



CLEAN, SANITIZE OR DISINFECT?

**Environmental Hygiene
Quiz Show for Frontline
Healthcare Providers!**

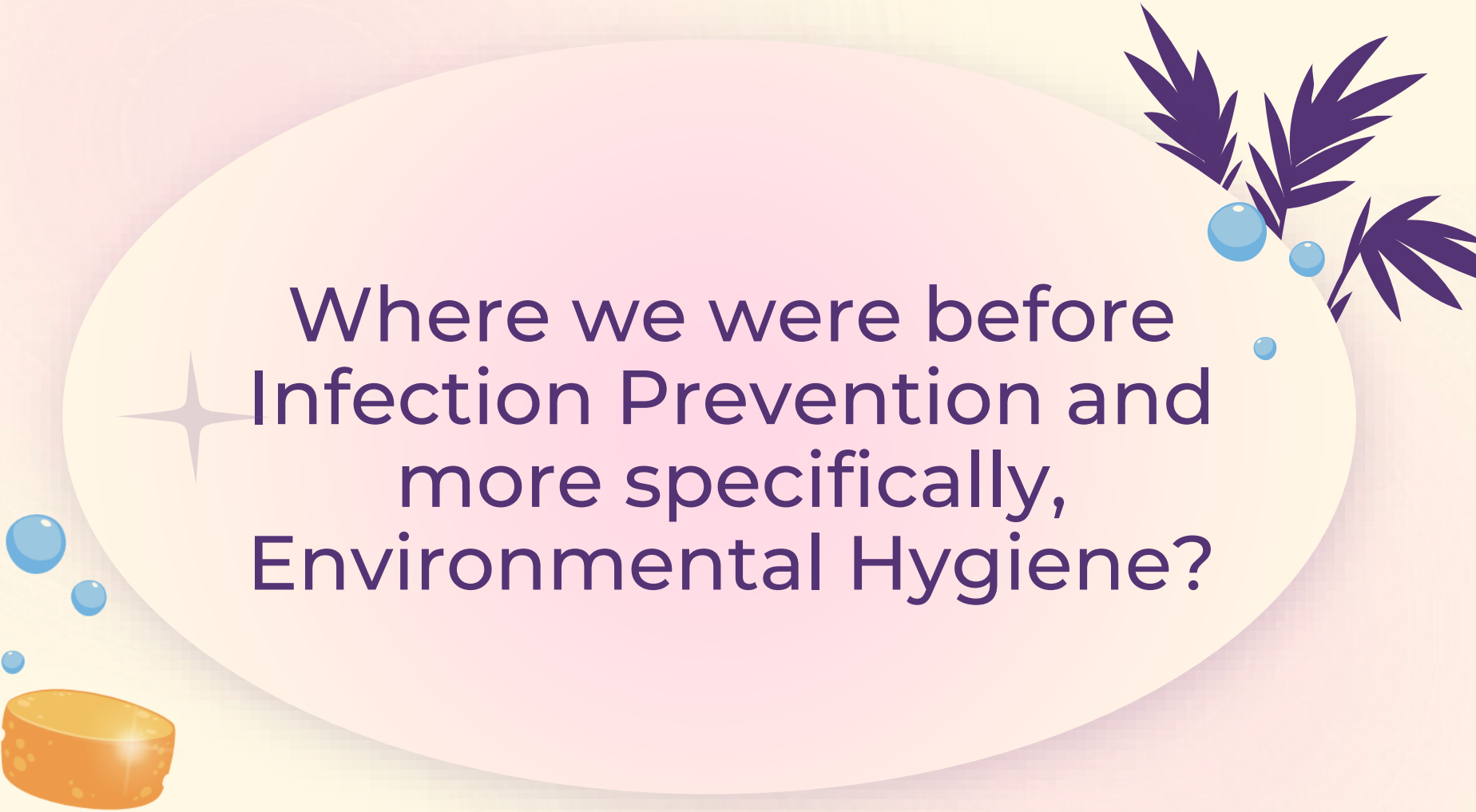
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Vydia is a board-certified infection preventionist. She left healthcare after 33 years to work with Diversey—a global leader in cleaning & disinfection.

In the past year, she & her team have shadowed EVS technicians in hospitals across the US and Canada—identifying best practices and the biggest opportunities for improvement.





Where we were before
Infection Prevention and
more specifically,
Environmental Hygiene?

The Medieval Era (500-1500)

Prevalent Diseases

- Plague
- Smallpox (20-60% mortality)
- Dysentery
- Typhus
- Leprosy
- Tuberculosis

*First hospitals in Europe to care for the sick, insane and destitute (rich people received care at home)



Established in 1123,
London

P.W. Smith et al. AJIC 2012

https://en.wikipedia.org/wiki/St_Bartholomew%27s_Hospital

The Medieval Era (500-1500)

Control Measures

In 1300s, a third of ALL people in Europe died of bubonic plague



- Collection of the bodies of plague victims – left in streets, collected in carts and placed in mass graves outside of town
- Abandon the town!- some lost 2/3 of the population within a year
- Hang those who came from an epidemic region to an uninfected area
- Shut plague victims in their homes and burning clothing and bedding

The Medieval Era (500-1500)

Hypothetical Infection Control Committee Agenda

- Review of infections and mortality
 - Hospital infection rate: 90%
 - Clean wound infection rate 80%
 - Hospitalization-associated death rate 40-70%
- Staffing problems
 - Many died of plague or smallpox
 - Inmates assisted patients
- Surveillance denominator (beds or patients???)
 - Multiple patients in a single bed-accounts of up to 6
- Hospital stench
- Policy for corpse removal- at times left for >24 hours in a bed with living patients
- Vermin in beds



History of Cleaning and Disinfection:

Ancient Times (3000 BCE) :

Egyptians, Greeks and Chinese used vinegar, wine or herbal infusions to clean surfaces even though microbial causes of disease were not known at this time

Florence Nightingale (mid-1850s)

Nurse working in Crimea who reduced infection rates with basic cleaning, wound hygiene, fresh air, laundry practices and bed spacing

Joseph Lister (1860s):

Used carbolic acid to disinfect surgical instruments, wounds and operating rooms

***First systematic use of a chemical disinfectant in a hospital setting**



Hospital Operating Room in 1900

P.W. Smith et al. AJIC 2012



“It is time for cleaning, still
the Cinderella of infection
control, to step into the
spotlight.”



*Dancer, S.J. Hospital cleaning: past, present, and
future. Antimicrob Resist Infect Control 12, 80 (2023).
<https://doi.org/10.1186/s13756-023-01275->*

SESSION OBJECTIVES



01.

DIFFERENCES

Know the **differences** between cleaning, sanitizing & disinfecting.

02.

SURFACES

Apply concepts of cleaning, sanitizing & disinfection to common household &, most importantly, healthcare surfaces.

03.

PRODUCTS

Distinguish common EVS products & kill claims by reading disinfectant labels.



DEFINING HYGIENE

Clean, sanitize
or disinfect?

Why does it matter?

01.

WHAT IS CLEANING?

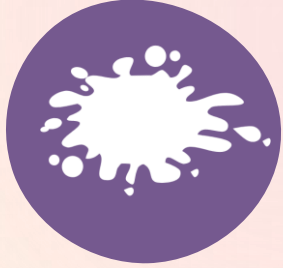


The **physical removal** of foreign material (e.g., dust, soil) and organic material (e.g., blood, secretions, excretions, microorganisms).

Cleaning **physically removes** germs, but **does not** actually **kill** them.



WHAT IMPACTS CLEANING?



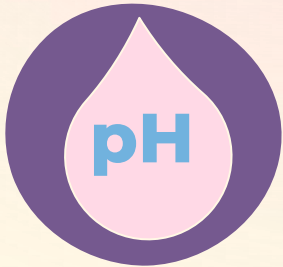
Soil



Residue



Temperature



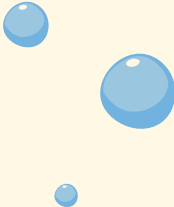
Water pH



Water Hardness



Application



WHAT IS SANITIZING?



Sanitizing **kills some bacteria** on surfaces using EPA-approved chemicals.

The amount of bacteria killed (called “log reduction”) depends on whether or not the surface comes into contact with **food**.



DEFINITION OF A “FOOD CONTACT SURFACE”

Per USDA, food contact surface is any surface that may come in direct contact with exposed meat or poultry product.

Examples include: conveyor belts, table countertops, knives, stock pots & cutting boards. Equipment should be **sanitized every 4 hours** if used consistently.



POTABLE WATER RINSING?

Some **food contact** surface products require rinsing with potable (drinkable) water, others do not.

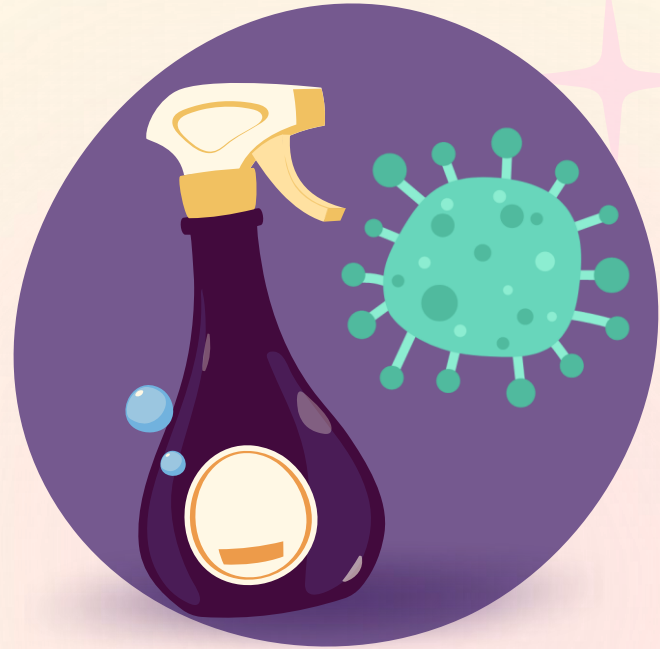
Always look at the label to learn if rinsing is required!



WILL SANITIZERS IMPACT VIRUSES?

No. Products that only carry an EPA-registered sanitizing claim are not tested to inactivate viruses, like influenza or SARS CoV-2.

To ensure eradication of viruses, a product must be registered as a disinfectant.



SOFT SURFACE SANITIZING

- “Soft surface” claims are limited, by the EPA, to “sanitizer.”
 - Soft surface examples: privacy curtains, fabric upholstery
- EPA just published soft surface disinfectant testing methods, so we can expect to see more products with these claims in the near future.
- The sanitization standard for contamination reduction of non-food contact surfaces is generally accepted as 99.9% (a 3-log reduction).
- The sanitizer claim is based on laboratory testing of only two bacteria, not viruses or fungi.



Products may carry a claim to sanitize soft surfaces, like privacy curtains

WHAT IS DISINFECTION?

Disinfection **eliminates** most microorganisms, or germs, including **viruses, bacteria & fungi** from surfaces.



SPORICIDAL DISINFECTANTS

Some diseases, like *C. diff*, are caused by bacterial spores.
which can outsmart & survive many disinfectants.



EPA List K Chemistries	Advantages	Disadvantages
Hydrogen Peroxide/Peracetic Acid	Compatibility, broad pathogen coverage	Unstable/shelf life, expensive, odor, negative health effects
Sodium Hypochlorite (bleach)	Affordable, broad pathogen coverage, familiar, available in multiple formats	Hazard reactions with acids & ammonias, corrosive, stains, odor, respiratory irritant, may require rinse
Hypochlorous Acid	Affordable, broad pathogen coverage	Long contact times, may lack surfactants, onsite generation
Dichloro Isocyanurate (NaDCC)	Non-bleach sporicide, affordable, long shelf life, easy to store (compact)	Requires dilution, chlorine smell, negative health effects



PUTTING IT ALL TOGETHER:

LOG REDUCTION = GERM REDUCTION

Hard,
nonporous
surface

1,000,000 Germs!	10,000 Germs Remain	1,000 Germs Remain	100 Germs Remain	10 Germs Remain	1 Germ Remains
End of Day	2 Log 99%	3 Log 99.9%	4 Log 99.99%	5 Log 99.999%	6 Log 99.9999%
	Cleaning	Non-Food Contact Sanitizing	Disinfection for viral pathogens	Food contact sanitizer	Low/ intermediate disinfection

WE MUST REMOVE VISIBLE DIRT BEFORE SANITIZING OR DISINFECTING!



WIPE 1

First pass shows significant dirt removal

WIPE 2

Less soil released at second wipe

WIPE 3

Barely any soil on third wipe

WIPE 4

Surface disinfected, 1-minute wet time



Let's have some fun!

We'll begin with
common household
surfaces & activities.
We'll then advance to
healthcare tasks.



02.

Hygiene at Home and in Healthcare



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Washing dishes at home?

① Start presenting to display the poll results on this slide.

CLEAN

- Standard dishwashing detergents (or soaps) are not EPA-registered.
- If we look at the label, there are no pathogen kill claims.
- Instructions: Dispense into sink or directly onto sponge. Wash dishes & rinse thoroughly.
- Fun fact! Some in-home dishwashers do have sanitizing claims. To do so, the machine must be registered with EPA.



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Baby bottles?

① Start presenting to display the poll results on this slide.

IT DEPENDS!

- Per the CDC, if your baby is **< 2 months** old, was born **prematurely**, or has a **weakened immune system** due to illness (such as HIV) or medical treatment (such as chemotherapy for cancer), **sanitizing** feeding items **daily** (or more often) is particularly important.
- Daily sanitizing of feeding items may not be necessary for older, healthy babies, if those items are cleaned carefully after each use.
- To learn how, go to <https://www.cdc.gov/hygiene/childcare/clean-sanitize.html>



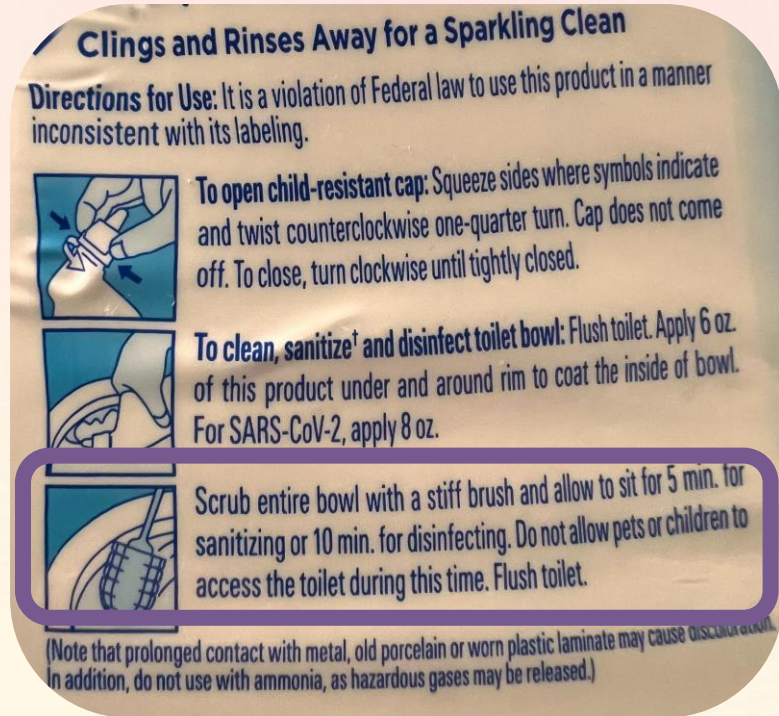
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Household toilet?

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IT DEPENDS!



How I apply the product determines whether I am cleaning, sanitizing or disinfecting

- 6 oz versus 8 oz for COVID-19?!
- 10 **whole** minutes = disinfect
- 5 minutes = sanitize
- Anything rinsed/removed before 5 mins = cleaning

A photograph of a modern hospital room. In the center is a hospital bed with a dark blue mattress and white frame. To the left is a light-colored wooden table on a grey stand. To the right is a medical workstation with a large monitor on a stand, a keyboard on a tray, and a blue stool. The room has light wood flooring, a sink area with a mirror, and a doorway in the background. A purple circle with the number '03.' is overlaid on the top left.

03.

IN HEALTHCARE FACILITIES

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Spraying a patient room countertop with a 3-minute disinfectant, and wiping immediately with a dry cloth or towel

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CLEAN

- The keyword = IMMEDIATELY
- Spraying a surface wet, and then immediately wiping it dry does not allow the full **contact time**.



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What is the highest level of hygiene needed for a dedicated meat cutting board in the kitchen?

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SANITIZE!

In kitchens, the highest level of food-contact surfaces needed is **sanitizing**, which reduces germs by 5-logs if we adhere to the **contact time**.

Disinfection of high-touch surfaces (light switches, door knobs & handles, etc) is still needed in dietary areas.

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**Wiping patient bed rails,
wetted once with a 10-
minute disinfectant**

① Start presenting to display the poll results on this slide.

IT DEPENDS . . .

Keywords: **wetted once**

In order to disinfect, the disinfectant solution must remain **wet for the ENTIRE 10 minutes!**

It is challenging to keep surfaces wet for that long, and oftentimes, reapplying is needed.

If we don't meet the **contact time**, we may just be cleaning—and not killing germs.

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Wiping a door knob, wetted with a 1-minute disinfectant wipe (no wiping or drying after)

① Start presenting to display the poll results on this slide.

DISINFECT

Using a pre-wetted wipe with a 1-minute contact time is very likely to remain wet for 60 seconds without reapplication.

We can feel confident the disinfectant is killing germs.

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Mopping the floor in an occupied patient room during daily room cleaning

① Start presenting to display the poll results on this slide.

IT DEPENDS!

What chemical is in your mop bucket?

Most facilities clean patient room floors daily with a **neutral floor cleaner**.

Other facilities may choose to **disinfect floors** at certain times. **Operating rooms** will apply a disinfectant on the floor per AORN guidelines.

To truly disinfect, the floor must remain wet the entire contact time!



03.

PRODUCT USE

How we use products impacts their ability to clean, sanitize or disinfect.



**Always read
the label!**



How to Read a Disinfectant Label

Read the entire label.

The label is the law!

Note: Below is an **example** of information that can be found on a disinfectant label

Active Ingredients:
What are the main disinfecting chemicals?

EPA Registration Number:

U.S. laws require that all disinfectants be registered with EPA.



ACTIVE INGREDIENTS:

Alkyl (60% C14, 30% C16, 5% C12, 5% C18)
Dimethyl Benzyl Ammonium Chloride10.0%

OTHER INGREDIENTS:90.0%

TOTAL:100.0%

EPA REG NO. 55555-55-55555

CAUTION

PRECAUTIONARY STATEMENTS:

Signal Words (Caution, Warning, Danger):

How risky is this disinfectant if it is swallowed, inhaled, or absorbed through the skin?

Directions for Use (Instructions for Use):

Where should the disinfectant be used?

What germs does the disinfectant kill?

What types of surfaces can the disinfectant be used on?

How do I properly use the disinfectant?

Contact Time:

How long does the surface have to stay wet with the disinfectant to kill germs?

Directions for Use

INSTRUCTIONS FOR USE:

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

For Disinfection of Healthcare Organisms:

Staphylococcus aureus,
Pseudomonas aeruginosa.

To Disinfect Hard, Nonporous Surfaces:

Pre-wash surface.

Mop or wipe with disinfectant solution.

Allow solution to stay wet on surface for at least 10 minutes.

Rinse well and air dry.



EXP MM-DD-YYYY
5 55555 55555 5

PRECAUTIONARY STATEMENTS:

Hazardous to humans and domestic animals. Wear gloves and eye protection.

CAUSES MODERATE EYE

IRRITATION. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Avoid contact with foods.

FIRST AID: IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.

Don't forget to check the expiration date!

...e off
...kin
...ter for
...on
...48) or
...ore this
...ay from
...onight and heat. When not in
use keep center cap of lid closed to prevent moisture loss. Nonrefillable container. Do not reuse or refill this container.

Precautionary Statements:

How do I use this disinfectant safely?
Do I need PPE?

First Aid:

What should I do if I get the disinfectant in my eyes or mouth, on my skin, or if I breathe it in?

Storage & Disposal:

How should the disinfectant be stored? How should I dispose of expired disinfectant? What should I do with the container?

WHAT IS THE CONTACT TIME?

Cleaning procedure: Blood and other body fluids containing HIV or HBV or HCV must be thoroughly cleaned from surfaces and objects before application of this product. This cleaning may be accomplished with any cleaning solution, including this product.

Contact time: Leave surface wet for 3 minutes for HIV-1 and 5 minutes for HBV and HCV with 3 fl. oz. per gallon use-solution.

Disposal of infectious material: Blood and other body fluids must be autoclaved and disposed of according to local regulations for infectious waste disposal.

This product is not to be used as a terminal sterilant/high level disinfectant on any surface or instrument that (1) is introduced directly into the human body, either into or in contact with the blood stream or normally sterile areas of the body, or (2) contacts intact mucous membranes but which does not ordinarily penetrate the blood barrier or otherwise enter normally sterile areas of the body. This product may be used to pre-clean or decontaminate critical or semi-critical medical devices prior to sterilization or high level disinfection.

To Use as a One-Step Cleaner/Disinfectant:

1. Pre-clean heavily soiled areas.
 2. Wipe hard, non-porous environmental surfaces with towelette.
 3. Allow surface to remain wet for 1 minute. For certain listed viruses, allow to remain wet for 30 seconds.
 4. Allow to air dry or rinse with potable water if necessary.
- Note: All food contact surfaces must be rinsed with potable water.
Do not use on glassware, utensils, or dishes.

To Use as a Restroom, Shower Room, Locker Room, Athletic Equipment Cleaner/Disinfectant:

1. Pre-clean heavily soiled areas.
 2. Wipe hard, non-porous environmental surfaces with towelette.
 3. Allow surfaces to remain wet for 1 minute. For certain listed viruses, allow to remain wet for 30 seconds.
 4. Rinse surfaces thoroughly and let air dry.
- Note: Floors will be slippery when wet or contaminated with foreign materials.

WHAT IS THE CONTACT TIME?

1. Pre-clean heavily soiled areas.
2. Wipe hard, non-porous environmental surfaces with towelette.
3. Allow surface to remain wet for 1 minute. For certain listed viruses, allow to remain wet for 30 seconds.
4. Allow to air dry or rinse with potable water if necessary.

WHAT IS THE CONTACT TIME?

Cleaning procedure: All blood and other body fluids must be thoroughly cleaned from surfaces and objects before disinfection by the germicidal wipe. Open, unfold and use first germicidal wipe to remove heavy soil.

Contact time: Use second germicidal wipe to thoroughly wet surface. Although efficacy at a one (1) minute contact time has been shown adequate against HIV-1/HBV/HCV, this time is not sufficient for all organisms listed on this label. Therefore a four (4) minute wet contact time must be used for TB and pathogenic fungi.

Killing *Clostridium difficile* spores: Disinfect as directed on this label. KILLS HIV-1 (AIDS VIRUS), HEPATITIS B VIRUS (HBV) AND HEPATITIS C VIRUS (HCV) ON PRE-CLEANED ENVIRONMENTAL SURFACES/OBJECTS AND PRE-CLEANED EXTERNAL SURFACES OF ULTRASOUND TRANSDUCERS AND PROBES PREVIOUSLY SOILED WITH BLOOD/BODY FLUIDS in one (1) minute at room temperature (68°-77°F) or (20°-25°C) in healthcare or other settings in which there is an expected likelihood of soiling of inanimate surfaces/objects with blood or body fluids, and in which the surfaces/objects likely to be soiled with blood or body fluid can be associated with the potential for transmission of Human Immunodeficiency Virus type 1 (HIV-1) (associated with AIDS), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV).

SPECIAL INSTRUCTIONS FOR CLEANING AND DECONTAMINATION AGAINST HIV-1, HEPATITIS B VIRUS (HBV) AND HEPATITIS C VIRUS (HCV) OF SURFACES/OBJECTS SOILED WITH BLOOD/BODY FLUIDS.

Personal protection: When using this product, wear disposable protective gloves, protective gowns, face masks, and eye coverings as appropriate when handling HIV-1 (AIDS Virus), HBV or HCV infected blood or body fluids.

Cleaning procedure: All blood and other body fluids must be thoroughly cleaned from surfaces and objects before disinfection by the germicidal wipe. Open, unfold and use first germicidal wipe to remove heavy soil.

Disposal of infectious materials: Dispose of used wipe in accordance with local regulations for infectious waste disposal.

Contact time: Use second germicidal wipe to thoroughly wet surface. Allow to remain wet one (1) minute, let air dry. Although efficacy at a one (1) minute contact time has been shown to be adequate against HIV-1/HBV/HCV, this time is not sufficient for all organisms listed on this label. Therefore a four (4) minute wet contact time must be used for TB and pathogenic fungi.

Precautionary Statements Hazards to Humans and Domestic Animals.

CAUTION: Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.

First Aid Call a poison control center or doctor for treatment advice. Have the product container or label with you when calling a poison control center or doctor, or going for treatment. If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. **Physical or chemical hazard** This ammonia, toilet bowl cleaners, rust removers, or acid, as this releases hazardous gases.

STORAGE AND DISPOSAL

Protect Yourself: Cleaning Chemicals and Your Health

Working with cleaning chemicals can cause:

- Coughing
- Wheezing
- Red, Itchy Eyes
- Skin Rashes
- Skin and Eye Burns
- Shortness of Breath
- Sore Throat
- Headaches or Dizziness
- Nosebleeds
- Asthma

If you have health problems that you think are caused by using cleaning chemicals, tell your supervisor and ask to see a doctor.



What You Need to Know

Do not mix cleaning products that contain bleach and ammonia. Dangerous gases can be released and can cause severe lung damage.

- Sufficient ventilation (airflow) when using cleaning chemicals.
- Protective clothing, gloves, and safety goggles, when needed.
- Labels on containers of cleaning chemicals.
- Training on the hazards of cleaning chemicals you are using and safe work practices.

Your employer must train you to:

- Know the hazards of cleaning chemicals BEFORE using them.
- Know how to use and store cleaning chemicals safely.
- Know how and when to dilute cleaning chemicals you are using.
- Know what to do if there is a spill or other emergency.
- Know how to obtain and use hazard information on labels and material safety data sheets (MSDS).
- Know how and when to use protective clothing, gloves, and safety goggles.

Remember

- Wash your hands after using cleaning chemicals and before eating, drinking, or smoking.

Green Cleaners

What are they?

- Cleaning products certified by independent organizations as safer to use and less harmful to your health and the environment.
- Cleaners with "green" in their name do not mean it has been certified.

Are Green Cleaners Effective at Cleaning?

- Many have met performance standards for its intended use.
- Also, many green cleaners are "fragrance-free" but still clean effectively. "Clean" does not have an odor!

Safety Reminder

- You may need to use protective clothing, gloves or safety goggles with some certified green cleaners. Ask your employer.

This guidance document is not an OSHA standard or regulation but it contains recommendations that are advisory in nature and intended to assist employers and workers in providing a safe and healthful workplace. The mention of any nongovernmental organization in this document does not constitute an endorsement by NIOSH or OSHA of that organization, its products or services.



WIPE THIS WAY

Some tips & tricks when using
disposable “pop-up” wipes.

The following slides do not
replace individual manufacturer’s
instructions for use.



Avoid Roping, Stranding or Snaking Wipes



- It's not a magic trick!
- Avoid pulling “ropes” or long strands of wipes at a time, given tendency to scrunch or ball the wipes.

“NO ROPES!”

**Roping wastes
wipes &
contributes to
increased
healthcare
costs.**



AVOID BUNCHING OR SCRUNCHING



- Scrunching, bunching or balling up the wipes doesn't allow smooth, consistent application.
- Bunching the wipe promotes air pockets where disinfectant will not reach the surface.



KEEP WIPES FLAT

Think of painting a wall with a flat tool (brush or roller), versus trying to paint with a wad of cloth.

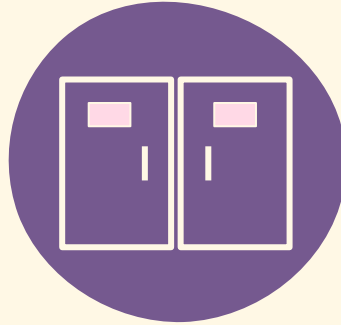


HOW MANY CLOTHS/WIPES PER CLEAN?

EQUIPMENT



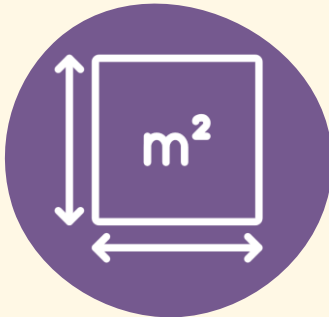
AREA/DEPT



WIPE SIZE



SQUARE FT



SOIL



**CROSS
CONTAMINATION**





WRAPPING UP!



Know the difference

When we talk about killing germs, there is a **significant difference** between **cleaning**, **sanitizing** & **disinfecting**.



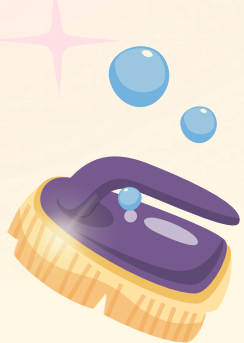
Surface consideration

Different areas, surfaces & objects need different levels of hygiene. Know what **products** are needed & **where** to perform your job safely & effectively.



Product application

How we apply chemicals, and with what tools, can impact the cleaning & disinfection process.



Strategies for Teaching Adult Learners

- Keep content relevant
- Tell stories as you're teaching
- Break up the information to avoid cognitive overload
- Keep audience engaged- get them involved, encourage Q&A
- Make material visually stimulating
- Smile and have fun!





Thanks!

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