



ENVIRONMENTAL CLEANING & DISINFECTION DIALYSIS:

***Key Considerations for Frontline
Staff & Infection Prevention***

Rebecca Battjes, MPH, CIC, FAPIC

(she/her)

APIC Coastline

July 25, 2025

FINANCIAL DISCLOSURE

Rebecca is employed by Diversey—A Solenis Company. Her expenses to attend this presentation (travel, accommodation, and salary) are paid by this company. Diversey has had no input into this presentation from a commercial interest.

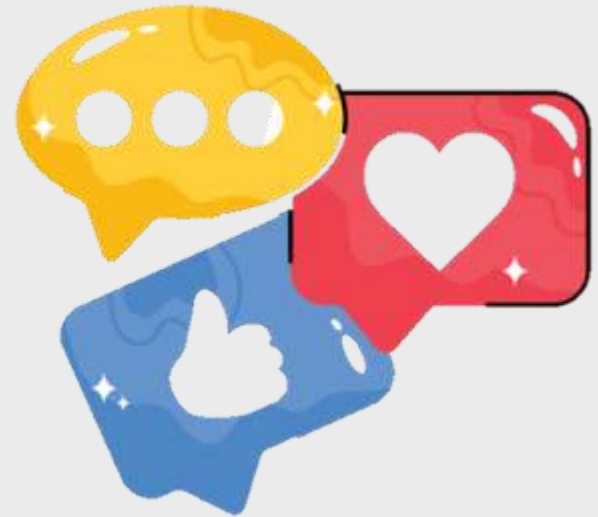


*Me, as the Infection Control
Administrative Assistant in 2005*

SPEAKER DISCLAIMER

Rebecca is an infection preventionist with an academic background in public health & over 20 years' experience working in various healthcare settings. She is not a registered nurse, nor is she a dedicated dialysis professional.

Please use the chat box, Q&A & reactions throughout the presentation!



★ TODAY'S GOALS ★



01

GROUND RULES

Review best practices in healthcare cleaning & disinfection for **all** healthcare professionals

02

WINNING PLAYS

Discuss key process considerations related to cleaning & disinfection

03

TACKLE HURDLES

Overcome common cleaning & disinfection challenges in the hemodialysis space

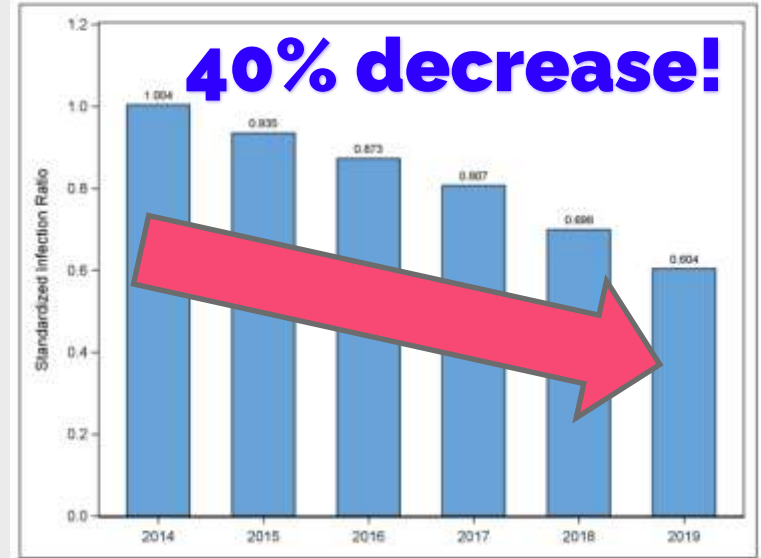


**How would you describe
your experience level
working in hemodialysis
areas?**

DIALYSIS FAST FACTS

- Nearly **half a million** Americans receive HD in over 7K outpatient clinics (USRDS 2023) annually.
- Infections, including bloodstream infections (BSI), are a leading cause of death & hospitalizations among patients on outpatient hemodialysis (CDC OP HD Report).
- Outpatient dialysis facilities made progress in preventing BSIs nationally. Between 2014 and 2019 the pooled BSI standardized infection ratio (SIR) decreased by 40%! (CDC).
- Inpatient dialysis CLABSI data are often not reflected in acute care hospital's overall CLABSI data.

Figure 1. Dialysis Bloodstream Infection Standard Infection Ratio by Year, National Healthcare Safety Network, 2014–2019

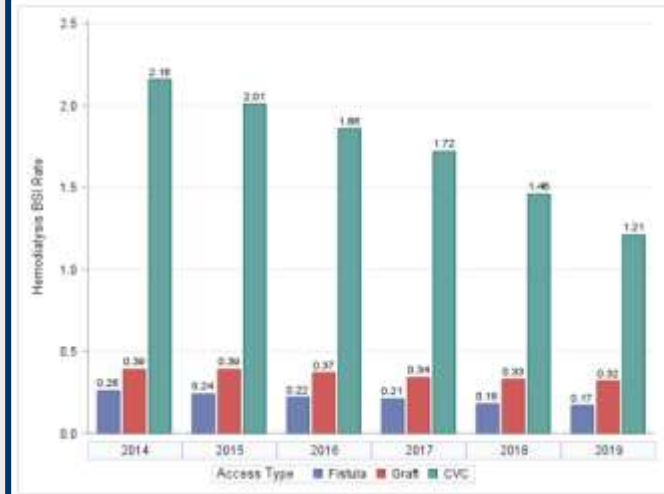


[Surveillance Summary of Bloodstream Infections in Outpatient Hemodialysis Facilities — National Healthcare Safety Network, 2014–2019 \(cdc.gov\)](#)

DIALYSIS RISK FACTORS

- Comorbidities
 - Diabetes, hypertension, hyperlipidemia, cardiovascular disease, etc.
- Line access
 - Central venous catheters (CVCs)
 - AV fistula/grafts not w/o risk, but much lower (see →)
 - Peritoneal tubing
- Social determinants of health
 - Age, race, sex, access to healthcare, where we are born, live & work

Figure 2. Annual Hemodialysis Bloodstream Infections Crude Rates by Access Types for Three Most Common Hemodialysis Access Types, per 100 Patient-Months, National Healthcare Safety Network, 2014–2019



[Surveillance Summary of Bloodstream Infections in Outpatient Hemodialysis Facilities — National Healthcare Safety Network, 2014-2019 \(cdc.gov\)](#)

COMMON DIALYSIS OUTBREAK CAUSES



**LINE-
RELATED
EVENTS**



**ADVERSE
DRUG
EVENTS**



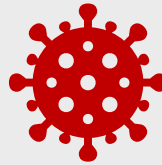
**BACTERIAL
& FUNGAL
INFECTIONS**



**CHEMICAL
INTOXI-
CATION**



**PERITONEAL
DIALYSIS**



**VIRAL
HEPATITIS
(BBPs)**



**WATER
ASSOCIATED**





THE IMPORTANCE OF DIALYSIS CLEANING & DISINFECTION



DIALYSIS OUTBREAKS

Outpatient hemodialysis facility (58)	2018	PA	108	2	Specific lapses in infection control not identified, however, practices observed at the time of the investigation may have not represented usual facility practices. Case patients were dialyzed in close proximity and cared for by the same staff.	Of these two new acute case-patients identified in 2018, one had HCV virus genetically related to virus from two facility patients with chronic infection who had been part of an earlier 2015 outbreak at this same location, listed below.
Outpatient hemodialysis facility (53)	2017	GA	47	2	Patients were dialyzed in close proximity and cared for by the same staff Lapses identified included environmental cleaning, hand hygiene	
Outpatient hemodialysis facility (33)	2016	unspecified	203	2	Specific lapses in infection control not identified at the time of the investigation	
Outpatient hemodialysis facility (54)	2016	PA	154	2	Breaches in environmental cleaning and disinfection practices identified included: lapses in hand hygiene, mixing of clean and dirty areas, inadequate cleaning of stations between patients	
Outpatient hemodialysis facility (51)	2015	NJ	237	2	Multiple lapses in infection control identified, including hand hygiene and glove use, vascular access care, medication preparation, cleaning and disinfection	

<https://www.cdc.gov/dialysis/reports-news/outbreaks.html>

DIALYSIS OUTBREAKS

Outpatient hemodialysis facility (51)	2015	NJ	84	2	Multiple lapses in infection control identified, vascular access care, medication preparation, cleaning and disinfection	
Outpatient hemodialysis facility (51)	2015	NJ	98	2	Multiple lapses in infection control identified, including hand hygiene and glove use, vascular access care, medication preparation, cleaning and disinfection	
Outpatient hemodialysis facility (52)	2015	PA	115	3	Multiple lapses in infection control identified, medication preparation close to treatment area	
Outpatient hemodialysis facility (52)	2015	PA	130	3	Multiple lapses in infection control identified, medication preparation close to treatment area	
Outpatient hemodialysis facility (52)	2015	PA	97	2	Multiple lapses in infection control identified, medication preparation close to treatment area, Use of single-dose vials for >1 patient, no separation of dirty and clean areas	(Philadelphia)
Outpatient hemodialysis facility (52)	2015	CA	28	3	Breaches in environmental cleaning and disinfection practices	
Outpatient hemodialysis facility (34)	2014	WA	186	3	Breaches in environmental cleaning and disinfection practices identified included: failure to consistently change gloves and perform hand hygiene	

**DIALYSIS =
INCREASED
ENVIRONMENTAL
RISKS!**

<https://www.cdc.gov/dialysis/reports-news/outbreaks.html>

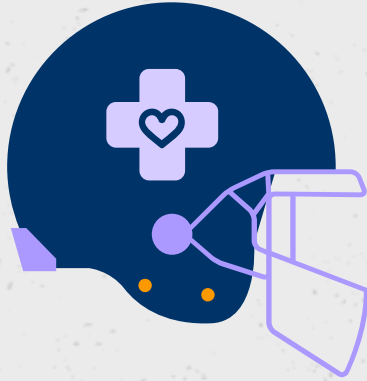
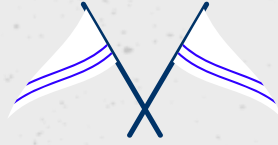


**OUTBREAKS ARE
NOT ALWAYS
IDENTIFIED & THE
MAJORITY ARE NOT
PUBLISHED.**



GROUND RULES

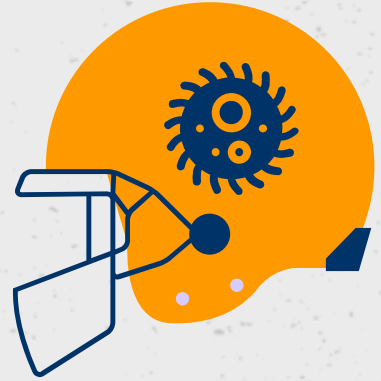
Review best practices in
cleaning & disinfection for
all healthcare professionals



★ INFECTION PREVENTION IS A TEAM SPORT

It is NOT a blame game.

In healthcare, it's **all of us** against the germs. To win, we need to have a game plan.



CLEANING BASICS

- Items must be **cleaned** using water with detergents or enzymatic cleaners **before processing**.
 - Especially important in areas where visible contamination is likely (e.g., ED, OR, dialysis)!
 - Two steps are needed when ever visible soil is present: ***clean, then disinfect***.
- Cleaning reduces the bioburden and removes foreign material (organic residue and inorganic salts) that interferes with the disinfection/sterilization process.
- Cleaning or decontamination should be done as soon as possible after the items have been used as soiled materials become dried onto the instruments.



REMOVE VISIBLE SOIL, INCLUDING BLOOD & BODY FLUIDS, BEFORE 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



**ALWAYS
ENSURE ALL
DISINFECTANTS
ARE EPA-
REGISTERED!**

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



Don't forget to check the expiration date!

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.

Get off skin for 48 hours or more this way from sunlight 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?

WINNING PLAYS



Discuss key process
considerations related
to cleaning &
disinfection



CLEANING & DISINFECTION: GENERAL BEST PRACTICES

WHERE

- All **HD station surfaces** in between patients, including prime buckets & wall boxes, and per facility policy.
- Focus on **high-touch surfaces** more frequently, especially during respiratory viral seasons & outbreaks.
- Always clean & disinfect **shared portable medical equipment** in between patients & per policy



HOW

- Leave surfaces visibly wet for the **ENTIRE** contact time on the label.
- Clean **high to low**, clean to dirty, in a consistent pattern.
- Changes wipes or cloth if they fell on the floor (do not continue cleaning with it), when visibly soiled or when no longer wetting surfaces.
- Never dip a used cleaning tool into the disinfectant solution (double dipping)



https://www.cdc.gov/infectioncontrol/guidelines/environmental/index.html#anchor_1556905362

BLOOD & BODY FLUID SPILLS



Promptly clean and decontaminate spills of blood or other potentially infectious materials (CDC, OSHA) ***before other tasks!***



Follow **proper procedures** for site decontamination of spills of blood or blood-containing body fluids (spill kits, etc.).



Wear proper **PPE based on possible exposure.**



For **large** BBF spills, clean the visible matter with disposable absorbent material & discard the contaminated materials in appropriate, labeled containment. **Pre-clean prior to disinfection.**

KEY CONSIDERATIONS FOR SELECTING THE BEST POSSIBLE DISINFECTANT FOR YOUR HD FACILITY



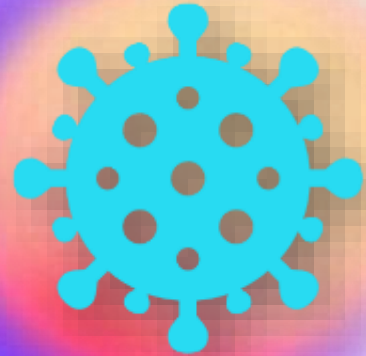
[This Photo](#) by Unknown Author is licensed under [CC BY-ND](#)

CRITERIA OF AN IDEAL DISINFECTANT: KEY CONSIDERATIONS

CONSIDERATION	QUESTIONS TO ASK
Kill Claims	Does the product kill the most prevalent healthcare pathogens?
Kill Times and Wet/Contact/Dwell Times	How quickly does the product kill prevalent healthcare pathogens? Ideally, the overall wet/contact/dwell time greater than or equal to the kill claims and dry time.
Safety	Does the product have an acceptable toxicity & flammability rating?
Ease of Use	Odor acceptable, shelf-life, in convenient forms (wipes, spray) water soluble, works in organic matter, one-step (cleans/disinfects)
Other Factors	Supplier offers comprehensive training/education, 24-7 customer support, overall cost acceptable (product capabilities, cost per compliant use, help standardize disinfectant in facility/system)

KILL CLAIMS

- Does the product kill the most prevalent healthcare pathogens, including those that:
 - Cause most HAIs?
 - Cause most outbreaks?
 - Are of concern with your team?
 - Use the IP annual risk assessment & plan!
 - Consider unit/department specific needs
 - For dialysis, **review labels for bloodborne pathogen contact times**



CRITERIA OF AN IDEAL DISINFECTANT:

KEY CONSIDERATIONS

CONSIDERATION	QUESTIONS TO ASK
Kill Claims	Does the product kill the most prevalent healthcare pathogens?
Kill Times and Wet/Contact/Dwell Times	How quickly does the product kill prevalent healthcare pathogens? Ideally, the overall wet/contact/dwell time greater than or equal to the kill claims and dry time.
Safety	Does the product have an acceptable toxicity & flammability rating?
Ease of Use	Odor acceptable, shelf-life, in convenient forms (wipes, spray) water soluble, works in organic matter, one-step (cleans/disinfects)
Other Factors	Supplier offers comprehensive training/education, 24-7 customer support, overall cost acceptable (product capabilities, cost per compliant use, help standardize disinfectant in facility/system)

KILL TIMES & WET/CONTACT TIME



Kill times may vary by pathogen on a product label.

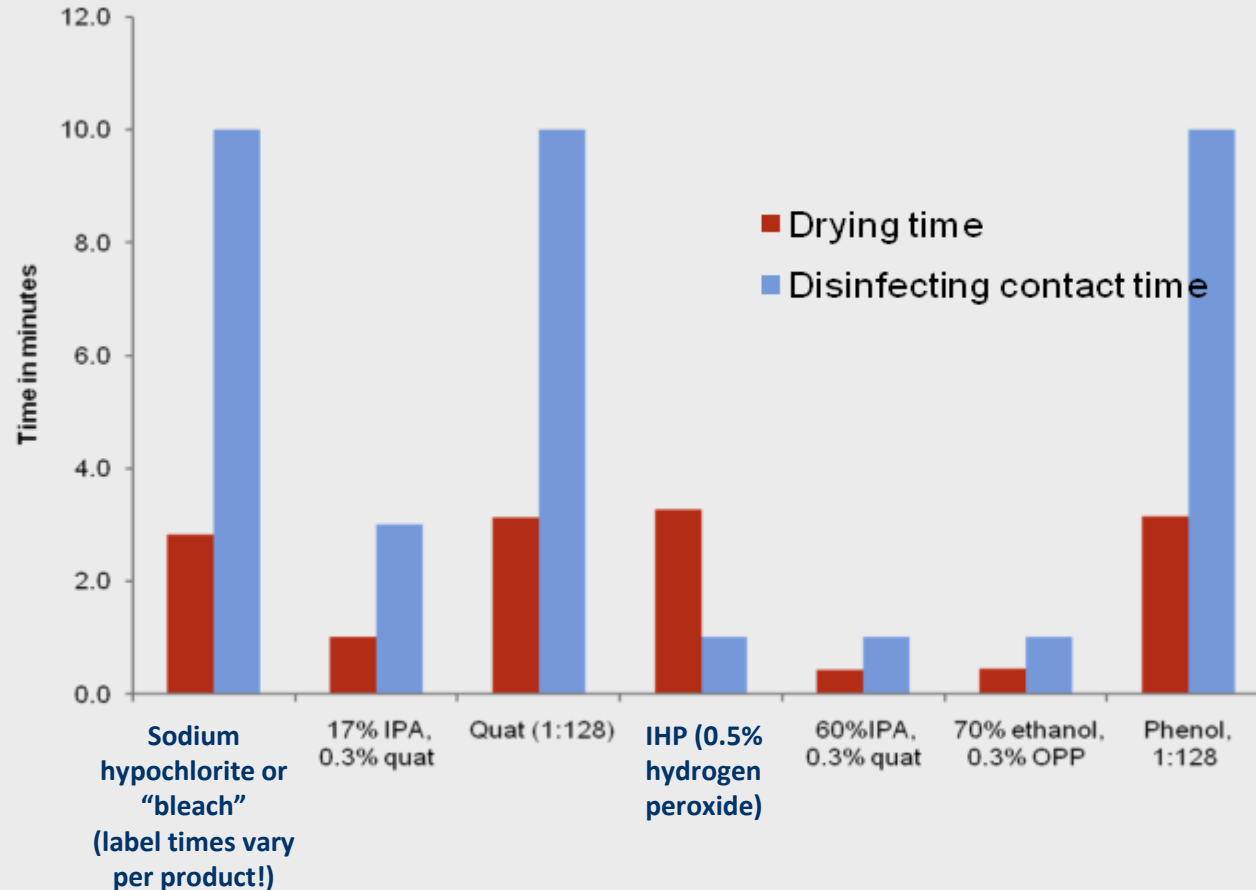
Most IP departments will adhere to the highest wet/contact time of all relevant pathogen kill times listed.

Some disinfectants may have higher kill times for bloodborne pathogens, which should always be adhered to in healthcare environments.

ALL HCP must know the agreed upon contact times for all disinfectants!

Regulatory & accreditation surveyors ARE TIMING disinfection!

DRY TIME VS. LABEL CONTACT TIME



HOW LONG MUST THE SURFACE BE VISIBLY WET?

Special Instructions For Cleaning and Decontamination Against HIV (AIDS VIRUS), HBV (HEPATITIS B VIRUS) and HCV (HEPATITIS C VIRUS) on Surfaces/Objects Soiled with Blood/Body Fluids. Kills HIV-1 (AIDS virus), HBV (Hepatitis B virus) and HCV (Hepatitis C virus) on pre-cleaned environmental surfaces/objects previously soiled with blood/body fluids in healthcare settings 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 fluids can be associated with the potential for transmission of Human immunodeficiency virus type 1 (HIV-1) (associated with AIDS), HBV (Hepatitis B virus) and HCV (Hepatitis C virus).

Personal Protection: Disposable latex or vinyl gloves, gowns, masks, and eye coverings must be worn during all cleaning and decontamination procedures of blood and other body fluids.

Cleaning Procedures: Blood and other body fluids must be thoroughly cleaned from surfaces and objects before applying this product.

Disinfectant Use and Contact Time: Effective against HIV-1 (AIDS virus), HBV (Hepatitis B virus) and HCV (Hepatitis C virus) on hard non-porous surfaces. Prepare disinfectant by mixing 12 fl.oz. (1 ½ cups) of this product per gallon of water to provide 5,000 ppm of available chlorine. Leave surfaces visibly wet for 5 minutes for HIV and 10 minutes for HBV/HCV. Drain and let air dry.

Disposal of Infectious Materials: Blood and other body fluids should be autoclaved and disposed of according to Federal, State, and local regulations for infectious waste disposal.

[Above is an example of an EPA Master Label. All healthcare disinfectants must be EPA registered.](https://www3.epa.gov/pesticides/chem_search/ppls/070271-00013-20221227.pdf)

https://www3.epa.gov/pesticides/chem_search/ppls/070271-00013-20221227.pdf

CRITERIA OF AN IDEAL DISINFECTANT:

KEY CONSIDERATIONS

CONSIDERATION	QUESTIONS TO ASK
Kill Claims	Does the product kill the most prevalent healthcare pathogens?
Kill Times and Wet/Contact/Dwell Times	How quickly does the product kill prevalent healthcare pathogens? Ideally, the overall wet/contact/dwell time greater than or equal to the kill claims and dry time.
Safety	Does the product have an acceptable toxicity & flammability rating?
Ease of Use	Odor acceptable, shelf-life, in convenient forms (wipes, spray) water soluble, works in organic matter, one-step (cleans/disinfects)
Other Factors	Supplier offers comprehensive training/education, 24-7 customer support, overall cost acceptable (product capabilities, cost per compliant use, help standardize disinfectant in facility/system)

PRODUCT SAFETY RATINGS

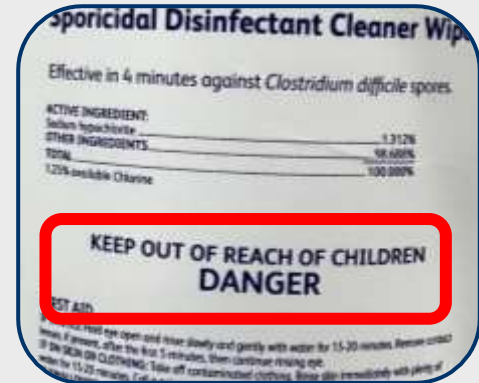
BEST POSSIBLE IS EPA TOXICITY RATING OF IV

- No danger, warning or caution (“signal words”) language on the label!
- Not harmful to health, not flammable, no physical hazard
- No gloves or other PPE (important for **patients, residents, family & visitors**)
- Staff will use gloves as per Standard Precautions & facility policy
- Always read labels for instructions.

<https://www.npic.orst.edu/factsheets/signalwords.pdf>



EPA Category IV label example



EPA Category 1 label example

CRITERIA OF AN IDEAL DISINFECTANT:

KEY CONSIDERATIONS

CONSIDERATION	QUESTIONS TO ASK
Kill Claims	Does the product kill the most prevalent healthcare pathogens?
Kill Times and Wet/Contact/Dwell Times	How quickly does the product kill prevalent healthcare pathogens? Ideally, the overall wet/contact/dwell time greater than or equal to the kill claims and dry time.
Safety	Does the product have an acceptable toxicity & flammability rating?
Ease of Use	Odor acceptable, shelf-life, in convenient forms (wipes, spray) water soluble, works in organic matter, one-step (cleans/disinfects)
Other Factors	Supplier offers comprehensive training/education, 24-7 customer support, overall cost acceptable (product capabilities, cost per compliant use, help standardize disinfectant in facility/system)

RESULTS FROM FRONTLINE HD AUDIENCE (n = 39)

What is your facility's primary diluted disinfectant chemistry for surfaces (not the dialyzer interior)?

Bleach



51%

Quaternary ammonium compounds ("quats")



13%

Improved hydrogen peroxide



3%

NaDCC tablets



0%

Peracetic acid (PAA)



0%

We only use ready-to-use disinfectants (no mixing or diluting)



28%

Girl, I have no clue!



5%

DIALYSIS & SODIUM HYPOCHLORITE USE: KEY CONSIDERATIONS

- Sodium hypochlorite (“bleach”) may be used heavily in dialysis, *despite* alternative corrosion, shorter contact times profiles.
- Not all bleach is equal!
 - Ensure an EPA registration number (if bleach is just for laundry and has no disinfection claims)
- Check for correct bleach dilutions/ratios!
 - **Ready-to-use products do not conform to a 1:10 or 1:100 dilution!**

Can we expect
our colleagues
to calculate
correct ratios?

Public Health Ontario Bleach Calculator

<https://www.publichealthontario.ca/en/health-topics/environmental-occupational-health/water-quality/chlorine-dilution-calculator>



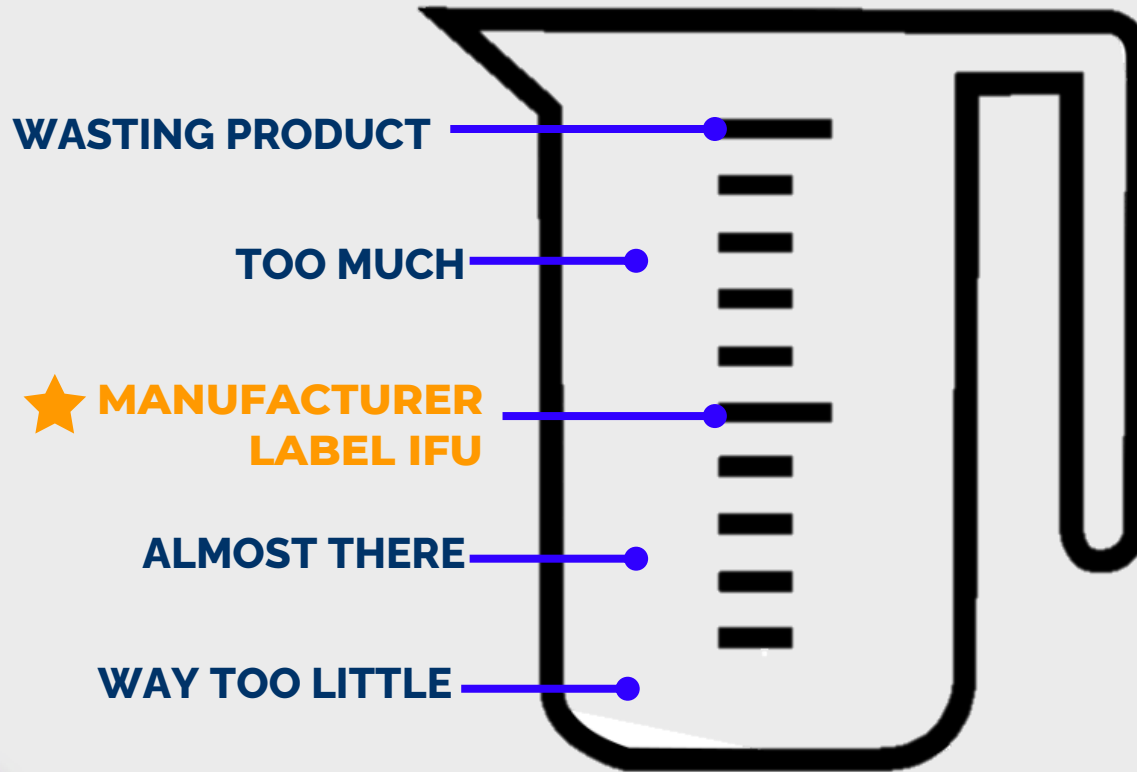
DIALYSIS & SODIUM HYPOCHLORITE USE:

KEY CONSIDERATIONS

- Concentrate bleach may not contain surfactants (chemicals that aid in soil penetration & removal)
 - Some ready-to-use bleach products do contain enhanced cleaning chemistries
- Short shelf life & specific storage
 - Expiration dates on containers may be coded (not DD/MM/YYYY)
- Manual mixing leads to errors!
- Many bleach solutions are two-step cleaner/disinfectants. Two-step cleaning is a heavy resource burden.
 - Many chlorine compounds require a third rinsing step with water to reduce salty residues (see →).



MANUAL MIXING OF DISINFECTANTS



TOO LITTLE → LESS EFFECTIVE

MORE IS NOT BETTER

Always follow the label instructions.

Pay attention to different dilution ratios.

Test solutions per manufacturer recommendations.



DILUTION RATIOS MATTER!



SOME PRODUCTS CAN DO MANY THINGS AT DIFFERENT DILUTIONS



1:16

Disinfect

Use to clean and disinfect:

- High-touch surfaces
- Bloodborne Pathogen Spills



1:64

Virucide

Use as a virucide:

- Virucide
- Bloodborne Pathogen Spills



Ratios shown are examples only. Refer to disinfectant label & IFUs for dilution ratios.



1:128

Non-food contact sanitizer

Use to clean and sanitize:

- Non-food contact surfaces
- Floors
- Walls

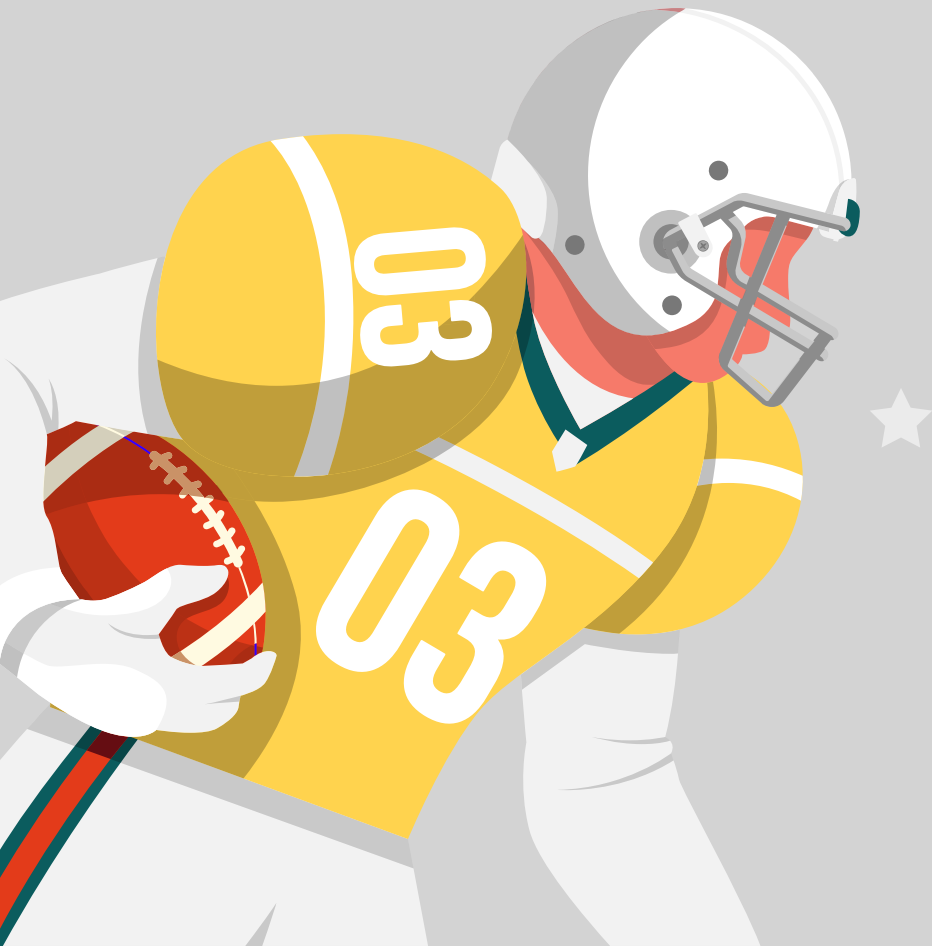


1:256

Cleaner

Use to clean:

- Floors
- Walls



TACKLING HURDLES

Overcome common
cleaning & disinfection
challenges

PRIMARY DISINFECTION RESPONSIBILITIES IN ACUTE CARE FACILITIES



Device User/ Clinical

- Determined by facility policy
- Shared portable medical equipment



Environmental Services

- High-touch surfaces
- Occupied daily room cleaning
- Discharges
- General shared areas
- Generally, *not* responsible for shared portable medical equipment



Central/ Sterile Supply

- Unique/complex equipment reprocessing (e.g., IV pumps)

PRIMARY DISINFECTION RESPONSIBILITIES IN DIALYSIS FACILITIES



DIALYSIS TECHNICIANS

- Specialized training in dialysis-specific protocols (machine interiors, etc)
- May be employed by the facility or outside/ contracted company.
- Very helpful in learning dialysis complexities!



ENVIRONMENTAL SERVICES

- Responsibilities may be unique from acute care facilities.
- Contracted versus facility employed?
- May need specialized training in dialysis areas.
- If contracted, what disinfectants are used?

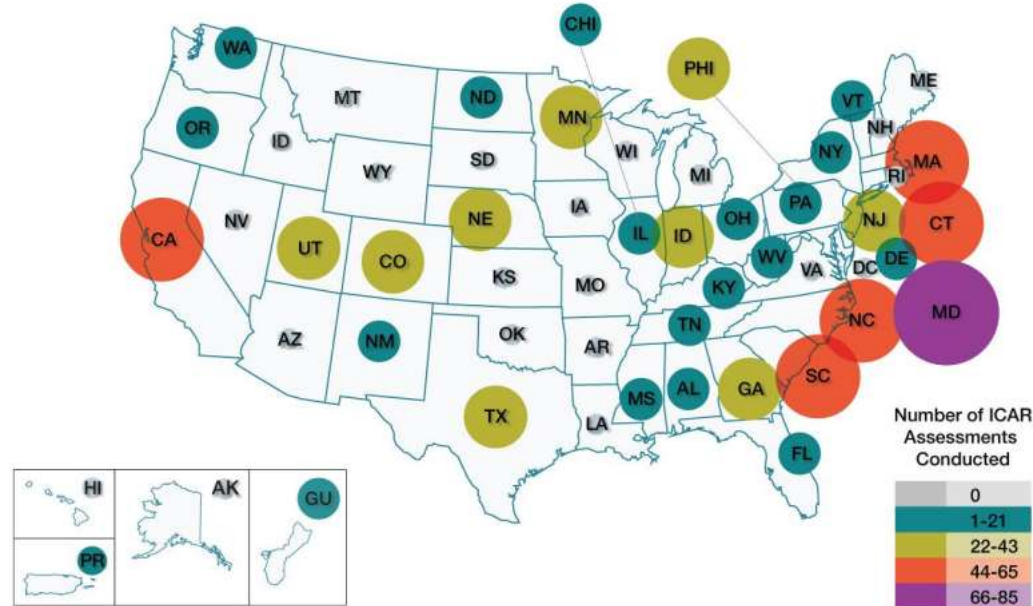


CLINICAL TEAM

- Determined by facility policy
- Shared portable medical equipment
- Includes ALL members, including nurses, physicians, care technicians, etc.

ASSESSMENTS AND OBSERVATIONS OF IPC PRACTICES IN US OUTPATIENT HEMODIALYSIS FACILITIES, 2015–2018: IMPORTANT OPPORTUNITIES FOR IMPROVEMENT

Number of Infection Control Assessment and Response (ICAR) Assessments Conducted per Jurisdiction
Data from 800 visits, Division of Healthcare Quality Promotion, CDC – United States, 2015-2018

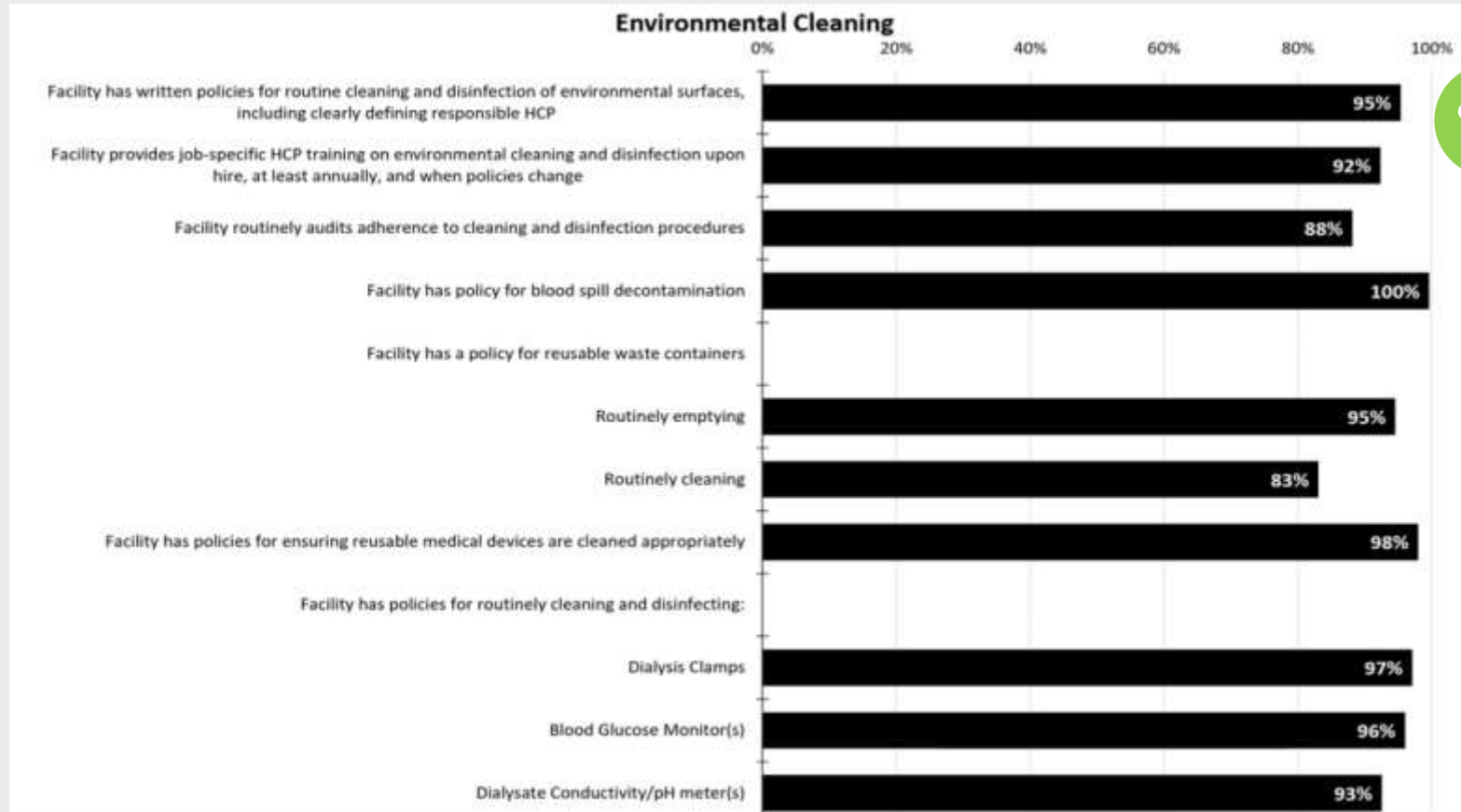


**BTWN 2015 &
2018, 800
ASSESSMENTS
CONDUCTED**

**ALL OUTPATIENT
HD CLINICS**

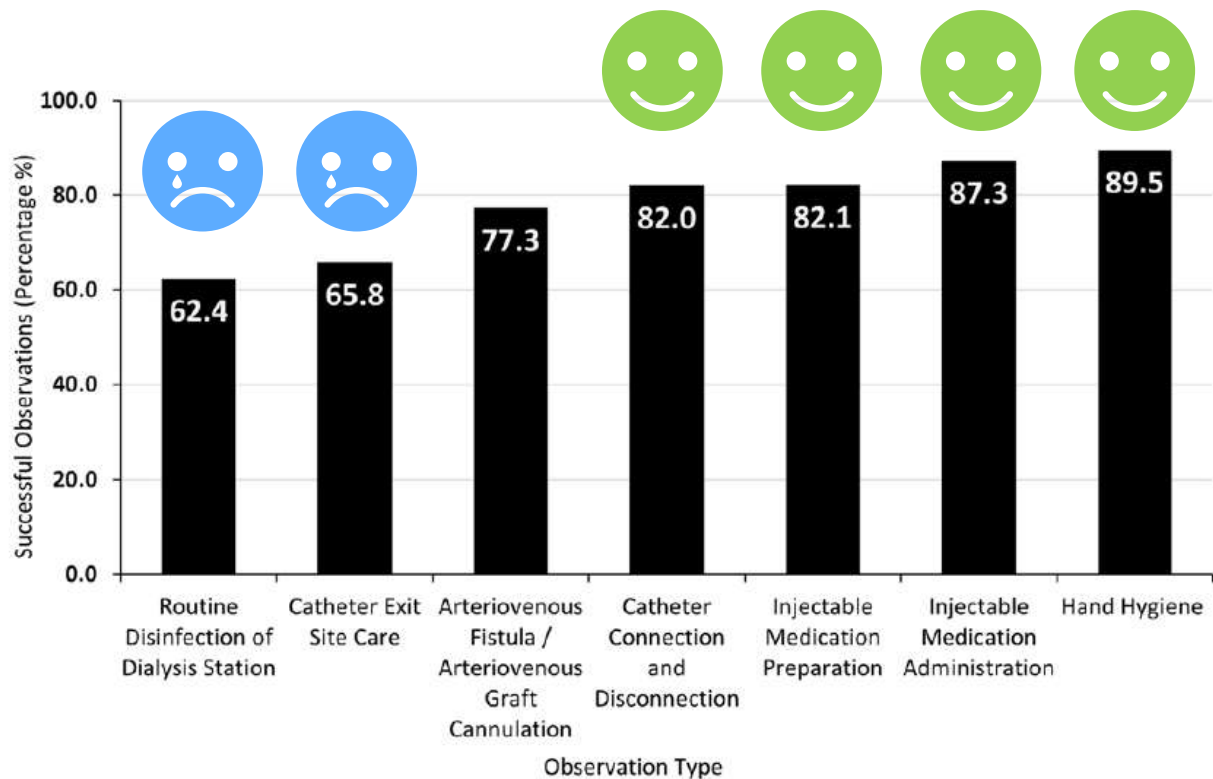
**OVER 70K
UNIQUE
OBSERVATIONS!**

WRITTEN POLICIES AVAILABLE IN NEARLY ALL VISITED FACILITIES!



SUCCESSFULLY OBSERVED IPC PRACTICES?

Figure 1. (Continued).



APIC 2022 NONCRITICAL DISINFECTION POSTER

#APIC2022 Selected Equipment for Labeling		
Equipment or Item	Group Responsible	Manufacturer Recommended
IV pump	CSS	Bleach
SCD Pump	EVS	Bleach
Vital Sign Machines	User	Bleach
Wall Mounted Vital Sign Machines	EVS	Bleach
EKG Machine	User	Bleach
PCA	CSS	Bleach
Feeding Pump	EVS	Bleach
Defibrillator on Code Cart	CSS	Quaternary Ammonium
Wall Mounted Patient Monitor/Leads/Pulse Ox/Cuff	EVS	Quaternary Ammonium
Bladder Scanner	User	Quaternary Ammonium
Telemetry Pack	User	Quaternary Ammonium



Dabkowski M. 2022. **Improving Cleaning Compliance of Noncritical Equipment with Labels and Auditing.** APIC 2022 oral abstract. Accessed securely online as conference attendee at <https://c53ac34983397363b9e2-fa85729df59db74d0fed9dc21ffea231.ssl.cf1.rackcdn.com//1884872-1491675-004.pdf>.

TOOLS TO BOOST COMPLIANCE

Clean and Disinfectant Patient Area



Wipe down high-touch surfaces

Note: Clean in this order to reduce risk of spreading pathogens



1 Clean touch screen and data entry keyboard



2 Dialysis machine top, front and sides



3 Disinfect all surfaces of the emptied priming bucket. Allow the bucket to air-dry before reconnection or reuse.



4 Bicarbonate jugs, conductivity meter (after each patient use) and wall connections



5 Tray table on the recliner if attached, or clean the overchair table if unattached



6 Fully recline the dialysis chair and clean with disinfectant. Clean TV controls and patient call system.



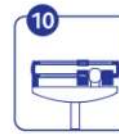
7 Blood Pressure Cuff



8 Stethoscope - after each patient use



9 Glucometer - after each patient use

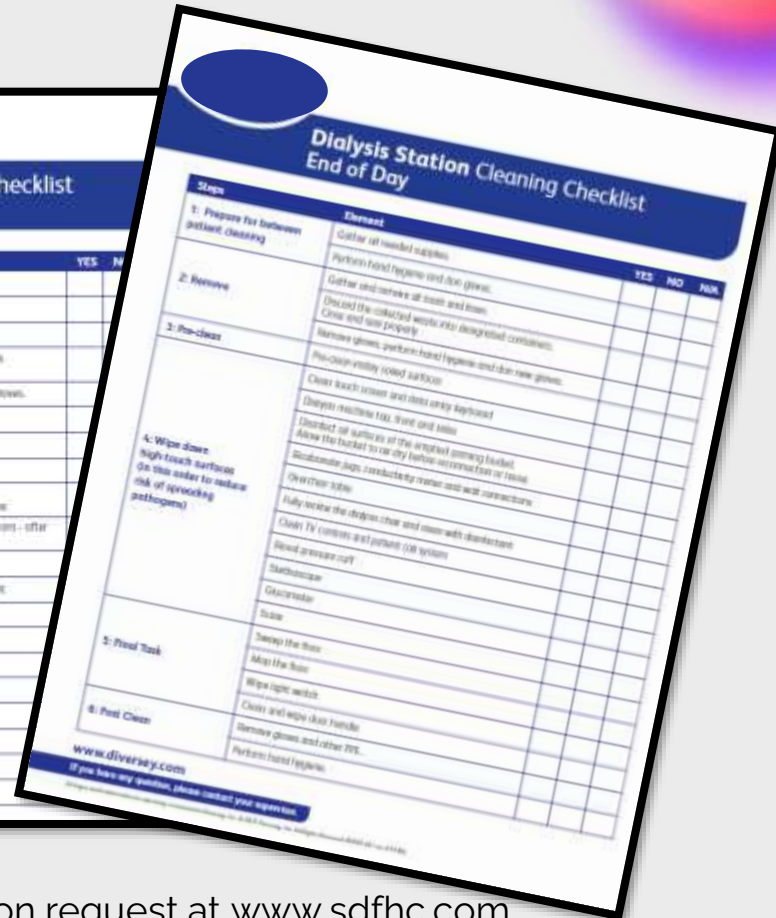
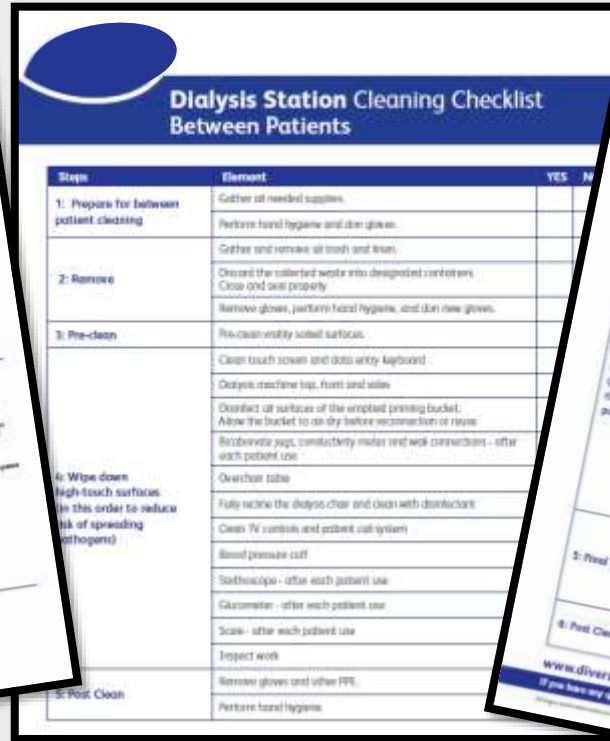
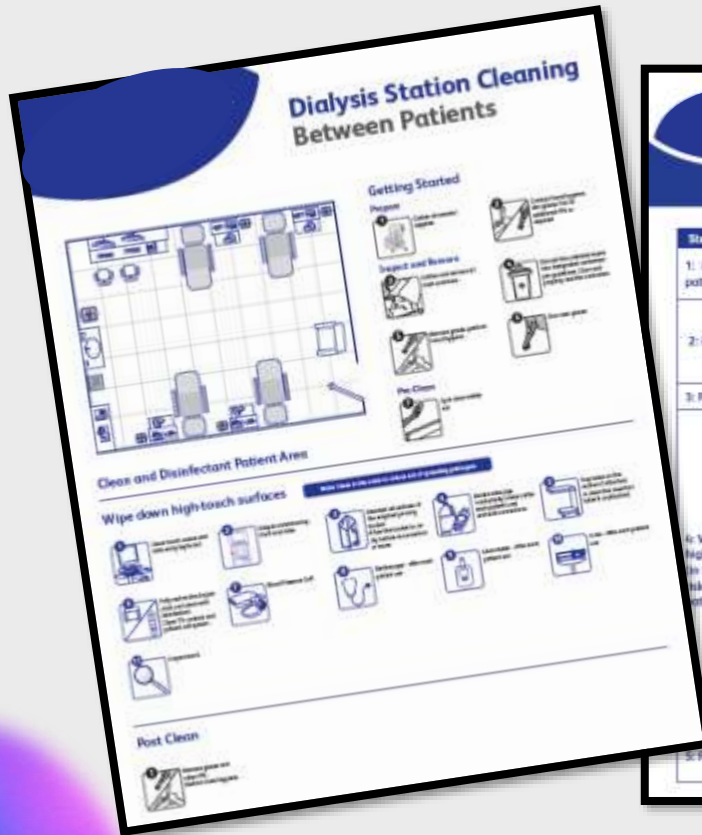


10 Scale - after each patient use



11 Inspect work

TOOLS TO BOOST COMPLIANCE



Customized wall charts & checklists available upon request at www.sdfhc.com.

WIPES MUST BE AVAILABLE AT POINT OF CARE!

- Training cards/checklists for ALL who do the cleaning/disinfection.
 - Bring the IFUs & wipes to the equipment!
- Portable shared medical equipment may differ from that in acute care
 - The only way to get to know the environment is to be **present**!



CDC AUDIT TOOL

Facility Name: _____ Observer: _____
 Date: _____ Day: M W F Tu Th Sa Shift: 1st 2nd 3rd 4th Start time: _____ AM / PM

Audit Tool: Hemodialysis station routine disinfection observations*

(Use a "√" if action performed correctly, a "Φ" if not performed/ performed incorrectly. If not observed, leave blank. All applicable actions within a row must have "√" for the procedure to be counted as successful.)

*This audit tool applies when there is no visible soil on surfaces at the dialysis station. If visible blood or other soil is present, surfaces must be cleaned prior to disinfection.

Discipline	All supplies removed from station and prime bucket emptied	Gloves removed, hand hygiene performed	Station is empty before disinfection initiated	New clean gloves worn	Disinfectant applied to all surfaces and prime bucket	All surfaces are wet with disinfectant	All surfaces allowed to dry	Gloves removed, hand hygiene performed	No supplies or patient brought to station until disinfection complete

Discipline: P=physician, N=nurse, T=technician, S=student, O=other

Duration of observation period: _____

Number of procedures performed correctly = _____

Total number of procedures observed during audit = _____

ADDITIONAL COMMENTS/OBSERVATIONS:

** Ensure the patient has left the dialysis station before disinfection is initiated.



National Center for Emerging and Zoonotic Infectious Diseases
 Division of Healthcare Quality Promotion

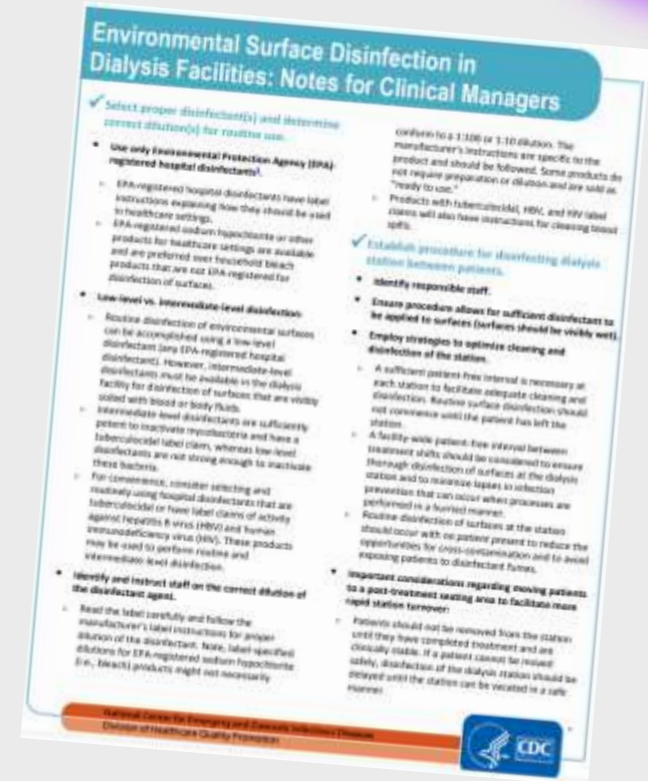


Infection Prevention does NOT own auditing. Engage unit staff in their own performance!

BUT *do* visit HD areas frequently

CDC'S ENVIRONMENTAL DISINFECTION IN DIALYSIS: NOTES FOR CLINICAL MANAGERS

- Select proper disinfectant(s) and determine correct dilutions, surface compatibility & IFUs
 - **CDC: unclear guidance (→) regarding low versus intermediate level disinfection.**
- Establish procedures for disinfecting dialysis stations between patients.
- Ensure all staff have been properly trained.
- Ensure staff have access to supplies (PPE, cleaning tools, waste management, etc.)



CONFUSED? EMAIL CDC!

----- Original Message-----

Sent: 9/13/2024

From: Educator

Email Address: rbattjes@solenis.com

Subject: Clarification on Dialysis Notes for Clinical Managers

Question: Hello! I am responsible for providing environmental hygiene education to infection prevention peers and frontline healthcare professionals. In researching CDC recommendations for hemodialysis disinfection. I believe there are incorrect statements made in the Notes for Clinical Managers related to low versus intermediate level disinfection (<https://www.cdc.gov/dialysis-safety/media/pdfs/env-notes-508.pdf>). The

document states that intermediate (tuberculocidal) disinfectants MUST be used any time visible blood is present, however, this contradicts more recent 2008 Sterilization & Disinfection guidelines to use tuberculocidal disinfectant OR an EPA-registered disinfectant that can kill HBV and HIV (new List S per EPA) or a 1:100 bleach dilution. Likewise, I am not aware, nor see the rationale, for using only a tuberculocidal disinfectant in operating rooms, which are feasibly more likely or equally likely to be contaminated with gross blood and body fluids. I believe that statement requiring intermediate disinfection is tied to older 2001 hemodialysis recommendations and OSHA recommendations before EPA testing methods for bloodborne pathogens were developed. In addition, I believe these statements mislead and confuse HD professionals. Also, one could argue that many bleach dilutions lack surfactants and are less effective at removing gross soil than one-step cleaner disinfectants. I would love to partner with someone from CDC to help clear this confusion. In the short term, I would ask that someone from CDC confirm or clarify my interpretation, as I commonly have to help others sort through this issue.

Optional Information

Name: Rebecca Battjes, MPH, CIC, FAPIC

Title: Infection Preventionist

OMG! THEY REPLIED!

Greetings,

Thank you for your inquiry to CDC-INFO.

Your request for information was forwarded to CDC's Disinfection Team. We hope you find their reply helpful.

Thanks for your question. As you know intermediate level disinfectants often have broad activity and in many cases will cover the three main Bloodborne pathogens. Historically it has been used as a proxy for disinfectants that should be adequate in these situations. We agree however that now the more appropriate thing to say would be to use disinfectants with label claims against bloodborne pathogens per the manufacturer's IFUs. This might include some low level disinfectants with activity against these pathogens.

I think you are highlighting this sentence on page 2: "However, intermediate-level disinfectants must be available in the dialysis facility for disinfection of surfaces that are visibly soiled with blood or body fluids" ?

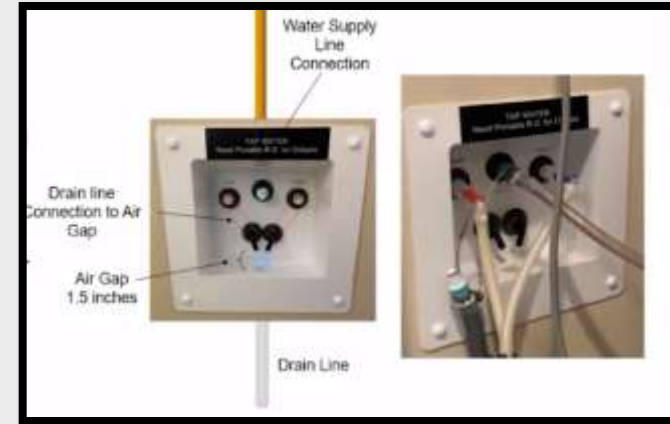
This is an oversimplification, as disinfectants with a label claim against Hepatitis B and HIV should be used, per the manufacturers IFUs, in this circumstance (this could include low-level disinfectants with such a claim). We will pass your feedback along to the Making Dialysis safer Coalition.



Does your HD facility or department use wall boxes and prime buckets?

DIALYSIS WALL BOXES

- Part of the immediate patient care environment & are considered **contaminated** or **dirty**.
- Wall boxes contain **drains** that are predisposed to the development of **biofilms**.
- May become **clogged**; splashing & foaming at the wall box may occur.
- **Biofilms** in wall box drains may contain opportunistic pathogens that can cause Healthcare-associated Infections (HAIs).
 - Gram negative bacteremia & candidemia in dialysis patients are a **red flag for environmental and/or water-associated contamination**



<https://www.cdc.gov/dialysis/guidelines/wall-boxes.html>

DIALYSIS OUTBREAK: WALL BOXES

- From July 2015 through September 2018, **58 BSIs** across 3 separate HD centers.
- Wet with visible pooling of water
- Staff interviews foul odors, clogging, lack of hand hygiene after touching wall boxes
- Every wall box had contamination with PA, SM and E. cloacae
- Sinks were **not** commonly contaminated with above organisms
- Whole genome sequencing (WGS) confirmed patients & wall boxes
- CVCs, dialyzing later in the day, and increased staff involved in dialysis session were identified risk factors.



Novosad 2019: [https://www.ajkd.org/article/S0272-6386\(19\)30797-8/pdf](https://www.ajkd.org/article/S0272-6386(19)30797-8/pdf)

CDC Webinar via YouTube <https://www.youtube.com/watch?v=kzRiS5ZG3Jk>

WALL BOXES: CDC RECOMMENDATIONS

- Develop policies about the specific frequency and methods for wall box surface disinfection
- Disinfectant wall boxes **at least daily** (e.g., at the end of the day after all patients have dialyzed)
- Clean & disinfect more frequently if needed (e.g., if visibly soiled)
- Clean & disinfect after the patient has left the HD station
- Apply EPA-registered disinfectant to all wall box surfaces & attached hoses per IFUs
- Ensure high touch surfaces (e.g., connections for acid, bicarbonate, and reverse osmosis water) are disinfected
- Wipes or other supplies used to disinfect the wall box should be discarded after use and not used to disinfect other surfaces in the dialysis station.
- Achieve full contact time (more than 1 cloth or wipe may be necessary)

DIALYSIS OUTBREAK: SALINE PRIME BUCKETS

- Outbreak occurred over 20 yrs ago but just published in 2021.
- Eight dialysis patients bwtm 7/15/02 – 9/24-02, all with lab-confirmed BSIs with *Candida tropicalis*.
 - Two cities, 3 separate outpatient HD centers
- Important finding = recovery of *C. tropicalis* from both the hollow handle as well as from the main compartment of several SPBs (never previously published).
- A plastic “plate” of the handle allowed fluid leakage but made cleaning this area virtually impossible.



Boyce et al 2021. Photos on slide included in open access article & are property of the study authors.

SALINE PRIME BUCKETS: IPC MEASURES

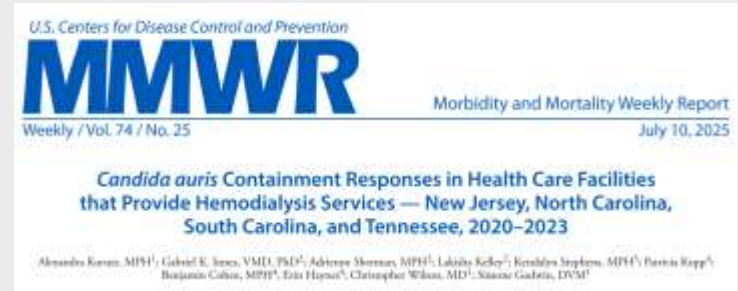
After the following IPC recommendations were followed, no more *C. tropicalis* BSIs occurred, and subsequent SBP samples were negative:

- Purchasing more SPBs
- Removing all “saline bucket plates”
- Daily disinfection of SPBs by soaking in a 1:10 bleach solution & allowing to air dry before reuse
- Not rinsing SPBs with tap water after disinfection
- Educating all personnel involved in dialysis regarding the new disinfection policy, and documentation of personnel training
- Replacing tap water inlet hose, RO reject water hose, and spent dialysis hose on all portable RO machines at Unit C.



NEW JULY 2025 MMWR HD PUBLICATION

- In 5 facilities providing dialysis in 4 states, 6 patients infected or colonized with *C. auris* received dialysis for up to 4 months **without transmission** to other patients.
 - None of the HD facilities had prior knowledge of the patients' *C. auris* status and had implemented standard dialysis IPC only.





As an IP, what is a possible hypothesis on why no *C. auris* transmission occurred in these HD facilities?

DIALYSIS CLEANING & DISINFECTION EDUCATION



- Excellent video with animations, real life patient experiences & quizzes to check knowledge!
- Go to <https://edhub.ama-assn.org/cdc-project-firstline/interactive/18754441>!



VALIDATION

VALIDATION METHODS

VISUAL
AUDIT



FLUORESCENT
MARKER

ATP



CULTURE

<https://www.cdc.gov/hai/toolkits/evaluating-environmental-cleaning.html>

Validating the Environmental Hygiene Program*

	Method	Pros	Cons
	Visual audits	Easy to perform, cost effective, engages staff	Difficult to standardize, may be seen as punitive w/o team engagement, Hawthorne effect, IP resources
	Satisfaction surveys	Encourages resident participation, including family & visitors, quantitative measurement	Subjectivity, emphasizes visible cleanliness only, not true disinfection , no benchmarking
	Environmental culture	May be useful during an outbreak or research project, quantitative	Not recommended by CDC as routine measure, high cost , long turn around times, results may not correspond to the outbreak
	ATP	Easy to use & train others, immediate feedback, can be helpful when evaluating new/novel cleaning methods	Detection of organic matter (bioburden) is not reliable predictor of infection risk, high cost of equipment & supplies , storage of swabs
	Fluorescent marking	Very inexpensive, easy to perform, immediate results	Does not identify pathogens, only detects cleaned/not cleaned, may be seen as punitive w/o team engagement

Modified from Infection Prevention Guide to LTC 2nd ed, APIC, 2017.



THANKS!

ANY QUESTIONS?

CREDITS: This presentation template was created by **Slidesgo**, including icons by **Flaticon**, and infographics & images by **Freepik**.

DIVERSEY CONTACT INFO



REBECCA BATTJES,
MPH, CIC, FAPIC

 @Linkedin.com

 @rovingIP

 @rebeccabattjes

rbattjes@solenis.com



VYDIA NANKOOSINGH,
MLT, CIC

 linkedin.com

vnankooosingh@solenis.com



PREET SINGH

Healthcare Sector
Infection Prevention Specialist

 LinkedIn

prsingh@solenis.com

REFERENCES

- Association for Professionals in Infection Control and Epidemiology. (2019). Infection Prevention Guide to Long-Term Care, 2nd edition.
- Boyce JM, Dumigan DG, Havill NL, Hollis RJ, Pfaller MA, Moore BA. A multi-center outbreak of *Candida tropicalis* bloodstream infections associated with contaminated hemodialysis machine prime buckets. *Am J Infect Control*. 2021 Aug;49(8):1008-1013. doi: 10.1016/j.ajic.2021.02.014. Epub 2021 Feb 22. PMID: 33631306.
- Centers for Disease Control & Prevention. 2014 - 2019 Surveillance Summary of Bloodstream Infections in Outpatient Hemodialysis Facilities — National Healthcare Safety Network. Available online at <https://www.cdc.gov/dialysis-safety/media/pdfs/BSI-NHSN-2014to2019-508.pdf>. Access on October 16, 2024.
- Gualandi NR, Novosad SA, Perz JF, Hopkins LR, Hsu S, Segura S, Kopp P, Maloney M, McHale E, Mehr J, Perlmutter R, Patel PR. Assessments and observations of infection prevention and control practices in US outpatient hemodialysis facilities, 2015-2018: important opportunities for improvement. *Infect Control Hosp Epidemiol*. 2024 May 15:1-6. doi: 10.1017/ice.2024.61. Epub ahead of print. PMID: 38747278.
- Kurutz A, Innes GK, Sherman A, et al. *Candida auris* Containment Responses in Health Care Facilities that Provide Hemodialysis Services — New Jersey, North Carolina, South Carolina, and Tennessee, 2020–2023. *MMWR Morb Mortal Wkly Rep* 2025;74:415–421. DOI: <http://dx.doi.org/10.15585/mmwr.mm7425a1>
- Omidbakhsh N. Theoretical and experimental aspects of microbicidal activities of hard surface disinfectants: are their label claims based on testing under field conditions? *J AOAC Inter* 2010;93(6):1-8
- Rutala WA, Weber DJ. Selection of the Ideal Disinfectant. *Infection Control & Hospital Epidemiology*. 2014;35(7):855-865. doi:10.1086/676877.
- United States Renal Data System. 2023 USRDS annual data report: epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD. <https://usrdp.adr.niddk.nih.gov/2023>. Published 2023. Accessed October 16 2024.

REFERENCES

- Rutala WA, Weber DJ. Selection of the Ideal Disinfectant. Infection Control & Hospital Epidemiology. 2014;35(7):855-865. doi:10.1086/676877.
- United States Renal Data System. 2023 USRDS annual data report: epidemiology of kidney disease in the United States. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD. <https://usrdp.adr.niddk.nih.gov/2023>. Published 2023. Accessed October 16 2024.