



Getting the Bugs Out:

Infection Control Concepts

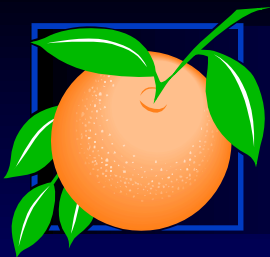
George Ralls MD, FACEP

The background of the slide features a stylized, light blue graphic of leaves and branches. The leaves are elongated with pointed tips and have a central vein. The branches are thin and curved, weaving through the leaves. The entire graphic is rendered in a single shade of blue against a solid dark blue background.

No Disclosures

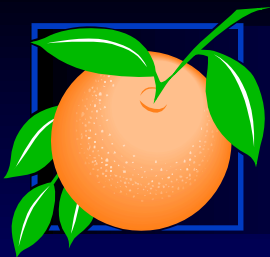
**No studies have identified
quantitative relationships
between microbial
contamination levels and
workplace associated
infection**





Presentation Outline

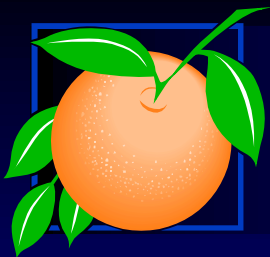
- **Common Pathogens**
 - **MRSA**
 - **Norovirus**
 - **Influenza**
- **Blood-borne Pathogens**
- **Mitigating Exposure Risk and Spread**
- **Summary**



Common Pathogens

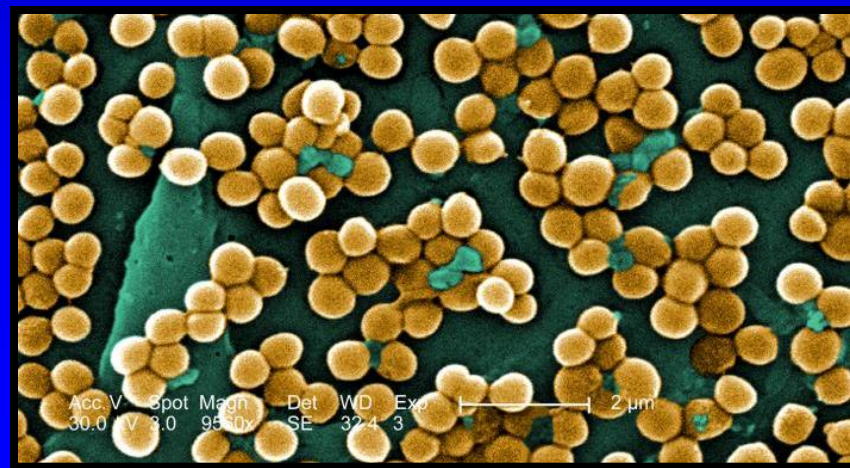
- **Methycillin Resistant Staphylococcus Aureus (MRSA)**
- **Influenza**
- **Norovirus**

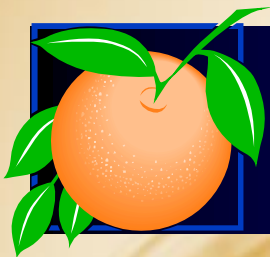




Staphylococcus Aureus

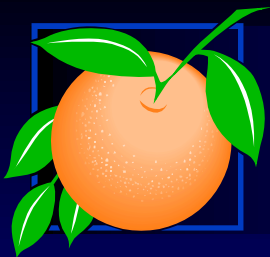
- Often referred to as “Staph”
- Bacteria commonly carried on skin or in nose of healthy people
- A common cause of skin infections in the US
- Most Staph skin infections are minor and easily treated





MRSA

- **Methicillin Resistant Staphylococcus Aureus (MRSA)**
- **A type of Staph resistant to certain antibiotics**
- **Identified in 1961**
 - **Methicillin was a common treatment for staph infections**
- **MRSA more common in hospitals and other healthcare facilities**



MRSA

- **Factors predisposing to MRSA transmission:**
 - **Crowding**
 - **Frequent skin-to-skin contact**
 - **Compromised skin (cuts, scrapes)**
 - **Contaminated items**
 - **Lack of cleanliness**
- **Schools, dormitories, military barracks, correctional facilities, daycare centers**

- **Community-Acquired MRSA (CA-MRSA)**

- No recent healthcare contact
- 85% of cases are NOT serious



- **Healthcare-Associated MRSA (HA-MRSA)**

- Different strain
- More serious than CA-MRSA



What is the Difference?

	CA-MRSA	HA-MRSA
Antibiotic Resistance	Susceptible to many antibiotics (except to beta-lactams)	Multi-drug resistant
Clinical Presentation	Mostly skin and soft tissue Rarely invasive	Commonly invasive
Predominant Age Group	Younger age; children, young adults	Older age; elderly
Risk Factors	Crowding Lack of Cleanliness Frequent Skin-to Skin Contact Compromised Skin Contaminated surfaces/Items	Recent hospitalization History of surgical/invasive medical procedures Presence of permanent medical device passing through the skin

Signs & Symptoms

- Redness
- Warmth
- Swelling
- Tenderness/pain
- Boils or blisters
- May drain serous fluid or pus



Spreading Staph and MRSA

- **Colonization:** Staph can live on your body without causing disease
 - 25% of general population carry staph in nostrils; 1% carry MRSA
- **Autoinfection:** accounts for 1/3 in cases
- **Direct contact:** Lesions draining pus
- **Hands:** Most common instrument of spread



Prevention

Practice good hygiene:

- Keep your hands clean by washing thoroughly with soap and water or using an alcohol-based hand sanitizer
- Keep cuts and scrapes clean and covered with a watertight bandage until healed
- Avoid contact with other people's wounds or bandages
- Avoid sharing personal items such as bed linens, towels, clothing, sheets, and toys with a person who has CA-MRSA infection



How Worried Should We Be About MRSA?

- Invasive MRSA infection remains most frequently associated with healthcare-associated risk factors; it is unusual in otherwise healthy individuals
- CA-MRSA typically is less serious and usually manifest as skin and soft tissue infections
- The incidence of invasive CA-MRSA infection remains extremely low, however, a small risk for serious or life-threatening infections does exist
- We should take notice of the continued emergence of this form of MRSA within the community and take positive steps to minimize transmission, but we need not react out of proportion to the risk

**MRSA transmitted from
a colonized person to
household contacts in
approximately 50% of
cases**



**Over 25 studies
reported clear evidence
of MRSA transmission
from health-care
workers to patients**



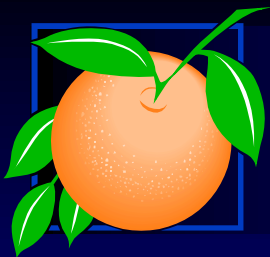


NOROVIRUS



- **Great Escape Lodge & Indoor Water Park**
 - New York resort linked to the illness of nearly 400 people
- **University of Connecticut Sorority**
 - 30 Sorority Women treated at the infirmary after dining at the Adams Mill Restaurant
- **Villanova University**
 - Over 100 hundred students became sick
- **Royal Caribbean Cruise Ship**
 - One passenger unleashed Norovirus that sickened 116 passengers.
 - Ship returned to port and underwent deep cleansing & decontamination.

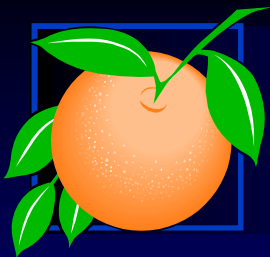
NOROVIRUS IS SUSPECTED



Norovirus

- ❖ **A viral infection(stomach flu)**
- ❖ **Causes severe inflammation of the gastrointestinal tract**
- ❖ **Common cause of food poisoning**
- ❖ **Strikes quickly, feel very sick**
- ❖ **Symptoms last 1-2 days**
- ❖ **No long-term health effects**
- ❖ **Dehydration may require medical attention**

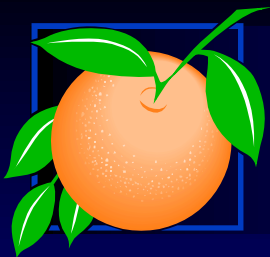




Symptoms of Norovirus

- **Nausea**
- **Vomiting**
- **Diarrhea**
- **Abdominal cramps**
- **Fever**
- **Dehydration**





Spreading Norovirus

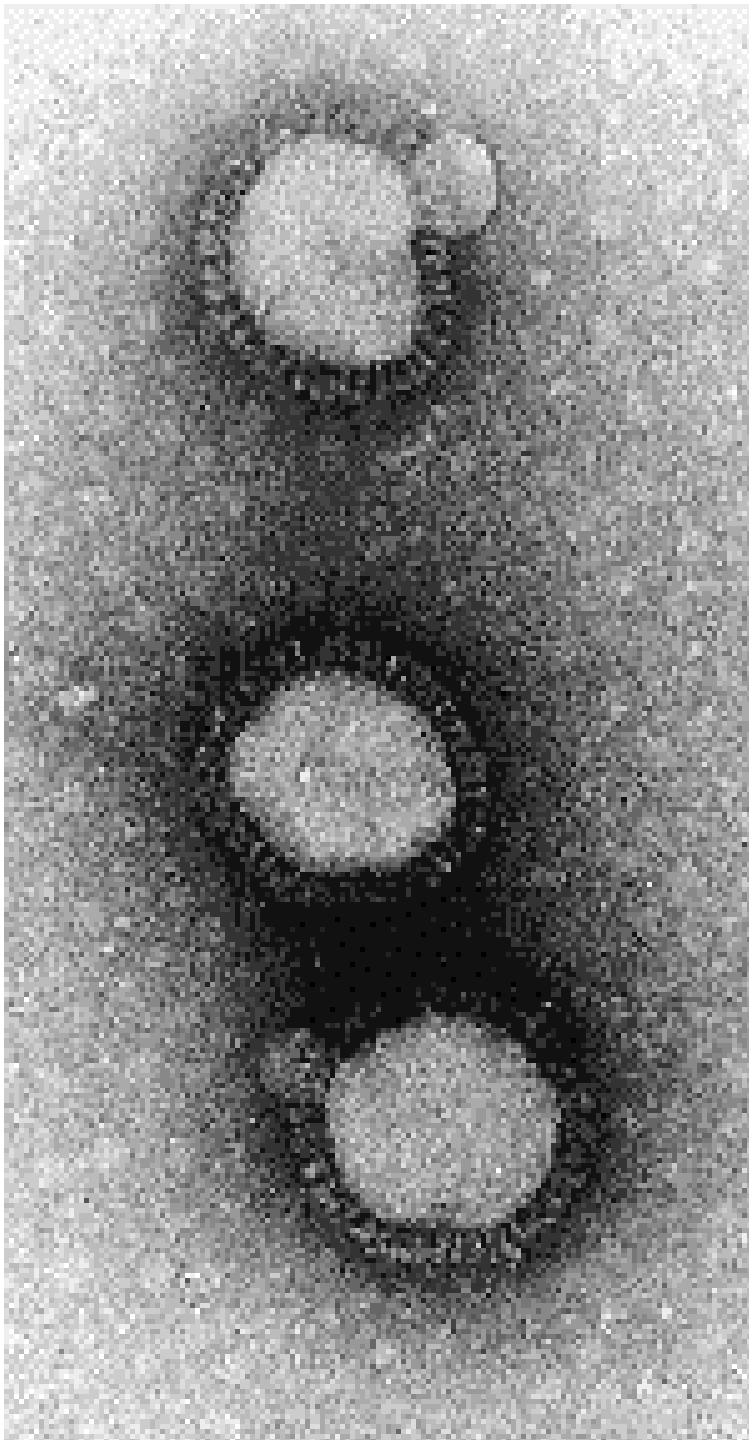
- **Primarily from one infected person to another (by fecal-oral route)**
- **Kitchen workers can contaminate a salad or sandwich as they prepare it**
- **Fishermen can contaminate oysters**
- **Norovirus infection has become a genuine plague on cruise ships**

NOROVIRUS IS EXTREMELY CONTAGIOUS

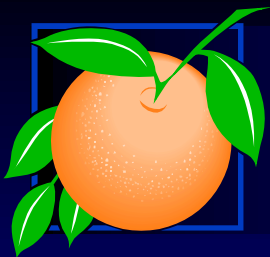
How Do People Become Infected with Noroviruses?

- **Eating food or drinking liquids that are contaminated with Norovirus**
- **Touching surfaces or objects and placing their hand in their mouth**
- **Direct contact with another person who is infected**





INFLUENZA

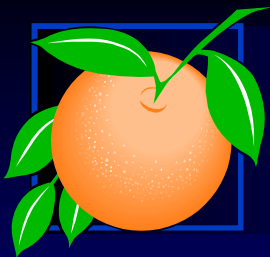


'The FLU'

- True **Influenza**
 - influenza virus A or influenza virus B
 - Many other viruses are associated with respiratory tract infections



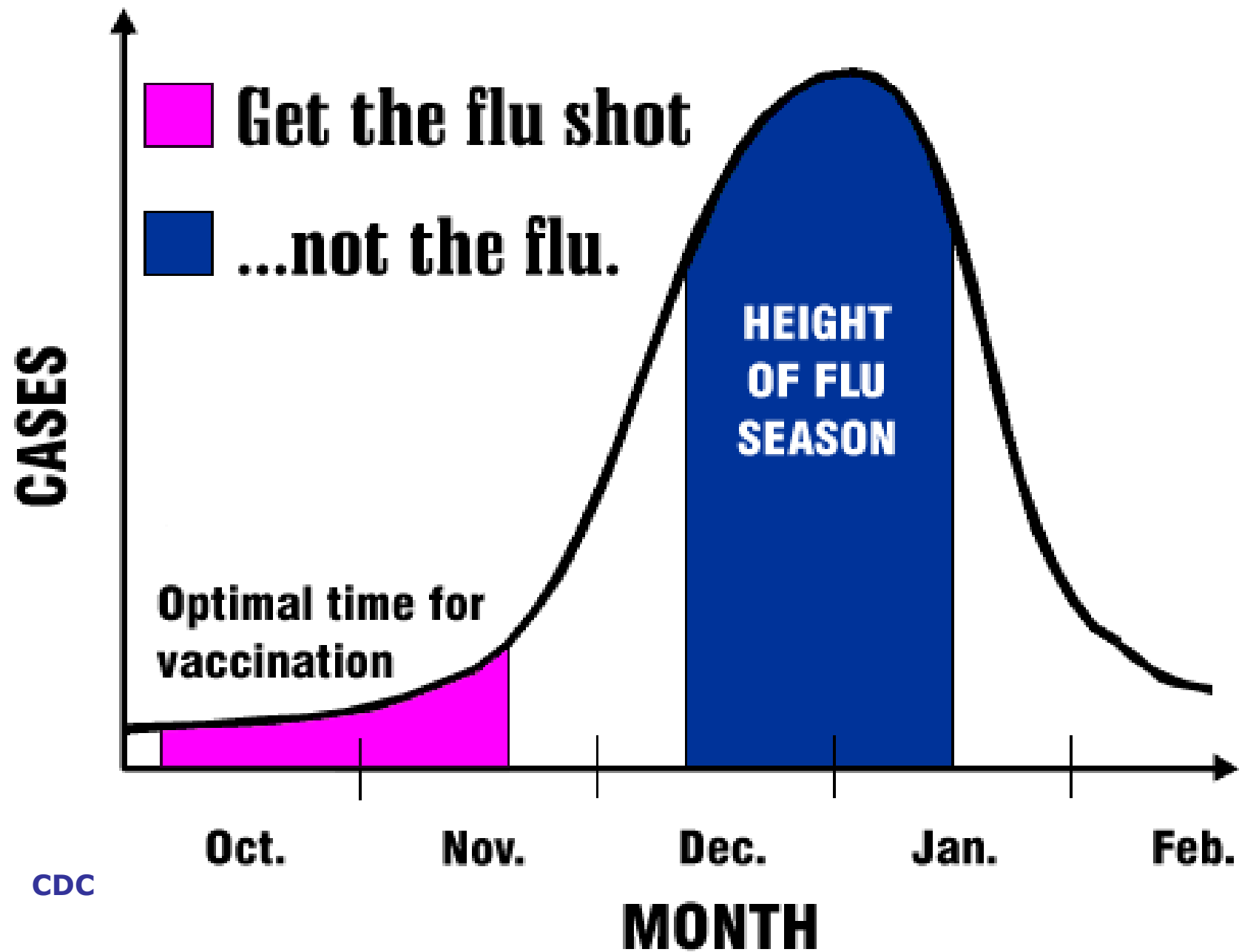
- FEVER
- HEADACHE
- MYALGIA
- COUGH
- RHINITIS
- NAUSEA/VOMITING
- OCULAR SYMPTOMS

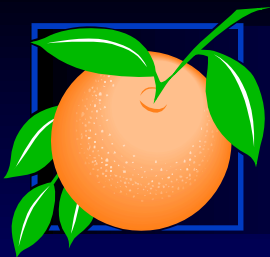


Influenza

- **Significant morbidity and mortality**
- **Lost productivity**
 - Missed work days
- **Hospitalizations**
 - Approximately 100,000 per year
- **Deaths**
 - 20,000 to 40,000 deaths each year in the US

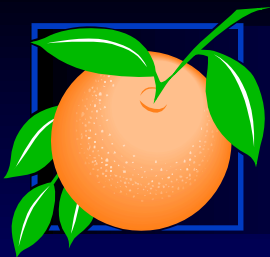




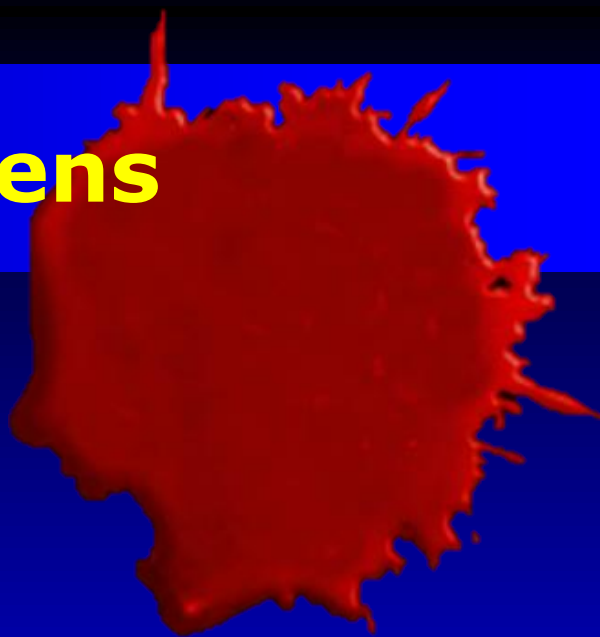


Presentation Outline

- **Common Pathogens**
 - Norovirus
 - Influenza
- **Blood-borne Pathogens**
- **Mitigating Exposure Risk and Spread**
- **Summary**



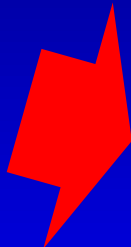
Blood-borne Pathogens



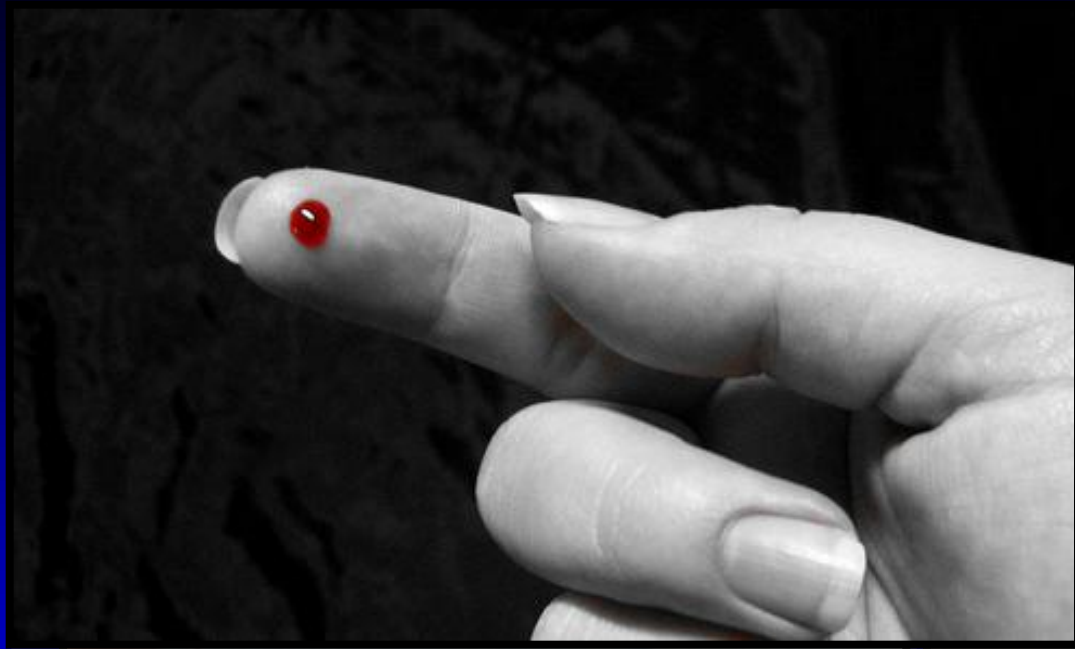
HIV

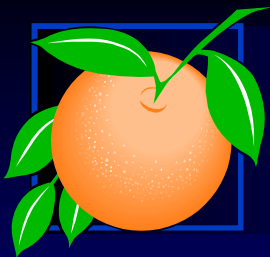
Hepatitis B

Hepatitis C



- **Health Care Workers**
 - **Corrections**
- **Dental Workers**
- **First Responders**





Blood-borne Pathogens

HIV

Hepatitis B

Hepatitis C



TABLE 1. Recommended HIV postexposure prophylaxis (PEP) for percutaneous injuries

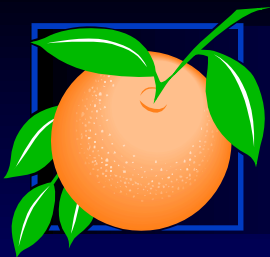
Exposure type	Infection status of source				
	HIV-positive, class 1*	HIV-positive, class 2*	Source of unknown HIV status†	Unknown source§	HIV-negative
Less severe¶	Recommend basic 2-drug PEP	Recommend expanded ≥3-drug PEP	Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors††	Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely	No PEP warranted
More severe§§	Recommend expanded 3-drug PEP	Recommend expanded ≥3-drug PEP	Generally, no PEP warranted; however, consider basic 2-drug PEP** for source with HIV risk factors††	Generally, no PEP warranted; however, consider basic 2-drug PEP** in settings in which exposure to HIV-infected persons is likely	No PEP warranted

HIV



TABLE 2. Recommended HIV postexposure prophylaxis (PEP) for mucous membrane exposures and nonint

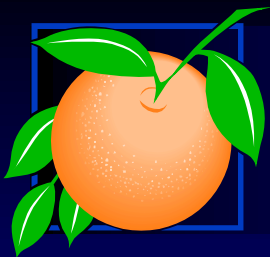
Exposure type	Infection status of source				
	HIV-positive, class 1†	HIV-positive, class 2†	Source of unknown HIV status§	Unknown source¶	HIV-negative
Small volume**	Consider basic 2-drug PEP††	Recommend basic 2-drug PEP	Generally, no PEP warranted§§	Generally, no PEP warranted	No PEP warranted
Large volume¶¶	Recommend basic 2-drug PEP	Recommend expanded ≥3-drug PEP	Generally, no PEP warranted; however, consider basic 2-drug PEP†† for source with HIV risk factors§§	Generally, no PEP warranted; however, consider basic 2-drug PEP†† in settings in which exposure to HIV-infected persons is likely	No PEP warranted



Concerning Pathogens

- Vancomycin Resistant Enterococcus (**VRE**)
- Clostridium Difficile (**C. Diff**)



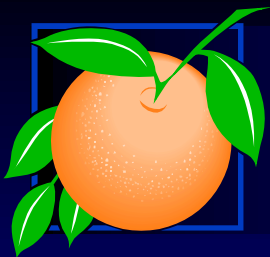


Concerning Pathogens

Bioterrorism



- **Anthrax**
- **Plague**
- **Small Pox**
- **Botulism**
- **Tularemia**
- **Hemorrhagic Fever**



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Cleaning: Removal of visible soil from objects and surfaces accomplished manually

Disinfection: Eliminates many or all microorganisms, except bacterial spores

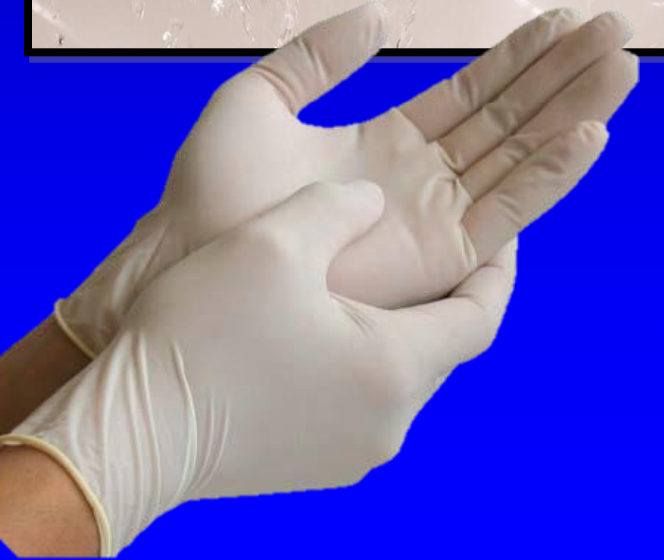
Sterilization: Destroys or eliminates all forms of microbial life



Critical items: Enter sterile tissue

Semi-critical items: Contact mucous membranes or non-intact skin

Noncritical items: Contact intact skin

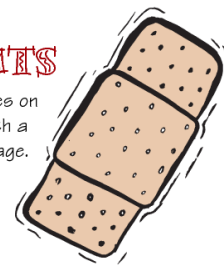


UNIVERSAL PRECAUTIONS

To avoid getting infected with HIV, Hepatitis B or C or another communicable disease, use the following precautions when you come into contact with any body fluids or fecal matter. In order to be safe and not to discriminate, assume that everyone is infectious.

COVER CUTS

If you have cuts or open sores on your skin, cover them with a plastic bandage.



WEAR GLOVES

If there is any risk of coming into contact with blood or other body fluids, wear latex gloves. Gloves should only be worn once and disposed of in a plastic garbage bag.



WASH HANDS

Wash your hands with soap and hot water for at least 20 seconds after you have had contact with blood or other body fluids, after going to the bathroom, before preparing or eating food, and after removing latex gloves. Use hand lotion to help keep your hands from becoming chapped or irritated. Intact skin is your first defense against infection!



DISCARD GARBAGE

Use caution when disposing of garbage and other waste that may contain infected materials or used needles. Discard material soiled with blood or other body fluids in a sealed plastic bag.



CLEAN UP

Spills of blood or other body fluids should be cleaned up with a fresh mixture of household bleach (1 part) and water (9 parts). Paper towels should be used and disposed of in a plastic garbage bag. Remember to wear latex gloves during clean-up.



WASH CLOTHES

Soiled items should be stored in sealed plastic bags. Wash soiled clothing separately in hot soapy water and dry in a hot dryer, or have clothes dry-cleaned.



For more copies of this poster or other documents on HIV/AIDS, contact the Canadian HIV/AIDS Information Centre
 ☎ 877-939-7740 ☎ 613-725-1205
 ✉ aldeida@cpha.ca www.aldeida.cpha.ca

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Dri-Mist® Micro-Particle Generator





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 Vision 290™

Select a Vehicle

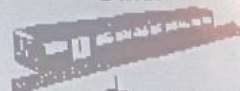
Automobile



SUV



Other



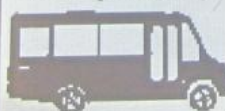
EMS / Van



EMS (Extended)



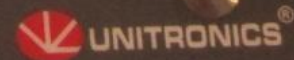
Bus (Shuttle)



Bus (Full Size)



Esc



⚠ WARNING

USE ZIMEK PRODUCTS ONLY



The background image shows the interior of a vehicle or a small container. It is filled with a thick, white fog or mist. Several bright, circular overhead lights are visible, casting a glow through the haze. In the lower foreground, a red cooler or storage box sits on a light blue surface. The overall atmosphere is dim and obscured by the fog.

14 minute dry-mist cycle

10 minute wait/kill time

24 minutes total



Treatment COMPLETE

Job # 1018

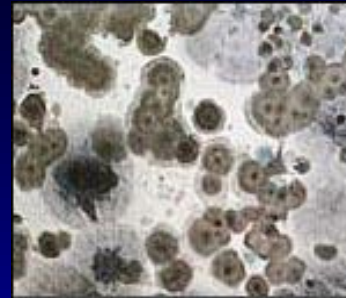
Loc: M24

**Disconnect VDO, Replace
Exhaust Cover and Clean the
Inside of All Windows Prior to
Operating the Vehicle.**

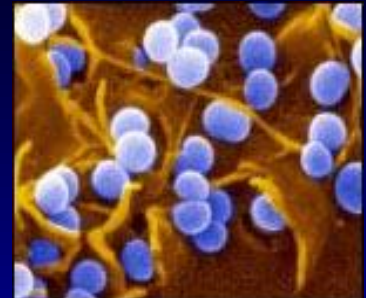
OK



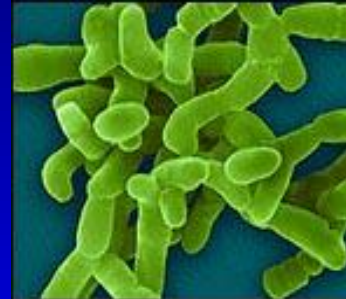
- Easy to use and implement
- Safe for electronics
- No toxic residue
- Short unit down time
- Does not eliminate spore forming bacteria
 - Anthrax
 - C. Diff



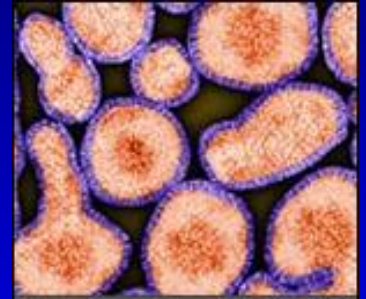
Toxic Mold



MRSA



Tuberculosis (TB)



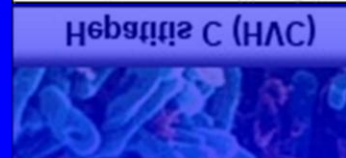
Influenza



Hepatitis C (HVC)



Norwalk Virus



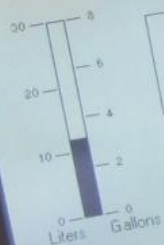
Hepatitis C (HVC)



Norwalk Virus

Vision290™

Spray / Drain



OFF

ON

Exit

UNITRONICS®

WARNING
USE ZIMEK PRODUCTS ONLY

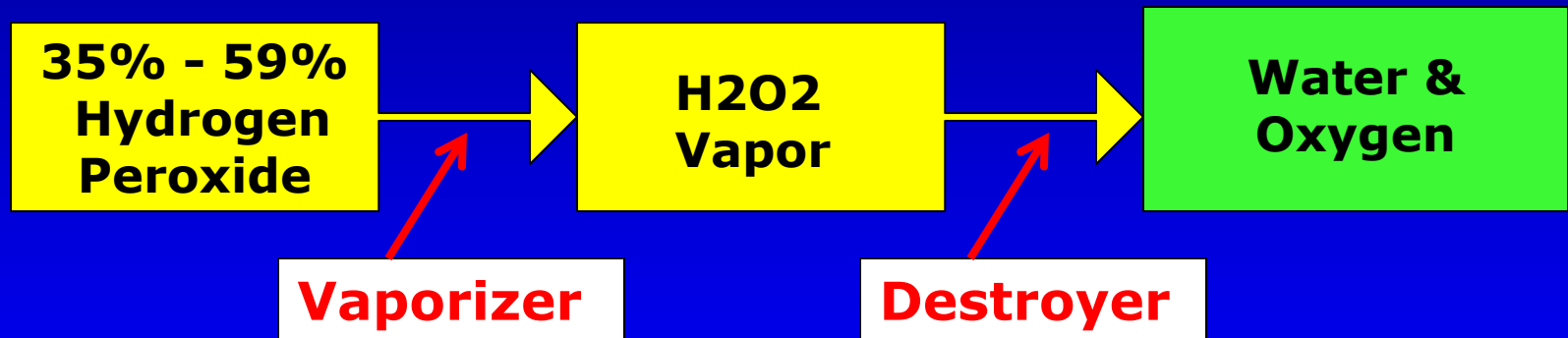
ZIMEK
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ZIMEK





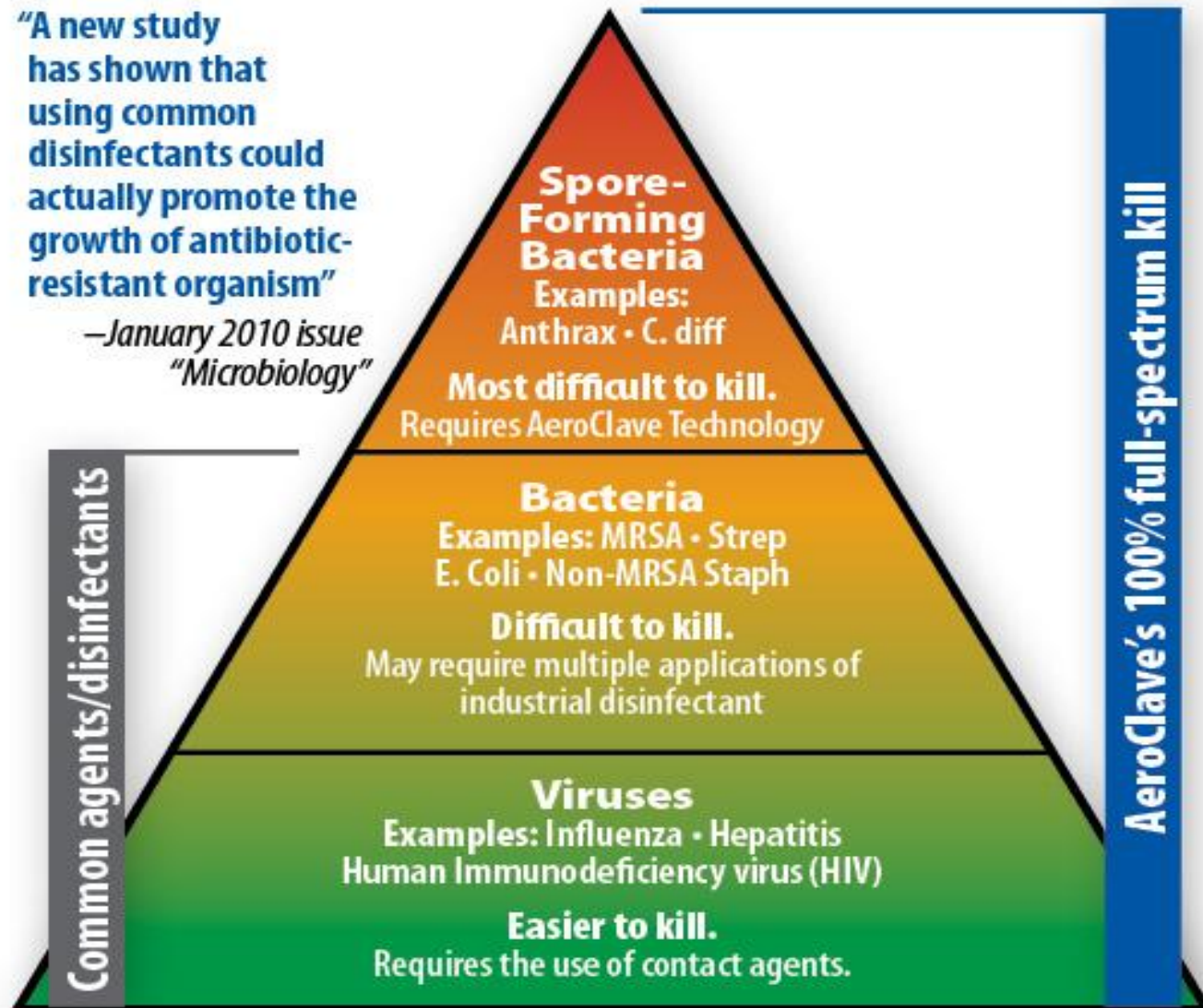




Vaporized Hydrogen Peroxide (VHP®)

**"A new study
has shown that
using common
disinfectants could
actually promote the
growth of antibiotic-
resistant organism"**

*—January 2010 issue
"Microbiology"*

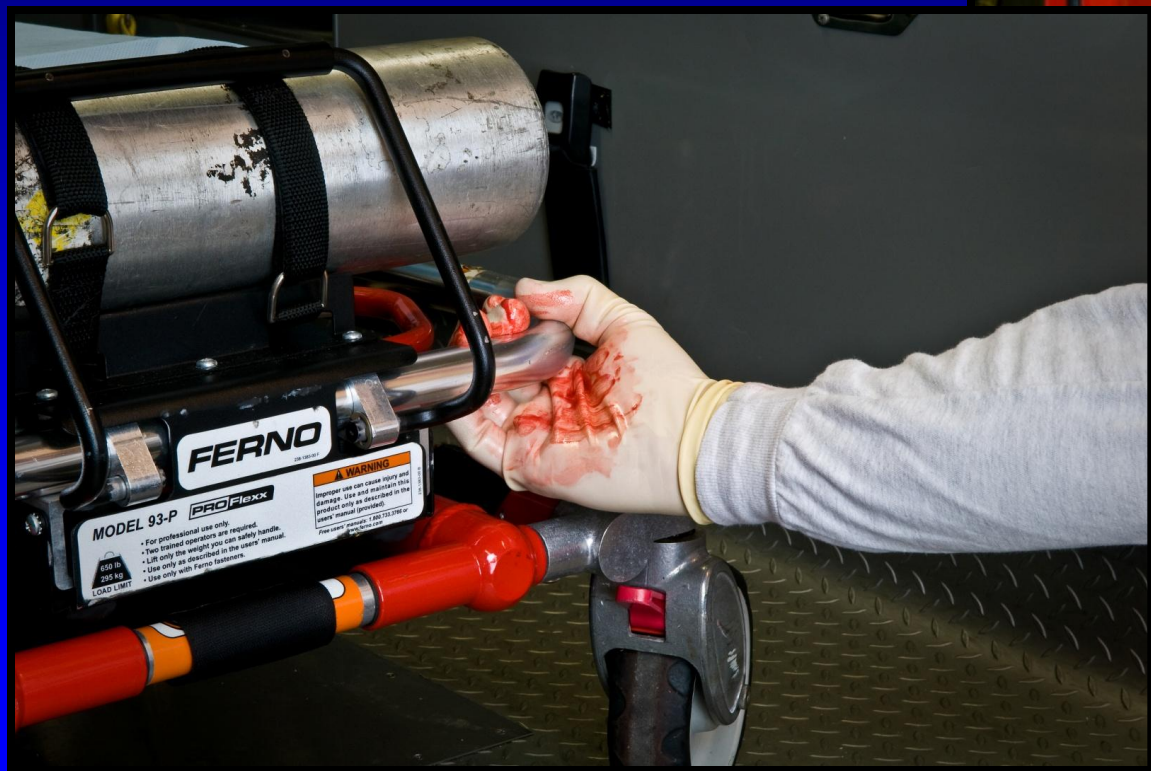


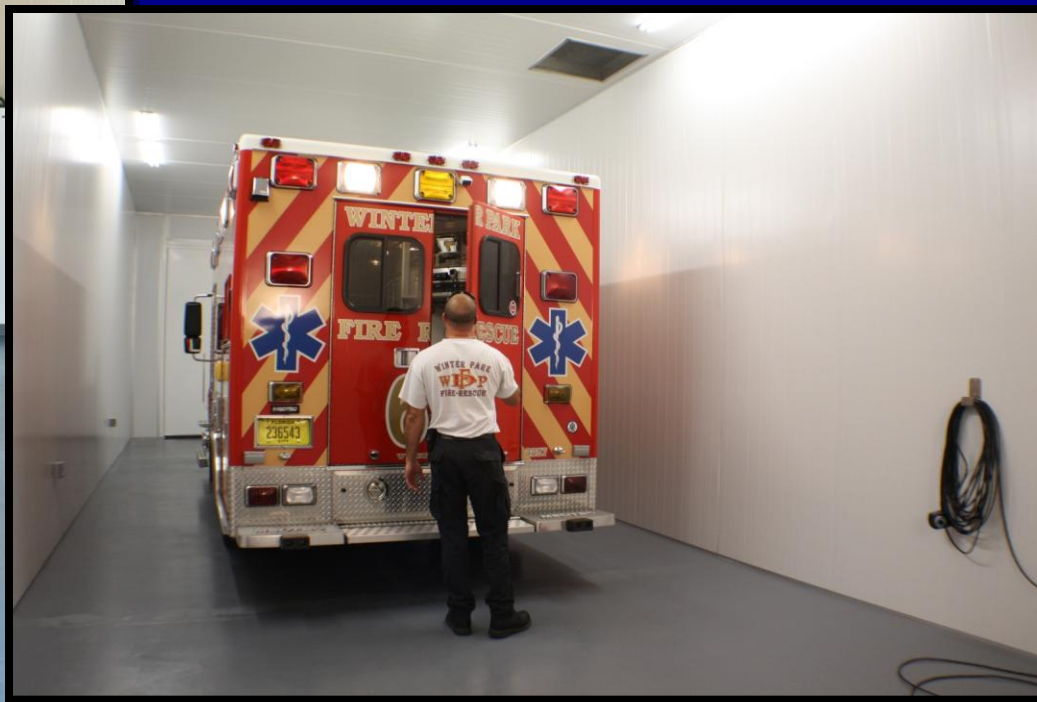
AeroClave's technology is the most cost-effective process to kill the full-spectrum of diseases from easy to kill viruses to spore-forming bacteria.

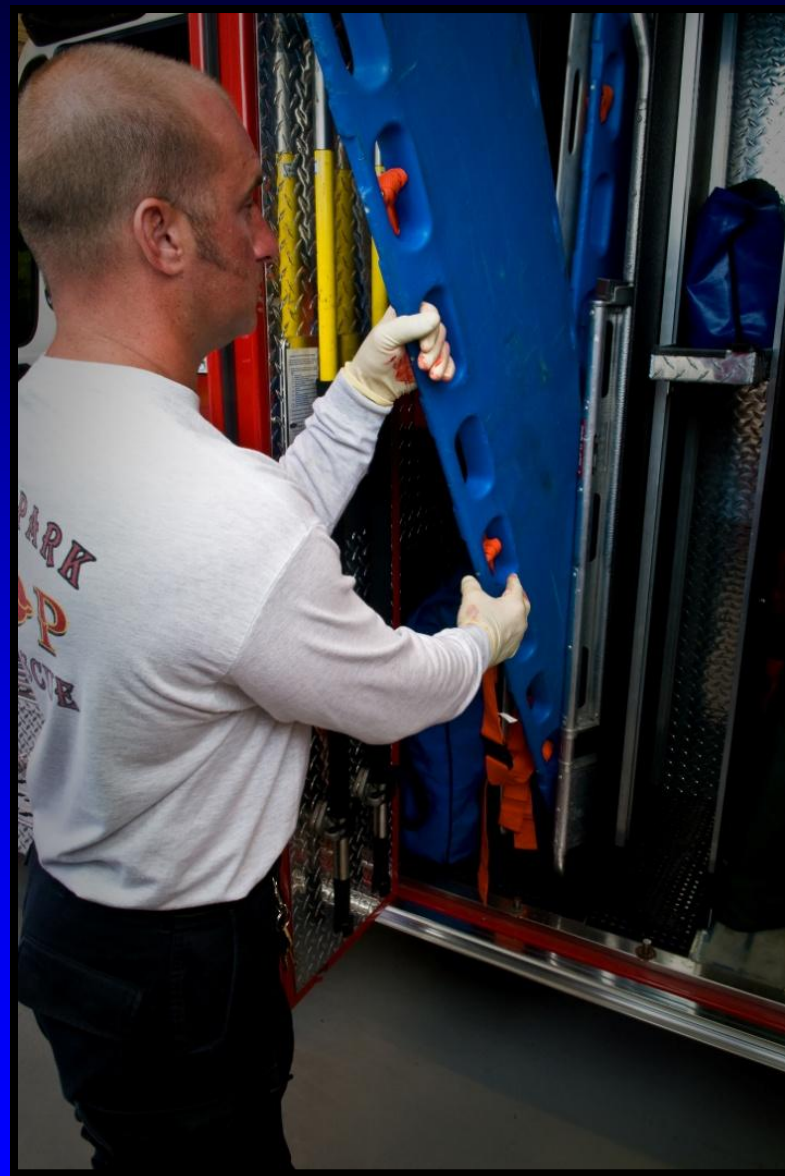




P.A.D.S.



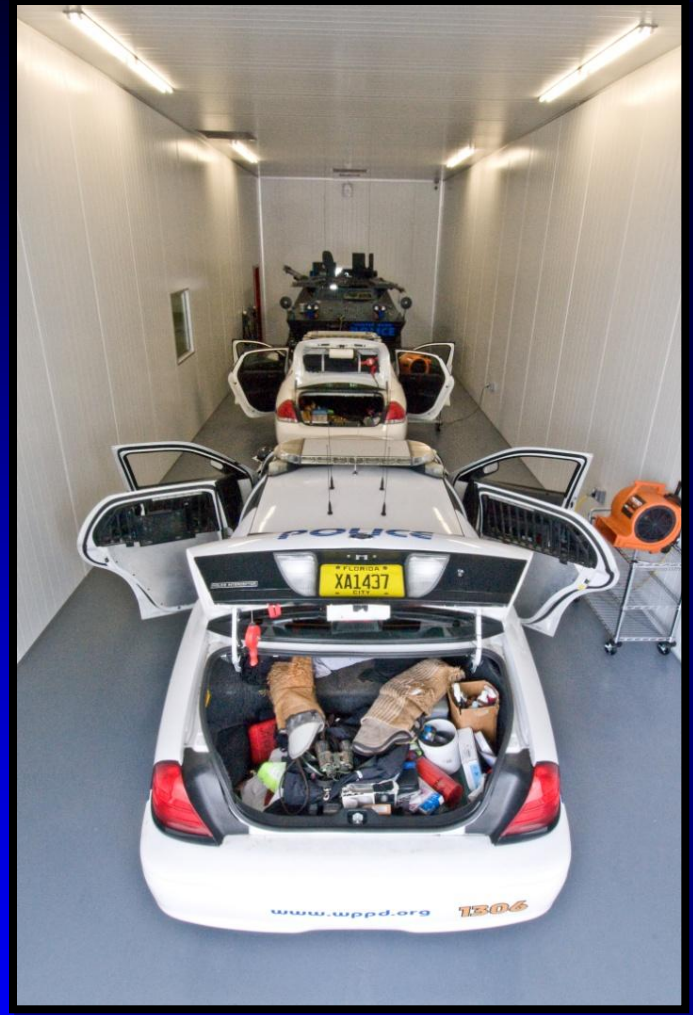








2 Hour Cycle Time



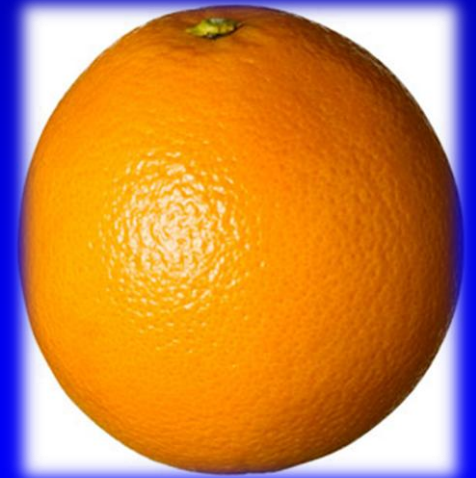
- **Zimek:**

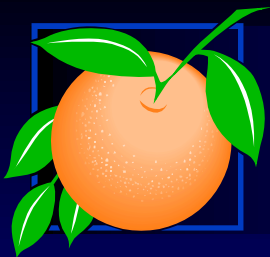
- **\$53,000**
- **\$5.00 per cycle**
- **Disinfectant; not sporicidal**
- **24 minute cycle time**



- **Aeroclave:**

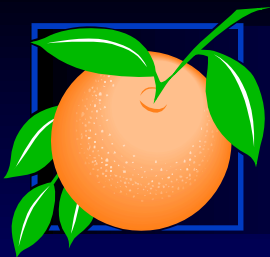
- **P.A.D.S. set up \$250,000**
- **\$56.00 per cycle**
- **Sterilization; kills all organisms**
- **2 hour cycle time**





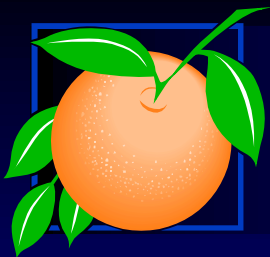
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Summary

- **Develop a policy**
 - **It doesn't need to be expensive or complicated**
 - **Take fear out of the equation**
- **MRSA, Norovirus and Influenza exposure risk can be controlled with simple measures**
- **Risk of blood-borne pathogen exposure is an issue for healthcare workers, dental workers and first responders**



Summary

- **Exposure to blood-borne pathogens can be reduced by using universal precautions if dealing with bodily fluids**
- **If a significant exposure occurs seek medical attention promptly**
 - **Starting PEP is time sensitive**



Getting the Bugs Out:

Infection Control Concepts