



# Cleaning and Disinfection of Wheelchair Seating

Anna Sokol, RN, MN, BScN, BScKin, WOCC(C)  
Clinical Education Specialist  
Motion Concepts




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## Disclosure and Disclaimer



### Disclaimer

Information contained in, and otherwise shared during, this presentation does not constitute medical advice nor any type of protocol. Please refer to the user's manual of the product you are trying to clean or disinfect. Please follow the policies, procedures, guidelines, recommendations, and protocols of your organization and the facility you are visiting.

### Affiliation Disclosure

The instructor discloses that he/she is an employee of Motion Concepts, one of Invacare subsidiary companies.

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## Objectives:

### By the end of this session, the participant will be able to:

- Describe how wheelchair cleaning and disinfection can help to break the chain of infection transmission
- Identify at least 2 high-touch areas for a manual wheelchair requiring cleaning and disinfection between patients
- Identify at least 2 high-touch areas for a power wheelchair requiring cleaning and disinfection between patients
- Name at least 3 Matrx products that may be ordered in infection control covers

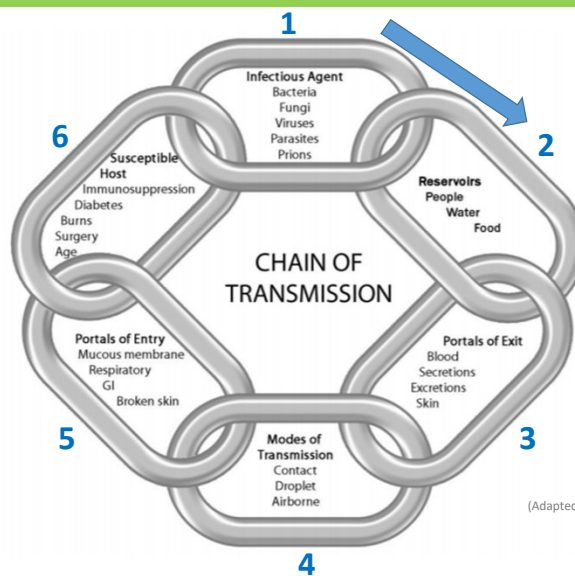
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## Chain of Transmission

Infection transmission does not take place unless all six of the links in the chain of transmission are present



(Adapted from PHO, 2019)

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## Breaking the Chain of Transmission – Engineering Controls

**BREAKING THE CHAIN OF TRANSMISSION**

(Adapted from PHO, 2019)

**Anti-bacterial:**  
AATCC Method 147-1988 Staphylococcus A, contact inhibition 99%+

**Anti-Fungal:**  
AATCC Method 30-1998 *Candida albicans*, contact inhibition 99%+

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## Breaking the Chain of Transmission – Engineering Controls

**BREAKING THE CHAIN OF TRANSMISSION**

(Adapted from PHO, 2019)

Indirect Contact

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## COVID Modes of Transmission

**Infected individual** shedding virus in respiratory & fecal discharge, contaminating surfaces & aerosolization

**Aerosolized viral particles**  $\leq 5\mu\text{m}$  could potentially travel longer distance

**Droplet nuclei**  $\geq 5\mu\text{m}$ , traveling  $\leq 1\text{m}$  (social distance)

**Direct contact**

**Indirect contact**

**Infectious virus transmission** involving combination of both respiratory and fecal-oral routes

**Susceptible individuals**

(Adapted from Ijaz et al., 2020)  
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**FOMITE** = object that may be contaminated and involved in transmission of bacterial or viral infections

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## Levels of precautions

**Routine Practices**

**Additional Precautions/Use of PPE Required**

**! Routine Practice**  
Universal Precautions  
Standard Practice

CDC.gov | https://today.fairfax.edu

**! Contact Precautions**

Images from keysurgical.com

**! Droplet Precautions**

Images from keysurgical.com

**! Airborne Precautions**

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# Cleaning & Disinfection of Wheelchairs



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## GERM WARFARE study (Martin, 2019)

Where are bacterial colonies found on manual wheelchairs?



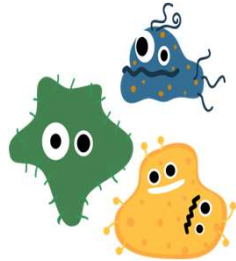
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## GERM WARFARE study (Martin, 2019)

Where are bacterial colonies found on power wheelchairs?



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## "That's wheelie gross!" – Seminal Research Study

Researchers from Bridgepoint Hospital (Toronto) conducted interviews with 18 acute care hospitals; 16 chronic care hospitals; 14 long term care facilities. Most of them had 50-200 wheelchairs on premises

### Respondents expressed concerns related to:

- lack of reliable systems to track and identify dirty and clean wheelchairs (71%)
- failure to clean and disinfect wheelchairs between patients (52%)
- difficulty cleaning cushions (42%)
- lack of guidelines (35%)
- continued use of visibly soiled wheelchairs (29%)
- lack of resources (25%)
- absence of guidelines on wheelchair disinfection (100% of respondents)
- authors noted lack of research and failure to consider wheelchairs as a fomite

(Gardner et al., 2014)





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Viability of pathogens on surfaces		
Pathogen	Survival on fomites	
C. Difficile spores	Weeks to months	(Sulyok et al., 2021)
Escherichia Coli	Up to 60 days on steel Up to 8 weeks on fabrics Up to 300 days on plastic	(Jablonska-Trypuc et al., 2022)
MRSA	Up to 70 days	(Jablonska-Trypuc et al., 2022)
Pseudomonas Aeruginosa	Up to 8 weeks on fabrics Up to 10 days on plastic	(Jablonska-Trypuc et al., 2022)
Klebsiella Pneumoniae	Up to 4 weeks on fabrics Up to 1 month on plastics	(Jablonska-Trypuc et al., 2022)

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## Equipment Requirements

**Keep Patient's Environment and Equipment Clean**



**CDC Healthcare Infection Control Practices Advisory Committee**

**Medical equipment and surfaces should:**

- Be cleaned and disinfected between patients
- Be made of materials that can endure repetitive use of disinfectants
- **NOT** have tears, damages, or holes that trap bacteria

(HICPAC CDC, 2021)

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## ! Cleaning:



“The physical removal of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms).

Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action”

(PHO, 2018, p. 2)

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## ! Disinfection:



The inactivation of disease-producing microorganisms by a disinfectant product applied to surface or equipment.

Medical equipment/devices must be cleaned thoroughly before effective disinfection can take place (PHO, 2018).

Disinfection may not kill all bacterial spores.



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**! Cleaning and disinfection 2-in-1**  
 may be achieved in a single step, **if:**

- a chemical product falls under the category of cleaner and disinfectant
- organic material, debris, and other contaminants are effectively removed, and
- the specified product contact time (dwelling time) is achieved for disinfection



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**CANADIAN-MADE HOSPITAL-GRADE DISINFECTANTS**



**Test: Compatibility of wipeable Startex™ with disinfecting wipes**

Name of Product	Ingredients	Drying time	Minimum contact time required for low-level disinfection	Residue/Discoloration	Type of residue	# of cycles	Effect on Startex material
<b>PREempt</b> wipes DIN 02436671	Accelerated hydrogen peroxide 0.5%	1.5-2 min	30 sec	None	None	100	No effect on the structure of the material
<b>OPTIM</b> 33TB wipes DIN 02285347	Accelerated hydrogen peroxide 0.5% and patented combination of other chemicals	3 min	1 min	Slight oily residue after 70 cycles	Leathery-oily feel	100	No effect on the structure of the material

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## CLEANING AND DISINFECTION

### With What?

#### 70-90% Isopropyl alcohol

- Offers intermediate-level disinfection
- Damages plastics and rubber
- Evaporates quickly
- Flammable

#### Chlorine bleach

- 1:10 solution for high-level disinfection
- 1:50 solution for intermediate level
- 1:500 solution for low-level disinfection
- Corrosive to metal
- Destroys adhesives
- Dwelling time 10 min (not practical)

#### 0.5% hydrogen peroxide (enhanced action formula)

- 1-3 minutes dwelling time for low-level disinfection
- 3-5 minutes for intermediate disinfection
- fast-acting
- non-toxic
- considered the most effective and safest
- May be destructive for copper, brass, anodized aluminum, and carbon-tipped devices

#### Phenols

- may be used for low-level disinfection
- may not be used on porous materials
- hazardous if come in contact with skin and mucous membranes

#### Quaternary ammonium

- used as low-level disinfectants
- require 10 min contact time (not practical)
- not effective against Tb and non-enveloped viruses
- linked to allergies and birth defects

(PHO, 2018)

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## HOW TO CHOOSE A DISINFECTANT?

### Latest generation of disinfectants:

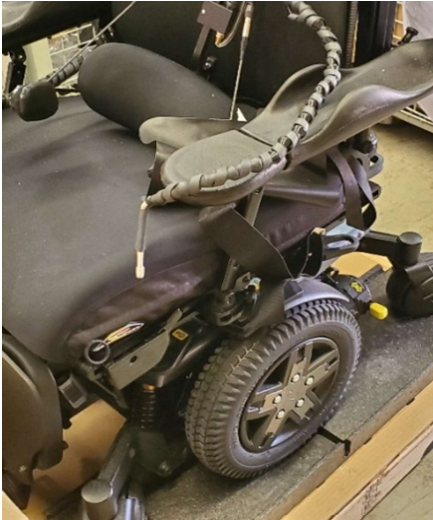
- Uses combination of low concentration chemicals
- Offered in enhanced formulations
- Usually based on hydrogen peroxide
- Improved to offer low and medium level disinfection
- Effective against enveloped and non-enveloped viruses
- Less damaging for wheelchair materials
- Less hazardous for people

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**HOW TO CHOOSE A DISINFECTANT?**



Wheelchairs have multiple components:

- Hardware
- Soft seating
- Electronics
- Individual-use components (sip-and-puff)



It's a good idea to look for the latest cleaning and disinfection recommendations from manufacturers of the products you work with



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**5 Steps to cleaning/disinfecting Startex RR**

*(infection control cover, PU-coated side out)*



1. Remove all gross contamination from surface  
i.e. urine, feces, blood with absorbent material i.e. cloth, paper towels
  1. Ensure area is clean by wiping the surface with one of the approved RTU (Ready-To-Use) cleaning agents
  2. Disinfect; liberally wipe the surface again with RTU wipes (avoid pooling of the disinfectant)
  3. Wipe dry after recommended dwell time (1-3 minutes – refer to each mfg. instructions)
  4. No matter what disinfectant chemistry is used, it is best practice to wipe the surface with a damp cloth and mild soap and finally a damp cloth (with liberal amounts of water)
- also**
- Startex may be easily washed in a washing machine with neutral detergent (Tide, Persil) in warm water (60°C or 140°F)
  - Air drying is the method of choice, but cold air-drying machine cycle is also safe for the fabric



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### ZIPPERED INFECTION CONTROL COVERS FOR ALL MATRX® CUSHIONS AND BACKS



**Infection Control Full Slipcover with zipper**

Zippered Infection Control covers are the best choice for clients with incontinence. Welded seams for advanced infection control, and machine-washable at temperatures required to kill bacteria/viruses.

**Available:** Available for ALL Matrix cushions, backs and Elan headrest pads

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### REVERSIBLE COVERS: MATRX® PS AND PSP CUSHIONS

Infection control on demand!



PS Cushion

PSP Cushion

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**MATRIX® PS CUSHION** 25

Moisture resistant Wipeable Startex RR™

Outer cover

Reversible Startex RR™

Inner liner

ultra-fresh

Foam

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**Startex RR™**

**Anti-bacterial:**  
AATCC Method 147-1988 Staphylococcus A, contact inhibition 99%+

**Anti-Fungal:**  
AATCC Method 30-1998-Aspergillus Niger, contact inhibition 99%+

**Cytotoxicity:**  
Method SOP:EA-WI-015. Result: "negative" toxicity

**Advantages of Startex:**  
Complies with **Biocompatibility regulations:**  
**Prop 65** (Safe Drinking Water and Toxic Enforcement Act, California)  
**REACH** (European Union, Biosafety legislation)  
**RoHs** (EU Restriction of Hazardous Substances)

**Stronger:** Tear strength: 11.7 lbf & Hydrostatic burst: 200 psi  
**Non-slippery**  
**Highly stretchable**  
**Endures repeated use of hospital-grade disinfectant wipes**

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**DISINFECTING MATRIX® INFECTION CONTROL WIPEABLE COVERS**

**Startex RR** is highly resistant to wide array of disinfectants. Wiping of the smooth surface of the Startex RR can be done with the following commonly used RTU (Ready to Use) products:

Accel TB Wipes

Accel Prevention Wipes

3M Surface Disinfectant Cleaner Wipes

Optim 33TB Wipes

PREempt Wipes

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### MATRIX® ELAN HEADREST PADS



Reverse Startex™ Infection Control Cover



Foam with Antimicrobial Additive



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### MATRIX® PROTECT WIPEABLE SLICOVERS – FOR ALL MATRIX CUSHIONS



Hermetically welded seams help to prevent entrapment of small particles and passage of fluids



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**WIPEABLE SLIPCOVERS FOR MATRX® E2 BACKS**

**NEW**



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**PROTECT  
YOUR CLIENTS!**

**STAY SAFE!**



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**QUESTIONS?**



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**THANK YOU!**

Contact Anna Sokol:  
[asokol@motionconcepts.com](mailto:asokol@motionconcepts.com)

84 Citation Drive  
Concord Ontario  
L4K 3C1



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HICPAC CDC (Healthcare Infection Control Practices Advisory Committee for Centers for Disease Control and Prevention). *Science Brief: SARS-CoV-2 and Surface (Fomite) Transmission for Indoor Community Environments, Updated 2021*. <https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/surface-transmission.html>

Gardner, P., Muller, M. P., Prior, B., So, K., Tooze, J., Eum, L., & Kachur, O. (2014). Wheelchair cleaning and disinfection in Canadian health care facilities: "That's wheelie gross!". *American Journal of Infection Control*, 42(11), 1173-1177. doi: 10.1016/j.ajic.2014.08.007

Jablonska-Trypuc A., Makula, M., Wlodarczyk-Makula, M., Wolejko, E., Wydro, U., Serra-Majem, L., & Wiater, J. (2022). Inanimate surfaces as a source of hospital infections caused by fungi, bacteria and viruses with particular emphasis on SARS-CoV-2. *International Journal of Environmental Research and Public Health*, 19, 8121. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9265696/pdf/ijerph-19-08121.pdf>

Martin, B. (2019). Germ warfare. *PN*, 73(2), 24-28. <https://web.s.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=10&sid=6ca96cf9-a6b7-4abc-86b8-7dd854e0711f%40redis>

PHO (Public Health Ontario). (2019). Chain of Transmission and Risk Assessment Summary. <https://www.publichealthontario.ca/-/media/documents/1/2019/ipac-core-trainers-cot-summary.pdf>

PHO (Public Health Ontario). (2018) *Best Practices for Environmental Cleaning for Prevention and Control of Infections in All Health Care Settings, 3<sup>rd</sup> edition*. <https://www.publichealthontario.ca/-/media/documents/b/2018/bp-environmental-cleaning.pdf?la=en>

Sulyok, C.J., Fox, L., Ritchie, H., Lanzas, C., Lenhart, S., & Day, J. (2021). Mathematically modeling the effect of touch frequency on the environmental transmission of *Clostridioides difficile* in healthcare settings. *Mathematical Biosciences, Published online ahead of print, July 24, 2021*. doi:10.1016/j.mbs.2021.108666

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