

POINT OF ENTRY DISINFECTION STRATEGIES

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OUTLINE

THE THREAT

THE SOURCES

THE APPROACH

THE STRATEGIES

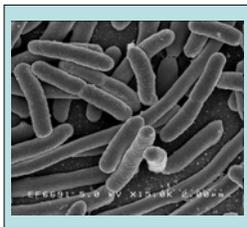
THE PRACTICE

THREATS

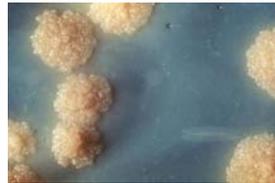
SPECIES

Bacteria	<i>Salmonella, Pseudomonas, Streptococcus</i>
Virus	<i>Influenza, mumps, small pox, chicken pox</i>
Protozoa	<i>Cryptosporidium, Giardia lamblia</i>
Fungus	<i>Candida, Ringworm</i>

BACTERIA



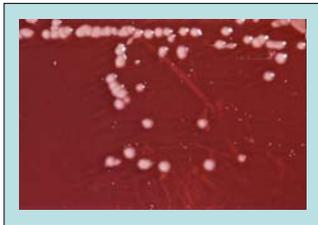
Escherichia coli



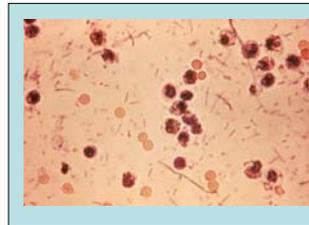
M. tuberculosis



Salmonella

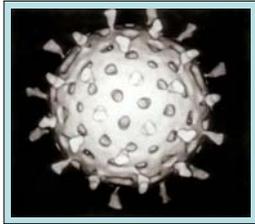


Pseudomonas aeruginosa

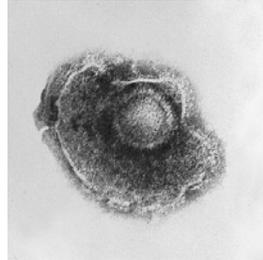


Shigella

VIRUS



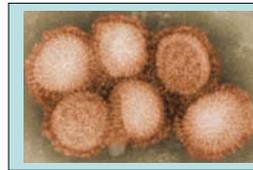
Rotovirus and Norovirus



Vericella (Chicken Pox)

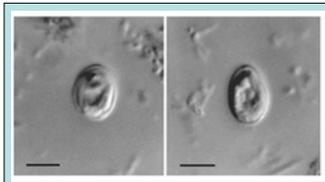


Icosahedral adenovirus

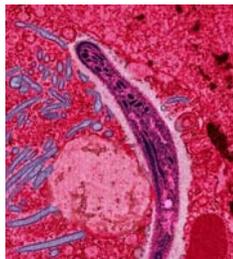


Influenza

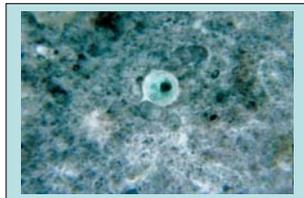
PROTOZOA



Cryptosporidium



Plasmodium (Malaria)



Entamoeba (Dysentary)

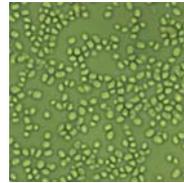


Giardia lamblia

FUNGUS

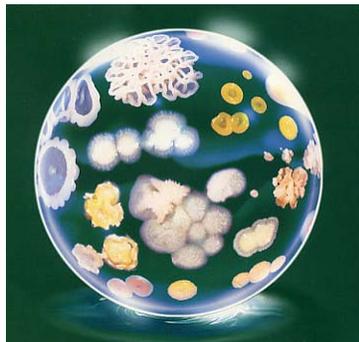


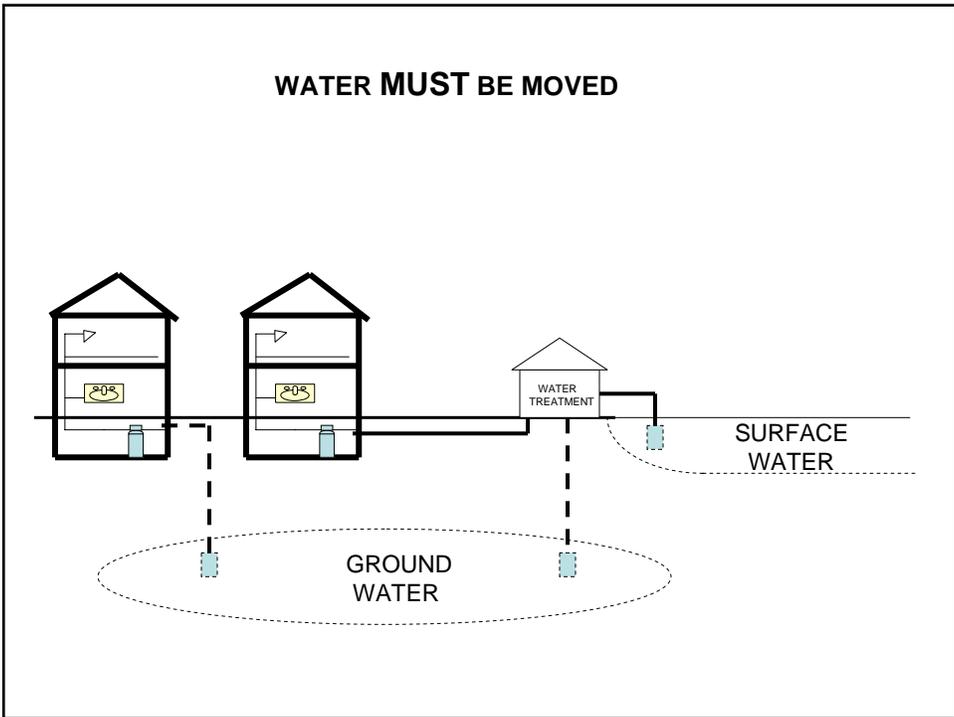
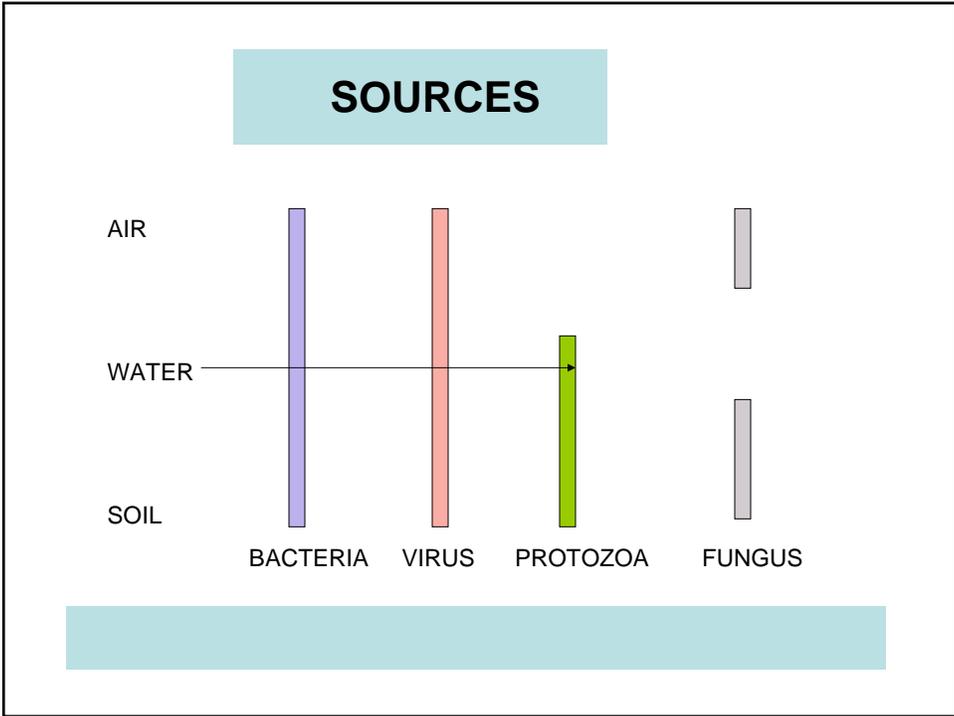
Candida albicans fungus



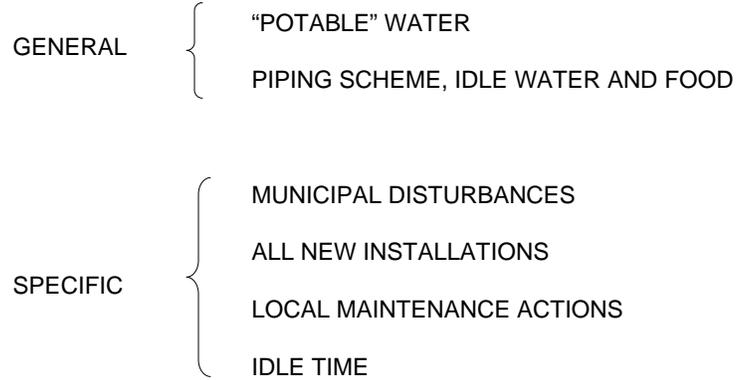
Candida glabrata

The Problem is COLONIES



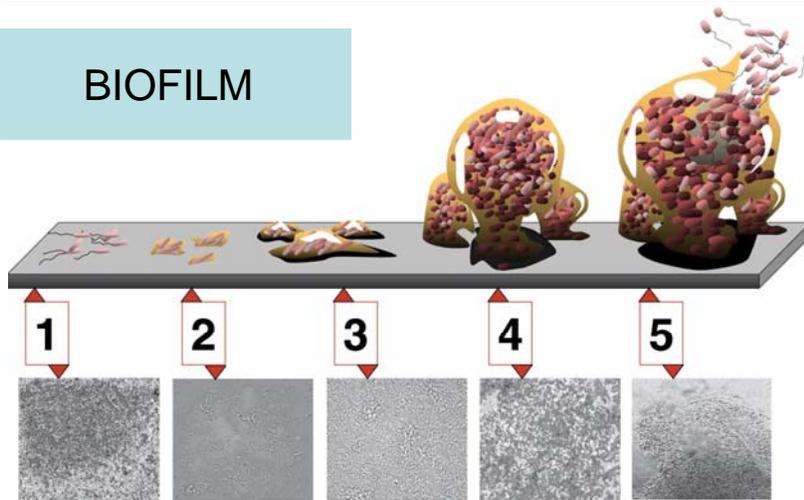


WATER SYSTEM SOURCES FOR BACTERIA



UBIQUITIOUS

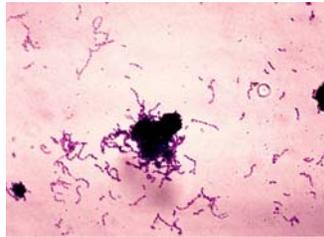
BIOFILM



STAGES

1. Initial attachment
2. Irreversible attachment
3. Maturation I
4. Maturation II
5. **Dispersion**

BIOFILM IN THE MOUTH



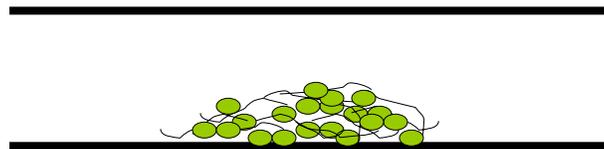
Streptococcus mutans



Dental Plaque

MATURE BIOFILM

SESSILE BACTERIA IN POLYSACCHARIDE MATRIX



TERMINOLOGY

POTABLE	No bacteria (colonies) in <u>95% of samples</u>
DISINFECT	Eliminate pathogens
SANITIZE	<u>Safe</u> for public health
STERILIZE	<u>Complete</u> kill of microorganisms

GENERAL APPROACH

General Cautions	Awareness and consumer education Review actions, and develop/practice good habits Plastic gloves with all wetted parts, esp cartridges
Preventive Maintenance	Routinely sanitize equipment after installation Suggest/conduct sanitize at cart/ bulb changes. Be proactive.
Corrective Maintenance	Have ready procedures to disinfect equipment Maintain lab contact and have procedures
Testing	Have a means to test for dangers

STRATEGIES

	MICROBIOLOGIC EFFECTS
FILTRATION	Remove (Trap)
ULTRAVIOLET LIGHT	Sterilize (DNA)
DRY and LIQUID CHEMICALS	*Oxidize Membranes
OZONE	*Disintegrate
HEAT	*Cook

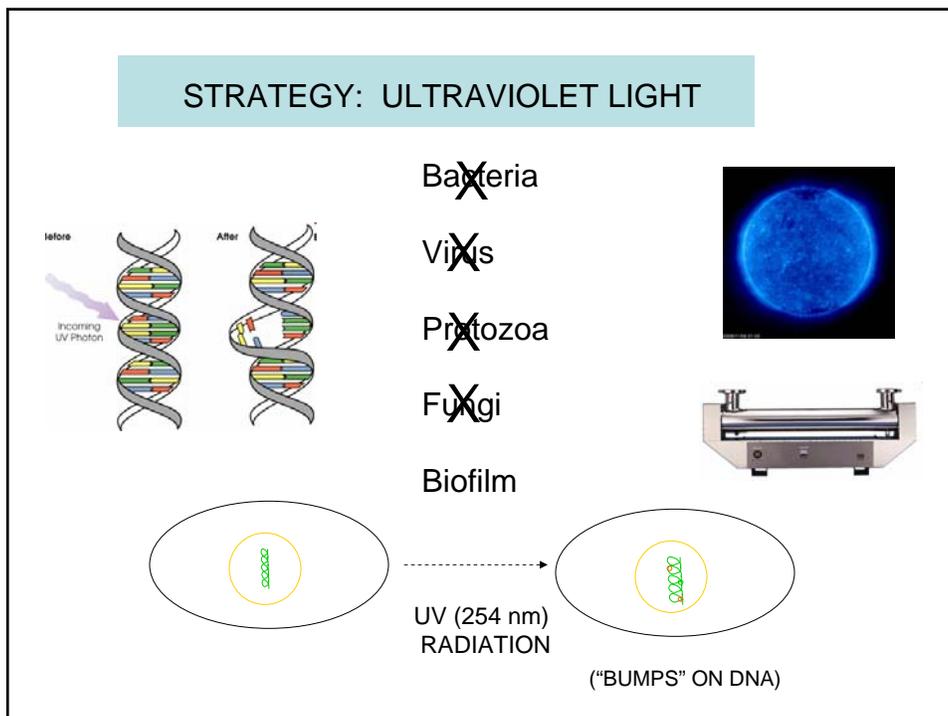
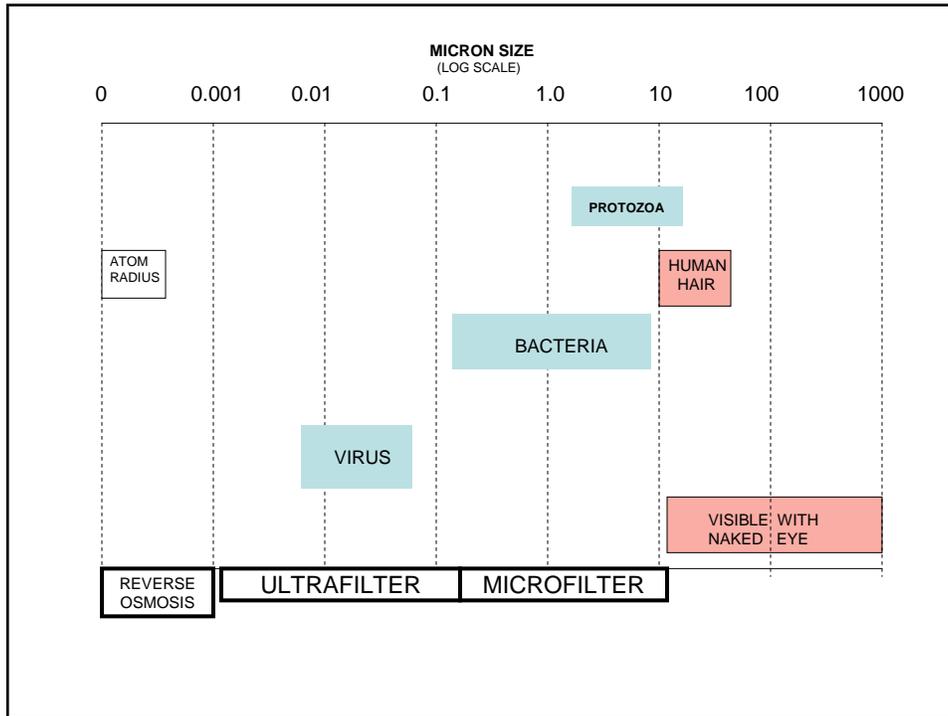
*ENDOTOXIN THREAT

STRATEGY: FILTRATION



Bacteria
~~Viruses~~
~~Protozoa~~
~~Fungi~~
Biofilm





STRATEGY: DRY and LIQUID CHEMICALS



CHLORINE

HYDROGEN PEROXIDE

PARACETIC ACID

Bacteria ~~X~~

Virus ~~X~~

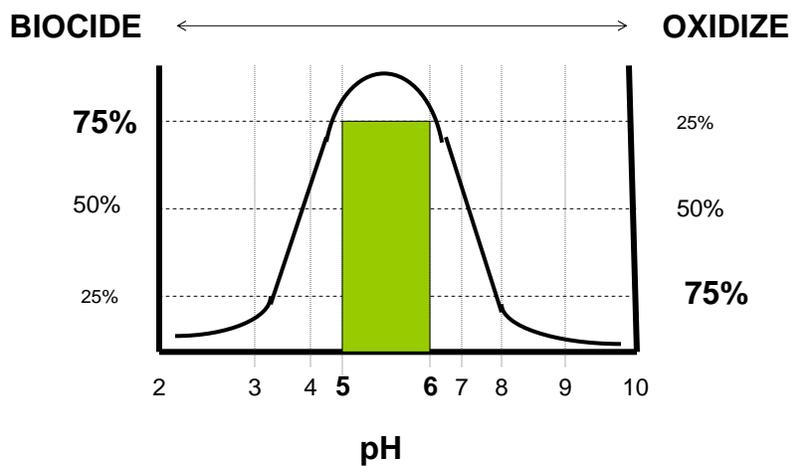
Protozoa ~~X~~

Fungi ~~X~~

Biofilm ~~X~~



CHLORINE AND pH



STRATEGY: OZONE

~~Bacteria~~

~~Virus~~

~~Protozoa~~

~~Fungi~~

~~Biofilm~~



STRATEGY: HEAT

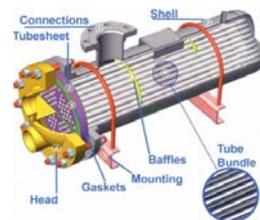
~~Bacteria~~

~~Virus~~

~~Protozoa~~

~~Fungi~~

Biofilm



DISINFECTION PRACTICES

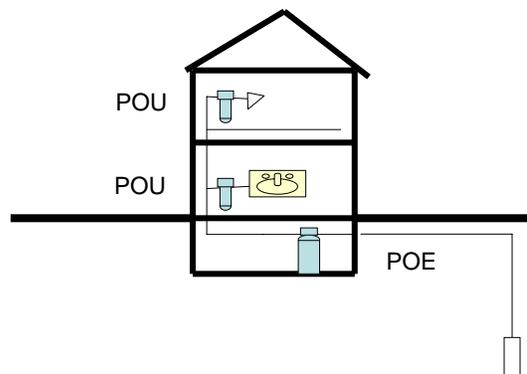
WATER SOFTENER AND FILTER

REVERSE OSMOSIS (MEMBRANES)

ULTRAVIOLET LIGHT

CHLORINE INJECTION

POINT OF USE (POU) OR POINT OF ENTRY (POE)



GENERAL APPROACH TO POU/POE

PRE INSTALLATION	Know/test the microbiology situation Understand the impact upon equipment
INSTALLATION	Personal and tool hygiene Preparation and disinfection of equipment Customer awareness
POST INSTALLATION	Establish routine for retest React to non-routine and threatening events

WATER SOFTENER AND FILTER

PRE INSTALLATION

Well Water	Test for bacteria and algae
Municipal	Confirm chlorine residual

INSTALLATION

1. Install clean equipment, including valve and pipe lengths
2. Use clean tools, including hands and funnels
3. Flush (to drain) installed system.
4. Disinfect system with chlorine
5. Re-flush system

FOLLOW-UP

1. Establish period for flushing and disinfection
2. Establish routine for re-testing for bacteria and biofilm

POU REVERSE OSMOSIS

PRE INSTALLATION

Pretreat for Hardness, Iron and Manganese
Determine if there is a chlorine residual

INSTALLATION

1. Install clean equipment, including tubing and storage tank
2. Use clean tools, including hands
3. Always use plastic gloves for handling cartridges
4. Disinfect individual cartridge housings with chlorine
5. Flush system

FOLLOW-UP

1. Establish period for changing pre and post filters and membrane
2. Always disinfect housings when changing cartridges.
3. Establish routine for system disinfection

ULTRAVIOLET LIGHT

PRE INSTALLATION

Pretreat for Hardness, Iron and Manganese and Turbidity
Well Water Test for bacteria and algae
Municipal Confirm chlorine residual

INSTALLATION

1. Install clean equipment, cylinder and quartz sleeve
2. Use clean tools, including hands
3. Always use gloved hands for handling bulb and quartz sleeve
4. Flush (to drain) installed system.
5. Disinfect system with chlorine
6. Re-flush system

FOLLOW-UP

1. Establish period for bulb change and disinfection
2. Establish routine for re-testing for bacteria and biofilm

CHLORINE INJECTION

PRE INSTALLATION

Test for pH and understand the chemistry
Well Water Test for bacteria and algae
Ensure proper concentration and contact time

INSTALLATION

1. Install clean equipment.
2. Use clean tools, including hands
3. Flush (to drain) installed system.
4. Test and ensure proper dosage
5. Educate owner on recharging system

FOLLOW-UP

1. Establish period for checking dosage
2. Establish routine for re-testing for bacteria

DISINFECTION STRATEGIES AT THE POINT OF ENTRY

THE WAR CAN BE SUCCESSFULLY WAGED
BUT NEVER WON