Spec It Right: Know Your Durable Coated Fabrics – Reduce Failures and Advance Understanding using the Durable Coated Fabric Programming & Selection Guide for Healthcare

AAHID Education Session

November 12, 2020
11am-1pm EST

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Healthcare Interior Designers


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Spec It Right: Know Your Durable Coated Fabrics-Reduce Failures and Advance Understanding using the Durable Coated Fabric Programming and Selection Guide for Healthcare

Important Notes!

- This session will feature a live Q&A with the speakers. Submit your questions by clicking the Q&A box at the bottom of your screen, and they will be answered at the end of the session.
- Questions related to technical issues can also be entered in the Q&A box, and they will be answered immediately by our producers.
- This session is being broadcast over Zoom Webinar. For best performance, it is recommended that you close any other applications on your computer that could prevent you from getting the most out of this session.
- You can find specifics regarding CEU accreditation for this session in the Attendee Resources tab on the home page of HCD Virtual.

***Teri Lura Bennett**, RN, CHID, CID, IIDA, EDAC, NIHD Johns Hopkins Health System, 1993-2020, retired*

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

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

***Barbara Dellinger**, MA, FIIDA, CHID, CID, EDAC, NCIDQ, Director Design & Research, Adventist Healthcare*

***Jane Rohde**, AIA, FIIDA, ASID, ACHA, CHID, LEED AP, BD+C, GGA-EB.*

Principal JSR Associates Inc

Learning Objectives:

#1. Demonstrate knowledge of durable coated fabric construction, performance characteristics, field reporting, challenges of cleaning and disinfecting processes and procedures.

#2. Recognize the challenges and benefits of conducting real-world, third party lab tests and field studies to evaluate the impact of environmental contaminates, cleaning chemicals, and methods on 24/7 heavy duty durable coated fabrics.

#3. Provide background and demonstration of the *"Durable Coated Fabric Programming and Selection Guide for Healthcare"* to evaluate, prioritize, and inform selection of durable coated fabrics appropriate to your projects.

#4. Evaluate multiple attributes when specifying durable coated fabrics to improve successful outcomes.

Teri Lura Bennett, RN, CHID, CID, IIDA, EDAC, NIHD
Johns Hopkins Health System, 1993-2020, retired

#1. Demonstrate knowledge of durable coated fabric construction, performance characteristics, field reporting, challenges of cleaning and disinfecting processes and procedures.

Jargon Alert!

Upholstery materials are all called **"fabrics"**
…they are either **durable coated fabrics**
or **woven textile fabrics**

Fabric memo samples have a label that provides information about material composition and testing,

Designers call this a **"Memo Tag"**

Manufacturers call this a **"Sample Ticket"**

These terms can be used interchangeably

What are durable coated fabrics?

Coated Fabrics
represent a family of fully coated textiles that can be considered “non-porous”.

Coated Fabrics
Are NOT a textile with a coating applied to the yarn.

Choices are:
PVC – Polyvinyl chloride (vinyl)

PU – Polyurethane (PU)

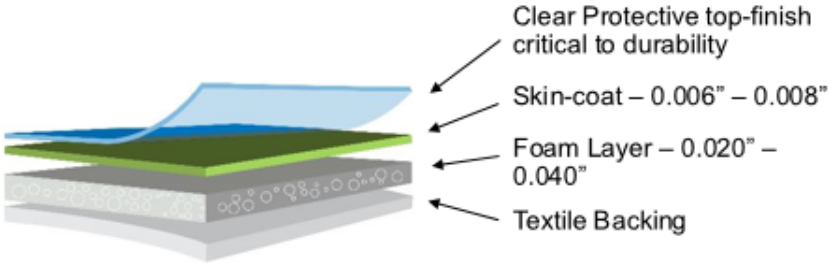
Silicone – relatively new to the Coated Fabrics market

Thermoplastic Elastomers – very new, used in roofing products for years

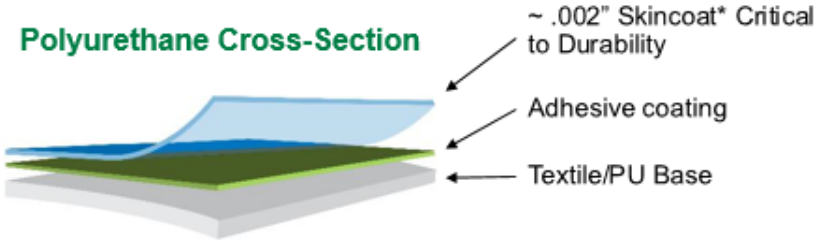
Slide content courtesy of Ronnie Bell, Technical Manager OMNOVA 2018

Construction Basics

PVC Cross Section

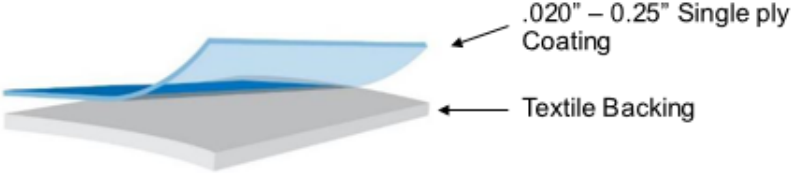


Polyurethane Cross-Section

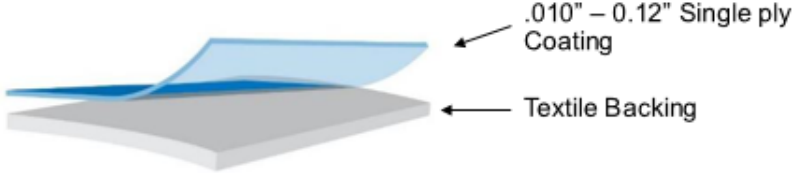


*Best: Polycarbonate – High resistance to hydrolysis
Good: Polyether – Good resistance to hydrolysis
Fair: Polyester – Low resistance to hydrolysis

Thermoplastic Elastomers



Silicone Coating



Slide content courtesy of Ronnie Bell, Technical Manager OMNOVA 2018

Are you experiencing this?

Soiling?

Staining?

Cracks?

Puddling?

Delamination?

Fading from Sunlight and Ultraviolet Light Exposure?

Do you have a room like this?

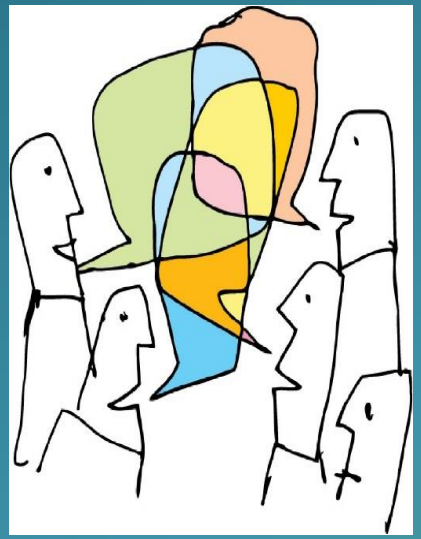
Cost to Reupholster?
> $700,000

Were you told, "this is only happening at your hospital".

What happened ?

…furniture cleaned in real-world healthcare environments are not being cleaned as recommended by manufacturers.

The result? … premature upholstery failure, disgusted patients, & frustrated staff.



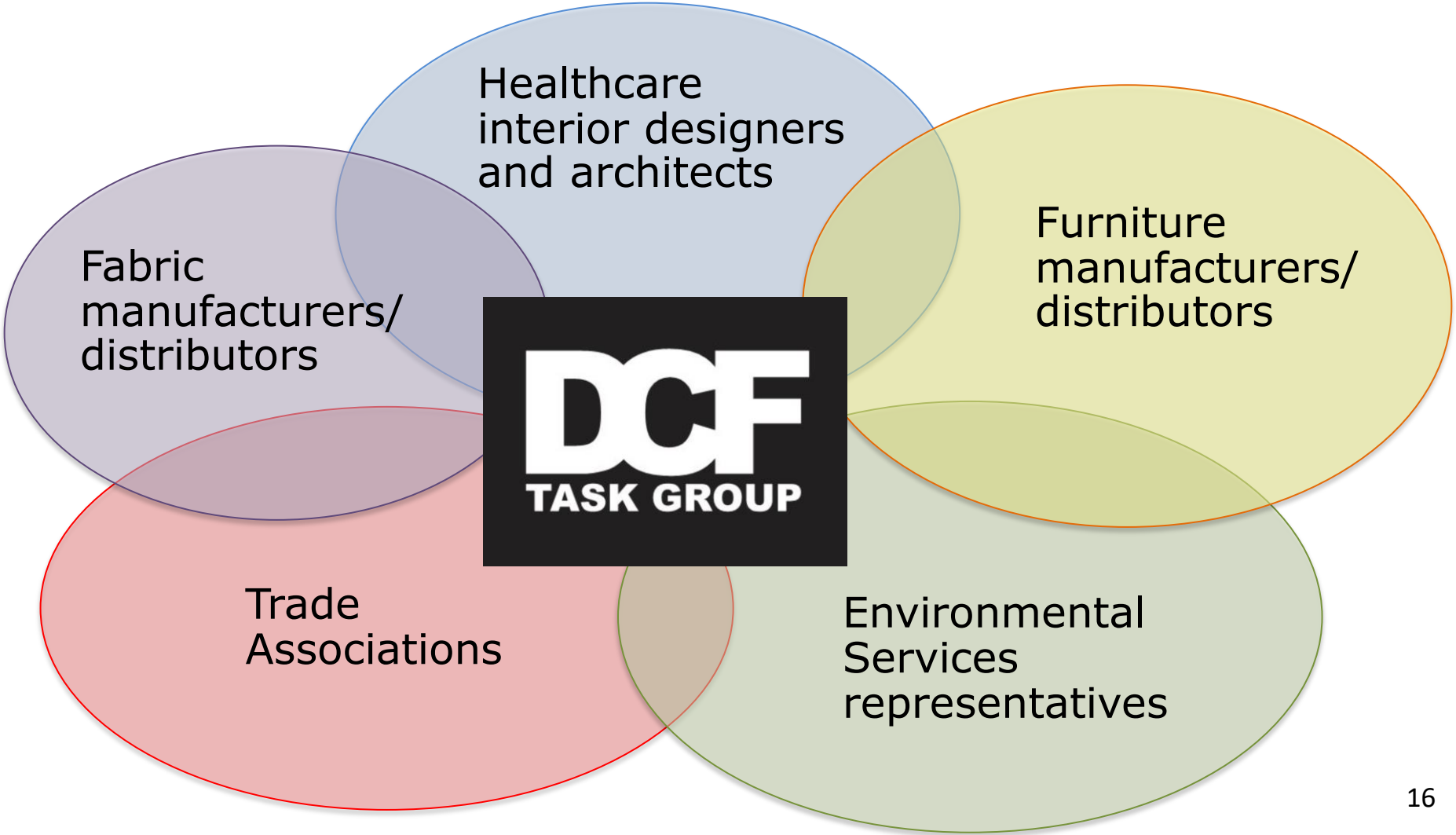
February of 2017, in an airport shuttle to attend Design Connections, several healthcare designers, in-house and consultants, expressed their frustration with persistent coated fabric failures.

We shared our stories, experiences and photos.

Continuing the discussion with fellow AAHID-CHID, and other industry partners, we realized…

Ah –Ha!…

We were ALL having the same problems!
We decided to work together to try to do something about it!


Healthcare interior designers and architects
Fabric manufacturers/ distributors
Furniture manufacturers/ distributors
DCF
TASK GROUP
Trade Associations
Environmental Services representatives

The **Durable Coated Fabrics (DCF)** Task Group was born…

Comprised of volunteers & peers representing ;

- **Healthcare interior designers and architects**
- **Fabric manufacturers/distributors**
- **Furniture manufacturers/distributors**
- **Trade Associations**
- **Environmental Services representatives**

Since 2017 in meetings & monthly conference calls we've discussed issues of **performance & durability**, polled the industry for information on current practices, supported durability field testing, shared information, and advanced collaborative collegial dialogue within our industry.

Since 2019 DCF has affiliated with AAHID

Updates are posted on the AAHID LinkedIn page to continue the dialog.

We need each others help!

.

In 2018 AAHID & DCF surveyed 150+ Healthcare Designers, asking…

When evaluating an upholstery material for your healthcare environments, what are your main issues?

…the response was overwhelming…

#1 Performance & Durability 38%

#2 Cleanability ***24%***
#3 Aesthetics ***18%***
#4 Warranty ***11%***
#5 Cost ***6%***
#6 Sustainable (Green) ***3%***

Data gathering, with the help of AAHID, the DCF task group gathers information to better understand the magnitude of product failures within acute care, outpatient care, and long-term care failures, including associated costs, and potential solutions.

Cleaning and Disinfection Survey; to collect data on cleaning/disinfection products & procedures being used, from Environmental Services, Facility Management, and Designers **:**

https://www.surveymonkey.com/r/J6W3PDX

Healthcare Durable Coated Fabrics Upholstery Failures Survey; to provide data regarding actual problems and failures of various types of durable coated fabrics used in healthcare across the U.S.

https://www.surveymonkey.com/r/HKBM67B

Healthcare Furniture Failures Survey; to provide data on the challenges of various furniture items used in healthcare across the U.S.

https://www.surveymonkey.com/r/7NSKHD5

https://www.surveymonkey.com/r/7MGW896

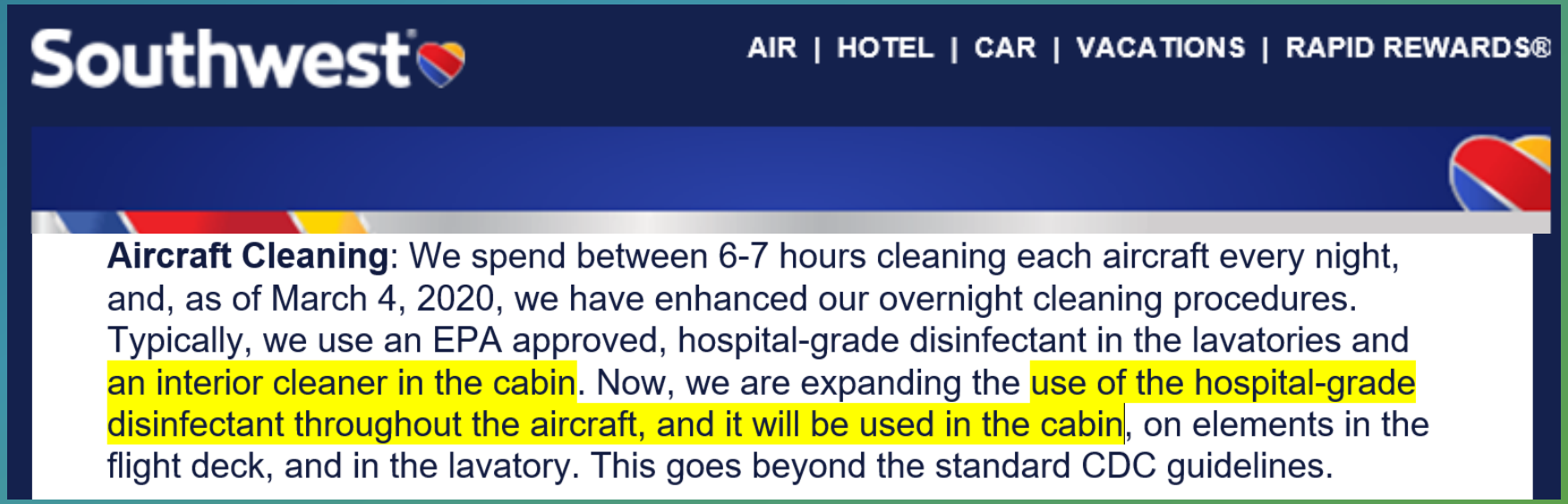
Our conclusion?

Industry standard fabric tests do not reflect **real world healthcare** conditions!

Manufacturer recommended cleaning & disinfecting procedures **are not** happening.

…and then along came ***SARS-CoV-2/COVID-19***….

On March 9th I received this email from Southwest Airlines
(emphasis mine)



Anyone care to guess what's going to happen to
surface materials *which were* ***not*** *specified for environments,*
…which are now routinely cleaned with
high risk healthcare *cleaners and disinfectants?*

We live in a Covid-19 world now
highest risk *healthcare cleaners, & disinfectants, are being used extensively in* ***non-healthcare*** *industries;*

Transportation, Hospitality, Education, & Workplace

How soon before they are ***all*** *experiencing accelerated upholstery and surface material* ***failures?***

It's probably already begun….

These materials were not specified for this kind of cleaning, so ***when*** they fail, these designers/owners may also hear

"you didn't clean them according to our recommendations"

and

"we'll provide you with more of the same material"

Our new reality is that we all need to plan for expensive upholstery replacements!

The primary responsibility of a

Professional Healthcare Interior Designer

is to safeguard the health, safety, and welfare
of our patients, visitors and staff.

We cannot be compelled to specify a product that we do not consider to be the best selection for our projects.

We talk to each other.
We trust each other.
We share **real world** information and expertise

This comes with the responsibility to always speak the **truth** to the best of our ability.

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

#1. Demonstrate knowledge of durable coated fabric construction, performance characteristics, field reporting, challenges of cleaning and disinfecting processes and procedures.

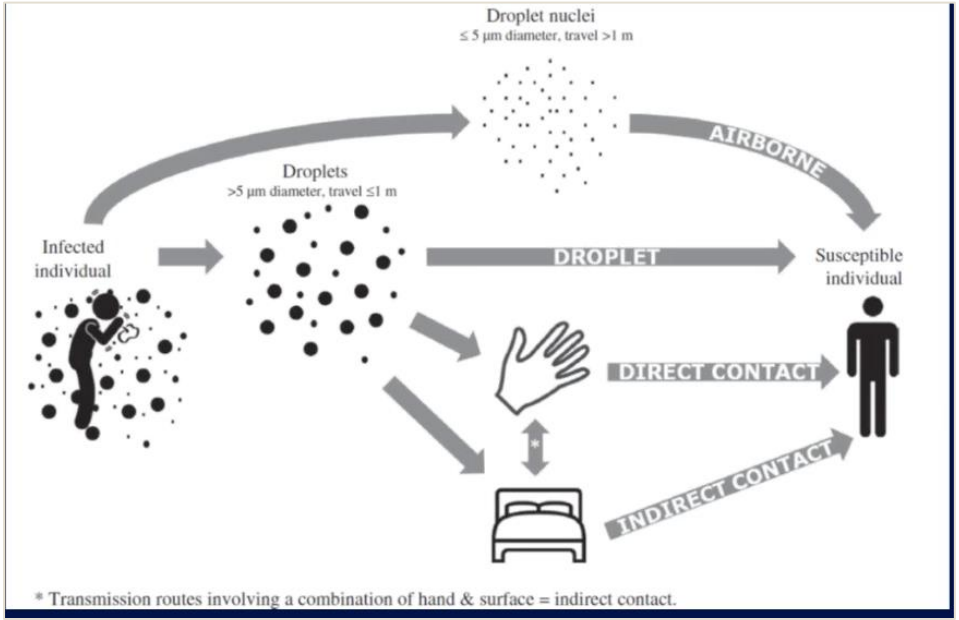
Cleaning & Disinfection Paradigms and Innovative Technologies

Presented by:
Shari Solomon, Esq
301-377-9555
solomon@cleanhealthenv.com

CleanHealth Environmental
Risk Management Training Solutions

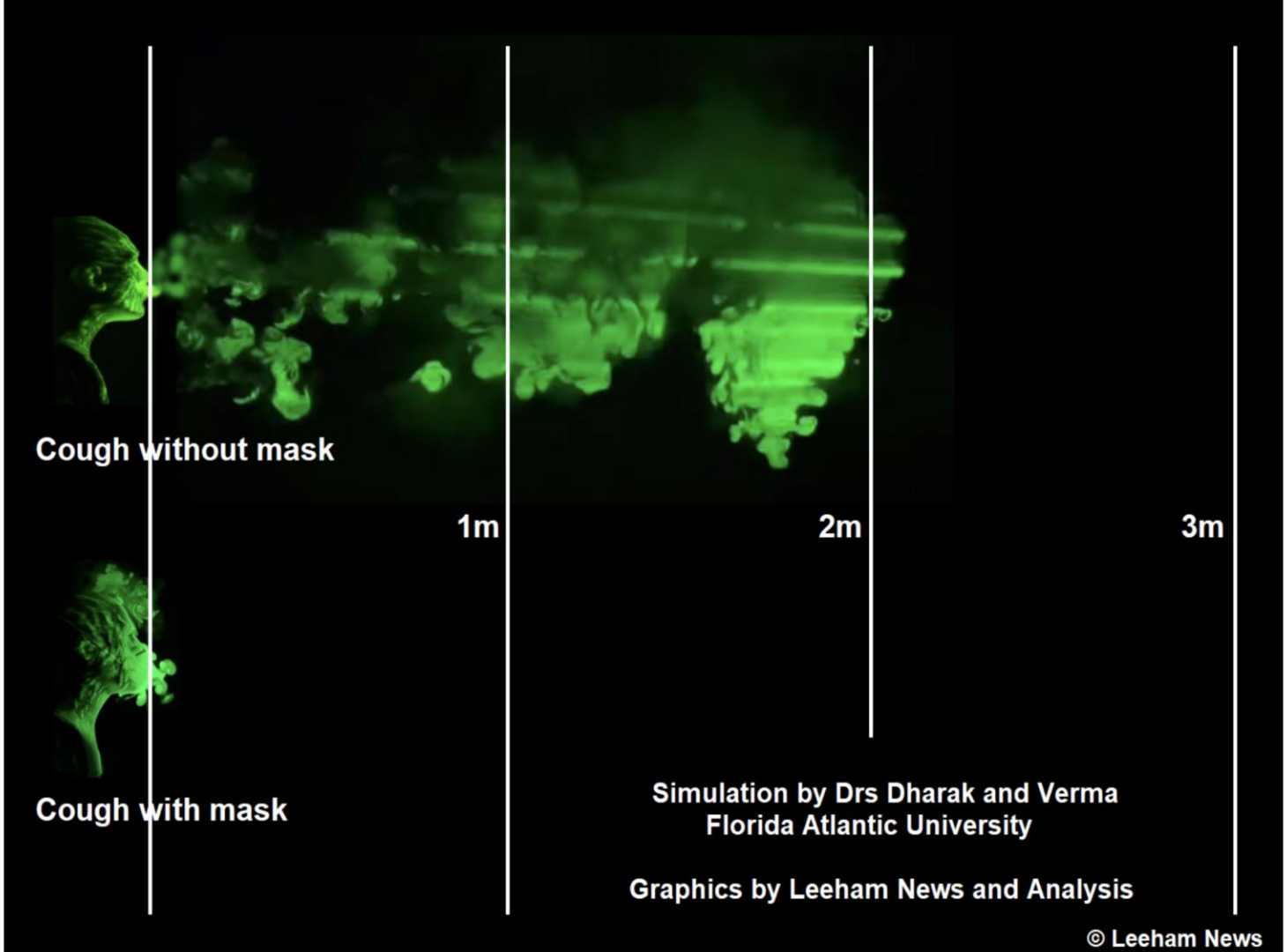
How does COVID-19 Spread?

- Person-to-person
  - Between people who are in close contact with one another (within about 6 feet)
  - Via respiratory droplets produced when an infected person coughs or sneezes.
- Contact with infected surfaces or objects
- Through feces
- Airborne



"This virus has many routes of transmission, which can partially explain its strong transmission and fast transmission speed."

-China CDC


Cough without mask
1m
2m
3m
Cough with mask
Simulation by Drs Dharak and Verma
Florida Atlantic University
Graphics by Leeham News and Analysis
© Leeham News

Organisms Outside Human Body

Microbe	Survival time outside human body
Clostridium difficile (spores)	5 months
Acinetobacter spp.	3 days to 5 months
Enterococcus spp. including VRE	5 days – 4 months
Pseudomonas aeruginosa	6 hours – 16 months
Klebsiella spp.	2 hours to > 30 months
Staphylococcus aureus, inc. MRSA	7 days – 7 months
Norovirus (and feline calicivirus)	8 hours to > 2 weeks[1]
SARS Coronavirus	72 hours to >28 days[2]
Influenza	Hours to several days[3]

Adapted from Kramer *et al. BMC Infect Dis* 2006;6:130.

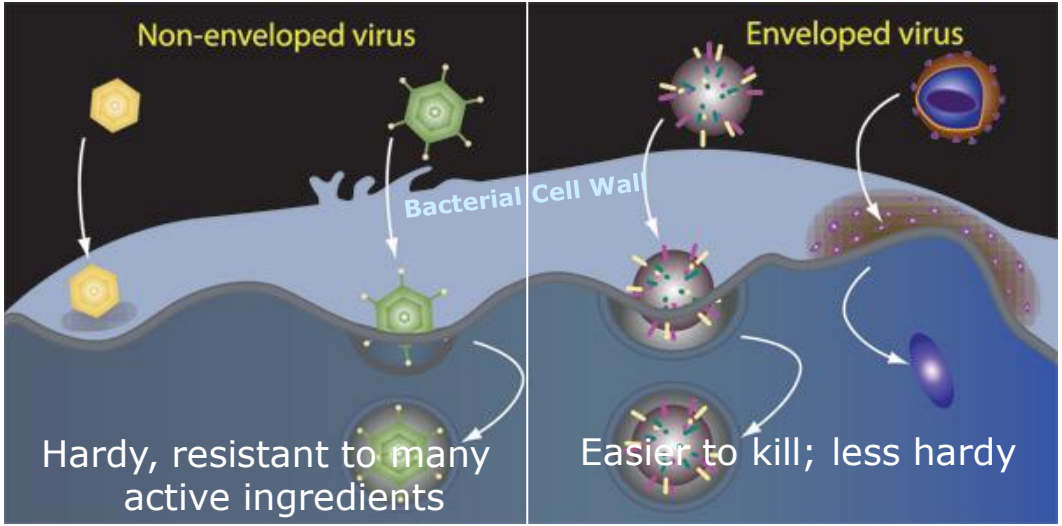
1. Doultree *et al. J Hosp Infect* 1999;41:51-57.
2. Rabenau *et al. Med Microbial Immunol* 2005;194:1-6.
3. Bean *et al. J Infect Dis* 1982;146:47-51.

SARS-CoV-2 (COVID-19) compared to SARS-CoV-1

Media	SARS-CoV-1	SARS-CoV-2
Aerosols	3 hours	3 hours
Plastic	72 hours	72 hours
Stainless Steel	48 hours	48 hours
Cardboard	8 hours	24 hours
Copper	8 hours	4 hours

Holbrook, M.G., Gamble, A., Williamson, B.N., et al. (2020) Aerosol and surface stability of SARS-CoV-2 as compared with SARS-CoV-1. New England Journal of Medicine, Correspondence nejm.org.

Virus Structures



- Picornoviridae (Polio, Enterovirus, Hepatitis A , Rhino)
- Parvovirus
- Calicivirus, Norovirus
- Adenovirus
- Rotavirus

- Coronavirus
- Hepatitis C
- Paramyxoviridae (Parainfluenza, RSV, Measles, Mumps)
- Herpesviridae (Herpes, CMV)
- Vaccinia
- Hepatitis B
- Influenza
- HIV-1

Used with permission from

Kimberly-Clark PROFESSIONAL

Resistance of pathogens to disinfectants

Pathogens	Example	Disinfectants		
		Low-level Disinfection	Intermediate-level Disinfection	High-level Disinfection
Prions	Mad Cow Disease			
Bacterial Spores	Clostridium difficile			Peracetic acid / hydrogen peroxide blends
Mycobacteria	Tuberculosis		Quat / alcohol	Bleach and Hydrogen peroxide
Nonlipid or small viruses	Norovirus			
Fungi	Athletes foot		Quat / alcohol blends	
Vegetative bacteria	MRSA, VRE	Quats		
Lipid or medium viruses	HIV SARS-CoV-2			

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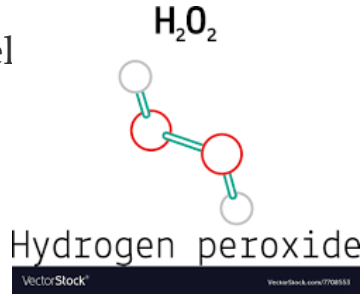
Cleaning Agents Commonly Used in Healthcare

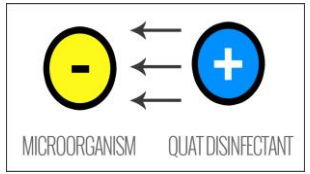
Bleach: sodium hypochlorite - intermediate level disinfectant

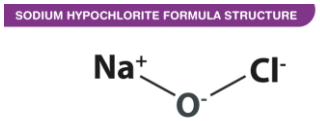
Hydrogen Peroxide: Can be either a low or intermediate level disinfectant

Alcohol: Isopropyl and ethyl alcohol at 55-70%, usually used in combination with quaternary ammonium salts or as 70% isopropyl alcohol

Quaternary Ammonium (Quats): low level disinfectants that will kill most bacteria, viruses and fungi.







How to Clean and Disinfect

Surfaces

- Cleaned with detergent or soap and water prior to disinfection
- For disinfection:
  - EPA-registered household disinfectants
  - Additionally, diluted household bleach solutions (at least 1000ppm sodium hypochlorite) can be used if appropriate for the surface.

Cleaning vs. Sanitizing vs. Disinfecting

Cleaning

- The removal of material like dust, soil, blood and body fluid
- Physically removes rather than kills microorganisms. Accomplished with water, detergents, and mechanical action
- Always essential prior to disinfection or sterilization
- A surface that has not been cleaned effectively cannot be properly disinfected or sterilized.

Sanitizing

- Carry a general claim of germ control, but generally not organism specific
- There are two basic kinds of sanitizers, food contact and non-food contact sanitizers.
  - food contact surfaces 99.999% (a 5-log reduction)
  - nonfood contact a reduction of 99.9% (3 logs)

  within 30 seconds.

Disinfecting

- The inactivation of pathogens.
- Usually involves chemicals, heat or UV.
- Sterilization destroys microbial life including bacteria, viruses, spores and fungi
- Most common disinfectants used as quaternary ammonium compound products, hydrogen-based products, and sodium hypochlorite (bleach)

Soft Surface "Disinfection"

- Soft surface claims are limited by the EPA, to "sanitizer" versus "disinfectant" claims.
- The EPA Performance Standard for non-food contact sanitizers requires a reduction of at least 99.9% (a 3-log reduction).
- The disinfectant standard requires a higher level of reduction, 99.9999% reduction/kill (a 6-log reduction).

***3 log reduction means** the number of germs is 1000 times smaller. 4 **log reduction means** the number of germs is 10,000 times smaller.

List N: Disinfectants for Use Against SARS-CoV-2

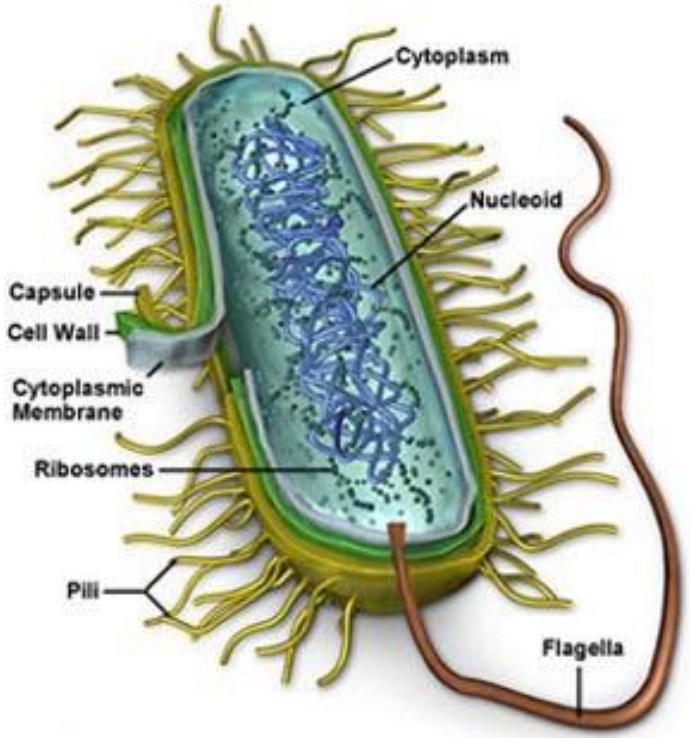
https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

- List N includes products that meet EPA's criteria for use against SARS-CoV-2
- When purchasing a product, check **EPA registration number**
- **Note: Inclusion on this list does not constitute an endorsement by EPA.**

How Disinfectants Work

To Work Properly, Disinfectants Need:

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



Health Concerns Surrounding Application of Disinfectants

Accidental mix of bleach and acid kills Buffalo Wild Wings employee

Incidents like this, which create chlorine gas, occur more than 2,000 times per year in the US

by Leigh Krietsch Boerner
NOVEMBER 13, 2019 | APPEARED IN VOLUME 97, ISSUE 45

Credit: Shutterstock

HEALTH

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

By ANDREW JOSEPH @DrewQJoseph / JUNE 5, 2020 Reprints

CHRIS DELMAS/AFP VIA GETTY IMAGES

To try to kill the novel coronavirus, some Americans are unsafely 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 those ways.

The findings come from an online survey of 502 adults conducted by the Centers for Disease Control and Prevention in May. Thirty-nine percent had misused the cleaning products, and one quarter reported "an adverse health effect that they believed was a result" of the products.

POISON Help®
1-800-222-1222
AAPCC

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

By Rachael Rettner - Senior Writer 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.

Application Methods/Considerations

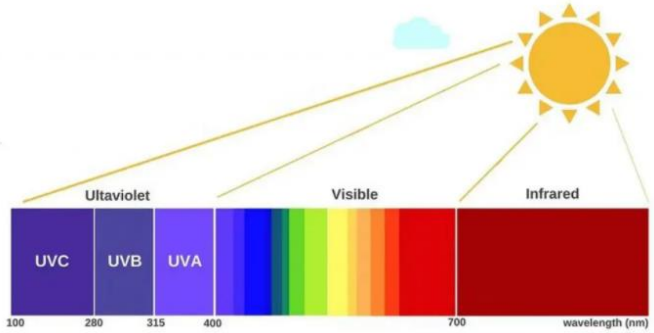
- Electrostatic Sprayers
- Vapor Systems
- Spray Bottles
- Traditional Wiping

High Touch Surfaces

- Surfaces with regular hand-contact are called high touch surfaces.
- These surfaces should be cleaned and disinfected daily to reduce the spread of infection

Ultraviolet Germicidal Irradiation

- Short wavelength ultraviolet C (UVC) light destroys microorganism's DNA
- λ = 255 nm – 280 nm for LED
- λ = 230 nm – 250 nm for mercury



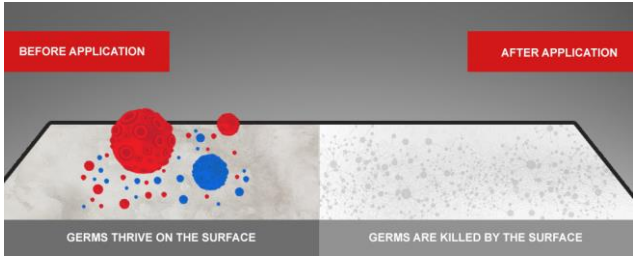
Continuous Disinfection Technologies

Environmental Hygiene Technologies: *Antimicrobial Surfaces*

Replacing traditional materials (e.g., plastic, stainless steel) with materials with antimicrobial properties or treating surfaces with coatings is a potential solution to this problem.

Candidate antimicrobial surfaces and coatings supported by data from nonclinical settings include:

- Copper
- Silver
- Surfaces sprayed with surfacine or organosilane



Biostats

American will be the first airline to use a coating said to kill coronavirus for up to seven days

(Matt York/AP)

Chemical experts question EPA's approval of coronavirus disinfectant

The cleanser could be harmful and might not be necessary

American Airlines is the first carrier to get emergency approval from the Environmental Protection Agency to use a disinfectant that is supposed to kill the novel coronavirus on surfaces for up to seven days. But some experts say the product could pose a hazard to humans and the environment. (Matt York/AP)

By Steven Mufson and Meryl Kornfield

August 26, 2020 at 2:09 p.m. EDT

Add to list

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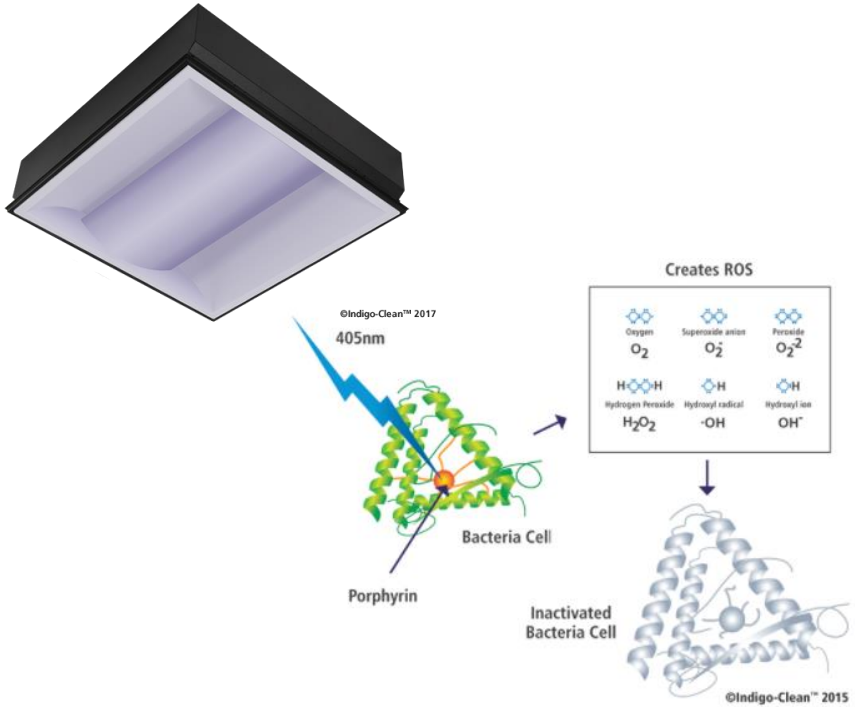
High-Intensity Narrow-Spectrum (HINS) Light

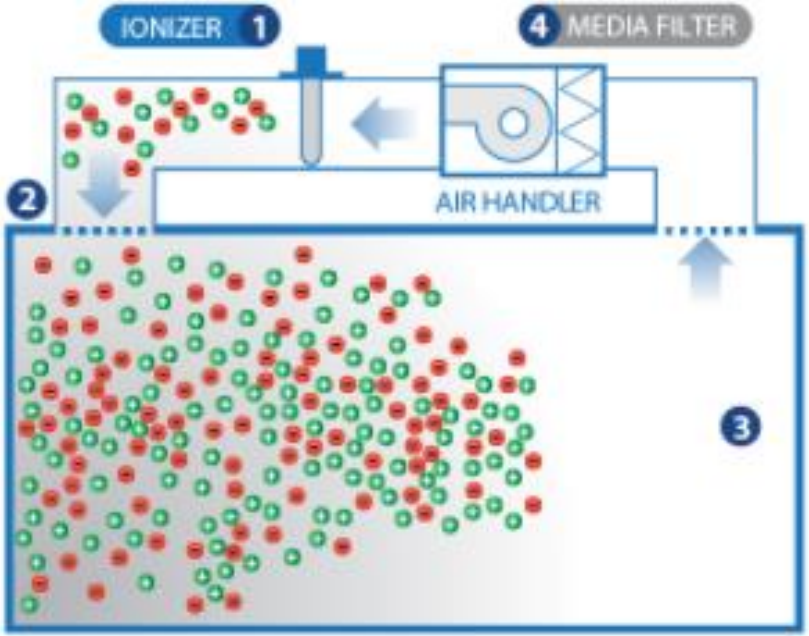
- 405 nm, sometimes referred to as “Near UV,” although not in the UV spectrum.
- Conforms to international safety guidelines for clinical use in occupied rooms
- Provides continuous disinfection of air and exposed surfaces in occupied spaces.



Inactivation of bacteria via visable light absorption

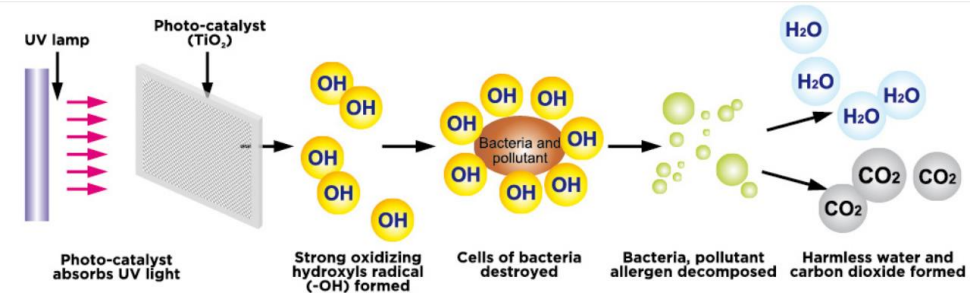
Bipolar / Needlepoint Ionization

- Air cleaners using reactive ions and/or reactive oxygen species (ROS) have become prevalent during the COVID-19 pandemic.
- Systems can be modified to create mixtures of reactive oxygen species (ROS), ozone, hydroxyl radicals and superoxide anions.
- Systems may emit ozone, some at high levels. Manufacturers are likely to have ozone generation test data.



Photocatalytic Oxidation (PCO)

- Consists of a pure or doped metal oxide semiconductor material
- Activated by a UV light source
- Some units claim disinfection from gaseous hydrogen peroxide
- Possible by-products formed by incomplete oxidizing.
- Used in localized UV air purifiers and HVAC systems



Thank you!

"Let me guess...it's contagious!"

#2. Recognize the challenges and benefits of conducting real-world, third party lab tests and field studies to evaluate the impact of environmental contaminates, cleaning chemicals, and methods on 24/7 heavy duty durable coated fabrics.

Linda Gabel, CHID IIDA Senior Interior Design Planner, The Ohio State University Wexner Medical Center

Case Study – University Health System

New 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

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Unintended Consequences

Rapid degradation of polyurethane (PU) coated fabrics and finishes:

- At 8 months in Emergency Department waiting and exam rooms
- Within 2 years:
  - Surgery waiting areas, infusion rooms
  - all 24/7 patient care areas, including task chairs/stools
- Within 3 years:
  - all areas, Gummy texture and peeling of task chair/stools
  - all clinic waiting areas, and PU top coat failure on printed vinyl, revealing white base coating
  - peeling of PU wood finishes
  - peeling and degradation of PU arm caps

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Public and Patient Area Failures

Issues:

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






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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

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Extent of Failures

Quantity of Failures from the Cancer Hospital, (Original items):

1,053 Inpatient sleep settees, overnight sleep chairs, & patient recliners
- **540** Large scale lounge seating units
- **923** Infusion Recliners & exam /infusion room guest seating
- **130** (ED only) modular & exam room seating

1,623 Upholstered Task chairs & stools

4,269 + additional failures in administrative and research buildings in 2020

Note that we had ordered large quantities of furniture with ***these same polyurethane fabrics and finishes between 2013 and 2018*** *to replace public and patient care furniture in waiting areas throughout the university hospital campus and all off-campus buildings and clinics.*

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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.
- Hospital Acquired Infections, (HAI) risks associated with the exposed sub-surfaces, cushion cores, soft backings, and raw wood:

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 - sent to hard trash

3. Financial impact - unforeseen cost of replacement furniture

– capital & operational budget diversions est. $9 Million over 5+ years

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What's the plan?

Discover the sources of failures - *collaborate with Chemical Engineering Department to understand chemical formula and construction of materials, generate hypothesis for lab tests*

Assess the impact to the hospital's business model – *operational vs. capital $*

Define new criteria and expand the conversation - *engage Facilities, EVS, EPI, Safety, Compliance, Supply Chain, Center for Innovation, Hospital Leadership*

- **SARS-CoV-2 = ALL spaces have the same high risk of failure**
- Reduce cost – first and life-cycle considerations, **plan for accelerated failures in non-clinical and administrative buildings**
- Increased durability to resist cleaning methods and environmental contaminates
- Create new tests & performance criteria for upholstery and finishes specifications
- **Create safer environments for all users**

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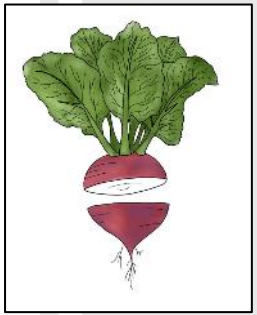
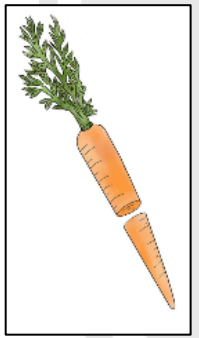
Third Party Lab Material Testing: 2018-2019

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

Disinfectant & Accelerated UV Exposure Tests, Combined Together

Stain Resistance Test – New Staining Agents and Cleaning Chemicals





Ten upholstery fabrics types currently marketed for "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 top coat
- Silicone with Brand C topcoat
- 100% nylon matrix
- Treated Leather

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Disinfectant & Accelerated UV Exposure Test

Disinfectants and Cleaners *–after saturation and drying, chemicals are left on samples going in to Xenon-Arc chamber to test for light-fastness and degradation*

- 10% bleach solution
- Oxivir TB: Hydrogen Peroxide (0.5%)
- Oxycide: Hydrogen Peroxide + Peroxyacetic Acid
- Quaternary - Virex II 256
- JF2 Glance: Non-ammoniated
- JF3 Stride Citrus Neutral cleaner
- Hand Sanitizer - 70% Isopropanol

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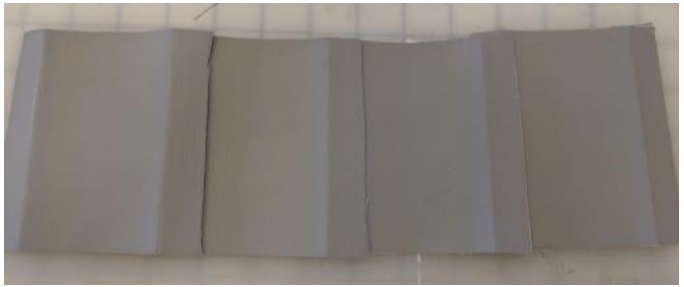
Disinfectant & Accelerated UV Exposure Test - Process

DISINFECTANT APPLICATION

80 DEGREE DRYING CABINET

XENON ARC CABINET



EVALUATE SAMPLES

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Disinfectant & Accelerated UV Exposure Test

Rating for fabrics for both tests:

4 **Excellent:** No effect to the integrity or appearance of the material

3 **Good:** Slight discoloration. Damage determined to not affect the material performance and aesthetically mildly objectionable.

2 **Poor:** Moderate effect. Softening, Stiffening and/or swelling are present and permanent.

1 **Severe effect**: Discoloration, cracking and/or delamination clearly visible or objectionable aesthetics.

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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 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
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

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Disinfectant & Accelerated UV Exposure Test

Takeaways:

- **Prolonged exposure to UV light matters with ALL disinfectant residue. What is the impact of different UVC light technologies?**
- **UV additive** appears to be very helpful in preventing damage
- **Topcoats & performance treatments/base cloth combinations matter** – polycarbonate vs. silicone with the same branded performance treatment/top coat had different results
- **50% of fabrics** rated for healthcare appear vulnerable to alcohol-based hand sanitizer and “non-oxidizing” cleaning chemicals
- **Acrylic topcoat**, not usually considered for healthcare, appears to perform very well with disinfecting chemicals, even alcohol-based hand sanitizers

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Stain Resistance Test – New Staining Agents

Commonly used environmental contaminates in healthcare and public areas tested:

Patient Transferrable Stains

1. Super Lustrous Lipstick- Love That Red (already on standard test)
2. Baby Oil (already on standard test)
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%, Homosalate10%, Octisalate 5%)
7. Skin Sunscreen Lotion with Broad Spectrum SPF 60+(Zinc oxide 4.7%, Titanium dioxide 4.9%)
8. Jamaican 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 (already on standard test)
4. Viscot Mini Surgical Fine Tip Marker

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Stain Resistance Test – Cleaning Chemicals

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

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

- Oxivir TB wipes Hydrogen Peroxide (0.5%)
- Clorox Bleach Germicidal Wipes
- Virex II 256

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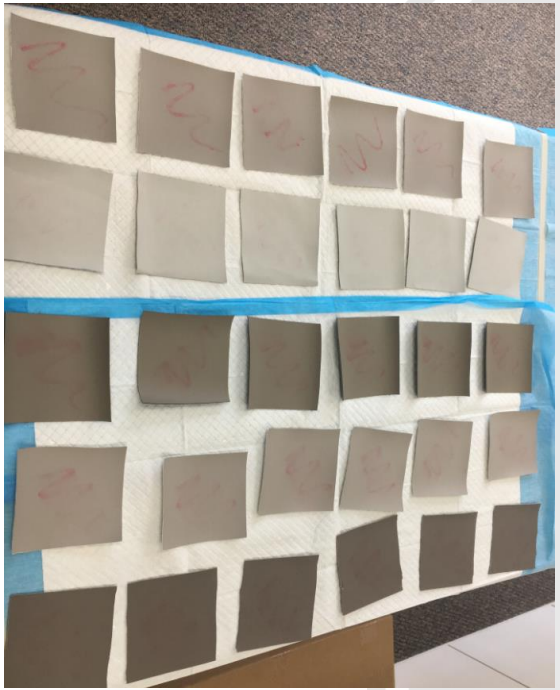
Stain Resistance Test – Process

APPLICATION OF STAIN, 48 HR DWELL TIME



AFTER CLEANING, EVALUATE

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Stain Resistance Test – Results

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
H Revlon Super Lustrous Lipstick- Love That Red	1 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 3.0	Rating: 2.3	Rating: 3.0	Rating: 3.0	Rating: 2.7	Rating: 2.0	Rating: 1.7	Rating: 2.7	Rating: 2.0
	2 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.0	Rating: 2.7	Rating: 2.7	Rating: 1.7	Rating: 3.3	Rating: 3.0	Rating: 2.3	Rating: 2.0	Rating: 3.0	Rating: 1.7
	3 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 2.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.7	Rating: 2.3	Rating: 2.0	Rating: 3.0	Rating: 1.7
	4 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 3.0	Rating: 2.3	Rating: 2.7	Rating: 3.0	Rating: 2.3	Rating: 2.0	Rating: 2.0	Rating: 3.0	Rating: 1.0
	5 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.7	Rating: 2.3	Rating: 3.0	Rating: 1.7
	6 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.3	Rating: 2.3	Rating: 2.3	Rating: 2.3	Rating: 3.3	Rating: 3.0	Rating: 3.0	Rating: 2.0	Rating: 3.0	Rating: 2.0

S= Stain Present

Evaluated using: + (present) or - (not present)

4 Excellent 3 Good 2 Poor 1 Severe Effect

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Stain Resistance Test – Results

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I Johnson's Baby Oil	1 (Oxivir)	S: +	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: -	S: -
		Rating: 3.3	Rating: 3.7	Rating: 4.0	Rating: 3.0	Rating: 3.3	Rating: 2.7	Rating: 3.7	Rating: 3.0	Rating: 4.0	Rating: 3.3
	2 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: -	S: +	S: +	S: -
		Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.7	Rating: 3.3	Rating: 3.0	Rating: 3.7	Rating: 2.7	Rating: 3.0	Rating: 3.0
	3 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: -	S: +	S: -	S: -
		Rating: 3.7	Rating: 2.7	Rating: 3.3	Rating: 3.0	Rating: 3.3	Rating: 2.3	Rating: 4.0	Rating: 2.3	Rating: 4.0	Rating: 3.0
	4 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: -	S: +	S: -	S: -
		Rating: 3.0	Rating: 3.3	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.3	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 3.0
	5 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: -
		Rating: 3.3	Rating: 2.3	Rating: 3.3	Rating: 3.7	Rating: 3.0	Rating: 3.0	Rating: 3.3	Rating: 2.7	Rating: 3.3	Rating: 3.7
	6 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: -	S: -
		Rating: 3.3	Rating: 2.7	Rating: 3.3	Rating: 3.0	Rating: 3.0	Rating: 2.3	Rating: 3.3	Rating: 2.3	Rating: 4.0	Rating: 3.0
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

4 **Excellent** 3 **Good** 2 **Poor** 1 **Severe Effect**

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J Jergen's Daily Mosture Dry Skin Moisturizer	1 (Oxivir)	S: +	S: -	S: +	S: +	S: +	S: -	S: +	S: -	S: -	S: -
		Rating: 3.0	Rating: 4.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 4.0	Rating: 3.0	Rating: 3.3	Rating: 4.0	Rating: 4.0
	2 (Bleach)	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: -	S: +
		Rating: 2.0	Rating: 3.7	Rating: 3.0	Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 2.7	Rating: 2.0	Rating: 3.7	Rating: 3.0
	3 (Virex)	S: +	S: -	S: +	S: +	S: -	S: +	S: +	S: +	S: -	S: -
		Rating: 2.0	Rating: 4.0	Rating: 3.0	Rating: 3.0	Rating: 3.7	Rating: 3.3	Rating: 3.0	Rating: 2.3	Rating: 4.0	Rating: 4.0
	4 (Oxivir)	S: -	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: -	S: +
		Rating: 3.3	Rating: 3.7	Rating: 3.3	Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 3.3	Rating: 2.7
	5 (Bleach)	S: +	S: -	S: -	S: +	S: +	S: +	S: +	S: +	S: -	S: +
		Rating: 2.0	Rating: 3.3	Rating: 4.0	Rating: 2.7	Rating: 2.7	Rating: 3.0	Rating: 2.0	Rating: 2.0	Rating: 3.0	Rating: 2.7
	6 (Virex)	S: +	S: -	S: +	S: +	S: -	S: -	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 3.7	Rating: 3.0	Rating: 3.0	Rating: 4.0	Rating: 3.7	Rating: 2.7	Rating: 3.0	Rating: 3.0	Rating: 2.7
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

4 Excellent 3 Good 2 Poor 1 Severe Effect

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L Cutex Polish Remover, Non-Acetone	1 (Oxivir)	S: -	S: +	S: -	S: -	S: -	S: -	S: -	S: +	S: -	S: -
		Rating: 3.7	Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 3.3	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0
	2 (Bleach)	S: -	S: +	S: +	S: -	S: -	S: +	S: -	S: +	S: +	S: -
		Rating: 4.0	Rating: 3.0	Rating: 3.3	Rating: 3.7	Rating: 4.0	Rating: 3.0	Rating: 3.7	Rating: 2.7	Rating: 3.7	Rating: 4.0
	3 (Virex)	S: -	S: +	S: +	S: -	S: -	S: +	S: -	S: +	S: -	S: -
		Rating: 4.0	Rating: 3.0	Rating: 3.3	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0
	4 (Oxivir)	S: -	S: +	S: -	S: -	S: -	S: +	S: -	S: +	S: -	S: -
		Rating: 4.0	Rating: 3.3	Rating: 3.7	Rating: 4.0	Rating: 4.0	Rating: 3.7	Rating: 4.0	Rating: 2.7	Rating: 4.0	Rating: 4.0
	5 (Bleach)	S: -	S: +	S: +	S: -	S: -	S: +	S: -	S: +	S: -	S: -
		Rating: 4.0	Rating: 3.3	Rating: 3.0	Rating: 3.7	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 2.3	Rating: 4.0	Rating: 4.0
	6 (Virex)	S: -	S: +	S: +	S: -	S: -	S: +	S: -	S: +	S: -	S: -
		Rating: 4.0	Rating: 3.0	Rating: 3.0	Rating: 4.0	Rating: 3.7	Rating: 3.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

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M Coppertone Ultraguard Sunscreen Continous 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

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N Neutrogena Sensitive Skin Sunscreen Lotion SPF 60+	1 (Oxivir)	S: +	S: -	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 4.0	Rating: 2.0	Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 1.7	Rating: 2.7
	2 (Bleach)	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 3.7	Rating: 3.0	Rating: 2.3	Rating: 2.3	Rating: 3.3	Rating: 3.0	Rating: 3.0	Rating: 1.7	Rating: 3.0
	3 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.0	Rating: 3.0	Rating: 2.0	Rating: 3.0	Rating: 2.0	Rating: 2.3	Rating: 2.7	Rating: 2.3	Rating: 2.0	Rating: 3.0
	4 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 4.0	Rating: 2.7	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 1.7	Rating: 2.7
	5 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.7	Rating: 3.0	Rating: 3.0	Rating: 2.7	Rating: 1.7	Rating: 3.0
	6 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.3	Rating: 3.3	Rating: 2.3	Rating: 3.0	Rating: 2.3	Rating: 2.0	Rating: 2.0	Rating: 2.0	Rating: 1.7	Rating: 2.7
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

4 Excellent **3** Good **2** Poor **1** Severe Effect

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Stain Resistance Test – Results

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
O Shea Moisture Jamaican Black Castor Oil Leave-in Conditioner	1 (Oxivir)	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 4.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0
	2 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.3	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.3	Rating: 3.0	Rating: 3.0	Rating: 3.0
	3 (Virex)	S: +	S: -	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 3.3	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0
	4 (Oxivir)	S: +	S: -	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 3.3	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0
	5 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 2.7	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.3	Rating: 3.0
	6 (Virex)	S: +	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 3.0	Rating: 3.0	Rating: 4.0	Rating: 3.7	Rating: 3.0	Rating: 3.0	Rating: 3.7	Rating: 3.0	Rating: 3.7	Rating: 3.0
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

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P Stomach Acid-Carolina Biological Supply	1 (Oxivir)	S: -	S: -	S: -	S: +	S: -	S: -	S: -	S: -	S: -	S: -
		Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.7
	2 (Bleach)	S: -	S: -	S: -	S: +	S: -	S: -	S: +	S: -	S: +	S: +
		Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 3.7	Rating: 3.0	Rating: 4.0	Rating: 3.0	Rating: 3.0
	3 (Virex)	S: -	S: -	S: -	S: +	S: -	S: -	S: -	S: +	S: -	S: -
		Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 3.7	Rating: 3.0	Rating: 4.0	Rating: 3.3
	4 (Oxivir)	S: -	S: -	S: -	S: +	S: -	S: -	S: -	S: -	S: -	S: -
		Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 3.7	Rating: 3.7	Rating: 3.3	Rating: 4.0
	5 (Bleach)	S: -	S: -	S: -	S: +	S: -	S: -	S: +	S: +	S: +	S: +
		Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 3.3
	6 (Virex)	S: -	S: -	S: -	S: +	S: -	S: -	S: -	S: +	S: -	S: -
		Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.3	Rating: 4.0	Rating: 4.0	Rating: 4.0	Rating: 3.0	Rating: 4.0	Rating: 4.0
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

4 Excellent 3 Good 2 Poor 1 Severe Effect

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S Viscot Mini Surgical Fine Tip Marker	1 (Oxivir)	S: +	S: +	S: +	S: -	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 1.0	Rating: 1.0	Rating: 1.0	Rating: 4.0	Rating: 1.0	Rating: 1.0	Rating: 1.0	Rating: 1.0	Rating: 2.0	Rating: 3.0
	2 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 3.0	Rating: 2.7	Rating: 2.3	Rating: 3.0	Rating: 2.0	Rating: 3.0	Rating: 2.0
	3 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 1.3	Rating: 1.3	Rating: 1.0	Rating: 3.0	Rating: 1.0	Rating: 1.0	Rating: 1.7	Rating: 1.0	Rating: 3.0	Rating: 2.7
	4 (Oxivir)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 1.0	Rating: 1.0	Rating: 1.0	Rating: 3.7	Rating: 1.0	Rating: 1.0	Rating: 1.0	Rating: 1.0	Rating: 1.3	Rating: 3.0
	5 (Bleach)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 2.7	Rating: 2.7	Rating: 2.0	Rating: 3.0	Rating: 2.0	Rating: 2.3	Rating: 3.0	Rating: 3.0	Rating: 3.0	Rating: 2.7
	6 (Virex)	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +	S: +
		Rating: 1.3	Rating: 1.3	Rating: 1.0	Rating: 3.0	Rating: 1.3	Rating: 1.0	Rating: 2.0	Rating: 1.0	Rating: 2.7	Rating: 2.3
	S= Stain Present										
	Evaluated using:	+ (present)	or - (not present)								

4 **Excellent** 3 **Good** 2 **Poor** 1 **Severe Effect**

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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%, Homosalate10%, 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

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Moving Forward

- **There is no “silver bullet” fabric for healthcare – yet!**
- **Modify industry standardized tests** to update expectations of performance – adjust to changes in disinfectants and CDC requirements, and UV light technologies
- **COVID-19 response = ONE LEVEL OF RISK** for selection of materials
- 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
- Start testing other vulnerable and failing finishes

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#3. Provide background and a demonstration of the *"Durable Coated Fabric Programming and Selection Guide for Healthcare"* to evaluate, prioritize, and inform selection of durable coated fabrics appropriate to your projects.

Barbara Dellinger, MA, FIIDA, CHID, CID, EDAC, NCIDQ
Director Design & Research, Adventist Healthcare

Shady Grove Medical Center Field Study Recap:
Evergreen Lounge: ICU/CVIR Family waiting

Initial Goals:

1. Assess performance of various coated fabrics
2. Test for cleanliness, lack of bioburden, once a week

- Reupholster seating units, 2-seater and 3–seater in the following durable-coated fabrics:
  - Silicone
  - Polyurethane/Polycarbonate
  - Vinyl
  - TPE

……..…..***Before*** *photo*

Criteria for selection of original 18 durable coated fabrics:

1. Manufacturer/distributor recommended as Heavy-duty, 24/7, Healthcare use
2. Aesthetics/color – avoid "patchwork quilt look"
3. Ability to withstand SGMC's cleaning products & process

Making the case for the importance of Evidence-Based Design and evaluating return on investments (ROI)

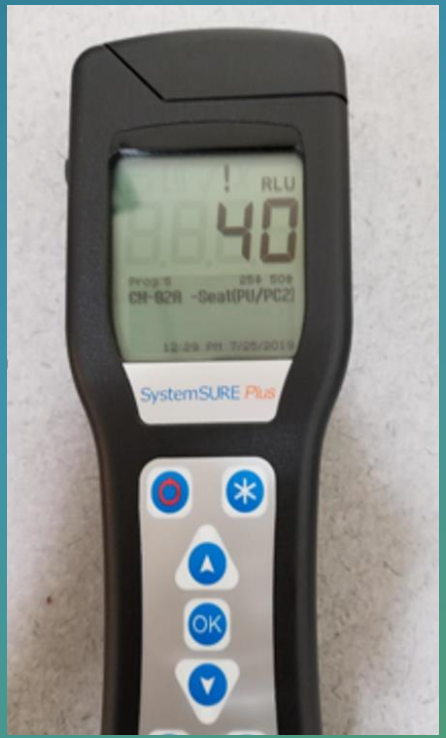
Research objective: to determine results for

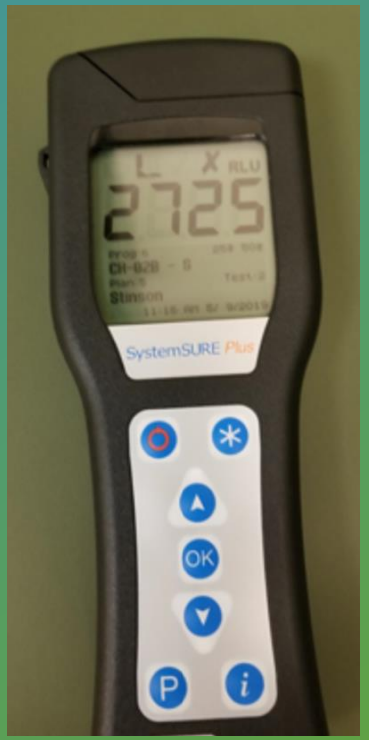
- HAI's related to fabric
- ROI's for failures

…… ***After*** *photo*

Using a Luminometer to quantify effectiveness of cleaning

Provided by SureTrend/Maryland Health Connections to measure for bioburden (ATP)





Scoring: 25-50 = Passing

11 = Excellent

2725 = Fail

Results:

Goal 1: Durability

15 of 18 – Excellent

3 of 18 – Good (stretching on humid days)

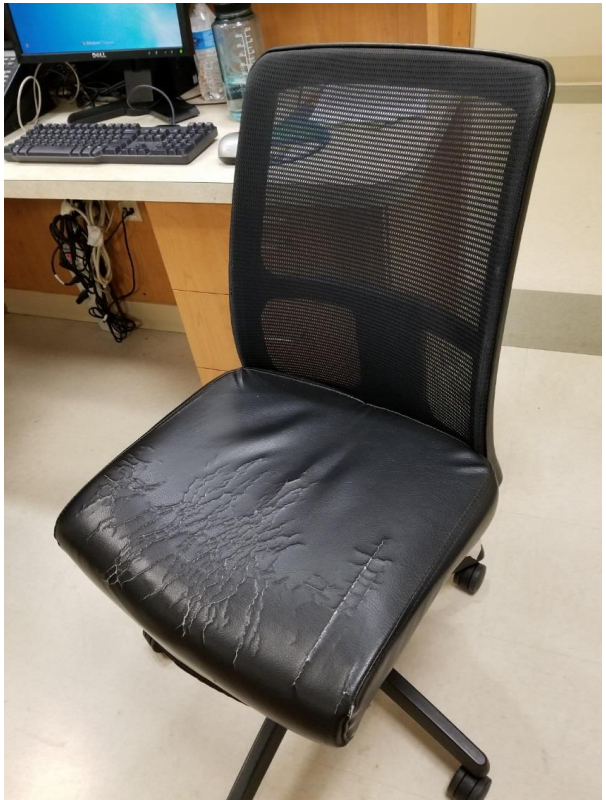
Goal 2: Cleanliness

Testing halted due to Environmental Services inability to comply with daily, consistent cleaning as recommended by fabric manufacturers, and challenges with the testing device.

Preliminary Results of SGMC Evergreen Lounge Durable Coated Fabrics Field Study 10/11/2019									
#	Code	Durable Coated Fabric Type	Splitting	Cracking/Peeling of coating from backing	Crocking	Softened or Gummy	Stretching	Ink Transfer	Comments
1	S1	Silicone 1							
2	S2	Silicone 2							
3	S3	Silicone 3							
4	T1	Thermoplastic Elastomer 1							Single Seat
5	T1	Thermoplastic Elastomer 1							Triple Seat
6	T2	Thermoplastic Elastomer 1							
7	T3	Thermoplastic Elastomer 1							
8	V1	Vinyl 1							
9	V2	Vinyl 1							
10	V3	Vinyl 1							
11	V4	Vinyl 1							
12	V5	Vinyl 1							
13	P1	Polyurethane/Polycarbonate 1							
14	P2	Polyurethane/Polycarbonate 1							
15	P2	Polyurethane/Polycarbonate 1							
16	P3	Polyurethane/Polycarbonate 1							Double Seats
17	P4	Polyurethane/Polycarbonate 1							
18	P5	Polyurethane/Polycarbonate 1							
Seats, backs and sides cleaned with Echolab A-456 II, from 1/10/2019 to 1/10/2019. Cleaning was supposed to be done daily (7 days/week), in reality it was done 3-5 times a week.									
			4-Excellent	3-Good	2-Poor	1-Severe			

Further case studies being developed…

Example: AHC – Case Study – SGMC Unit 2D



Within 3 months of directive from new nurse manager to use Bleach wipes on ALL chairs every day, this damage occurred.
Chairs had been in use (with no damage) for over 4 years. Other chairs are still in use with no damage.

Cost for new chairs:

$370 X 17 = $6,290

Unplanned Results:

- Continued to compare information for the 18 DCFs
- What testing data were manufacturers/distributors using to determine that their recommended fabric was “suitable for healthcare”
- We found many inconsistencies, and the more we looked, the more inconclusive the data was!

Why?

…because there were no requirements for testing minimum performance

- Inconsistent definitions of Heavy duty/approved for 24/7 healthcare use
- Inconsistent names of tests; CFFA, ASTM, AATCC
- Inconsistent vocabulary between disciplines
- Sustainable attributes often supersede durability and performance
- Sales reps don’t have answers – Tech depts. say some info is proprietary
- Technical people advise designers to ask for the data reports, which have more info but are inconsistent and incomplete
- Memo Tag/Sample Ticket information is limited by space, & wording is inconsistent between manufacturers.
- Jargon proliferates, an example is …“for healing”
- If a fabric fails a test, that information likely will not be provided

Something had to be done!

- Costs of failures continue to rise and may be in the hundreds of millions of dollars
- Linda's Ohio State University study, finding that current testing was unrealistic, created their own testing to replicate **real world** conditions
- New products coming out with unrealistic claims

…and we still did not have answers

Next steps were….

- Develop list of tests that were noted on the fabric Memo Tag/Sample Ticket
- Work with each durable coated fabric manufacturer/distributor to obtain complete list of fabric test results
- Gather, compare & analyze fabric test results

….this seemed so logical

Where do we find test information about about upholstery fabrics?

Conclusion:

Multiple similar but not the same tests

Minimal test information

Few names

Wide variance

There was no standard list of tests which were most important to healthcare designers.

Memo sample ticket and Website info comparison: V.3 - 9.28.20

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

Summary of our review of Fabric Test Results:

Memo Tag/Sample Ticket

- Provides only basic product information
- Quantity of tests varies between 0 – 7 (most list 0 - 2)
- Most reference "Wyzenbeek" but do not use official CFFA or ASTM test names
- Test names are inconsistent and confusing;
  - CFFA-**16** is Tear Strength, but AATCC **16**H is Colorfastness
  - ASTM D-751-06: is it "Break Strength" or "Seam Slippage"?

Manufacturer Website Information

- Testing info is limited and inconsistent between manufacturers
- One had tested for 12+ staining agents, with results
- Many provide results of cleaning product tests

Manufacturer/Distributor representative may provide additional information

- Several more test results were provided when the summary chart was sent
  - Between 8–12 tests listed (but most not on website)
- Some sent test results not listed on Memo tag or on Website

Unanswered questions remain

- How many tests did the fabric product fail?
- Which tests are most important? …and who decides?
- How much do the tests cost?

DCF Risk Tracking Summary Chart (1/28/2020) for Distributors

DCF Manu/Pattern_____Color_____Content_____

Item	General Test Name	Min. test score	Preferred score	Actual score or Pass/Fail
1.	**Abrasion Resistance**			
	CFFA 1			
	ASTM D- 4157- 2013	50,000 DR	100,000 DR	
	ASTM D-3389-2016			
2.	**Peel Adhesion**			
	CFFA 3/ASTM D 751	3		
3.	**Accelerate Light Aging**			
	CFFA 2			
	CFFA 2.a.1 Xenon Arc	Grade 4 slight change		
	CFFA2.a.2 Carbon Arc	Grade 4 slight change		
	CFFA 2.c QUV	Grade 4 slight change		
4.	**Crocking**			
	CFFA 7/AATCC	Grade 4		
5.	**Blue Dye Resistance**			
	GM test	Grade 8 slight change		
6.	**Flex Resistance**			
	CFFA 10 /ASTM 2097	Pass		
7.	**Chemical Resistance**			
	CFFA 100	Wet and dry 4		
	BIFMA 8.1 2017, chapter 7			
8.	**Seam Strength**			
	CFFA 14	35 lbs		
9.	**Stretch and Set**			
	CFFA 15	Varies		
10.	**Tear Strength**			
	CFFA 16	Method c – 15 lbs		
11.	**Tensile Strength/Elongation**			
	CFFA 17	50 lbs		
12.	**Print Wear**			
	ACT/ ASTM D 3389	3 min.		
13.	**Mildew Resistant**			
	CFFA 120	No growth		
14.	**Bacterial Resistant**			
	CFFA 300	Pass		
15.	**Hydrolytic Stability (PU only) CFFA 110**			
	CFFA 120/ASTM D 3690	Pass		
	ISO 1419	Pass		
16.	**Stain Resistance**			
	CFFA 141	Note what stains it		

Other tests found on Memo tags:

- Color Fastness – AATCC 16A or 16H (Is this the same as Crocking?)

Evergreen Field Test:
Assessment of Tests

Findings:

- Minimal test information
- Few names
- Wide variance
- Multiple similar but not the same tests

Conclusion:

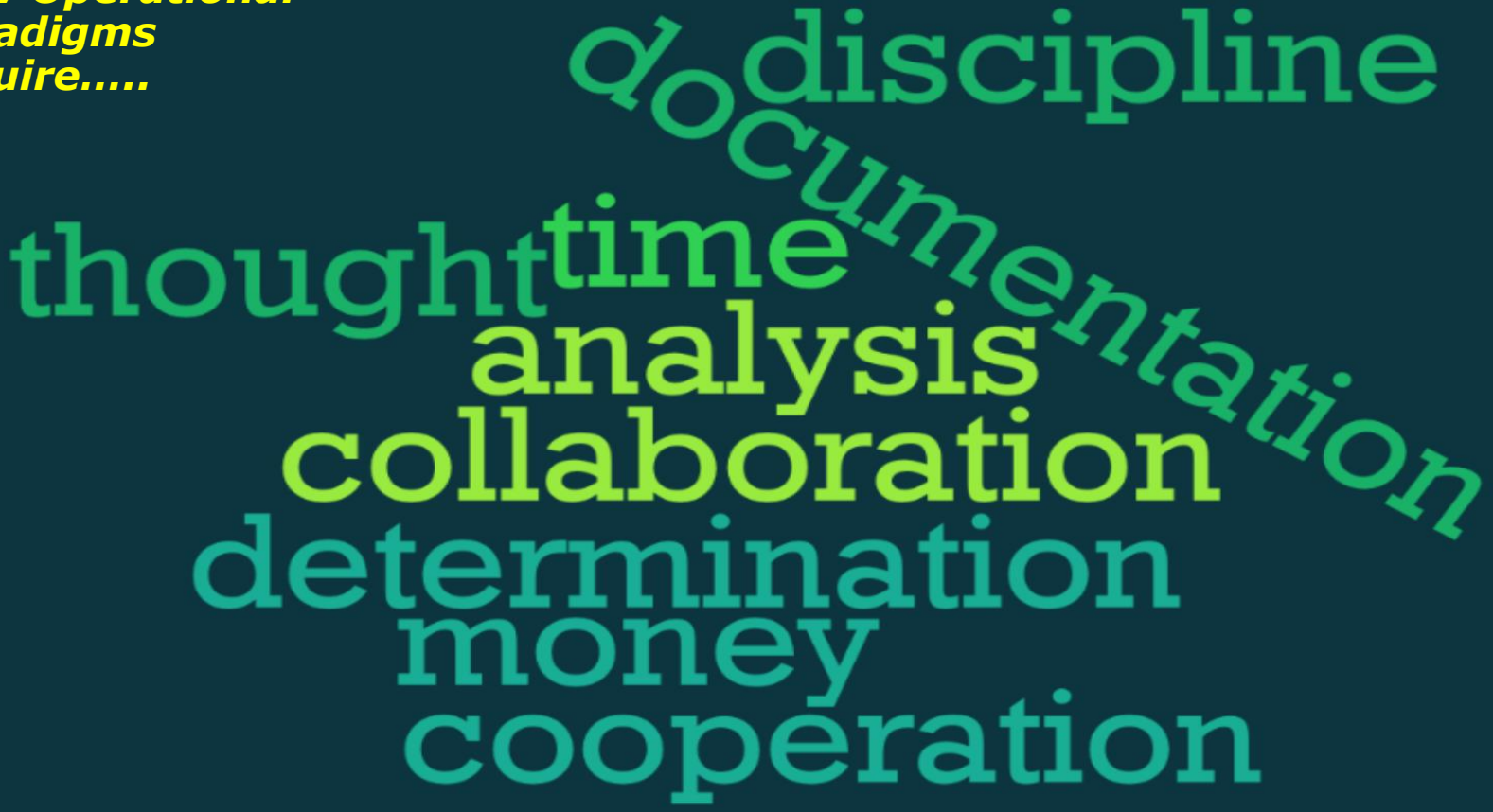
There was no standard list of the tests that were most important to healthcare designers.

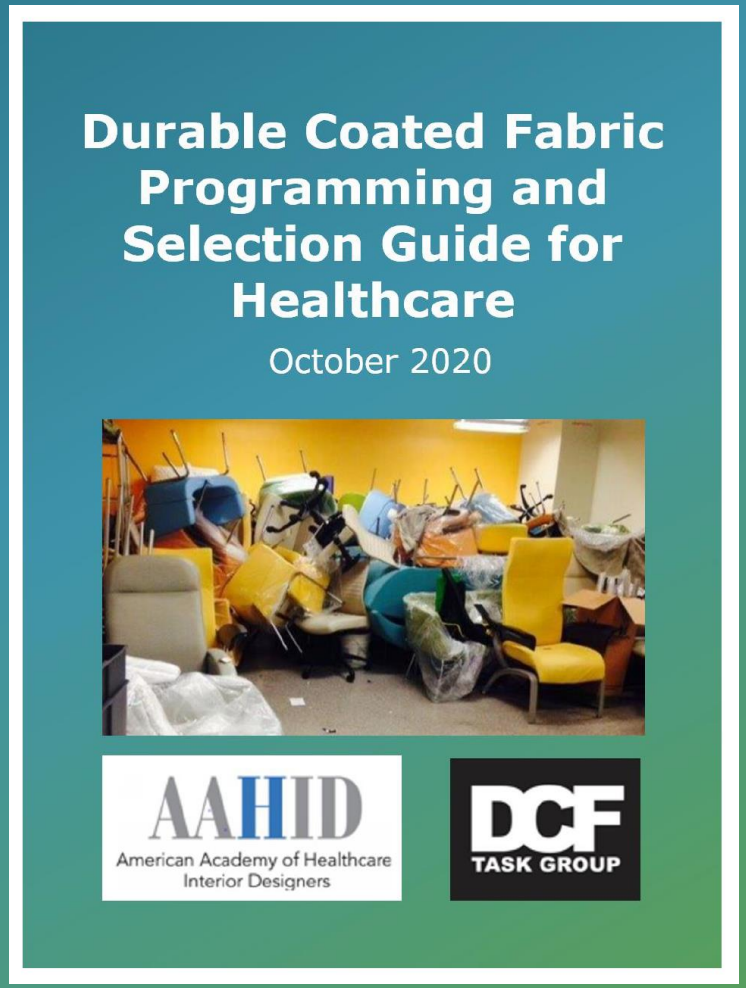
Lessons Learned:

I thought that the field test results were the most important part, but it turns out that test results, and data-gathering, are only the first step.

It’s the path you travel while gathering the data that may lead to new discoveries.

Field Tests and New Operational Paradigms require…..





The **Durable Coated Fabric Task Group** collaboration resulted in the…

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

Part 1 Programming Questions

Part 2 CFFA-Healthcare-201

CFFA CHEMICAL FABRICS AND FILM ASSOCIATION INC.

CFFA-HEALTHCARE-201
AUGUST 2020

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 (abradent) 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.

Crocking - 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 5 weeks.

Seam Strength - Simulates the resistance to seam tear propagation.

Stain Resistance – To determine 48-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

		FABRIC BACKING OR SUBSTRATE		
PROPERTY	**TEST METHOD**	**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 (indoor)	CFFA 2[1]	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[2]	No Cracking	No Cracking	No Cracking
Crocking: 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	CFFA 9	Pass	Pass	Pass
Flex*	CFFA 10	25,000 Cycles No Cracking/ Crazing	25,000 Cycles No Cracking/ Crazing	25,000 Cycles No Cracking/ Crazing
Hydrolytic Stability, PU	CFFA 11[3]	5 weeks	5 weeks	5 weeks
Seam Strength	CFFA 14	30 x 25 lbs.	35 x 35 lbs.	25 x 25 lbs.
Stain Resistance	CFFA 14[2,4]	No stain (4)	No stain (4)	No stain (4)
Tear Strength: Tongue Trap	CFFA 16b CFFA 16c	4 x 4 lbs. N/A	N/A 15 x 15 lbs.	4 x 4 lbs. N/A
Tensile	CFFA 17	50 X 50 lbs.	50 X 50 lbs.	40 x 40 lbs.
Volatility	CFFA 18[5]	8%	8%	8%

Table 1 footnotes continue on page 2
[1]200 hours using a Weatherometer or Fadeometer, or 150 hours using a QUV - dry cycle CFFA

Standard Test Method 2.d
[2]Using a 5 lb. roller, 20° F (-6.6°C).
[3]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
[4]Surgical marker will result in slight ghosting
[5]Activated carbon technique, hut 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 end 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 as abradent.

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 Fadeometer, or 150 hours using a QUV, dry cycle Method 2.d.

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 Crocking Resistance – Dry & Wet. See CFFA Standard Test Method 7.

5.8 Denim Stain Resistance - See CFFA Standard Test Method 70. (Sometimes referred to as 'Reverse Crocking').

5.9 Flame and Smoke Resistance – See CFFA Standard Test Method 9.

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

5.11 Hydrolytic Stability, Polyurethane – See CFFA Test Method 110.

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

5.13 Stain Resistance in Healthcare Environments – See CFFA Test Method 142.

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

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

5.16 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 applications (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 some upholstery applications (hospital, healthcare, etc.) disinfectants are applied on a regular basis and may harm the surface by color or gloss change, cracking, peeling, or hardening. CFFA Standard Test Method 100 - Accelerated Exposure to Disinfectants can be added to the specific product specifications to determine resistance. However, it should be noted that failing to rinse properly or use disinfectants at proper dilution ratios can shorten the useful life of the product, and is the most common basis of complaints.

*Test Methods may be accessed on line at: http://cffaperformanceproducts.org/cffa-pages/publications.asp

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CFFA

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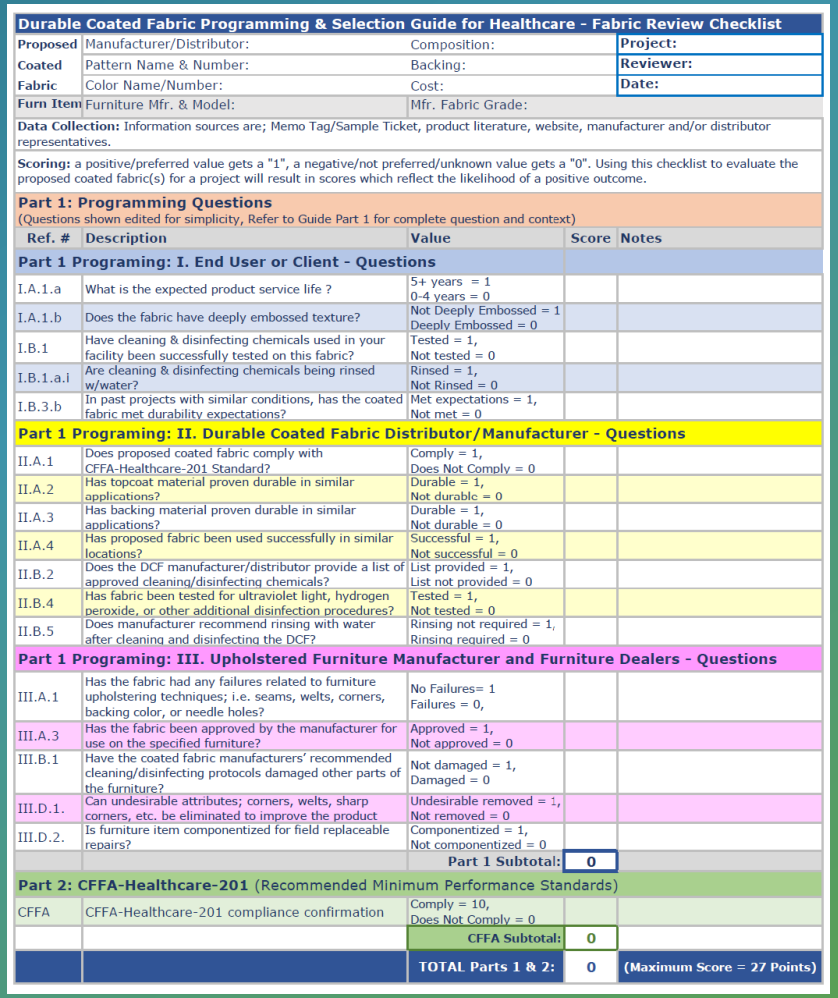

Durable Coated Fabric Programming & Selection Guide for Healthcare - Fabric Review Checklist

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.

Part 1: Programming Questions
(Questions shown edited for simplicity, Refer to Guide Part 1 for complete question and context)

Ref. #	Description	Value	Score	Notes
Part 1 Programing: I. End User or Client - Questions				
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		
Part 1 Programing: II. Durable Coated Fabric Distributor/Manufacturer - Questions				
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 provided = 1, List not provided = 0		
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 not required = 1, Rinsing required = 0		
Part 1 Programing: III. Upholstered Furniture Manufacturer and Furniture Dealers - Questions				
III.A.1	Has the fabric had any failures related to furniture upholstering 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		
		Part 1 Subtotal:	**0**	
Part 2: CFFA-Healthcare-201 (Recommended Minimum Performance Standards)				
CFFA	CFFA-Healthcare-201 compliance confirmation	Comply = 10, Does Not Comply = 0		
		CFFA Subtotal:	**0**	
		TOTAL Parts 1 & 2:	**0**	**(Maximum Score = 27 Points)**

Fabric Review Checklist

Currently we are in a transition period;

CFFA-Healthcare-201

- available since August 2020
- not yet adopted as an industry standard
- not yet reflected in fabric information

Industry wide adoption of

CFFA-Healthcare-201

will guide comparison of
durable coated fabrics
based on standard testing for
performance, durability,
cleaning, and disinfecting.

So where are we now?
What can we do during the transition time?

- Designers and Specifiers have asked for clarity and transparency with testing.
- CFFA has clarified; and developed **CFFA-Healthcare-201.**
- Designers can learn more about the various tests and test names, understand the issues that the DCF manufacturers face.
- Coordinate with durable coated fabrics manufacturers/distributors AND furniture manufacturers. **Listen to their concerns**.
- Durable coated fabrics manufacturers/distributors can be transparent, do more testing, share test results, gear up for complying with **CFFA-Healthcare-201.**
- Furniture Manufacturers can work with durable coated fabrics manufacturers/distributors to get **CFFA-Healthcare-201** test results, and review with designers issues they have discovered related to furniture design (seams, welts, curves, needle size, etc.)

What can we do as healthcare interior designers?

- Complete the Programing Guide Checklist

- Be sure your coated fabric complies with CFFA-Healthcare-201

#4. Evaluate multiple attributes when specifying durable coated fabrics to improve successful outcomes.

Thank you, Teri, Shari, Linda, & Barbara!

Jane Rohde, AIA, FIIDA, ASID, ACHA, CHID, LEED AP, BD+C, GGA-EB.

Principal JSR Associates Inc

When all performance characteristics are not evaluated, DCF failures were the result.

When Single Attribute approach is used, what are the risks?

What does Multiple Attribute mean?

When product life cycle is not evaluated from the beginning, what are the potential consequences?

What are additional examples that have created unintended consequences, such as premature product failure that impacts human health?

Owner’s Project Requirements (OPR)

Balancing Criteria

- Single Attribute Selection – not a comprehensive evaluation – can create unintended consequences
- Evaluation of all components – required to meet project requirements
- 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.
- COVID-19 – cleaning, sanitizing, and disinfection for human health and safety are front and center

Outpatient Healthcare Project Example

Photo provided by JSR Associates, Inc.: Dr. Menton: Photographer: Nicole Lowder

- **Gypsum Board**: Lower GWP*
- **Acoustical Tile**: Higher GWP*
- Is that when the design decision is made?
- What are the other considerations?
  - Acoustic Comfort
  - Usability of Space
  - Existing Conditions
  - HIPAA Privacy

Move beyond a single attribute comparison!

***Tally Tool Comparison**

Owner Project Requirements (OPR)

Project Type: Healthcare Setting Urban Hospital

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 Infection Risk
Outcome: Reduce Readmission Rates
Outcome: Improved Discharge Planning Process
Outcome: Maximize Reimbursement Rates
Outcome: Improve HCAHPS Scores
Outcome: Care Staff Retention
Outcome: Staff Satisfaction

Design Firm Recommendations to Owner

Urban Hospital – site constraints dictates orientation and location of building

LEED® v4.1 Silver Certification

Fitwel® Two Stars Certified

Operational cost savings is key to the Client

Environmental: Energy and Water Savings

Material Selection: Building Service Life, Environmental Footprint, and IEQ

Health & Wellness: Thermal, Acoustic, and Lighting Comfort and Quality, Healthy Nutritional Focus, Water Availability and Water Quality

Product Example #1

OPR: Building Service Life: 12 years
OPR: Reduce / Mitigate Spread of Infection
OPR: Improve HCAHPS Scores

Upholstery Materials 

Green Building Rating System: Material Selection

The Notorious Chair Graveyard

Complexity of Product Failure

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

Result of Collaboration of All Stakeholders

- Toolkit Development
- Process and Programming Guide
- Questions: DCF distributors / manufacturers / clients / furniture manufacturers
- CFFA–Healthcare-201 for minimum performance standards
- Comply with CFFA-Healthcare-201
- Opportunity for replication of toolkit for other interior product families
- Resource development that now impacts ALL spaces – as a result of COVID-19
- www.durablecoatedfabrics.com

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DCF
TASK GROUP

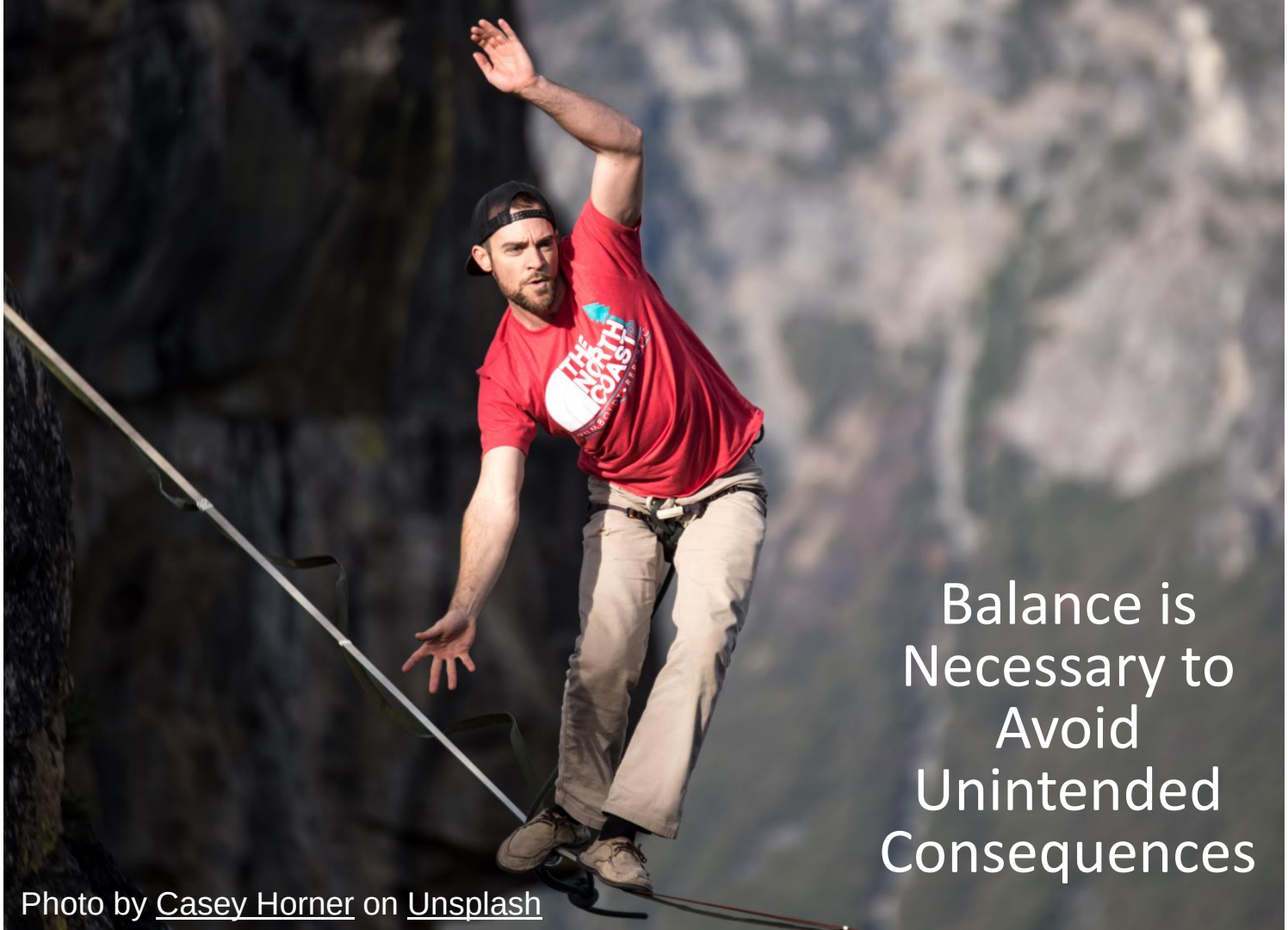


Photo by Casey Horner on Unsplash

Product Example #2

OPR: Building Service Life: 20+ years anticipated
OPR: Mitigate Infection Risk
OPR: Improve HCAHPS Scores
OPR: Reduce Readmission Rates
OPR: Maximize Reimbursement Rates

Low-Flow Toilets 

Green Building Rating System: Water Use Reduction
Health & Wellness Rating System: Water Quality

The recent U.S. National Academies of Science (NAS) study that highlights the importance of designing a plumbing system to minimize the risk of Legionella bacteria

Hotels, Schools, Offices, Apartments, & Government Buildings

- Water Management Plan for all Building Types
- ASHRAE 188 – evaluation of Legionella
- Evaluation of COVID-19 and resulting Cleaning, Sanitizing, and Disinfection Requirements
- Flushing is a vector for transmission

Photo by Steven Ungermann on Unsplash

Product Example #3

OPR: Building Service Life: 50+ years anticipated
OPR: Outcome: Mitigate Infection Risk
OPR: Outcome: Care Staff Retention
OPR: Outcome: Staff Satisfaction

Plumbing Infrastructure 

Health & Wellness Rating System: Access to Water & Water Quality

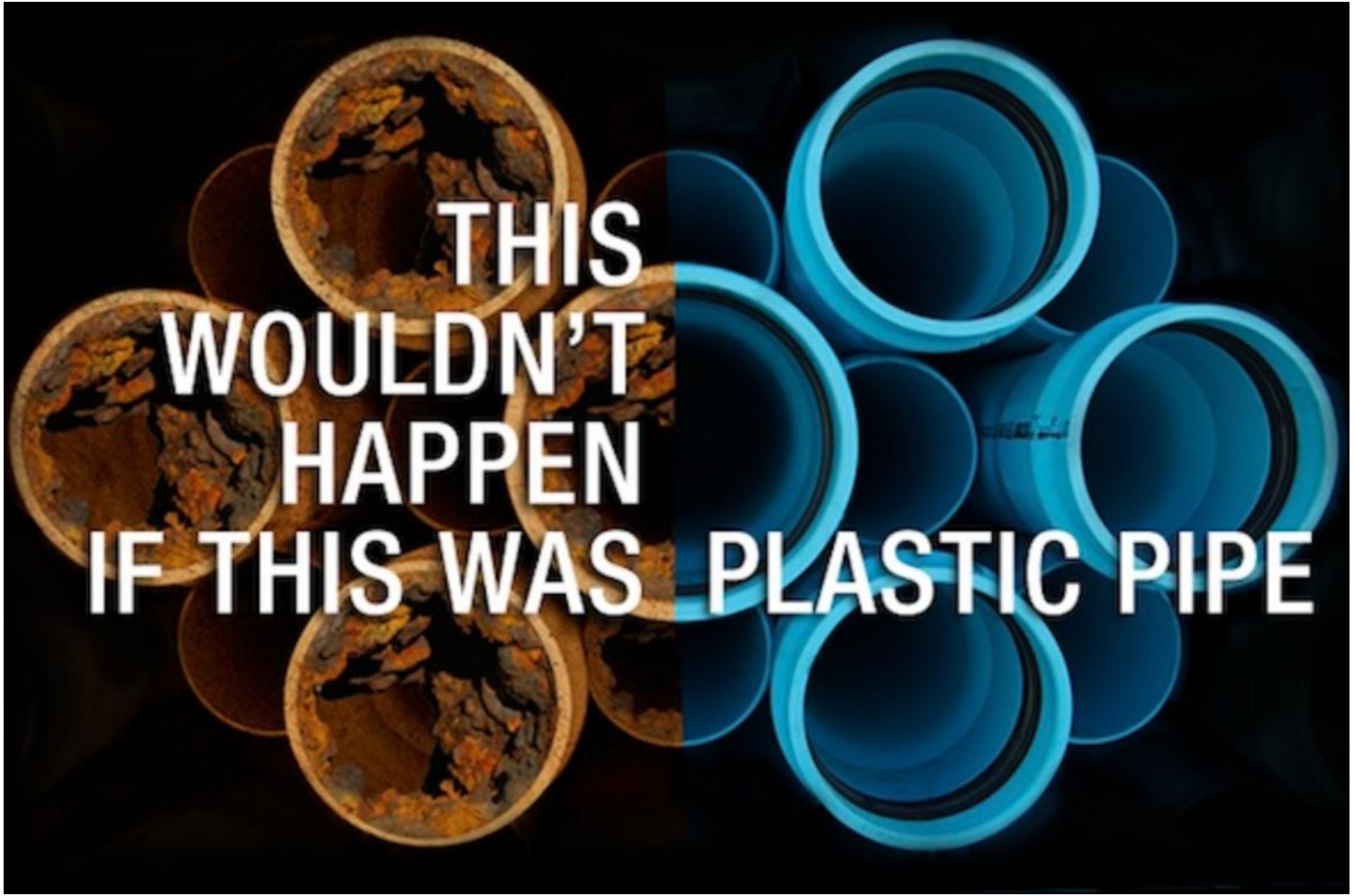
Los Angeles Department of Water and Power determined **corroded cast-iron pipe was overwhelmingly to blame for water pipe breaks!**

Photo: www.Plumbingzone.com

National Research Council of Canada – **iron pipe break rates: 100 km (62.41 miles) of water distribution pipe!**

Replacing infrastructure – but also evaluation of Water Quality – along with flow, quantity, and use – **all attributes!**

Photo: American Vintage Home



Building Service Life: 100+ years
Independent Study: American Water Works Association and Plastics Pipe Institute

Summary: Select products **in context**

Understand Sustainable Attributes that are Supported by Performance Testing in context with the Application, Building Type, and Care Population

Balance all the considerations with Owner Project Requirements & Design Firm Recommendations

Recognize “real life” challenges and address them from the beginning in the development of the OPR and Functional Program

Collaboratively discuss the interconnectivity of innovation, research, science, solutions, and proven track records

Think of product life cycle as an approach to investment with a return instead of first cost solution

Consider decisions that impact all stakeholders needs – including product service life, health, safety, and wellbeing

Specify a product for the appropriate setting and do **not** select based on a single attribute or “redlist” approach

Next Steps:

…. share this information with non-Healthcare designers…


AAHID will post info on their website and
LinkedIn page as it becomes available.
Encourage all Interior designers
to discuss this with your peers, clients, etc.
We don’t have all the answers yet,
but we do have partners to help find the solutions!

Help us to Collect Data!

Cleaning and Disinfection Survey
https://www.surveymonkey.com/r/J6W3PDX

Healthcare Durable Coated Fabrics Upholstery Failures Survey
https://www.surveymonkey.com/r/HKBM67B

Healthcare Furniture Failures Survey
https://www.surveymonkey.com/r/7NSKHD5
https://www.surveymonkey.com/r/7MGW896

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AMFP Association of Medical Facility Professionals

IIDA THE COMMERCIAL INTERIOR DESIGN ASSOCIATION

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Q & A