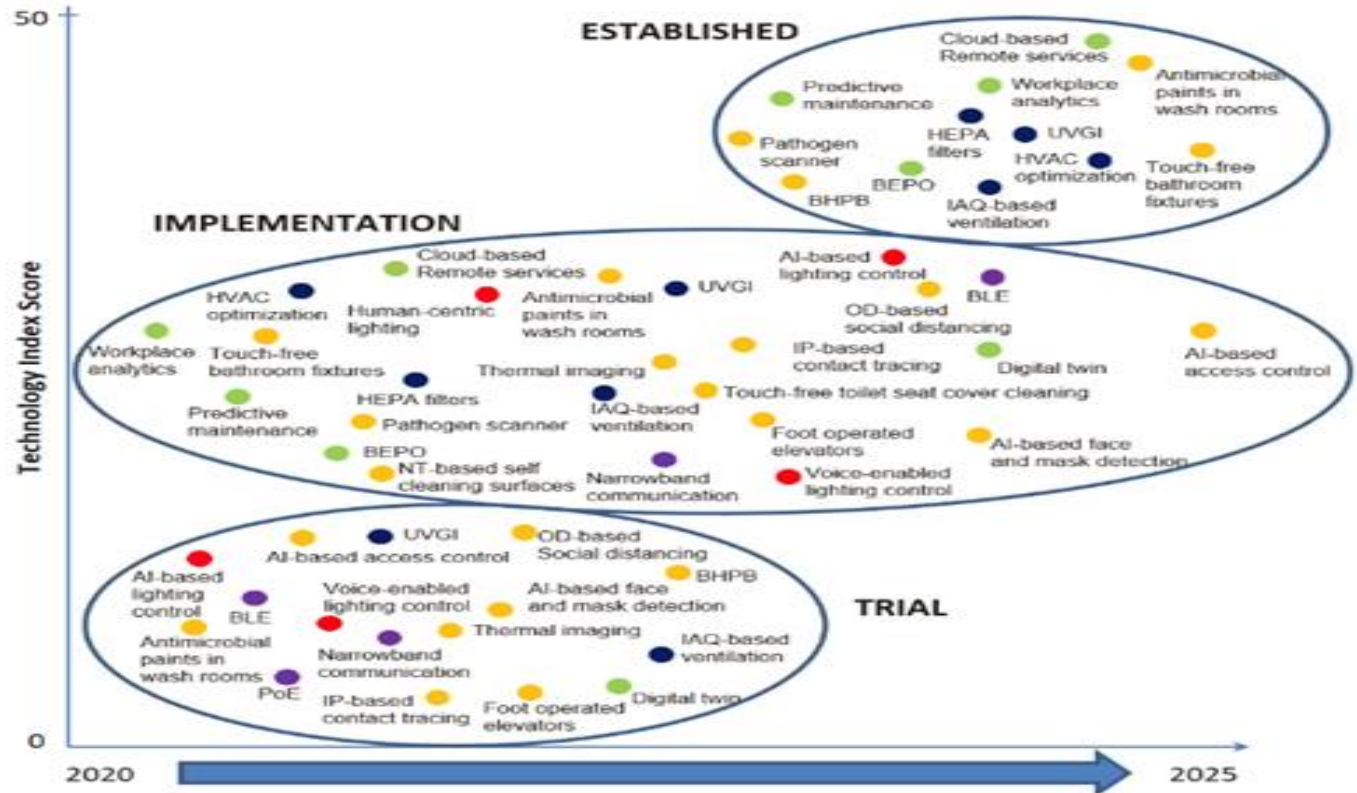


# Selected EPA-Registered Disinfectants

- **List K:** EPA's Registered Antimicrobial Products Effective against *Clostridium difficile* Spores
- **List N:** Disinfectants for Use Against SARS-CoV-2
- **List P:** Antimicrobial Products Registered with EPA for Claims Against *Candida Auris*
- **List Q:** Disinfectants for Emerging Viral Pathogens (EVPs)



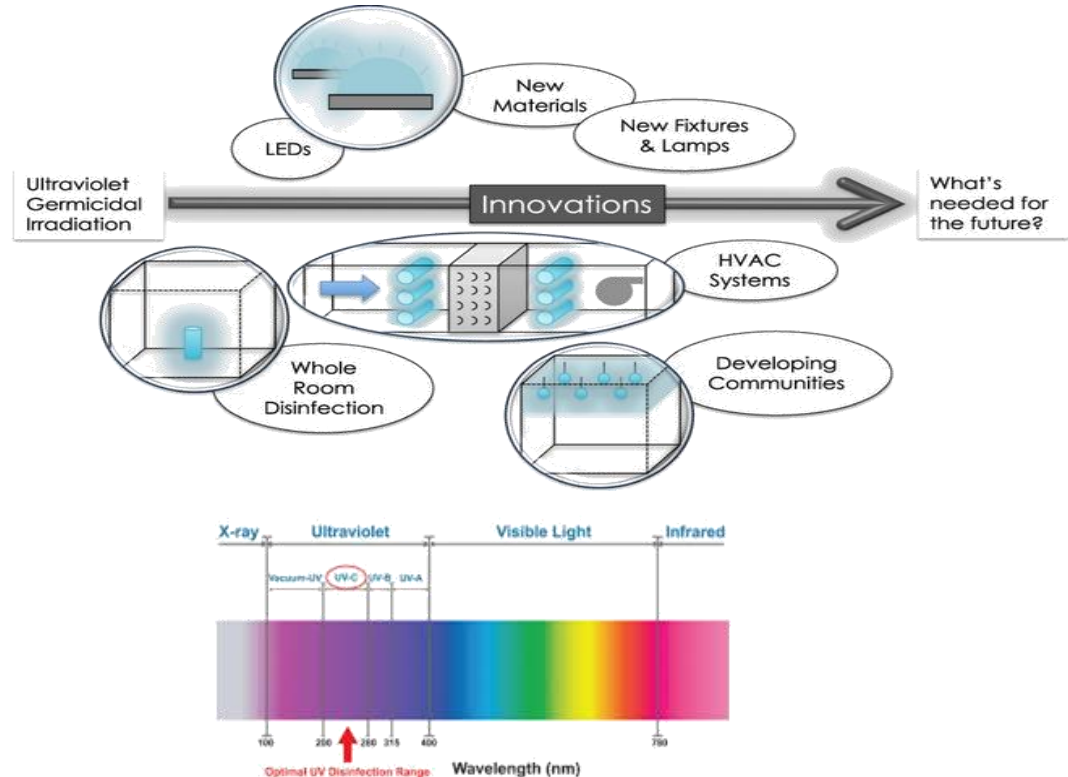
# Products Anticipated to Be Used



# Additional Disinfection Methods

## Ultraviolet Germicidal Irradiation

- Short wave, high energy ultraviolet C (UVC) light destroys microorganism's DNA
- Applications for water, air and surface disinfection
- UVC – *Group 1* carcinogen

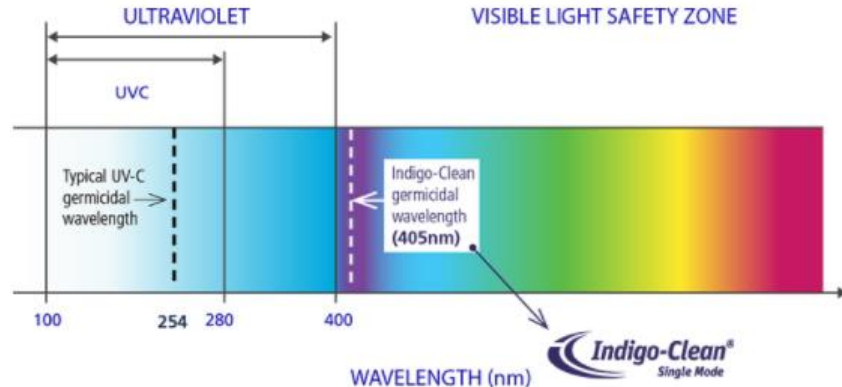


# High-Intensity Narrow-Spectrum (HINS) Light

- 405 nm, sometimes referred to as “Near UV,” although not in the UV spectrum.
- Conforms to international safety guidelines for clinical use in occupied rooms
- Provides continuous disinfection of air and exposed surfaces in occupied spaces.



Indigo-Clean™ 2017



# “New” Application Methods

- Electrostatic Sprayers
- Vapor Systems



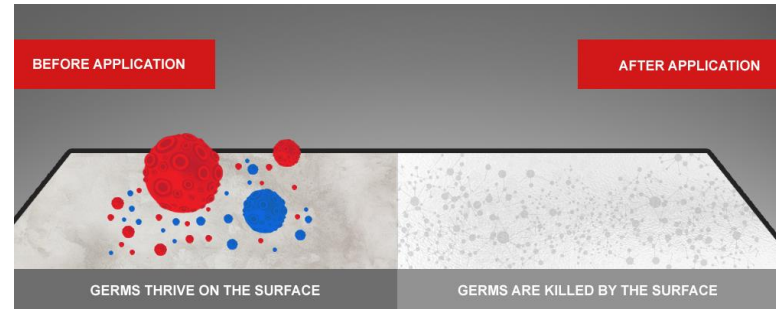
# Antimicrobial Surfaces

**Replacing traditional materials**  
(e.g., plastic, stainless steel)  
with materials with  
antimicrobial properties or  
treating surfaces with coatings

- Copper
- Silver

## Antimicrobial surface coatings

- Surfaces sprayed with  
surfacine or organosilane







**Barbara Dellinger, MA, FIIDA, CHID, CID, EDAC, NCIDQ,**  
Design & Research, Dellinger Consulting LLC

1. Explore optimizing selection and specification of high-performance healthcare surface materials to meet today's challenges.

## February 2017 -Design Connections - Ponte Vedra, Florida

Several  
AAHID  
CHID  
healthcare  
designers,



...manufacturers, associations, and industry partners, shared their frustration with ongoing & persistent coated fabric failures, comparing experiences we found we were all experiencing the same problems. After the conference, we continued the discussion, to find a solution, we formed the Durable Coated Fabrics task group.

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## Shady Grove Medical Center Evergreen Lounge Study 2018-2019

**Discovery:** *Everywhere we looked there were issues and unanswered questions...*

- Memo tag/Sample ticket material composition and testing information was different for every fabric
- Websites provide inconsistent information on testing and material composition
- Sales representatives were not always able to provide additional information



### Goals:

- Assess various coated fabrics performance
- Regular testing of cleaning processes for cleanliness/bioburden

## Shady Grove Medical Center Evergreen Lounge Study 2018-2019

### Results:

Durability: Good-Excellent, w/stretching on humid days

Cleanliness: Poor, inability to comply with daily cleaning as recommended by fabric manufacturers



*Something had to be done...*

frustration,

time lost,

money lost,

& still no answers...



**How is a Designer  
supposed to know all  
of this?**

**How many  
tests were  
conducted?**

**How much  
do the tests  
cost?**

**How many  
tests did  
the product  
fail?**

**What are the  
common names  
used in place of  
some tests?**

**Who decides  
which tests  
are  
requested?**

**Who pays for the  
time it takes?**



## Memo sample ticket and Website info comparison:

Test names, if noted, are highlighted

Coated Fabric A (Sample ticket)	Coated Fabric B (Sample ticket)	Coated Fabric C (Sample ticket)	Coated Fabric D (Sample ticket)	Coated Fabric E (Sample ticket)
<p>Name and # of pattern</p> <p>Color</p> <p>Contents</p> <p>Finish</p> <p>Backing</p> <p>Cleaning</p> <p>Weight</p> <p>Width</p> <p>Repeat</p> <p><b>Abrasion (dbl rubs noted)</b></p> <p><b>TEST NAME/# NOT GIVEN</b> (other than Wyzenbeek)</p>	<p>Name</p> <p>Color and #</p> <p>Contents</p> <p>Finish</p> <p>Fluid Barrier</p> <p>Width</p> <p><b>Abrasion Resistance</b></p> <p>Hydrolysis Resistance</p> <p>Flammability</p> <p>(3 tests noted)</p> <p><b>TEST NAMES/# NOT GIVEN</b> (other than Wyzenbeek noted)</p>	<p>Collection</p> <p>Name</p> <p>Content</p> <p>Width</p> <p><b>Abrasion (Wyzenbeek)</b></p> <p>Cleaning Code</p> <p>Key Features :</p> <p>Bleach cleanable</p> <p>Resists blue jean dye</p> <p><b>TEST NAME/# NOT GIVEN</b> (other than Wyzenbeek)</p>	<p>Name</p> <p>Style</p> <p>Color</p> <p>Width</p> <p>Material</p> <p><b>NO TESTS NOTED</b></p>	<p>Name</p> <p>Number</p> <p>Color</p> <p>Content</p> <p>Backing</p> <p>Width</p> <p>Application</p> <p>Features</p> <p>Environmental info</p> <p>3 flame ratings</p> <p><b>Wyzenbeek</b></p> <p><b>Lightfastness AATCC 16</b></p> <p>Cal 133</p> <p>BIFMA</p> <p>Wyzenbeek noted; but not by test #</p> <p><b>2 TESTS NOTED</b></p>
<p><b>VS. Website info</b></p> <p>Additional website info - two more tests are noted but not by formal test name or #</p> <p>Price</p> <p>Finish (topcoat)</p> <p>Backing</p> <p>Warranty</p> <p>Environmental</p> <p>Flammability "meets all"</p> <p><b>No test noted on Website</b></p>	<p><b>VS. Website Info</b></p> <p>Additional website info -</p> <p><b>Abrasion Resist. ASTM D-4157</b></p> <p><b>Break Strength ASTM -D-751-06</b></p> <p><b>Tear Strength ASTM D-2261</b></p> <p><b>Seam slippage ASTM D-06</b></p> <p><b>Colorfastness to light AATCC 16</b></p> <p><b>Crocking ATTCC-8</b></p> <p><b>Hydrolytic Sta. ISO 1419</b></p> <p><b>7 Tests noted on Website</b></p>	<p><b>VS. Website info</b></p> <p>Additional website info</p> <p>4 Flammability test</p> <p>Colorfastness – <b>AATCC 16H</b></p> <p>Emissions CA</p> <p><b>Hydrolytic Stability – ISO 1419</b></p> <p><b>2 Tests noted on Website</b></p>	<p><b>VS. Website info</b></p> <p>Add'l website info</p> <p>5 flame tests</p> <p><b>ASTM D4157 – Wyzenbeek</b></p> <p><b>Crocking AATCC 8</b></p> <p><b>Light AATCC 16.3</b></p> <p><b>3 Tests noted on Website</b></p>	<p><b>VS. Website info</b></p> <p>Info exactly the same as sample ticket</p> <p><b>2 Tests noted on Website</b></p>

There was no standard list for the tests that are most important to healthcare designers! 2019-2020

# *Missing and inconsistent information...*

## **Memo Tag/Sample Ticket**

- Basic product information due to limited by space. Wording inconsistent
- No standard definition for “Heavy duty, 24/7 healthcare use”
- Various tests are done; sometimes for similar test; ASTM, CFFA, AATCC
- Quantity of tests shown varied from none to seven, average shown was two
- Several note “Wyzenbeek”, one factor for measuring durability in real-world healthcare environments
- Official CFFA or ASTM test names are not used
- Sustainable attributes listed which are not reliable indicators of performance and durability
- Various test names are similar but not the same which is confusing; such as...
  - CFFA-16 is Tear Strength
  - AATCC 16H is Colorfastness
  - ASTM D-751-06: is it “Break Strength” or “Seam Slippage”?

# ***Missing and Inconsistent information...***

## **Manufacturer's Website Information**

- Testing information is limited and inconsistent between manufacturers
- One had tested for more than twelve staining agents and provided results
- Another did not list any staining results
- Many provide results of cleaning product tests on the website; but some do not

## **Manufacturer and/or Distributor Sales Representatives**

- When the designer provided a summary chart indicating information gaps for the 8-12 tests used to analyze fabric differences, the representative was able to provide additional test results
- Those additional test results were not provided on the sample ticket or the website.
- Typically, a specifying designer is not permitted the time to conduct product comparisons at this level of detail.

*Your guide to making  
informed selections...*

## **Durable Coated Fabric Programming & Selection Guide for Healthcare**

*..questions and a  
checklist to obtain and  
compare information...*

## **Durable Coated Fabric Programming and Selection Guide for Healthcare**

October 2020



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American Academy of  
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# Durable Coated Fabric Programming & Selection Guide for Healthcare

## Durable Coated Fabric Programming & Selection Guide for Healthcare

### INTRODUCTION

The purpose of this guide is to provide interior designers and specifiers with a tool that will assist in the selection of appropriate durable coated fabrics, for upholstered seating in healthcare environments.

The **Durable Coated Fabric Programming & Selection Guide for Healthcare** consists of the following documents:

**Part 1 Programming Questions** to facilitate communication and confirm expectations between **Designers/Specifiers** and the following stakeholders:

**I. End-User or Client - Questions** (care providers, infection preventionists, environmental services, industrial hygienist, quality assurance, etc.)

**II. Durable Coated Fabric Manufacturer/Distributor - Questions**

**III. Upholstered Furniture Manufacturer/Dealer - Questions**

The Durable Coated Fabric programming questions and a summary Checklist for tracking the answers from **each** of the above stakeholders include the following categories:

- A. Performance / Durability and Budget
- B. Cleaning and Disinfecting
- C. Sustainable Attributes
- D. Upholstered Furniture Design

## Part 2 Chemical Fabrics and Film Association: CFFA-Healthcare-201

The CFFA-Healthcare-201 has been reprinted with permission of the Chemical Fabrics and Film Association (CFFA).

The Durable Coated Fabrics (DCF) Task Group is recommending that interior designers and specifiers request DCF distributors and manufacturers to utilize CFFA-Healthcare-201 to test their products. This provides a basis for informed decision making.

**Attachment A: Fabric Review Checklist:** Excel document for tracking/quantifying answers.

Durable Coated Fabric Programming & Selection Guide for Healthcare - Fabric Review Checklist			
Proposed	Manufacturer/Distributor:	Composition:	Project:
Coated	Pattern Name & Number:	Backing:	Reviewer:
Fabric	Color Name/Number:	Cost:	Date:
Furn Item	Furniture Mfr. & Model:	Mfr. Fabric Grade:	
Data Collection: Information sources are; Memo Tag/Sample Ticket, product literature, website, manufacturer and/or distributor representatives.			
Scoring: a positive/preferred value gets a "1", a negative/not preferred/unknown value gets a "0". Using this checklist to evaluate the proposed coated fabric(s) for a project will result in scores which reflect the likelihood of a positive outcome.			
<b>Part 1: Programming Questions</b> (Questions shown edited for simplicity. Refer to Guide Part 1 for complete question and context)			
Ref. #	Description	Value	Score Notes
<b>Part 1 Programming: I. End User or Client - Questions</b>			
I.A.1.a	What is the expected product service life ?	5+ years = 1 0-4 years = 0	
I.A.1.b	Does the fabric have deeply embossed texture?	Not Deeply Embossed = 1 Deeply Embossed = 0	
I.B.1	Have cleaning & disinfecting chemicals used in your facility been successfully tested on this fabric?	Tested = 1, Not tested = 0	
I.B.1.a.i	Are cleaning & disinfecting chemicals being rinsed w/water?	Rinsed = 1, Not Rinsed = 0	
I.B.3.b	In past projects with similar conditions, has the coated fabric met durability expectations?	Met expectations = 1, Not met = 0	
<b>Part 1 Programming: II. Durable Coated Fabric Distributor/Manufacturer - Questions</b>			
II.A.1	Does proposed coated fabric comply with CFFA-Healthcare-201 Standard?	Comply = 1, Does Not Comply = 0	
II.A.2	Has topcoat material proven durable in similar applications?	Durable = 1, Not durable = 0	
II.A.3	Has backing material proven durable in similar applications?	Durable = 1, Not durable = 0	
II.A.4	Has proposed fabric been used successfully in similar locations?	Successful = 1, Not successful = 0	
II.B.2	Does the DCF manufacturer/distributor provide a list of approved cleaning/disinfecting chemicals?	List not provided = 0 List provided = 1	
II.B.4	Has fabric been tested for ultraviolet light, hydrogen peroxide, or other additional disinfection procedures?	Tested = 1, Not tested = 0	
II.B.5	Does manufacturer recommend rinsing with water after cleaning and disinfecting the DCF?	Rinsing required = 1, Rinsing not required = 0	
<b>Part 1 Programming: III. Upholstered Furniture Manufacturer and Furniture Dealers - Questions</b>			
III.A.1	Has the fabric had any failures related to furniture upholstery techniques; i.e. seams, welts, corners, backing color, or needle holes?	No Failures = 1 Failures = 0	
III.A.3	Has the fabric been approved by the manufacturer for use on the specified furniture?	Approved = 1, Not approved = 0	
III.B.1	Have the coated fabric manufacturers' recommended cleaning/disinfecting protocols damaged other parts of the furniture?	Not damaged = 1, Damaged = 0	
III.D.1.	Can undesirable attributes; corners, welts, sharp corners, etc. be eliminated to improve the product.	Undesirable removed = 1, Not removed = 0	
III.D.2.	Is furniture item componentized for field replaceable repairs?	Componentized = 1, Not componentized = 0	
		<b>Part 1 Subtotal:</b>	<b>0</b>
<b>Part 2: CFFA-Healthcare-201 (Recommended Minimum Performance Standards)</b>			
CFFA	CFFA-Healthcare-201 compliance confirmation	Comply = 10, Does Not Comply = 0	
		<b>CFFA Subtotal:</b>	<b>0</b>
		<b>TOTAL Parts 1 &amp; 2:</b>	<b>0 (Maximum Score = 27 Points)</b>

## ***Products, Goods, and Information Flow...***

**Consumers, End Users, Hospitals, Clinics,  
and Long-Term Care Facilities**

**Designers, Furniture Dealerships,  
Furniture Manufacturers and Specifiers**

**Fabric Distributors**

**Fabric Manufacturers, Raw Goods, Products,  
Equipment, and Testing Labs**



# Results of Collaboration: CFFA-Healthcare-201 Standard and Certification Program

**CFFA** CHEMICAL FABRICS AND FILM ASSOCIATION INC.

**CFFA-HEALTHCARE-201B**  
February 2021

## Recommended Minimum Performance Standards for VINYL-COATED AND OTHER CHEMICAL COATED UPHOLSTERY FABRICS - HEALTHCARE

### 1. Scope

1.1 This document sets forth recommended performance standards for vinyl and other chemical coated fabrics produced with woven, non-woven, or knit substrates which are used as upholstery materials for indoor furniture in healthcare settings.

1.2 This performance standard is not applicable to vinyl or chemical coated fabrics used in outdoor applications.

1.3 The test results for coated fabrics, when tested in accordance with the CFFA Standard Test Methods, must attain the minimum values of all properties listed in **TABLE 1** for a given construction in order to conform to this standard.

### 2. Applicable Documents\*

For applicable documents used in this performance standard, refer to CFFA Standard Test Methods Pamphlet, most recent Edition.

### 3. Definitions

**Abrasion** - Measurement of the ability of the chemical coating to resist surface wear when rubbed against another (abrasive) surface.

**Accelerated Exposure to Disinfectants** - To determine surface changes, including color, gloss, or deterioration due to cracking, peeling, to hardening as a result of exposure to disinfectants.

**Accelerated Light Aging** - A determination of the resistance of chemical coated fabrics to exposure to laboratory simulated sunlight.

**Adhesion** - A measure of the force required to separate a chemical coating from the base substrate.

**Blocking** - A determination of the development of surface tack at elevated temperatures.

**Cold Crack** - A measure of the ability of a chemical coated fabric to withstand cracking when folded at low temperature.

**Cracking** - A measure of resistance to transfer of color from a chemical coating to another surface (usually a fabric) by rubbing action.

**Denim Stain Resistance** - To determine the resistance to transfer of color from denim fabric to a chemical coated fabric by rubbing action.

**Flame and Smoke Resistance** - To determine flammability and smoke generation.

**Flex** - A determination of the change in surface characteristics of a chemical coated fabric when subjected to multiple flex cycles.

**Hydrolytic Stability** - To determine the resistance of urethane coated fabric to hydrolysis when subjected to a combination of an elevated temperature and high humidity for 10 weeks.

**Seam Strength** - Simulates the resistance to seam tear propagation.

**Stain Resistance** - To determine 24-hour stain resistance using reagents commonly found in healthcare.

**Tear Strength** - A measurement of the force required to continue or propagate a tear in a coated fabric.

**Tensile Strength** - A measurement of the force required to break a coated fabric.

**Volatility** - A measurement of weight loss of a chemical coated fabric when subjected to an elevated temperature.

**TABLE 1**

PROPERTY	TEST METHOD	FABRIC BACKING OR SUBSTRATE		
		KNITS	NON-WOVENS	WOVENS
Abrasion: (Wyzenbeek) Healthcare / High Traffic	CFFA 1a #10 Duck	100,000 cycles	100,000 cycles	100,000 cycles
Healthcare / Normal Traffic		50,000 cycles	50,000 cycles	50,000 cycles
Accelerated Exposure to Disinfectants	CFFA 100	Slight Change	Slight Change	Slight Change
Accelerated Light Aging (Denim)	CFFA 2i	No change	No change	No change
Adhesion*	CFFA 3	3.0 lbs.	3.0 lbs.	3.0 lbs.
Blocking	CFFA 4	None- Slight Adh. (2)	None- Slight Adh. (2)	None- Slight Adh. (2)
Cold Crack	CFFA 6a	No Cracking	No Cracking	No Cracking
Cracking: Dry & Wet	CFFA 7	Excellent (4)	Excellent (4)	Excellent (4)
Denim Stain Resistance	CFFA 70	Slight (8)	Slight (8)	Slight (8)
Flame and Smoke Resistance (CAL-117-2013)	CFFA 9	Pass	Pass	Pass
Flex	CFFA 10	25,000 Cycles No Cracking/ Cracking	25,000 Cycles No Cracking/ Cracking	25,000 Cycles No Cracking/ Cracking
Hydrolytic Stability, PU	CFFA 110*	10 weeks	10 weeks	10 weeks
Seam Strength	CFFA 14	30 x 25 lbs.	35 x 35 lbs.	25 x 25 lbs.
Stain Resistance	CFFA 142	No stain (4)*	No stain (4)*	No stain (4)*
Tear Strength: Tongue	CFFA 16a	4 x 4 lbs.	N/A	4 x 4 lbs.
Teig	CFFA 16c	N/A	15 x 15 lbs.	N/A
Tensile	CFFA 17	50 X 50 lbs.	50 X 50 lbs.	40 x 40 lbs.
Volatility	CFFA 185*	8%	8%	8%

Table 1 footnotes continue on page 2

1200 hours using a Weatherometer or Fademeter, or 150 hours using a QUV - dry cycle CFFA Standard Test Method 2.4  
\*Using a 5 lb. roller, 20° F (4°C)  
Hydrolytic Stability, PU - Adhesion: Must maintain 75% of original strength. Abrasion: Must pass 25k double rubs. Flex Resistance: No breaks in coating at 15K cycle  
\*Tack and lipsticks are rated at 2/3  
\*Activated carbon technique, but at 220°F (104°C).

### 4. Performance Requirements

4.1 Vinyl and other chemical coated healthcare upholstery fabrics consist of one or more layers of polymer coatings laminated to a knit, woven or non-woven fabric backing made up of natural and/or synthetic fibers. Along with physical and performance properties each product must meet aesthetic requirements including color, texture and haptics.

4.2 The minimum physical and performance standards for knits, woven and non-woven coated fabrics are listed in separate columns in Table 1.

4.3 Properties described in **TABLE 1** for coated fabrics collectively make up the minimum performance standards. Depending upon specific tailoring and performance requirements, these properties should be used to select the construction of coated fabric most suited for each use. Properties are measured using CFFA Standard Test Methods. All test methods are outlined in the CFFA Standard Test Methods pamphlet which describes their purpose and relates the properties tested to various aspects of performance.

### 5. Test Procedures

5.1 Abrasion Resistance - See CFFA Standard Test Method 1a. Wyzenbeek Method using #10 Duck is standard.

5.2 Accelerated Exposure to Disinfectants - See CFFA Standard Test Method 100 (see note 6.3).

5.3 Accelerated Light Aging - See CFFA Standard Test Method 2. 200 hours using a Xenon Arc Weatherometer or Fademeter, or 150 hours using a QUV, dry cycle Method 2.4.

5.4 Adhesion of Coating to Fabric - See CFFA Standard Test Method 3. Use a Scott or Instron type Universal Tester.

5.5 Blocking - See CFFA Standard Test Method 4.

5.6 Cold Crack Resistance - See CFFA Standard Test Method 6a. Use a 5 lb. Roller.

5.7 Cracking Resistance - Dry & Wet. See CFFA Standard Test Method 7.

Note: This test method is based on GMW 15337. However, the oven aging requirement has been removed.

\*Test Methods may be accessed on line at: <http://cflapformanceproducts.org/cffa-pages/publications.asp>

### MEMBERS

BASF Corporation  
BYK USA, Inc.  
Canadian General - Tower Limited  
CGPC America Corporation/Endurates™  
ExxonMobil Chemical Company  
Formosa Plastics Corporation, USA  
Morbarn, Inc.  
OMNOVA Solutions  
Proquinal 3.A./Spradling International, Inc.®



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58 Denim Stain Resistance - See CFFA Standard Test Method 70. (Sometimes referred to as Reverse Cracking.)

59 Flame and Smoke Resistance - See CFFA Standard Test Method 9.

510 Flex Resistance - See CFFA Standard Test Method 10. Use a Flexometer (Newark Flex) Test Unit.

511 Hydrolytic Stability, Polyurethane - See CFFA Test Method 110.

512 Seam Strength - See CFFA Standard Test Method 14. Use a Scott or Instron type Universal Tester.

513 Stain Resistance in Healthcare Environments - See CFFA Test Method 142.

514 Tearing Strength - See CFFA Standard Test Method 16b and 16c. Use a Scott or Instron type Universal Tester.

515 Tensile Strength - See CFFA Standard Test Method 17. Use a Scott or Instron type Universal Tester.

516 Volatility - based on Activated Carbon Technique, except at 220°F. (104°C). See CFFA Standard Test Method 18.

### 6. Notes

6.1 Stretch and Set - Stretch and set properties can affect "puddling" in upholstered seating, a condition where a seat bottom will distort, with the coated fabric contributing to a depression or folds and wrinkles forming due to an inability to fully recover its original dimensions after being stretched. However, the prime causes of puddling are improper selection of the type of underlying urethane cushioning, and issues with seat design or construction. CFFA does not set a minimum performance standard for this property. See CFFA Standard Test Method 15.

6.2 Mildew and/or Bacterial Resistance - For healthcare applications, biological resistance requirements may be incorporated into the performance standard to address the needs of the customer. However, their use may have to be weighed against environmental restrictions specific to an institution. In healthcare requirements (hospital, healthcare, etc.), biological resistance requirements may be incorporated into the specifications to meet the needs of the final customer.

6.3 Accelerated Exposure to Disinfectants - In Healthcare applications, disinfectants are applied on a frequent basis and may harm the surface by color or gloss change, cracking, peeling, or hardening. CFFA 100 is the method used to determine resistance. However, it should be noted that failing to raise property or dilute disinfectants to the recommended concentration can shorten the life of the product. NOTE: Manufacturers' cleaning instructions must be followed; otherwise, premature failures may occur.



Look for the  
**CFFA-Healthcare-201**  
Certification mark !

A durable coated fabric  
must pass all tests to  
become Certified.



***There is no criteria  
for “CFFA compliant”***

If a durable coated fabric is CFFA certified,  
it will be listed on the CFFA website as a certified coated fabric;

<https://www.cffaperformanceproducts.org/cffa-pages/healthcare.asp>

<https://aahid.org/>

# Results of Collaboration:

## CFFA-Healthcare-201 Standard



### CFFA 142: Stain resistance in the Healthcare Environment

#### Transferable Stain Types

- Synthetic Body fluids:
- Stomach Acid\*
- Human Sweat\*
- Urine\*

\* See CFFA 142 for specific info

#### Inks:

- Viscot Mini surgical Fine tip marker
- Ballpoint pen – Bic round Stic-blue

#### Transferable Stains:

- Revlon Super Lustrous Lipstick “Love that Red”
- Johnson’s Baby Oil
- Jergens Daily Moisture Dry Skin Moisturizer
- Cutex Polish Remover Non-Acetone
- Coppertone Ultraguard Sunscreen
- Octocrylene 4%
- Shea Moisture Jamaican black castor oil leave in conditioner

## *Results of Collaboration: **CFFA-Healthcare-201 Standard***



CFFA-70 – Denim Stain Resistance, also known as ‘reverse crocking’, typically occurs when highly pigmented clothing comes in contact with upholstery fabrics

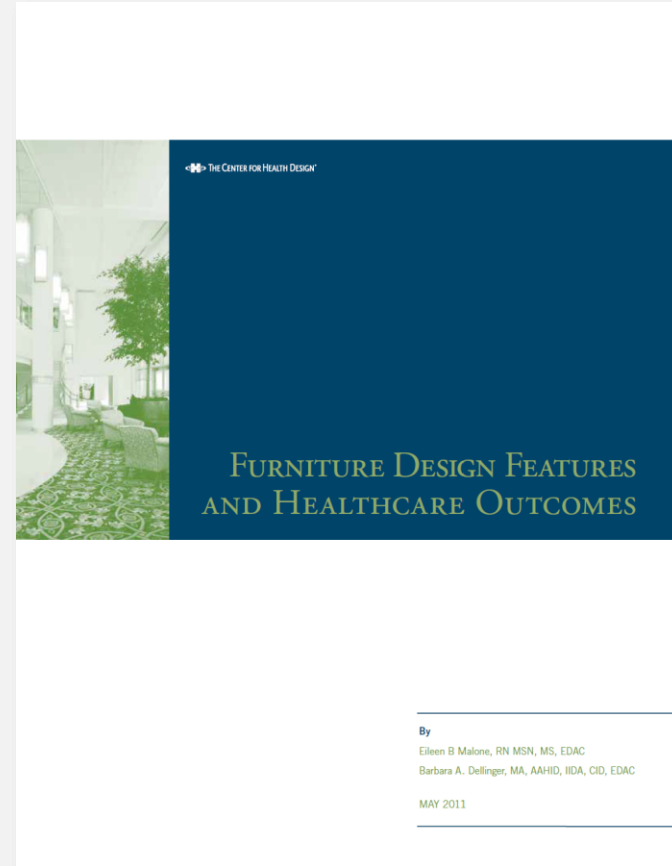
CFFA- 100 – Accelerated Exposure to Disinfectants, such as Clorox Healthcare Hydrogen Peroxide Cleaner Disinfectant (Wipes), VIREX II 256, diluted to specified concentration, and Clorox Healthcare Bleach Germicidal Wipes

See **CFFA-HC-201 Standard** for further information and the full list of required test methods to meet the minimum performance requirements

# *A Furniture Checklist from The Center for Health Design, Knowledge Repository:*

## **Furniture Design Features and Healthcare Outcomes**

*Authors: Eileen B. Malone and  
Barbara A. Dellinger, May 2011.*



# Furniture Assessment Checklist:

FIGURE 3  
Evidence-Based  
Design Checklist

Findings Scale:  
Present (+), Absent (-),  
More Information Needed (?),  
Not Applicable (N/A)

## APPENDIX

Findings	EBD Goals and Furniture Features
	1. Reduce surface contamination linked to healthcare associated infections <sup>1,2</sup>
	a) Surfaces are easily cleaned, with no surface joints or seams. <sup>1,3,4</sup>
	b) Materials for upholstery are impervious (nonporous). <sup>1,7,8</sup>
	c) Surfaces are nonporous and smooth. <sup>9</sup>
	2. Reduce patient falls and associated injuries <sup>10</sup>
	a) Chair seat height is adjustable. <sup>11,12,13,14,15</sup>
	b) Chair has armrests. <sup>16</sup>
	c) Space beneath the chair supports foot position changes. <sup>17</sup>
	d) Chair seat posterior tilt angle and seat back recline facilitate patient egress. <sup>18</sup>
	e) Chairs are sturdy, stable, and cannot be easily tipped over. <sup>19,20,21</sup>
	f) Rolling furniture includes locking rollers or casters. <sup>22</sup>
	g) Chairs have no sharp or hard edges that can injure patients who fall or trip.
	3. Decrease medication errors <sup>23</sup>
	a) Lighting fixtures should provide 90-150 foot candle illumination and an adjustable 50-watt high intensity task lamp for furniture with built-in lighting that is used in a medication safety zone. <sup>24,25</sup>
	b) Furniture is configurable to create a sense of privacy to minimize visual distractions and interruptions from sound and noise during medication transcription, preparation, dispensing, and administration activities. <sup>26,27</sup>
	4. Improve communication and social support for patients and family members <sup>28</sup>
	a) Furniture can be configured into small flexible groupings that are easily adjusted to accommodate varying numbers of individuals in a variety of healthcare settings. <sup>29,30,31</sup>
	b) Wide-size and age variations are supported. <sup>32</sup>
	c) Acoustic and visual patient privacy are supported. <sup>33,34,35,36,37,38</sup>
	5. Decrease patient, family member, and staff stress and fatigue <sup>39</sup>
	a) Materials suggest a link to nature. <sup>40,41,42,43</sup>
	b) Appearance is attractive and non-institutional. <sup>44,45,46,47</sup>
	c) Furniture is tested for safe and comfortable use by all, including morbidly-obese individuals. <sup>48,49,50</sup>
	6. Improve staff effectiveness, efficiency, and communication
	a) Furniture is easily adjustable to individual worker's ergonomic needs. <sup>51</sup>
	b) Design enables care coordination and information sharing. <sup>52,53</sup>
	c) Materials are sound absorbing. <sup>54,55,56,57,58,59</sup>
	7. Improve environmental safety
	a) Materials do not contain volatile organic compounds (VOC), such as formaldehyde and benzene. <sup>60,61,62</sup>
	8. Represent the best investment
	a) Reflect and reinforce the organizational mission, strategic goals, and brand.
	b) Integrate new with existing furniture and objects for facility renovation projects.
	c) Pieces can be flexibly reconfigured and moved to support changing and emerging missions.
	d) Provide casters or glides to reduce floor damage.
	e) Check that there are no protrusions that may damage walls; check chair rail heights.
	f) Manufacturer provides results of safety and durability testing.
	g) Manufacturer describes the specific evidence that has been used to design the product.
	h) Manufacturer includes a warranty appropriate to use, such as furniture used all day, every day.
	i) Replacement parts are available.
	j) Repairs can be done in the healthcare facility.
	k) Manufacturer or local dealer can assist with furniture repair and refurbishing.
	l) Environmental services (housekeeping) staff can easily maintain furniture.
	m) A Group Purchasing Organization (GPO) can be used when purchasing furniture.

Source: Malone, E. B. &  
Dellinger, B. A. (2011).  
*Furniture design features  
and healthcare outcomes.*  
Concord, CA: The Center for  
Health Design

FIGURE 3  
(continued)  
Evidence-Based  
Design Checklist  
Instructions

Product: \_\_\_\_\_ Manufacturer: \_\_\_\_\_  
Cost: \_\_\_\_\_ Date: \_\_\_\_\_

**Notes:**  
The purpose of the Evidence-Based Design (EBD) Furniture Checklist is to help improve targeted healthcare outcomes by providing healthcare leaders and designers with an evidence-based tool that assists them in making the best furniture investments. Furniture generally includes chairs, sofas, tables, systems and built-in furniture and does not include the patient bed or carts that support medical procedures. The checklist is divided into eight sections that correspond to common EBD goals for which furniture has been shown to play a role. Each section includes recommended furniture features based on cited research and standards, which are in the References Appendix.

**EBD Furniture Checklist Instructions and Summary Information about Variables**  
Information about furniture features can be gleaned from numerous sources: manufacturer product brochures, websites and catalogs; furniture manufacturer and dealer representatives; and furniture trade publications. Use the checklist to guide inquiry and product evaluation, facilitate team and client communication about desired furniture features, to compare furniture options, and evaluate existing furniture.

A scale is provided to indicate whether the degree to which the furniture being reviewed has the recommended features:  
(+) Present – The furniture has the feature  
(-) Absent – The furniture feature is absent  
(?) More information needed – Cannot determine if the feature is present. Need more information from the manufacturer.  
(N/A) Not applicable – Some features will only apply to certain types of furniture.

**Additional information about each checklist variable:**

- 1a - Joints and seams complicate effective cleaning, creating organism reservoirs that can further the spread of contact transmitted healthcare associated infections. A space between the chair back and seat can facilitate cleaning.
- 1b - Contaminated body fluids soak into porous upholstered furniture complicating effective cleaning.
- 1c - Nonporous, smooth solid surfaces such as laminate or poly resin products facilitate effective cleaning. Note: Hard metal surfaces like copper and surface antimicrobial treatment claims presently lack sufficient evidence for efficacy.
- 2a/b/c/d - Chair seat heights sized to individual needs, armrests, and space beneath a chair to support posterior foot placement facilitate safer sit-to-stand movements.
- 2e - Increased chair posterior seat tilt and increased chair back recline interferes with egress, especially in older adults.
- 2f - Tipped-over-furniture-caused injuries for children are increasing.
- 2g - Locking rollers and casters prevent unwanted furniture movement.
- 2h - Sharp furniture edges, such as wooden chair arms with corners, can injure vulnerable patients who bump into them.
- 3a - For systems and built-in furniture used in an area where medications are prescribed, medication orders are entered into a computer, or onto paper documents, and where medications are prepared and administered that includes lighting, brighter illumination results in fewer visual medication errors.
- 3b - Distractions and interruptions are associated with more medication errors.
- 4a - Smaller, more intimate furniture groupings foster communication.
- 4b/c - Systems furniture should include acoustical panels with a minimum noise reduction coefficient of 0.65.
- 5a - Humans have a genetic propensity to positively respond to nature.
- 5b - Perception of quality, service, and waiting time are linked to physical environmental attractiveness. Non-institutional appearing environments are associated with less patient stress.
- 5c - Sixty-eight percent of Americans are either overweight or obese and require furniture safely designed for their comfort.
- 6a - OSHA recommends furniture that can be tailored to worker ergonomic requirements.
- 6b - Quality healthcare delivery depends on informal interactions by the healthcare team, facilitated by furniture design.
- 6c - Noise distracts and stresses staff, resulting in more time needed to complete procedures and in staff burn-out.
- 7a - Furniture made with VOCs is a source of indoor air pollution.
- 8a - Furniture provides important visual cues about the healthcare organization.
- 8b - Furniture color, material, and style contribute to an image.
- 8c - Emergency preparedness and response situations require furniture that can be easily moved and reconfigured.
- 8d - Some soft flooring products used to reduce noise, fatigue and injury are more vulnerable to furniture-caused damage.
- 8e - Hard furniture protrusions can damage walls.
- 8f - Manufacturer-conducted furniture testing for safety and durability is required; ask for the results.
- 8g - Manufacturers engage in significant product design and research; ask for the results.
- 8h - Some furniture is used 24 hours a day, every day.
- 8i - The availability of replacement furniture parts, especially for those components exposed to more wear and tear can prolong the life of the object.
- 8j - Furniture that can be repaired in the healthcare facility will be potentially out of use for a shorter period of time.
- 8k - Manufacturer or dealer-supported furniture repair and refurbishing will prolong the life of the object.
- 8l - The environmental services team must be able to easily clean, disinfect, and maintain the furniture, involve them!
- 8m - Group purchasing organizations are used to lower costs.

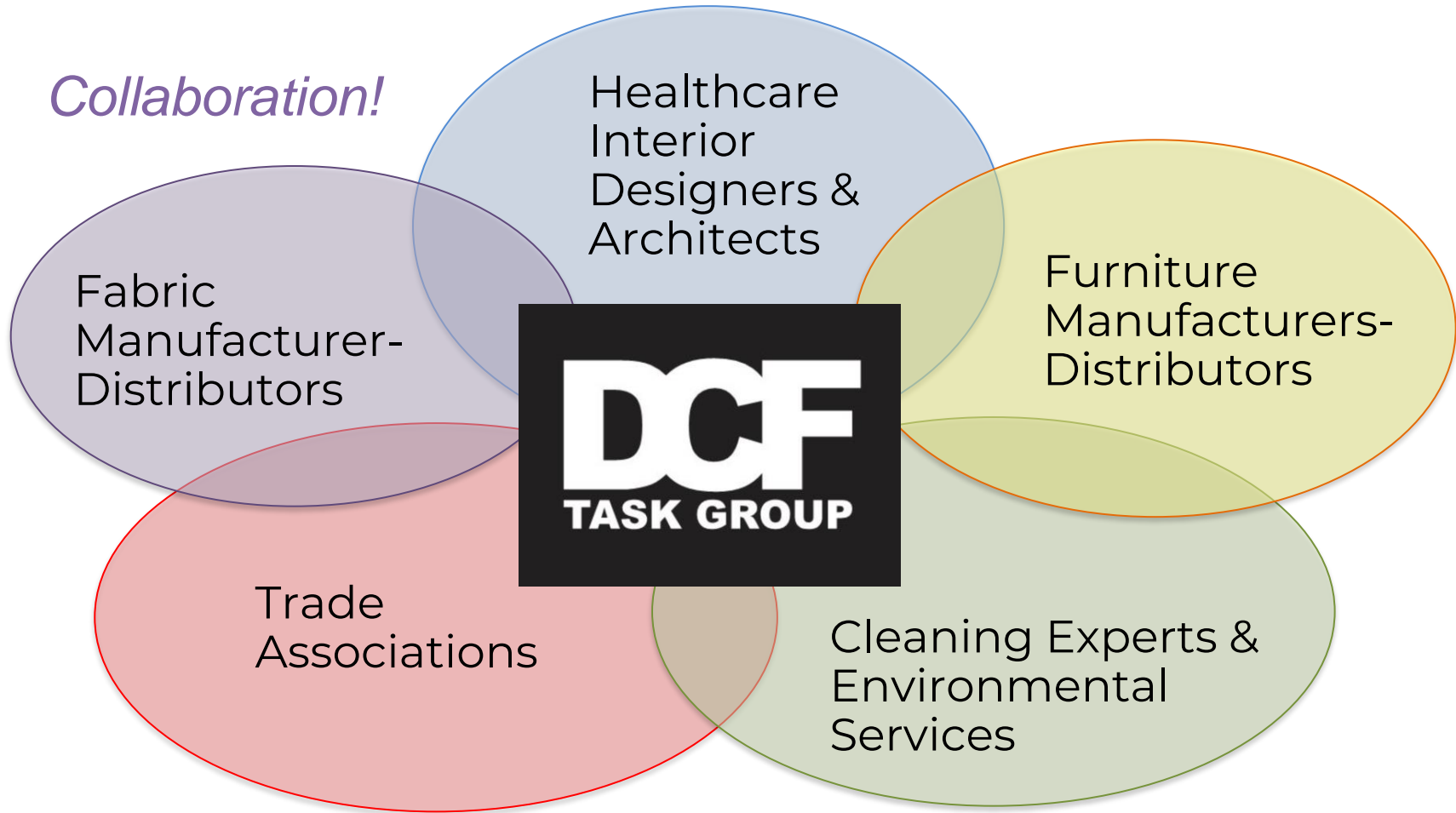


## *What can we do now?*

Encourage industry acceptance of the CFFA-HC-201 Certification

- Encourage your fabric manufacturer/distributor partners to get products certified.
- Reference CFFA website and link to manufacturer's /distributor's products that have passed CFFA-HC-201, and other links
- Issues with specific tests (CFFA 100 – bleach wipes) and (CFFA 142 nail polish remover) keep some from getting the full certification.
- If a product has passed CFFA-HC-201, designers can ask that it be labeled as such.

*Collaboration!*



# Session D01: Durability and Performance Requirements – Are Your Specifications Informed?

# aahid

American Academy of  
Healthcare Interior Designers

## Biobreak – 15 minutes

Our presentation will resume promptly at \_\_\_\_\_

*Please turn in your completed Survey cards, and  
after the break, we'll share our results from last year!*



## Survey of HCD 2021 Attendees

*Most attendees  
were:  
**Interior  
Designers***

**Performance &  
Durability**  
*is top selection  
criteria*

**54%**  
*were **First  
Timers!***

*67% for whom  
cost is a factor,  
prefer  
**less than  
<\$70/yd***

**The Owner**  
*paid for repairs,  
reupholstery,  
replacements*

**77%** *had removed  
failed furniture  
within the past  
6 months!*

**Linda Gabel**, CHID, NCIDQ, Senior Interior Design-Planner,  
The Ohio State University Wexner Medical Center



*Learning Objective:*

2. Understand new real-world issues for surface material and relevant failures including the impact of environmental contaminants, cleaning chemicals and methods.

# Case Study – Academic Medical Center

**1.2 million SF state-of-the-art Cancer Hospital opened in 2014**

## **Project Goals for Furniture and Finishes:**

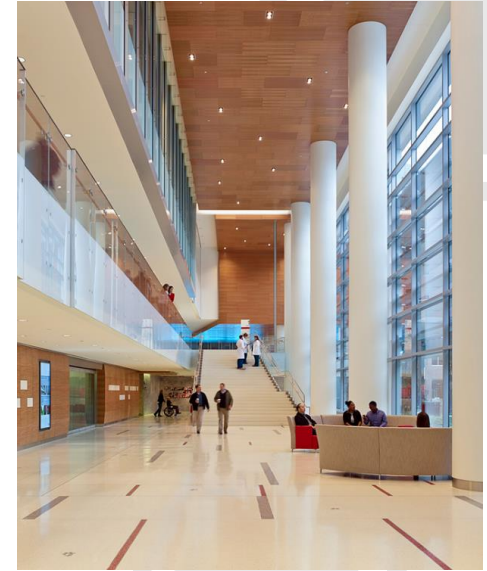
- Create a safe environment for patients, guests and staff
- Sophisticated esthetic
- LEED Gold / reduce use of PVC – based products

*Design Consultant chose to replace 90% of PVC with Polyurethane coated fabrics and finishes.*

- Reduce first cost
- Increased durability
- Ease of housekeeping and maintenance

## **Unintended Consequences:**

***Rapid degradation of Polyurethane coated fabrics, wood finishes, & materials on furniture and equipment, starting at 8 months.***



# Public and Patient Area Failures

## Issues:

- Cleaning & Chemicals
- “no rinse” protocol
- UV-C light treatment
- Heat
- Oils
- Sweat
- 24/7 use
- Rubbing/abrasion
- Polyurethane-based materials





# Clinical and Office Support Areas Failures

## Issues:

- Heat
- Oils
- Sweat
- 24/7 use
- Rubbing/abrasion points
- Polyurethane-based materials



*These surfaces are not scheduled to be routinely cleaned by EVS*

# Why is this so important?

## 1. Epidemiology (EPI) Concerns

EVS staff is unable to properly clean and disinfectant the surfaces due to damage & vulnerable subsurface of material exposed to HAI\*/pathogens:

- **Monkeypox**
- **SARS-CoV-2**
- **Multidrug resistant organisms (e.g. MRSA, VRE)**
- **Clostridium difficile**
- **Acinetobacter**
- **Pseudomonas**
- **Klebsiella**

## 2. Contaminated Furniture has to be pulled out of service

- *all items sent to hard trash. FTEs hired to manage recycle/landfill/replacement/repairs*

## 3. Financial impact - unforeseen cost of replacement furniture

- *capital & operational budget diversions est. \$9 Million over 5+ years*

\*Hospital Acquired Infections



# Third Party Lab Material Testing: 2018-2019

**Goal** – Create fabric performance tests that reflect the current state of disinfecting chemicals/methods, and environmental contaminants within the acute care hospital setting to more accurately predict fabric performance:

## Disinfectant & Accelerated UV Exposure Tests

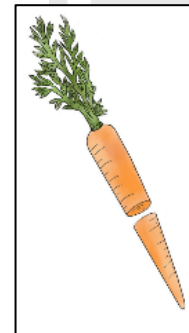
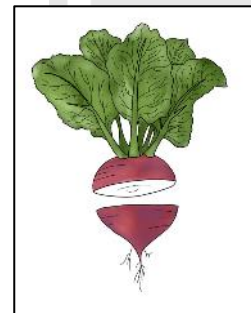
*Combined together with chemical remaining on fabric, extended dwell time*

## Stain Resistance Test

*New staining agents, extended dwell time, EVS chemicals*

## Ten durable coated fabrics types currently marketed 24/7 “healthcare” tested:

- Vinyl with Brand A topcoat
- Vinyl with UV and acrylic topcoat
- Vinyl with Brand B topcoat
- Polyurethane
- Thermoplastic Elastomer
- Polycarbonate with Brand C topcoat
- Silicone, no topcoat
- Silicone with Brand C topcoat
- 100% nylon matrix
- Treated Leather



# Disinfectant & Accelerated UV Exposure Test - Results

Disinfectant	Fabric 1 Vinyl w/Brand A Topcoat	Fabric 2 Vinyl w/UV & Acrylic Topcoat	Fabric 3 Thermoplastic Elastomer	Fabric 4 Silicone, no topcoat	Fabric 5 Polyurethane	Fabric 6 Treated Leather	Fabric 7 Vinyl w/Brand B Topcoat	Fabric 8 100% Nylon Matrix	Fabric 9 Polycarbonate w/Brand C Topcoat	Fabric 10 Silicone w/Brand C Topcoat
A In-house Bleach	Rating: 3.0	Rating: 3.0	Rating: 1.7	Rating: 3.3	Rating: 1.0	Rating: 2.0	Rating: 1.3	Rating: 1.0	Rating: 2.0	Rating: 4.0
B Oxivir TB: Hydrogen Peroxide (0.5%)	Rating: 2.0	Rating: 3.0	Rating: 2.0	Rating: 3.0	Rating: 1.0	Rating: 2.7	Rating: 3.0	Rating: 1.3	Rating: 2.0	Rating: 3.0
C Oxycide: Hydrogen Peroxide + Peroxyacetic Acid	Rating: 2.0	Rating: 3.0	Rating: 2.0	Rating: 3.0	Rating: 1.3	Rating: 2.3	Rating: 2.3	Rating: 2.3	Rating: 2.0	Rating: 3.0
D Quaternary- Virex II 256	Rating: 4.0	Rating: 4.0	Rating: 2.0	Rating: 4.0	Rating: 1.3	Rating: 3.0	Rating: 4.0	Rating: 1.3	Rating: 1.7	Rating: 4.0
E JF2 Glance: Non-ammoniated	Rating: 4.0	Rating: 4.0	Rating: 2.0	Rating: 2.7	Rating: 1.0	Rating: 3.7	Rating: 4.0	Rating: 1.0	Rating: 2.3	Rating: 3.0
F JF3 Stride Citrus Neutral Cleaner	Rating: 3.3	Rating: 4.0	Rating: 2.0	Rating: 2.7	Rating: 1.0	Rating: 4.0	Rating: 4.0	Rating: 3.3	Rating: 2.7	Rating: 2.3
G Hand Sanitizer- 70% Isopropanol	Rating: 4.0	Rating: 3.3	Rating: 2.0	Rating: 2.0	Rating: 1.0	Rating: 3.7	Rating: 4.0	Rating: 1.3	Rating: 3.0	Rating: 3.0

4

Excellent

3

Good

2

Poor

1

Severe Effect



# Stain Resistance Test

**Commonly used environmental contaminants in healthcare and public areas:**

## Patient Transferrable Stains

1. Super Lustrous Lipstick- Love That Red
2. Baby Oil
3. Daily Moisture Dry Skin Moisturizer
4. Acetone Nail Polish Remover
5. Non-Acetone Polish Remover
6. Broad-Spectrum Sunscreen SPF 50 (Oxybenzone 5%, Avobenzone 3%, Octocrylene 4%, Homosalate 10%, Octisalate 5%)
7. Skin Sunscreen Lotion with Broad Spectrum SPF 60+ (Zinc oxide 4.7%, Titanium dioxide 4.9%)
8. Black castor oil strengthen restore leave-in conditioner

## Synthetic Body Fluids and Clinical Reagents

1. Stomach Acid – Carolina Biological Supply Company: Gastric Juice, Artificial, Laboratory Grade
2. Human Sweat – Pickering AATCC TM15 Sweat pH 4.3
3. Urine – Carolina Biological Supply Company: Simulated Urine, Normal
4. Viscot Mini Surgical Fine Tip Marker



# Stain Resistance Test – Results

Application of staining agent with *extended dwell time of 48 hours*

Cleaning of staining/contaminate agents *with hospital disinfectants in lieu of soap & water:*

Stain	Replicate (Cleaning Agent)	Fabric 1 Vinyl w/Brand A Topcoat	Fabric 2 Vinyl with UV & Acrylic Topcoat	Fabric 3 Thermoplastic Elastomer	Fabric 4 Silcone, no topcoat	Fabric 5 Polyurethane	Fabric 6 Treated Leather	Fabric 7 Vinyl w/Brand B Topcoat	Fabric 8 100% Nylon Matrix	Fabric 9 Polycarbonate w/Brand C Topcoat	Fabric 10 Silcone w/Brand C Topcoat
M Coppertone Ultraguard Sunscreen Continuous Spray SPF 50	1 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 2.3	Rating: 3.0	Rating: 3.0	Rating: 2.3	Rating: 3.0	Rating: 2.7	Rating: 2.0	Rating: 1.7	Rating: 3.0
	2 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.0	Rating: 2.7	Rating: 2.0	Rating: 2.0	Rating: 1.0	Rating: 2.7	Rating: 2.0	Rating: 1.3	Rating: 1.7	Rating: 1.0
	3 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.3	Rating: 2.0	Rating: 1.7	Rating: 1.7	Rating: 2.0	Rating: 2.7	Rating: 2.3	Rating: 1.3	Rating: 1.3	Rating: 1.0
	4 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.0	Rating: 2.7	Rating: 2.7	Rating: 3.0	Rating: 2.3	Rating: 3.0	Rating: 3.0	Rating: 1.7	Rating: 2.0	Rating: 2.3
	5 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 2.0	Rating: 2.0	Rating: 1.0	Rating: 1.3	Rating: 2.3	Rating: 2.3	Rating: 2.3	Rating: 1.0	Rating: 1.0
	6 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.3	Rating: 2.0	Rating: 1.7	Rating: 1.0	Rating: 1.3	Rating: 3.0	Rating: 3.0	Rating: 1.0	Rating: 1.7	Rating: 1.0
	S= Stain Present Evaluated using:										
		+ (present)	or - (not present)								

4

Excellent

3

Good

2

Poor

1

Severe Effect



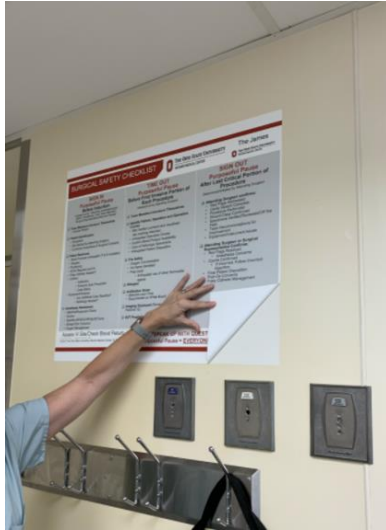
# Stain Resistance Test – Results & Take-Aways

Patient Transferrable Stains	Scores:
Super Lustrous Lipstick- Love That Red	100% fabrics stains present – no 4s
Baby Oil	75% of fabrics stains present, all at 2 or 3, few 4s
Daily Moisture Dry Skin Moisturizer	60% of fabrics stains present; all at 2 or 3, few 4s
Acetone Nail Polish Remover	30% fabrics types stains present; 3 or 4
Non-Acetone Polish Remover	30% fabric types stains present; 2, 3, 4
Broad-Spectrum Sunscreen SPF 50 (Oxybenzone 5%, Avobenzone 3%, Octocrylene 4%, Homosalate 10%, Octisalate 5%)	100% fabrics stains present – no 4s; all fabric types scored 1-2, very few 3s
Skin Sunscreen Lotion with Broad Spectrum SPF 60+(Zinc oxide 4.7%, Titanium dioxide 4.9%)	100% fabrics stains present – no 4s; 1 fabric type scored 1, most scored 2
Jamaican black castor oil strengthen restore leave-in conditioner	100% fabrics stains present – no 4s
Synthetic Body Fluids and Clinical Reagents	Scores:
Stomach Acid	40% fabrics stains present, all at 3 & 4
Human Sweat	0% fabric stains present, though 50% scored 3 on degradation & appearance
Urine	0% fabric stains present, though 50% scored 3 on degradation & appearance
Viscot Mini Surgical Fine Tip Marker	100% fabrics stains present; no 4s, many 1,2s



# O.R. materials degradation discovery 2021

Yellowing & degradation of new interior finish materials, sensors and device covers



Recently renovated ORs, (noticeable within 8 months to 2 years)

# Hypothesis

Germicidal process using high intensity UV-C (254 nm) radiation, with or without the use of wet chemical agents to clean and disinfect the rooms, may be the source of the new damage. *(currently no ASTM standardized tests appear to exist for this type of exposure to any material).*

- New OR wall finish materials are thermoplastic panels and bumper rails; *(old walls were glazed ceramic tile).*
- New OR flooring is a new low VOC epoxy flooring, *(existing is an old epoxy resin formula).*

*OSU CDME & WMC Currently conducting formal material tests: UV-C disinfecting light exposure equivalent to 0-5 years in the O.R.s using ASTM test methods and EVS processes*

# Why is this important?

Surfacide tower UV-C emitters are design to kill pathogens on all elements in the space

No matter what UVC bulb/machine manufacturer:

- ▶ Without the Parabolic Concentrator forcing energy into the environment, UVC will **not** reach maybe 3 feet.
- ▶ With the Parabolic Concentrator the energy reaches 5-7; 10 feet+ with combined energy of multiple towers.



Sends  
energy to  
ceiling

Sends  
energy to  
floor

## Laser Mapping

Laser at top of each emitter  
measures size of room

+

How close emitters are to  
everything in room AND each  
other

=

Precise Room Disinfection



3ft  
5ft or  
7ft radius  
around  
each  
emitter

*We also use this technology for COVID, ICU, Cancer and (All) patient room turns*

# Impact of OR material failures

**HARD COSTS** to replace walls/floors in one OR: **\$80,000**

- hard construction and ICRA costs = \$72,000
- moves/clean storage/logistics of all ME = \$8,000

**SHUT DOWN LOSS OF REVENUE: \$1,050,000**

Requires shut down of adjacent ORs to mitigate vibration and sound, ICRA

- Vibration/sound/Impact to departments *on the floors below*  
**only after-hours work = 14 days construction**
- 3 ORs shut down x an average of \$25K per day, evening work

**LOSS OF PATIENT CARE DAYS: 42** *may have procedures cancelled due to the delay*



# How we are moving forward

- **There is no “silver bullet” fabric for healthcare – yet!**
  - CFFA Healthcare 201b Certification for durable coated fabrics is a great start!

**Verify expectations of performance** – track changes in EVS protocols, chemicals, and CDC requirements for new test methods

- Discover extent of damage by UV-C light disinfection technologies & protocols used by hospitals. Develop NEW standardized material tests for healthcare based upon these protocols.
- **Prioritize component-based furniture** over unitized to easily replace components that are forecasted to degrade over time
- **Adjust life-cycle replacement** expectations with Owner/end-user
- Manufacturers have **opportunity for innovative & collaborative product development** to create durable fabrics and finishes





Jane Rohde, AIA, FIIDA, ASID, ACHA, CHID, LEED AP BD+C, GGA-EB, GGF  
Principal - JSR Associates, Inc

## *Learning Objective*

4. Improve your selection process for successful outcomes by evaluating multiple attributes when specifying products and materials.



## Multiple Attributes



# Nutrition Facts

About 25 servings per container  
Serving size 2 Tbsp mix (25 g)

Amount per serving

**Calories** **100**

	% Daily Value *
Total Fat 1.5 g	2%
Saturated Fat 1 g	5%
Trans Fat 0 g	
Cholesterol 0 mg	0%
Sodium 125 mg	5%
Total Carbohydrate 21 g	8%
Dietary Fiber 1 g	0%
Total Sugars 13 g	
Includes 12 g Added Sugars	24%
Protein 1 g	
Vitamin D 0 mcg	0%
Calcium 10 mg	0%
Iron 1 mg	6%
Potassium 54 mg	2%

\* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.





*Multiple  
Attributes*



## **Performance Characteristics**

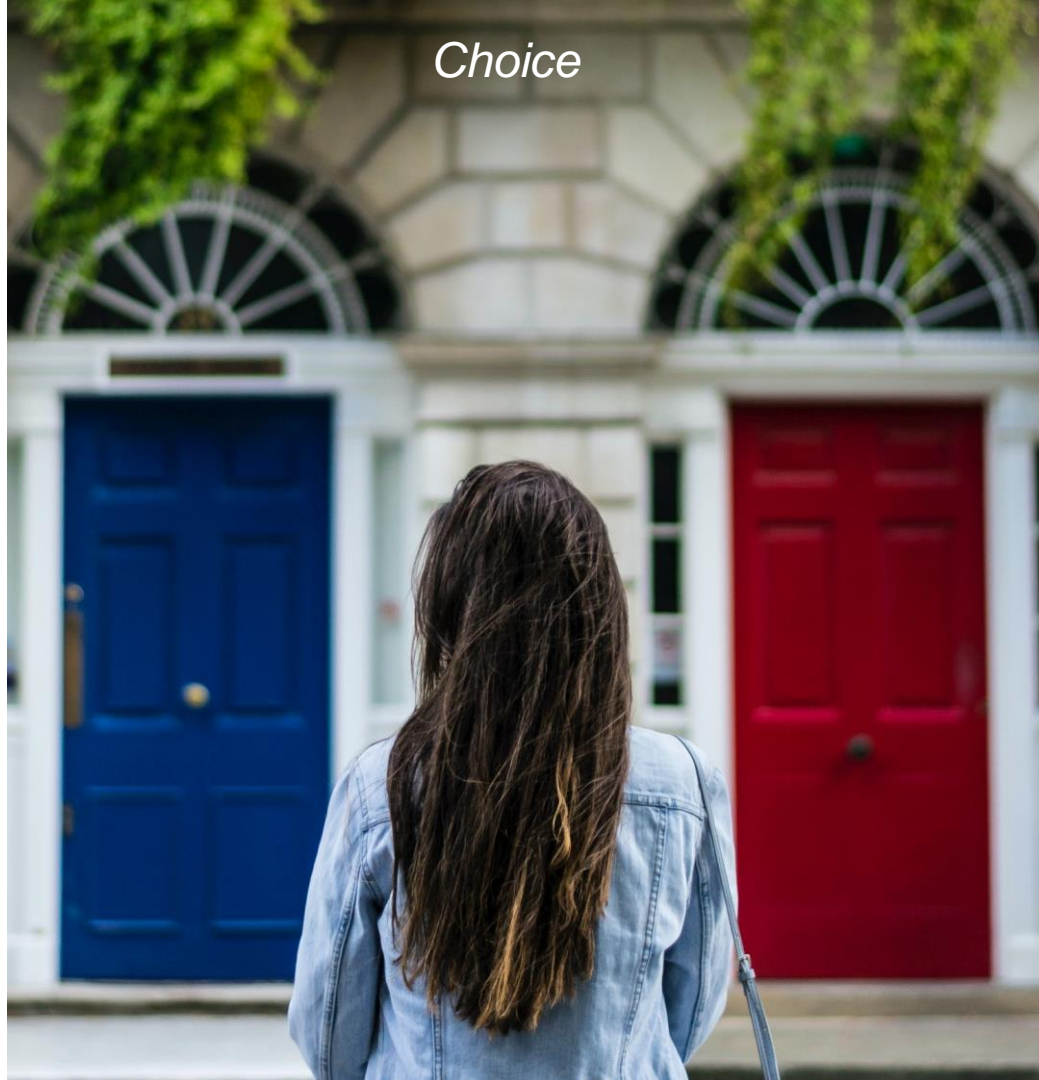
- GWP – Embodied Carbon
- Cleanability
- EPA DfE – Disinfection
- Durability
- Performance Standards – e.g., CFFA Healthcare 201 Standard Certification
- Product Service Life
- Circularity
- Price Point

**Appropriate Product  
Selected to Meet Application  
Requirements!**

*Performance  
Sustainability  
+ Health*

---

*Product  
Service Life  
Protect the  
Earth  
Human  
Wellness*



*Choice*

*Performance  
vs.  
Sustainability  
vs.  
Health*

---

*Premature  
Product Failure  
Premature  
Landfill  
Human Risk*



# Owner Project Requirements

Product Selection and Specification

# Owner Project Requirements (OPR)

## Project Type: Hospital Emergency Room

Building Service Life: Exterior: 50 years

Building Service Life: Systems: 20 years – 2 ½ Cycle Renovations based on System Service Life

Building Service Life: Interior: 12 years – 4+ Cycle Renovations based on Product Service Life

Outcome: Mitigate / Reduce Infection Risk

Outcome: Improve ED CAHPS Scores (pre- and post-COVID-19 pandemic)

Outcome: Improve Patient and Family Satisfaction

Outcome: Improve Care Staff Retention

Outcome: Improve Staff Satisfaction

Outcome: Reduction of Fall Risk

Resource: Facility Guidelines Institute: [www.fgiguilines.org](http://www.fgiguilines.org): Hospital – OPR and Safety Risk Assessment

Resource: Centers for Medicare and Medicaid Services: <https://www.cms.gov/Research-Statistics-Data-and-Systems/Research/CAHPS/ED> (as of 11/05/2020)



## Design Firm Recommendations

Hospital Emergency Room – existing site constraints determine orientation and location of building addition

LEED® v4.1 Silver Certification

Fitwel® Two Stars Certified

Operational cost savings is key to the Client

Environmental expectations: Energy & Water Savings

Material Selection: Product Service Life, Global Warming Potential, & IEQ

Health & Wellness: Acoustic and Lighting Comfort, Quality, & Control, Water Access & Quality



# Hospital Emergency Room

Performance characteristics for ER product specifications:

- Surfaces to withstand high frequency of cleaning & disinfection
- Handwashing sink accessible locations
- Visual & physical staff access to patients
- Patient & family comfort
- Surface impact resistance
- Lighting controls & contrast
- Durable acoustic materials
- Warm aesthetics



# Product Selection Process

Hospital Emergency Room – existing site constraints dictate orientation and location of building

LEED® v4.1 Silver Certification

Fitwel® Two Stars Certified

Operational cost savings is key to the Client

Environmental expectations: Energy & Water Savings

Material Selection Product Service Life, Global Warming Potential, & IEQ

Health & Wellness: Acoustic and Lighting Comfort, Quality, & Control, Water Access, Availability & Quality

# Product Selection Process

## Attribute Example: Product Life Cycle

- Comparison of Products
- Performance Testing of Products
- What are the other performance and functional considerations based upon the OPR and the Sustainable / Health & Wellness Requirements?
  - Global Warming Potential (Embodied Carbon)
  - Indoor Environmental Quality
    - Operationally – Green Cleaning and Disinfection
    - IAQ: VOCs – Product Emissions / On-going
    - Acoustics / Thermal / Lighting Comfort (e.g., LRV)

**It is essential to move beyond a single attribute comparison for final product selection!**



## Summary of Complexity of Product Failure

- Evaluation of material selection based upon single attribute
- Perception of “sustainability” or “material health”
- Appropriate product for the appropriate application
- Evaluate ALL performance requirements – including cleaning and disinfection
- Real world conditions – kill time, staff time, FTEs, environmental services training and education

# Balancing Criteria

- There are some trade-offs – realizing that some will take precedent over others
- Product Service Life to be identified and tied to Use Phase – based upon performance through maintenance, durability, etc.
- SARS-CoV-2, Monkey Pox, MRSA, VRE – cleaning, sanitizing, and disinfection for human health and safety are still front and center

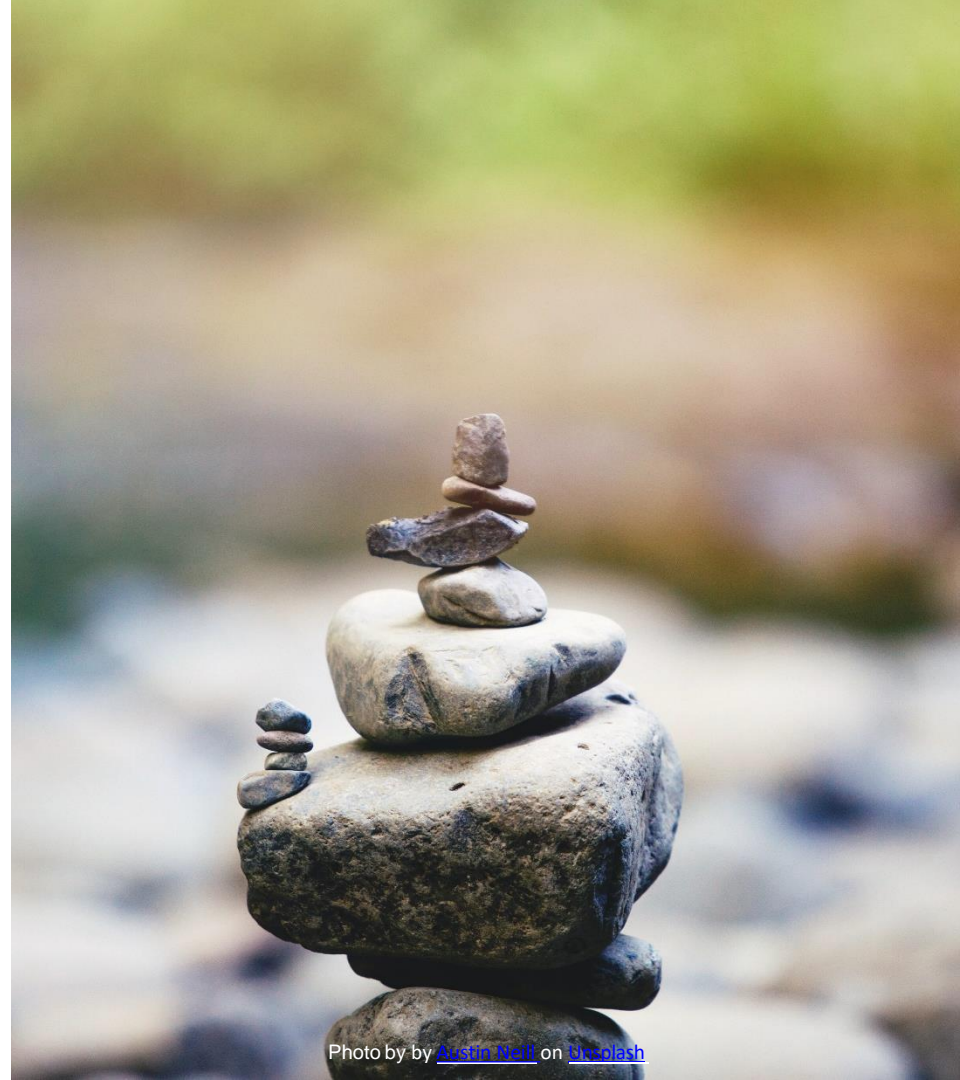


Photo by by [Austin Mehl](#) on [iStockphoto](#)





**Balance is Necessary to Avoid Unintended  
Consequences**

## *Questions every healthcare interior designer needs to ask when considering a durable coated fabric selection...*

1. Look and Look for the labels! Are there specific cleaning and disinfecting requirements?
2. What are the cleaning and disinfecting chemical and procedures in your project environment?
3. What is the expected **useful service life in your project** location?
4. What are your real-world environmental conditions? (humidity, sunlight, etc.)
5. Read the Memo Tag (sample ticket) for basic information, but ask your rep, and check the website if you need to know more.
6. Are these third-party “real-world” tests or laboratory condition tests?
7. Look for the CFFA-Healthcare-201 certification, to know
8. that minimal testing standards have been met.
9. When in doubt complete a mock-up.






## Durable Coated Fabrics

AAHID supports the collaborative efforts of the Durable Coated Fabrics Task Group to provide resources to healthcare interior designers that assist with durable coated fabric selections based upon appropriate application, research, minimum performance standards and relevant test methods.



### Durable Coated Fabrics Resources:

-  CDC Cleaning & Disinfection Guidance Update Summary (April 2021)
-  Durable Coated Fabric Programming and Selection Guide for Healthcare (October 2020)
-  Fabric Review Checklist (October 2020)

*Next Steps...*

*DCF updates are available on the AAHID website!*

*Link: <https://aahid.org/resources/durable-coated-fabrics/>*



## Spread the Word!

- Share the AAHID website resources.
- Recommend to manufacturers to have products tested to CFFA Healthcare 201 Standard.
- Recommend designers to use a multiple attribute approach to product selection.
- Understand materiality and performance.

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# *Questions, Answers, and Comments...*

**aahid**

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