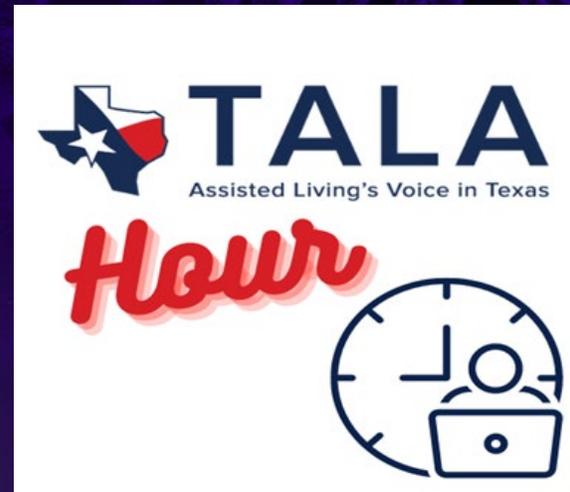




ELIMINATING PATHOGENS In Assisted Living Facilities

Evaluating the Efficacy & Usability of common disinfection application methods such as spray-and-wipe, electrostatic sprayers, UV light and whole-room disinfection using vaporized and dry-fog hydrogen peroxide.

TALA Hour
Friday August 6th, 2021





WELCOME!

About the Speaker:

Maryalice StClair, Chief Commercial Officer



Since 2013, Maryalice has worked with healthcare facilities to develop protocols for effective surface disinfection. She educates staff members in best practices to help meet infection control goals across a variety of healthcare settings including acute, rehab, assisted, and long-term care facilities.

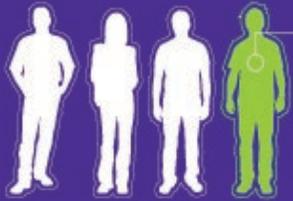
About Halosil International:

- Established in 2008
- Headquartered in Wilmington, Delaware
- First EPA Registered Dry Mist Fogging System (2013)
- HaloMist Disinfectant on EPA List N, both dry fog and spray application
- Small Business
- GSA Contract and ECAT Contract

Why is Surface Disinfection Important in an Assisted Living Facility?

Healthcare-Associated/Acquired Infections are infections people get while they are receiving health care for another condition.

Incomplete disinfection is a leading cause of HAIs. Research tells us that manual methods of disinfection alone are not sufficient for combating the threat of sickness and death caused by healthcare-associated infections (HAIs) per year.



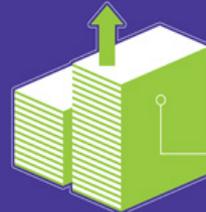
1 in 31 patients will contract an HAI during their hospital stay.



75,000 people in the U.S. die from HAIs each year, 38% from *C. difficile*.



If 25% of HAIs were prevented, annual cost savings would be \$11.3 billion.



Reimbursement penalties to hospitals for HAIs are increasing every year.

Both Healthcare Acquired and Community Acquired Infections Can Be Present in Assisted Living Facilities

Nosocomial vs Community Acquired Infection		
	More Information Online WWW.DIFFERENCEBETWEEN.COM	
	Nosocomial Infection	Community Acquired Infection
DEFINITION	Infections contracted within hospital or those not becoming clinically apparent til the discharge of the patient or infections contracted by the health care professionals as a result of their direct or indirect contact with the patients	Infections that are contracted outside the hospital or those who become clinically apparent within 48 hours from the hospital admission are community acquired infections.
MEANS OF CONTRACTING THE INFECTION	The patient contracts the disease during the hospital stay.	The disease is contracted by the patient before getting admitted to the hospital.

<https://i2.wp.com/www.differencebetween.com/wp-content/uploads/2018/08/Difference-Between-Nosocomial-and-Community-Acquired-Infection-Tabular-Form.jpg?w=730&ssl=1>

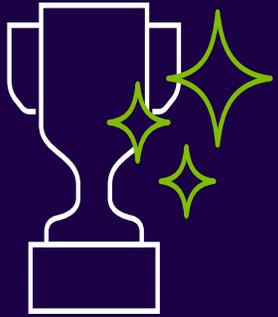
Disinfection in an Evolving Landscape

The emergence of COVID-19, coupled with deadly and hard-to-kill pathogens like *C. difficile*, has challenged almost everyone to re-evaluate their standards and processes for disinfection

- In 13 months, June 2020 to June 2021 - 105,000 residents and 40,000 staff died from COVID-19 in U.S. nursing homes.
 - 40,000 residents and staff died in 2020 before national counts were coordinated
- Current staff death rates in Texas are about 4X the national average; 8 out of 35 deaths in the US were in Texas.
- Texas nursing homes have a smaller percentage of confirmed resident cases (2.4%) than the national average (5.2%).
- Since the beginning of the pandemic, 95.5% of nursing homes nationally, and **97.5%** of Texas nursing homes have had confirmed cases of COVID-19 (about 1.2 million cases).

To effectively eliminate pathogens, healthcare facilities are increasingly relying on a variety of disinfection tools and methods to ensure no pathogens slip through the cracks.

Disinfection in an Evolving Healthcare Landscape



By its very nature, the healthcare industry has been at the forefront of **SANITIZING AND DISINFECTION EFFORTS.**

Pathogens that can cause infections include:

C. difficile, C. auris

SARS-CoV-2

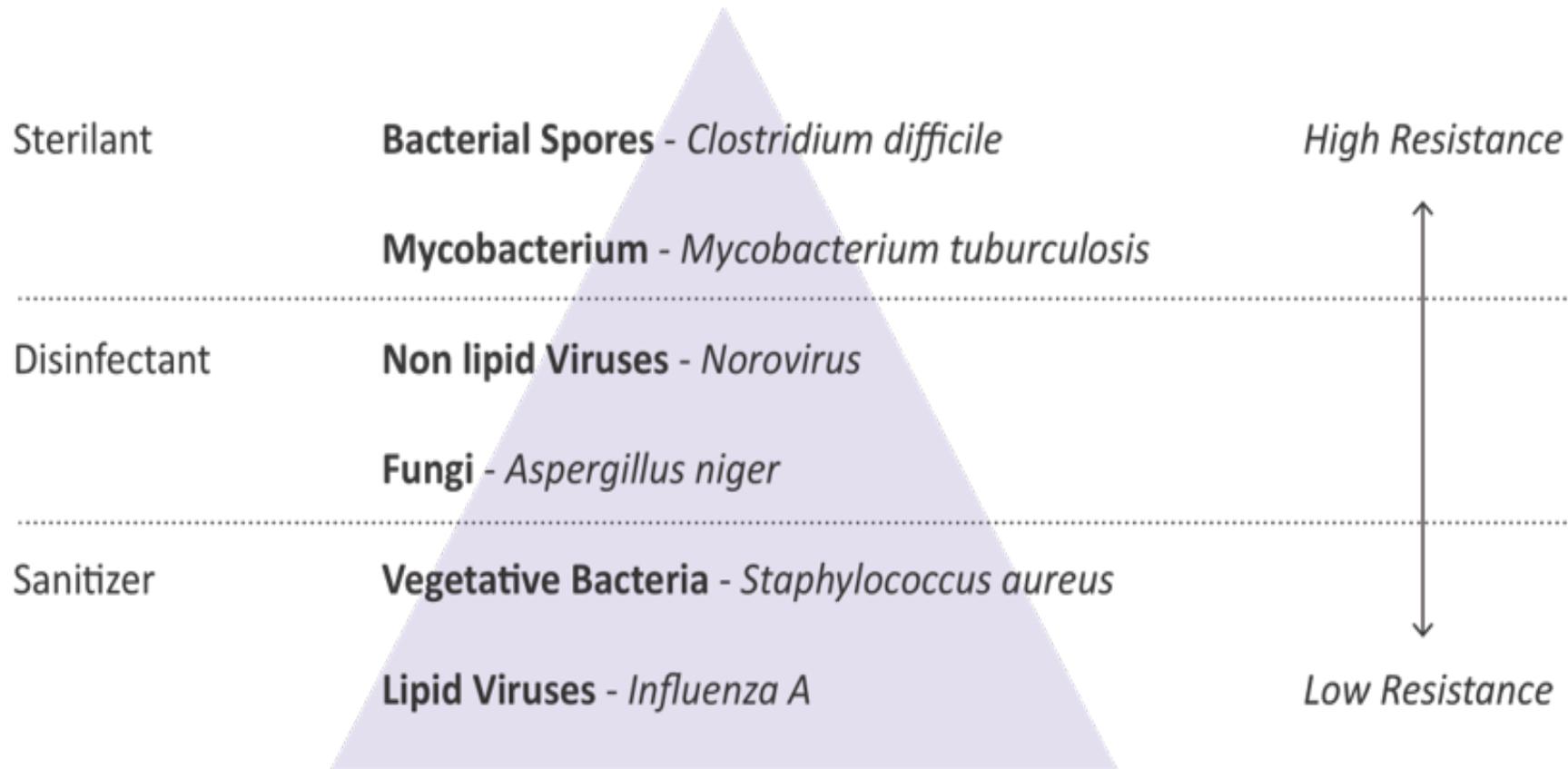
Methicillin-resistant Staphylococcus aureus

Norovirus

Pseudomonas aeruginosa

Staphylococcus aureus

Spaulding Hierarchy of Pathogen Resistance to Disinfectants



This hierarchy considers broad classifications of microbial categories. It is considered a rough guide to general susceptibility of microorganisms to disinfectants.

Sterilant/Sporicide

A "sterilizer" is an antimicrobial pesticide that destroys or eliminates all forms of microbial life in the inanimate environment, including bacterial spores. The term "sporicide" is an EPA term deemed to be synonymous with "sterilizer". Since sterilization includes eradication of all living microorganisms, such claims are intrinsically related to protection of human health.

Disinfectant

A chemical that destroys at least 99.99% of the vegetative forms of harmful microorganisms but does not ordinarily kill bacterial spores. A **Disinfectant Cleaner** cleans and disinfects in the presence of 5% artificial soil.

Sanitizer

EPA considers an antimicrobial to be a sanitizer when it reduces but does not necessarily... eliminate all the microorganisms on a treated surface. To be a registered sanitizer, the test results for a product must show a reduction of at least 99.9% in the number of each test microorganism over the parallel control.

Cleaner

A substance or mixture of substances (such as chemical or biological substances) that is intended to clean away or remove inanimate material from a surface, water or air, and that makes no pesticide claims.

Why is the EPA important?

- EPA is the US regulatory agency for pesticides.
- Anti-microbial disinfectants are regulated as pesticides.
- To legally sell a disinfectant it must be approved by the EPA and have a registration “label.”
- The label lists which pathogens a disinfectant has proven to the EPA that it can kill.
- Kill claims show the effectiveness of a disinfectant to kill germs
- EPA is sole regulator for disinfectants used on non-critical surfaces(e.g. bed rails)
- Disinfectants used on critical surfaces (e.g. surgical instruments) are regulated as sterilants by the FDA.

What is a LOG Kill ??

Disinfection methods vary and so does their effectiveness.

A disinfection technology's ability to kill bacteria wherever it reaches is vital to your infection prevention strategy's success. This cannot be overstated. It takes but a few pathogens to infect a patient. 'Almost disinfected' simply isn't enough.

*With 1,000,000
Microorganisms
present*

Sanitizer		Disinfectant				Sporicide
1-LOG KILL	2-LOG KILL	3-LOG KILL	4-LOG KILL	5-LOG KILL	6-LOG KILL	
90%	99%	99.9%	99.99%	99.999%	99.9999%	
100,000 Microorganisms Remain	10,000 Microorganisms Remain	1,000 Microorganisms Remain	100 Microorganisms Remain	10 Microorganisms Remain	1 Microorganism Remains	

Classification of Pathogens That Can Be Found in Assisted Living Facilities

Most Susceptible to Disinfectants

Most Resistant to Disinfectants

ENVELOPED VIRUSES

BACTERIA

FUNGI

NON-ENVELOPED VIRUSES

SPORES



- SARS-CoV-2**
- HIV type 1 (HIV-1)
- Influenza A (Hong Kong)
- Avian Influenza A (H5N1)
- Swine Influenza A (H1N1)

The Flu

- *Pseudomonas aeruginosa*
- *Staphylococcus aureus*
- *Staphylococcus aureus* (MRSA)
- *Escherichia coli*
- *Salmonella enterica*
- *Proteus mirabilis*
- *Enterobacter aerogenes*

MRSA & Staph

- *Trichophyton mentagrophytes*
- *Aspergillus niger*

Mold & Mildew

- Norovirus
- Enterovirus D68
- Rhinovirus type 37
- Minute Virus of Mice
- Feline Calicivirus

Colds & Norovirus

- *Clostridioides difficile* spores*

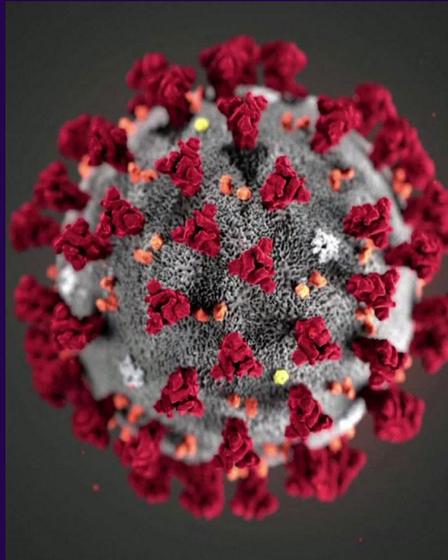
Spores

* Sporocidal claim applies only when fogged by a HaloFogger.

** Meets EPA guidance for emergent pathogen disinfection

What are the EPA Lists N & K ?

SARS-CoV-2



Pathogen that causes COVID-19

EPA created List N of products expected to kill the coronavirus SARS-CoV-2 when used according to label instructions.

Candida auris (C. auris)



Multi-drug resistant fungus with 30-60% mortality rate

The CDC guidance includes using products included on EPA List K for use against *C. difficile*.

Surface Disinfection and Sanitization Methods

- ❖ Chemical
- ❖ Physical

- *Advantages*
- *Disadvantages*
- *Ideal Uses*

The Bundled Approach
Disinfection of Noncritical Surfaces Bundle



Develop policies and procedures:

- Select cleaning and disinfecting products
- Educate staff-environmental services and nursing
- Monitor compliance (thoroughness of cleaning, product use) and feedback
- Implement “no touch” room decontamination technology and monitor compliance

Identifying Methods of Disinfection

SPRAY AND WIPE

✔ Benefits

- Often used with patients and staff in the room
- Little training required
- Generally low-cost disinfectants

⊗ Disadvantages

- Must **thoroughly wet** all surfaces, wait for contact time, and wipe
- Human error reduces efficacy, less than 50% of surfaces treated.
- Expose applicators to potentially hazardous chemicals

⊗ Ideal Uses

- Specific “high touch” surfaces (e.g., door handles, bed rails, elevator buttons, toilet handles)
- Small, easily identified surfaces

Using **Sprays and Wipes** for Surface Disinfection: Reduced Effectiveness, Increased Labor Costs, but Needed



- **Use in Occupied Rooms** – High touch areas will always need disinfection
Healthcare Grade Wipes - many wipes have short contact times (1-3 minutes for C. diff disinfection, for example).
- **Only half as good** – multiple studies have shown that **50 percent** of surfaces are disinfected during manual cleaning and disinfection processes.*
- **Minimum kill rate** – many available cleaner/disinfecting sprays are only capable of reaching a 4-log kill (99.99%) leaving more dangerous pathogens unaffected.
- **Only as effective as applied** – sprays require EVS technicians to apply the spray correctly. Most applications are sprayed on then immediately wiped off giving the product no time to actually treat a surface. Many sprays require 10-minutes dwell/contact time before wiping.
- **Not all surfaces are treated** – EVS technicians don't always spray all the surfaces that harbor infectious pathogens. Germs can travel throughout a room reaching surfaces outside of the the perceived "high-touch" surfaces.
- **Using wipes increases the chance of cross-contamination** – often one disinfecting wipe is used to 'wipe down' an entire room's surfaces. Moving from surface to surface, an over-used wipe can spread germs and contaminate new surfaces.
- **Labor vs Time** – to achieve efficacy levels of UV or fogging, one person (or a team) would be required to spray, then wipe, the walls, ceilings, floors, shelving... every exposed surface within a room.

* <http://www.cleanlink.com/news/article/Understanding-The-True-Cost-Of-HAIs-19224>

Identifying Methods of Disinfection

ELECTROSTATIC SPRAYER

✔ Benefits

- Enhancement over spray bottles
- Moderate upfront cost
- Less labor needed for greater surface coverage

✘ Disadvantages

- Must **thoroughly wet** all surfaces for the contact time (electronics, paperwork)
- **Exposes staff and bystanders** to airborne chemical disinfectants (full PPE required)
- Still **Labor Intensive** and often uses unreliable equipment
- Not all surfaces are treated

⚙ Ideal Uses

- Lower risk environments
- Need for faster turnaround
- Large spaces and common areas



Identifying Methods of Disinfection

UV LIGHT

✔ Benefits

- Surfaces are **dry**
- Generally, won't damage electronics
- **Sanitizes** a small, uncomplicated area quite quickly

✘ Disadvantages

- Little regulatory oversight
- **Misses pathogens** in shadows, line of sight, not all surfaces treated.
- Efficacy diminished by **distance**
- Can cause **damage** to materials over time (yellowing, brittleness)
- **High** cost (capital & maintenance)

☼ Ideal Uses

- Situations where sanitizing vs. disinfecting is deemed sufficient
- **If cost is not an issue**
- Generally, should augment through chemical disinfection

Using **UV** for Room Disinfection:



- **Possible Faster Room Turnover** – UV systems claim treatments take less than 30 minutes per room. To achieve a log kill that sanitizes, even sophisticated devices may need to be relocated within the room (multiple times depending on room size and layout) to treat shadowed and further away surfaces *increasing* room treatment times. They are very useful to sanitize non-isolation rooms and for small device disinfection.
- **Not Accountable** – UV efficacy claims not subject to US regulatory oversight. Reputable UV manufacturers do not claim a 6-log kill of *C. diff* spores.
- **Line-of-Sight-Issues** – Surface must be ‘seen’ to be effectively treated; surface reflection and mirrors are used to reach out-of-sight surfaces which can impact efficacy due to diffuse reaction (loss of light intensity).
- **Distance to Surface Issues** – Surfaces further from light source require longer exposure time for effective treatment.
- **Potential Surface Damage** – The closer the surface, the greater the risk for some materials to be damaged (equipment ‘sunburn’) from exposure to UV light.
- **Higher Capital Cost** – To purchase and maintain, on average, the most effective UV devices cost between \$40-\$90,000.
- **Reliability and Consistency** – UV bulb condition impacts efficacy; degrade with use and must be replaced frequently, and no method exists to immediately confirm light reached a particular surface in lethal dose.



What is Whole Room Disinfection?

Definition:

A disinfection technology's ability to truly disinfect ALL exposed surfaces in one step, often in complicated and irregular spaces, and on complex equipment.

While there are many application methods for disinfection, few are true methods of whole room disinfection.

Hydrogen Peroxide Vapor (VHP)

EPA Registered Whole Room Disinfection

✔ Benefits

- No-touch **whole-room sporicidal** kill
- Regulated by FDA and EPA
- **Repeatable** disinfection

⊗ Disadvantages

- 30-35% H₂O₂ formula, requires more applicator training time for safe use.
- HAZMAT, cannot be flown.
- Not compatible with some electronics and surfaces.
- **High** cost (capital & maintenance)

⊗ Ideal Uses

- Primarily used in commercial pharmaceutical manufacturing, Biosafety Level 3 and 4 Laboratories, research facilities and clean rooms.



Dry-Fog (Aerosolized Hydrogen Peroxide , AHP)

EPA Registered Whole Room Disinfection

☑ Benefits

- **No-touch whole-room sporicidal kill**
- Surfaces stay **dry**
- Disinfects **all** surfaces
- Fills the **air**
- Non-hazmat 5-7.5% formulas, little **training** required
- **Won't harm** electronics
- Easily **repeatable**

⊗ Disadvantages

- **Moderate cost** of acquisition
- Must **temporarily** isolate the space being treated
- Longer **dwell and aeration time**

⊗ Ideal Uses

- Preventative efforts in most spaces. Won't harm electronics and/or paper
- High-risk environments such as operating rooms and isolation rooms, known infection.
- Equipment and emergency vehicle disinfection
- Odor, mold, mildew control
- Approved for food site use





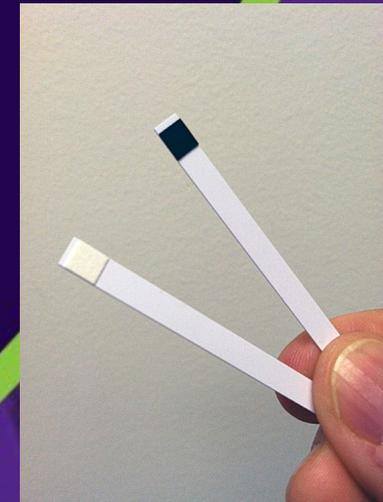
How do I Monitor the Effectiveness of Cleaning and Disinfection?

- Visual assessment is **not a reliable** indicator of surface cleanliness
- **ATP bioluminescence**-measures organic debris (each unit has own reading scale, <250-500 RLU)
- Microbiological methods-<2.5CFUs/cm²-pass; can be costly and pathogen specific
- **Fluorescent marker-transparent, easily cleaned, environmentally stable marking solution that fluoresces when exposed to an ultraviolet light** (applied by IP unbeknown to EVS, after EVS cleaning, markings are reassessed)

ATP Meter



H2O2 Test Strips



Where is Effective and Complete Surface Disinfection Important?

RESIDENT ROOMS



Not Just in Resident Rooms!

Shared Transport Vans



Employee and Resident
Break Rooms



Dining and Meeting
Rooms



Disinfection is an Evolving Landscape....



**Eliminating Pathogens
matters EVERYWHERE.**

To effectively eliminate pathogens, Assisted Living facilities increasingly rely on an arsenal of tools, including whole room disinfection, to ensure infection causing pathogens don't slip through the cracks.

Assisted Living Facilities need solutions that are:

SIMPLE

REPEATABLE

AFFORDABLE

EFFECTIVE

Educational E-Books

Whole Room Disinfection- Buyers Guide

http://halosil.com/wp-content/uploads/2021/08/Halosil_WRD-Buyers-Guide_2005-0721201.pdf

Guide to Infection Prevention

<http://halosil.com/wp-content/uploads/2021/08/Guide-to-Infection-Prevention.pdf>

Value Analysis to Whole Room Disinfection

http://halosil.com/wp-content/uploads/2021/08/Whole-Room-Disinfection_Value-Analysis_1908.pdf

Whole Room Disinfection- Buyers Guide (en Español)

<http://halosil.com/wp-content/uploads/2021/08/Spanish-Whole-Room-Disinfection-Buyers-Guide.pdf>

Halo Disinfection System Brochure

http://halosil.com/wp-content/uploads/2021/08/HaloFogger-Brochure_191204-002.pdf

THANK YOU

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**Come See us at the TALA Annual Conference
in September 19-21, 2021 !**