

Microfibre Cleaning: Is It All It's Been Cracked Up To Be?

Dr. Michelle Alfa, Diagnostic Services of Manitoba

A Webber Training Teleclass

Microfibre cleaning: is it all its been cracked up to be?

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Hosted by Nicole Kenny
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DIAGNOSTIC SERVICES OF MANITOBA
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Overview

- What is “environmental cleaning and disinfection” anyway??
 - Cleaning vs Disinfection
- Cleaning Cloths:
 - Microfibre
 - Cotton
 - Disposable
- Room Decontamination Technologies
- Summary

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Best Practices for Environmental Cleaning for Prevention and Control of Infections: In All Health Care Settings

PIDAC: Provincial Infectious Diseases Advisory Committee, Dec 8, 2009

Queens Printer for Ontario
Toronto, Canada
ISBN: 978-1-4249-9727-5

What is Environmental Cleaning Anyway?

- Cleaning: detergent & physical action**
Removal of debris, organic material (e.g. patient secretions) and microorganisms
- Disinfection: killing action**
Exposure to “agent” that kills microorganisms
→ chemical (liquid, vapour, gas)
→ UV light, steam

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Health Care: Cleaning & Disinfection (PIDAC 2009)

- Non-patient care areas:**
 - cleaning
- Patient-care areas:**
 - cleaning & disinfection
 - high-touch surfaces
 - frequency: risk stratification
 - compliance monitoring

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Why use a Disinfectant in Healthcare Facilities??

INFECTION TRANSMISSION:
 Environment → Patient
 Environment → Staff → Patient




Evidence for the role of Healthcare Environment as a source of HAI transmission is mounting.
 See PIDAC 2009 for good review

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Cleaning Agents: No Microbial Kill label claims

- **Detergents:**
 - surfactants
 - enzymes
 - no microbial kill claim
- **Accelerated Hydrogen Peroxide Cleaners**
 - no/limited microbial kill claims

RELY PRIMARILY ON "ELBOW GREASE"!!



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Hospital grade Disinfectants (DIN from Health Canada)

- **Chlorine:** 1:10 or 1:100 use-dilution
 - USE: Hydrotherapy equipment, blood spills
 - rinse needed for 1:10 use-dilution
 - toxic fumes → workplace safety issues
 - PPE needed
- **Accelerated Hydrogen Peroxide (TB claim)**
 - USE: surfaces in patient rooms
 - No rinse needed
- **Quaternary Ammonium compounds (QUATs™)**
 - USE: floors, walls, furnishing
 - narrow microbicidal spectrum
- **Phenolics** (not in nurseries or food contact surfaces)
 - USE: floors, walls, furnishing, IV poles
 - one-step commercial formulations

Pictures from Google Images PIDAC 2009 Appendix E

DISINFECTANT ISSUES: BEWARE!!!

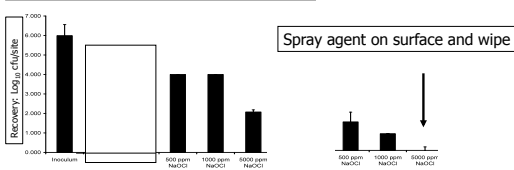
- **Contact time:** Liquid on a surface will dry in ~ 3mins → must be re-applied if recommended contact time is longer than 3 mins
- **Rinse off residuals:** Some disinfectants must be rinsed off after contact time due to irritation to patient skin (e.g. bleach 5000 ppm)
- **PPE:** Some disinfectants require PPE



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Efficacy of Bleach (5,000 ppm) in presence of organic material [killing of *C.difficile* spores]

Spray agent on surface and leave unwiped



Method	Concentration	Recovery (Log ₁₀ cfu/ml)
Inoculum	-	~1000
Spray agent on surface and leave unwiped	500 ppm NaOCl	~1000
	1000 ppm NaOCl	~1000
	5000 ppm NaOCl	~1000
Spray agent on surface and wipe	500 ppm NaOCl	~500
	1000 ppm NaOCl	~200
	5000 ppm NaOCl	~100

The Physical Action of Cleaning is critical NO MATTER WHAT AGENT is used for cleaning/disinfecting

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Cleaning Cloths:

- Cotton cloths – reusable
- Microfibre – reusable
- Synthetic - Disposable



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Microfiber cloths for cleaning

Advantages:

- Superior microbial removal vs cotton cloths
- Increased absorbancy
- Reduced chemical useage
- Transfer of organisms is lower

Disadvantages:

- Damaged by bleach & QUATs
- Higher cost

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What does the Published Data Say???....

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Moore & Griffith [2006 J Hosp Infect]

- Microfibre (6 different types) vs cotton cloth vs paper towel
 - *S.aureus*: 10⁷ Log cfu/steel carrier
 - manual wipe
- Results:
 - Microfibre cloths: removed organic material better than paper towel (~ 10 fold better).
 - Microfibre: Max reduction of 2 Log₁₀/carrier
 - Microfibre: transferred ~30 cfu to clean carrier
 - All Cloths: high variability in data → statistical analysis not possible

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Rutala et al (AJIC 2007):

Microfibre mop vs cotton mop: Hospital floors

QUAT compared to cleaner:

- Microfibre: 94% reduction cfu/site [adding Quat no diff]
- Cotton: 68% reduction cfu/site
- Cotton + QUAT: 95% reduction cfu/site

BUT.....

Pre-clean: 102 – 137 cfu/site
 Post-clean: 4 – 35 cfu/site

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Wren et al (J Hosp Infect 2008)

- Ultra-microfibre (UMF) vs Cotton cloth
 - manual wipe
 - MRSA, *A.baumannii*, *K.pneumoniae* (10³ cfu/site)
 - laminate, steel, vinyl floor carriers
 - dried in organic material 2 Hr or O/N
- Results:
 - Microfibre: significantly better removal of all orgs

BUT.....

Actual reduction was 6 Log₁₀ for UMF vs 4 Log₁₀ for cotton cloths

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Bergen et al J Hosp Infect (2009)

- **Microfibre only:**
 - manual wipe; 16 side protocol (folding)
 - surgical drape as surface
 - *E.faecalis* & *B.cereus*: 10⁷ cfu/site in organic load dried 10 – 15 mins
- **Results:**
 - Despite folding protocol; 3 to 5 cfu/site detected for 15 consecutive clean surfaces wiped with this cloth
 - Bacillus spores less likely to transfer

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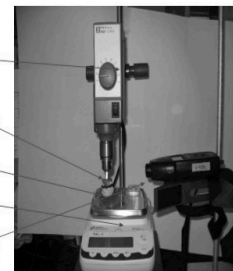
Diab-Elschahawi et al (ICHE 2010)

- Microfibre, cotton, sponge, paper towel
 - *S.aureus*, *E.coli* 10⁶cfu/ceramic carrier
 - organic load, dried 1 Hr
 - manual wipe (back-forth four times)
- Results:
 - 3 Log₁₀ reduction for MF and Cotton
 - 1-2 Log₁₀ reduction for sponge and paper towel

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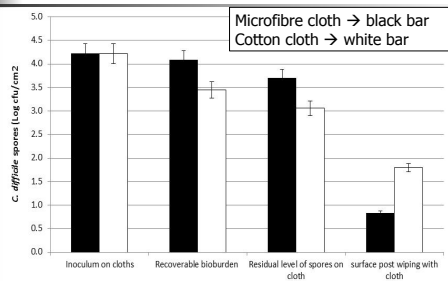
Simulated Surface cleaning efficiency

- Stirrer attached to a stand
- Drill-beat assembled to a rubber stopper covered by the cloth
- Surface tested (plastic, arborite, ceramic)
- Balance to measure the pre-established pressure
- Laser Tachometer measures RPM
- Digital timer set at 10 sec



Data from Adriana Trajtman's M.Sc. thesis

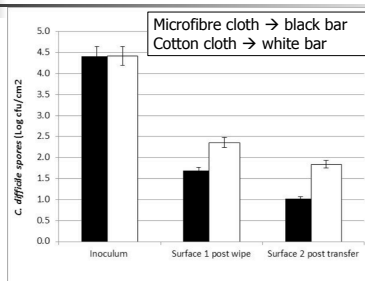
Microfibre vs Cotton Cloths: Release of *C.difficile* Spores



Data from Adriana Trajtman's M.Sc. thesis

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Microfibre vs Cotton Cloths: Transfer of *C.difficile* Spores



Data from Adriana Trajtman's M.Sc. thesis

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Microfibre: So is it all its been cracked up to be??

- Microfibre: does remove more microorganisms (including spores) from surfaces compared to Cotton cloths, but... removal ranges from 2 – 4 Log₁₀ removal.
- Microfibre: does transfer microbes to clean surfaces, but transfer is significantly less than Cotton cloths.



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Impact of New Room Decontamination Technologies

Even if UV light, Room fogging etc are used
→ Physical cleaning of Healthcare rooms is still necessary!



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Summary:



- Microfibre cloths do have better bacterial and spore removal compared to cotton (~ 2 log better)
- Microfibre cloths can transfer organisms to clean surfaces but much lower than cotton
- ? Data on disposable wipes vs Microfibre?
- Room decontamination: still requires cleaning with cloths but is disinfectant needed?

Newest Aid for Healthcare??

Along with hospital-issue gown patients will get microfiber slippers!!



Available in Safeway!!



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