
1. Introduction
2. Microbes – Life and Habits/Types
3. The Consequences of Microbial Growth
4. Microbes are everywhere
5. Microbial Habitats
   • Soft Goods
   • Building Materials
   • Rooms
   • Services
   • People
   • Wounds
6. Microbial Control
   • Infection Control Variables
   • Infection Control Realities
   • Dose Reduction Strategies
   • Antimicrobial Agents
7. Proactive Strategies
8. Reactive Strategies
9. Conclusions
10. Summary
Introduction

Enter the world of “wee beasties”

The World Around Us – Healthcare Environments

The Good, The Bad, and the Ugly

This is personal and affects caregivers and Patients

Fight or Flight?

Disinfecting Soft Goods

NOT A SIMPLE LAUNDRY LECTURE

NOT A SIMPLE DISINFECTION LECTURE

NOT A SIMPLE MICROBIOLOGY LECTURE

NOT A SIMPLE SOFT GOODS LECTURE

THIS IS: ALL OF THE ABOVE

MICROBES

Bacteria
– Gram (+)
– Gram (-)

Fungi
– Mycelial
– Yeast

Algae
MICROBES Life Needs

- MOISTURE
- NUTRIENTS
- PROPER TEMPERATURE
- RECEPTIVE SURFACES

If humans are comfortable, so are a wide range of microbes.

The Consequence of Microbial Growth

BUILDING INFECTION:

- ODORS
- STAINS
- DETERIORATION
- BIOFILMS

- FINANCIAL LOSS
- FUNCTIONAL TIME LOST
- LIFE OF MATERIALS LOST

The Consequence of Microbial Growth

HUMAN INFECTION:

- Susceptible Host
- Contaminated Laundry
- Airborne Pollutants
- Healthcare Worker
- Body Fluids
- Hands/Clothing
- Portable equipment
- Food Trays, etc...
- Shared Equipment
- Charts and Equipment carried from point to point

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The Consequence of Microbial Growth

**HUMAN INFECTION:**
- ADDITIONAL COSTS
- BED USE EXTENDED
- INFECTION CONTROL PROBLEMS
- EXPOSURE RISKS TO STAFF, VISITORS, AND OTHER PATIENTS

Microbes are Everywhere

**Amplification** (Source of Growth)
**Transfer** (Vector)

Work Space

Work Products

Microbial Habitats

**Soft Goods are EVERYWHERE in the healthcare environment**

- Woven Fabric
- Nonwoven Fabric
- Foams
  - Open Celled
  - Closed Celled
# Disinfecting Soft Goods

**Dr. Curt White**  
**A Webber Training Teleclass**

## Microbial Habitats

<table>
<thead>
<tr>
<th>BUILDING MATERIALS AND FURNISHINGS</th>
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<tbody>
<tr>
<td>Roofing Felts</td>
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<tr>
<td>Insulations:</td>
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<tr>
<td>Walls</td>
</tr>
<tr>
<td>Roof</td>
</tr>
<tr>
<td>Pipes</td>
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<tr>
<td>Ducts</td>
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<tr>
<td>HVAC</td>
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</table>

<table>
<thead>
<tr>
<th>ROOFS</th>
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<tbody>
<tr>
<td>Wall Coverings</td>
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<tr>
<td>Mats</td>
</tr>
<tr>
<td>Bedding</td>
</tr>
<tr>
<td>Blankets</td>
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<tr>
<td>Towels</td>
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<tr>
<td>Bed Pads</td>
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<tr>
<td>Linens</td>
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<thead>
<tr>
<th>SERVICES</th>
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<tbody>
<tr>
<td>Lapidus Pads</td>
</tr>
<tr>
<td>Masks</td>
</tr>
<tr>
<td>Mayo Stand Covers</td>
</tr>
<tr>
<td>Tuck Towels</td>
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<tr>
<td>Incise Drapes</td>
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<tr>
<td>Surgical Drapes</td>
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<tr>
<td>CSR Wraps</td>
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</table>

<table>
<thead>
<tr>
<th>CLEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wipes</td>
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<tr>
<td>Rags</td>
</tr>
<tr>
<td>Mops</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>CAFETERIA</th>
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</thead>
<tbody>
<tr>
<td>Linens</td>
</tr>
<tr>
<td>Wipes</td>
</tr>
<tr>
<td>Rags</td>
</tr>
<tr>
<td>Uniforms</td>
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</tbody>
</table>

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## Microbial Habitats

<table>
<thead>
<tr>
<th>PEOPLE</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Gloves</td>
<td>Uniforms</td>
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<tr>
<td>Shirts</td>
<td>Hats</td>
<td></td>
</tr>
<tr>
<td>Scrubs</td>
<td>Shoes</td>
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<tr>
<td>Underwear</td>
<td>Pants</td>
<td></td>
</tr>
<tr>
<td>Socks</td>
<td>Incontinence Diapers</td>
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<tr>
<td>Smocks</td>
<td>Baby Diapers</td>
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</table>

## Microbial Habitats

<table>
<thead>
<tr>
<th>WOUNDS</th>
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<tbody>
<tr>
<td>Stockinettes</td>
<td>Wraps</td>
<td></td>
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<tr>
<td>Garments</td>
<td>Gauze</td>
<td></td>
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<tr>
<td></td>
<td>Band-Aids</td>
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</tr>
</tbody>
</table>

## Microbial Control

- **DOSE**
- **VIRULENCE**
- **SUSCEPTIBILITY**
- **DOSE REDUCTION WITH BEST AVAILABLE TECHNOLOGIES**

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Microbial Control:  
Infection Control Realities

ALL OF THE HANDWASHING PROTOCOLS  
ALL OF THE DISINFECTING PROTOCOLS  
ALL OF THE STERILIZING  
ALL OF THE SPECIALIZED TRAINING  
ALL OF THE SPECIALIZED FILTERS  
AND....

STILL THERE ARE RISING HOSPITAL  
ACQUIRED DISEASE STATISTICS!

Microbial Control:  
Dose Reduction Strategies

Preventative Treatment  
After Contamination  
During Use  
Antimicrobial or Antibiotics  
Sterilization  
Sanitation  
Disinfection  
Preservation

Microbial Control:  
Dose Reduction Strategies

People seeking zero defect (infection), design to minimize human error by controlling what is controllable – hence, controlling dose of microbes from all sources seeking:

AS LOW AS REASONABLE ATTAINABLE  
(ALARA)

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Cleaning Practices

Microbial Habitats –
Out-of-Sight and Out-of-Mind?

Laundry Practices  Housekeeping Practices

In-Service Practices

Cleaning Practices

ALTER THE PRODUCTS AND NOT THEIR FUNCTION

• Product Design (use and abuse)
• Covers
• Soil Release/Builders
• Stain Repellent/Stain Release
• Safe Antimicrobial Treatments

Cleaning Practices

CLEAN UP THE DIRT

• Physical wiping
• Surfactants
• Oxidizing Agents
• Bicarb or CO2 ("Blasting")
Cleaning Practices

KILL THE MICROBES/KEEP THEM KILLED
- Oxidizing Agents
- Sterilants
- Autoclaving
- Safe Antimicrobial Treatment

FOLLOW AND POST CARE INSTRUCTIONS – PROVIDE TRAINING
WORK CROSS FUNCTIONALLY TO DEFINE
BEST PRODUCTS AND PRACTICAL RESULTS
REDUCING DOSE—REDUCING SOURCES, TRANSPORT, AND EXPOSURE

Microbial Control:
Antimicrobial Agents

Antimicrobial Agents

Differ in Their:
- Chemical Nature
- Durability
- Safety
- Mode of Operation
- Regulatory Compliance
- Effectiveness
- Cost
- Verification
- Ease of Use
Antimicrobial Types

**Leachable**
Leach out of substrate to inhibit growth

**Non-leachable**
A unique technology is a durably bonded solid that inhibits growth by physical contact
The solid is a micropolymer network

Conventional Antimicrobials

Diffuse from the product to come in contact with the microbe
- Leach or migrate off the product
- Are consumed by microorganisms
- Chemically interrupt (poison) the cell
- Cause microbial adaptation
- No means of attachment

Conventional Antimicrobials - Examples
- Bis chlorinated phenols
- Organo tins (i.e. TBT)
- Organo metallics (Pb, As, Hg)
- Chitin
- Silver / Copper / Zeolite
- Water soluble Quats
- Biguanide
- Isothiozolione
Mode of Action:
Traditional Antimicrobials

Mechanisms of Resistance:
Traditional Antimicrobials

Bonded Technology
Bound to the product controlling microbes on contact
- Bonded to the product surface
- Not consumed by microbes
- Mechanically stabs the cell
- Extended functional life
- Will not cause an environment to promote microbial adaptation
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Silane Technology

3-(trimethoxysilyl) propyl(dimethyloctadecyl ammonium chloride
EPA Registration Number 27668-52-6
C.A.S. Number 27668-52-6
Empirical Formula C26 H58 Cl N O3 Si

Antimicrobial is covalently bound to substrate...
Functionality stays intact and active through washing and repeated exposure to microbes
Extends functional life of goods by resisting deterioration

Ionic Association with Biological Membrane Surface

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Physical (Integral) Association with Biological Membrane Surface

Zone of Inhibition Story

Microbial Adaptation

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Photographs taken by electronic microscope

Microbial Control: Proactive Strategies

Control Microbial Growth Conditions

- MOISTURE
- TEMPERATURE
- NUTRIENTS
- RECEPTIVE SURFACES
- TREAT WITH A DURABLE LONG-LASTING ANTIMICROBIAL
Microbial Control – Reactive Strategies

- Throw out (burn or landfill)
- Dry Out
- Clean (Laundry, w/wo Sanitizers)
- Sanitize/Disinfect
- Treat with a Durable Long Lasting Antimicrobial

Conclusion

You MUST know:

- **Your Enemy** – The Problem Microbes.
- **The Antimicrobial** – “Womb to Tomb” Properties.
- **The Desired Substrate** – Compatibility and Durability.
- **The Use and Abuse Conditions** – Real World Stress Tests.
- **The Regulatory Requirements** – Claims and Compliance.

AND……

DO NO HARM

The Next Few Teleclasses

**September 20**  (South Pacific Teleclass)

- SARS in Singapore – What Can We Learn
  … with Dr. Chris Wynne, New Zealand

**October 5**

- Neonatal Sepsis, A 2006 Update
  … with Dr. Anne Matlow, Hospital for Sick Children

**October 12**

- The Changing Role of Infection Prevention and Control as Documented by the CBIC Practice Analysis
  … with members of the CBIC Board

**Infection Control Week**

**October 19**

- Hand Hygiene – Improving Compliance
  … with Dr. John Boyce, Hospital of St. Raphael

For the full teleclass schedule – [www.webbertraining.com](http://www.webbertraining.com)