Cleaning & Disinfection in Dialysis

What You Did Not Know

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NEBRASKA INFECTION CONTROL ASSESSMENT AND PROMOTION PROGRAM

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Presenters today:

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Sarah Stream, MPH, CDA, FADAA

PCAP

NEBRASKA INFECTION CONTROL ASSESSMENT AND PROMOTION PROGRAM

Panelist & Questions and Answer Session

Panelists today:

- Daniel Brailita, MD
- Juan Teran Plasencia, MD
- Rebecca Martinez, BA, BSN, RN, CIC
- Sarah Stream, MPH, CDA, FADAA
- Kate Tyner, RN, BSN, CIC
- Lacey Pavlovsky, MSN, RN, CIC, LTC-CIP
- Moderated by Margaret Deacy

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Please use the Q&A box in the webinar platform to type a question to be read aloud. If your question is not answered during the webinar, please e-mail it to <u>nebraskaicap@nebraskamed.com</u> or call Monday – Friday 8:00 am – 4:00 pm CST to speak with one of our Infection Preventionists.

Slides from this presentation will be available on the Nebraska ICAP website

Continuing Education

This nursing continuing professional development activity was approved by the Midwest Multistate Division, an accredited approver by the American Nurses Credentialing Center's Commission on Accreditation.

In order to obtain 1.0 contact hour, you must participate for the entire presentation and complete the evaluation.

No relevant financial relationships were identified for any member of the planning committee or presenter/author.

This educational activity is presented by Nebraska ICAP

NEBRASKA INFECTION CONTROL ASSESSMENT AND PROMOTION PROGRAM



Disclaimer

Every attempt has been made to provide an unbiased, balanced presentation.

This topic, however, lends itself to specific products to be discussed.

Name brands have changed to reflect generic names when possible.



Learning Objectives

Become familiar with basics and terminology of cleaning and disinfection

Explain the difference between cleaning, sanitation and disinfection

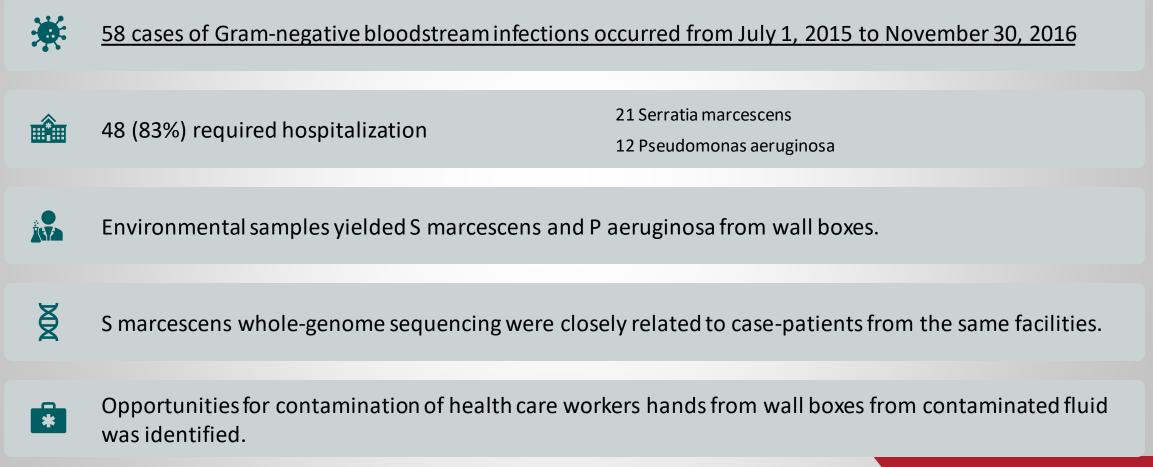
Identify effective contact times with different products

Discuss bleach use and appropriate precautions in dialysis settings

Identify PPE required when using disinfectants



Multicenter Outbreak of Gram-Negative Bloodstream Infection in Hemodialysis Patients Related to Wall Box



Novosad SA, Lake J, Nguyen D, Soda E, Moulton-Meissner H, Pho MT, Gualandi N, Bepo L, Stanton RA, Daniels JB, Turabelidze G, Van Allen K, Arduino M, Halpin AL, Layden J, Patel PR. Multicenter Outbreak of Gram-Negative Bloodstream Infections in Hemodialysis Patients. Am J Kidney Dis. 2019 Nov;74(5):610-619. doi: 10.1053/j.ajkd.2019.05.012. Epub 2019 Jul 30. PMID: 31375298.

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Multicenter Outbreak of Gram-Negative Bloodstream Infection in Hemodialysis Patients Related to Wall Box

July 2015 to November 2016

Staff may lack awareness of infectious risks associated with wall boxes and necessary infection prevention and control measures

Wall boxes contain drains that are predisposed to the development of biofilms that contain opportunistic pathogens

Wall box drains may become clogged; splashing and foaming at the wall box



Gap analysis

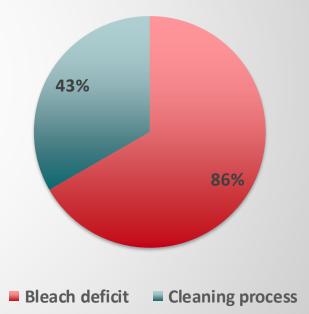
2015-2018 ICARs-14 Facilities

Dialysis Station Cleaning Compliance



2021-2022 ICARs-7 Facilities





WICAP

Preventing Transmission of Infections in Dialysis Facilities

Cleaning and Disinfection processes in hemodialysis break the chain of infection by reducing and eliminating opportunities of infectious agents via contaminated devices, equipment and supplies.

Supplies

• Dispose of left-over extra supplies

Contaminated devices

- BP cuffs
- Clamps
- Hemostats
- Stethoscopes

Equipment

- Dialysis machines
- Wall boxes
- Station chair
- Containers including prime waste

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Clean, Sanitize, or Disinfect?

Action	What does it do?	Example of when to do it
Cleaning	Cleaning removes dirt and organic matter from surfaces using soap or detergents. *Removes Germs*	Every time, it is the necessary first step to any cleaning/ disinfection process
Sanitizing	Sanitizing kills bacteria on surfaces using chemicals. It is not intended to kill viruses. *Lowers the number of germs*	Food contact surfaces
Disinfecting	Disinfecting kills viruses and bacteria on surfaces using chemicals. *Kills the germs*	High touch surfaces, surfaces contaminated by blood and body fluid

EPA What's the difference between products that disinfect, sanitize, and clean surfaces? https://www.epa.gov/coronavirus/whats-difference-between-products-disinfect-sanitize-and-clean-surfaces

Cleaning



- Cleaning is the necessary first step of any disinfection process.
- Cleaning removes organic matter, salts, and visible soils, all of which interfere with microbial inactivation.
- The physical action of scrubbing with detergents and surfactants and rinsing with water removes substantial numbers of microorganisms.
- If a surface is not cleaned first, the success of the disinfection process can be compromised.
- Removal of all visible blood and inorganic and organic matter can be as critical as the germicidal activity of the disinfecting agent.
- In some environments, surfaces that cannot be easily cleaned adequately, should be protected with barriers.

Cleaning, followed by disinfection

Spray-wipe-spray

Wipe-discard-wipe

If using liquid disinfectant:

- 1. User sprays the surface with the disinfectant
- 2. Wipe it using a disposable towel to clean the surface
- Followed with another "spray" to disinfect the surface (allowing contact time to disinfect)

If using disposable disinfectant wipes:

- 1. User uses one wipe to clean the surface
- 2. Discards the wipe,
- 3. Use a second wipe to disinfect the surface.

** Note Disinfectant products should not be used as cleaners unless the label indicates the product is suitable for such use.

Cleaning & Disinfecting Environmental Surfaces | FAQs | Infection Control | Division of Oral Health | CDC

Disinfection: mechanism of action

<u>Oxidation</u>- disrupt the cell wall of bacteria, resulting in the loss of structure, cell lysis and death (example chlorine) Denaturation-molecules break down the protein cell walls and then the cells collapse/lose function (example- alcohol) Surface active agentsimpact cell walls and membranes by positive surface charge (example quats)



Disinfection requirements



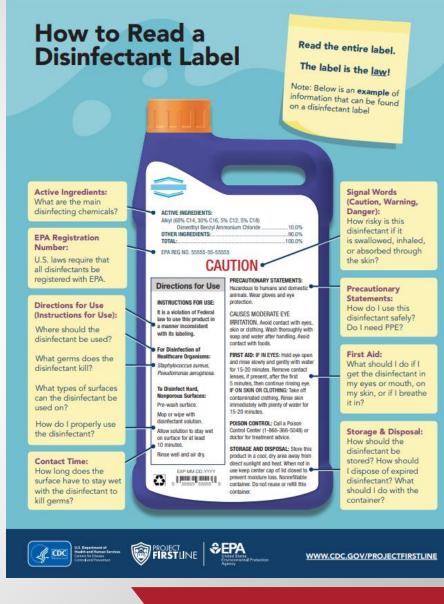
SURFACE IS CLEAN AND FREE OF GROSS SOIL APPROPRIATE CONCENTRATION OF ACTIVE INGREDIENT/ DILUTION ADEQUATE APPLICATION/ SURFACE SATURATION SUFFICIENT TIME FOR THE AGENT TO KILL ORGANISMS THAT ARE PRESENT (A.K.A CONTACT TIME)



More about Contact Time

How to Read a Disinfectant Label (cdc.gov)

- Sometimes called "dwell time," this is the amount of time a disinfectant needs to sit on a surface, without being wiped away or disturbed, to effectively kill germs.
- □ Why are multiple times sometimes listed (1 min, 3 min, 10 min)?
- Different types of pathogens require longer exposure to the chemical disinfectant- they are harder to kill?





Selection of Disinfectants

Considerations

- Speed of disinfection (Dwell Time/ Contact Time)
- Cleaning ability
- Personnel health and safety
- Cost
- Surface compatibility/ instructions for use for the surface
- Application method (wipes, bucket immersion, pour bottles, and sprays)



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<u>Cleaning</u> products that are healthier for people and the environment

- fragrance-free
- free of dyes
- non-antibacterial
- non-aerosols (propellant)



EPA Safer Choice logo





EPA Design for the Environment (DfE)



EPA design for the environment is the only certification logo for antimicrobial products that sanitize and disinfect and are better for the environment.

DfE-Certified Disinfectants | US EPA



Common Disinfectants

Disinfectant	Advantages	Disadvantages
Chlorine (a.k.a. bleach solutions)	EPA registered, low incidence of toxicity, reduces biofilms of surfaces, sporicidal at specific concentrations	Discoloration of fabrics, inactivated by organic matter, toxic when mixed with ammonia
Quaternary ammonium compounds (a.k.a 'quads')	EPA registered, surface compatible, active against many bacteria, enveloped viruses, and fungi	Not sporicidal, not effective against non- enveloped viruses, water hardness & cotton can make it less microbiocidal
Improved hydrogen peroxide	EPA registered, non-staining, surface compatible, excellent coverage of organisms, benign for environment, often sporicidal	Expensive
Phenolics	EPA registered, active against many bacteria, enveloped viruses, and fungi, inexpensive	Not sporicidal, tissue irritant
Alcohol	Good organism coverage, easy to use, used to disinfect small surfaces such as rubber stoppers on medication vials	Not EPA registered, not sporicidal, no detergent or cleaning properties

Cleaning and Disinfectant Safety

Follow these important safety guidelines when using chemical disinfectants:

- Open doors and windows and use fans or HVAC (heating, ventilation, and air conditioning) settings to increase air circulation in the area.
- Wear the recommended protective equipment (for example, gloves or goggles) to protect your skin and eyes from potential splashes.
- If the product instructions tell you to dilute the product with water, use water at room temperature (unless the label says otherwise).
- Clearly label all cleaning or disinfection solutions.
- Store and use chemicals out of the reach of children and animals.
- Do not mix products or chemicals with each other as this could be hazardous and change the chemical properties.
- Do not eat or drink near the chemicals. These products can cause serious harm.
- Immediately after disinfecting, wash your hands with soap and water for 20 seconds.

Cleaning: Bucket immersion or open bucket method

Bucket is pre-filled with disinfectant solution (mixed to manufacturer's instructions for use), usually with a filling station.

Clean cleaning cloths are placed in the bucket to soak

The object or surface is cleaned with sufficient saturation that the disinfectant stays on the surface, wet for the prescribed contact time.



- ✓ Wipes are only removed from the bucket, never double dipped
- ✓ Dirty rag bag is needed on the ES cart
- Change rags as needed to ensure saturation

Environmental Services Cleaning Guidebook.pdf (mnhospitals.org)

Nebraska ASAP Environmental Cleaning in Healthcare, part 1 setting up the cart

Dispensing Stations vs. Ready to Use

Dispensing Stations

- Dilution can vary over time, so validation process important to measure effectiveness
- Cost effective, mixing as needed at point of use
- Chemical distributed in concentrate form, higher yield.
 Potential splash risk, must use PPE (gloves, goggles)

Ready to Use

- Comes pre-mixed, dilution is always to manufacturer's instructions for use
- Costly on per-use scale
- Requires significant amount of storage

Reusable cleaning cloths

Single use, then 'rag bag' (no double dipping)

Microfiber is preferred

Sponges should not be used (they never dry, harbor lots of debris and germs)

Between uses, microfiber rags should be laundered in hot water, without bleach or fabric softener

• Adhere to manufacturers' instructions for specific direction

Most manufacturers recommend low heat for drying Do NOT dry any other cloths, rags, towels or other clothing with microfibers

How to wash microfiber: <u>https://www.maytag.com/blog/washers-and-dryers/how-to-wash-microfiber-towels-cloths.html</u>

Electronics & Keyboards



- Silicone cover-makes cleaning and sanitizing easier.
- Clean with a microfiber cloth or paper towel.
- Follow with disinfectant.
- Do not spray disinfectant directly on a keyboard.
- Disinfectant wipes can be used.



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Dialysis Station Disinfection

Identify	Establish	Provide	Establish
Responsible staff	A procedure to allow sufficient disinfectant to be applied to surface (wet time)	Patient-free intervals to allow through disinfection of surfaces to minimize lapses in infection prevention • Consider moving patients to a post-treatment seating area to facilitate more rapid station turnover.	A procedure and checklist for cleaning, disinfection, and drying Priming buckets Priming buckets Reusable supplies Discarding disposable supplies

Dialysis Station Disinfection in 2 Steps

Part A

- Remove used blood tubing and dialyzer and discard in a leakproof container
- Clean any visible soil or blood on surfaces
- Move any reusable supplies to an area where they will be cleaned and disinfected (clamps)
- Ensure the priming bucket is emptied
- Discard all single use supplies within the patient station
- Remove gloves and perform hand hygiene

Part B

- Assure the patient has exited the station
- Wear appropriate PPE which includes clean gloves
- Using a wiping motion, apply disinfectant to all surfaces in the patient station
- Ensure surfaces are visibly wet
- Disinfect the priming bucket and allow it to air dry before reconnecting
- Remove gloves and perform hand hygiene
- Allow surfaces to air dry and do not bring clean supplies into the stion until complete

Dialysis Wall Boxes



Hemodialysis Boxes - Maintenance Requirements | Ambulatory | Environment of Care EC | The Joint Commission

- Disinfect at least daily
- Cleaning and disinfect after the patient has left the station
- Apply disinfectant to all surfaces and any attached hoses
- Ensure high touch surfaces of the wall box and any attached hoses are disinfected
- Wipes and other supplies used to disinfect the wall box should be discarded after use and not used to disinfect other surfaces in the dialysis station
- More than one disinfectant wipe or application may be needed to ensure all wall box surfaces are visibly wet with disinfectant to achieve contact time specified for manufacturer







Sodium Hypochlorite

is the active ingredient that kills bacteria, fungi, and viruses, including SARS-CoV-2 and Influenza.



<u>Table G.1, Sodium hypochlorite: concentration and use - Infection Prevention and</u> <u>Control of Epidemic- and Pandemic-Prone Acute Respiratory Infections in Health Care -</u> <u>NCBI Bookshelf (nih.gov)</u>



Bleach is a good disinfectant in Dialysis

Strong and effective disinfectant, killing bacteria, bacterial spores, fungi, and viruses

Widely available

Low cost

Recommended surface disinfectant for healthcare facilities



Bleach Disadvantages

Bleach expires 1 year from production. Avoid overstocking.

Loses potency if stored incorrectly.

Keep out of direct sunlight and temps > 77 F
Discard unused mixtures 24 hours after preparation

Potency reduces over several months after opening, even with proper storage, so that standard dilutions are not longer effective.

Emits a toxic gas when exposed to direct sunlight or when mixed with certain chemicals (e.g., vinegar).

Deactivated by organic materials (i.e., surfaces must be cleaned before use to be effective).

Bleach: Recommended Dilution Nonporous Surfaces

500-615 ppm(parts per million) of 5% sodium hypochlorite is the usual recommendation for disinfection or 500 ppm.

Bleach concentration	8.25 %	Bleach concentration	5 %
Desired chlorine concentration	500 <u>ppm •</u>	Desired chlorine concentration	500 <u>ppm •</u>
Desired chlorine volume	1 <u>US gal ▼</u>	Desired chlorine volume	1 <u>US gal ▼</u>
Required bleach volume	24.09 <u>ml •</u>	Required bleach volume	39.75 <u>ml •</u>

Environmental Guidelines | Guidelines Library | Infection Control | CDC

Bleach Dilution Calculator



Bleach concentration	%
Desired chlorine concentration	<u>ppm •</u>
Desired chlorine volume	<u>US gal</u> 💌
Required bleach volume	<u>US fl oz</u> •

Bleach Dilution Calculator (omnicalculator.com)



Bleach: Recommended Dilution

Blood Spills

Blood Spills: 5,000-6,150 ppm (parts per million)

Bleach concentration	8.25 %
Desired chlorine concentration	5,000 <u>ppm •</u>
Desired chlorine volume	1 <u>US gal ▼</u>
Required bleach volume	240.9 <u>ml</u> •

Bleach concentration	5 %
Desired chlorine concentration	5000 <u>ppm •</u>
Desired chlorine volume	1 <u>US gal ▼</u>
Required bleach volume	397.5 <u>ml</u> •

Environmental Guidelines | Guidelines Library | Infection Control | CDC



Is it better to have a higher than recommended concentration?

Potential hazard for workers and patients

- Toxic gas when exposed to sunlight
- It is an irritant and can burn tissue!
 - mucous membranes
 - skin
 - airways
- Damaging to surfaces-can erode metals and surfaces



PPE USE

Protect your eyes, mouth and nose from splashes



Protect your skin

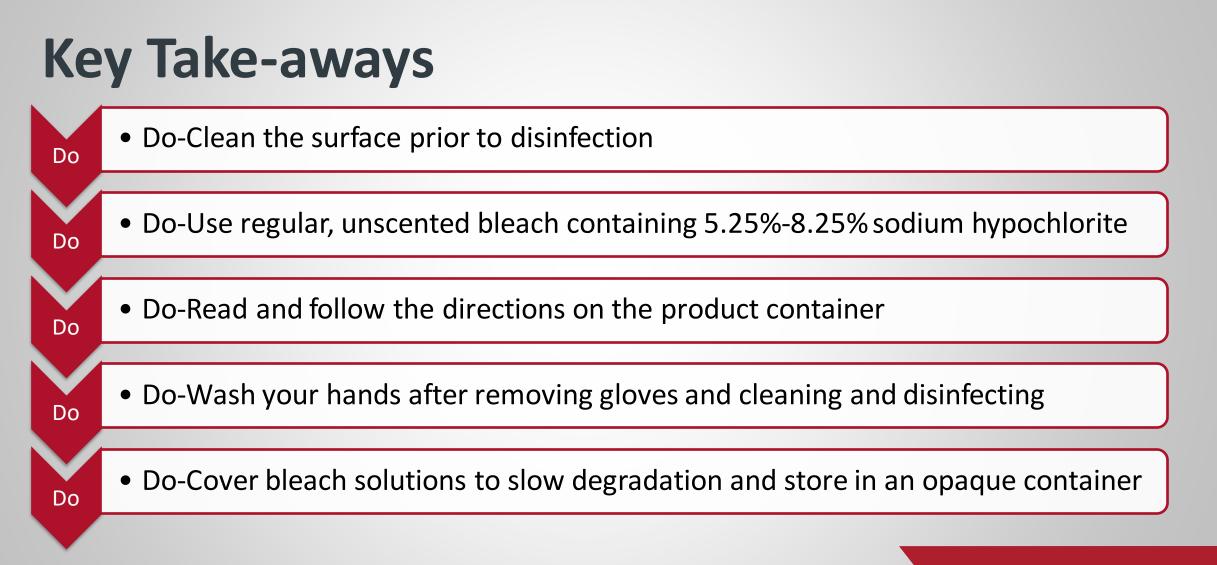






bleach-dilution-and-guidance-for-visitors-20200622.pdf (who.int)





Key Take-aways • Do not-Mix bleach with other cleaners, vinegars, ammonia, or acids Do Not • Do not-Touch your eyes Do Not • Do not-Inhale bleach fumes Do Not Do not-Keep bleach solution over 24 hours after mixing Do Not



Resources

CDC Cleaning and Disinfecting With Bleach | CDC

Environmental Surface Disinfection in Dialysis Facilities: Notes for Clinical Managers (cdc.gov)

NIH-National Library of Medicine

<u>Use of disinfectants: alcohol and bleach - Infection Prevention and Control of Epidemic- and Pandemic-Prone</u> <u>Acute Respiratory Infections in Health Care - NCBI Bookshelf (nih.gov)</u>

OMNI Calculator Bleach Dilution Calculator (omnicalculator.com)

WHO (Infographics) bleach-dilution-and-guidance-for-visitors-20200622.pdf (who.int)



Dialysis Program Development



Policy Development Operating Procedures

What surfaces are cleaned versus sanitized versus disinfected?

Disinfectant must be changed after (x) rooms/stations

After a 'sick' room, equipment must be wiped down & disinfectant refreshed

Disposable versus reusable mop heads and cleaning cloths

Orientation, training, and feedback (think checklists)

Communication strategies



Development of a Training Program

Core Interventions

- Orientation
- Training
- Evaluation of performance should be competency based.
- Patient education
- Surveillance and Auditing

General Cleaning Techniques

- Use only EPA registered disinfectants
- Identify and instruct staff on correct dilution of disinfectant agents
- Establish procedure for disinfecting dialysis station between patients
 - Cleaner to dirtier
 - High to low (Top to bottom)
 - Methodical, systematic manner
 - Number of clothes/wipes to be utilized

Create a checklist to avoid missing areas

Checklist: Dialysis Station Routine Disinfection

This list can be used if 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. The proper steps for cleaning and disinfecting surfaces that have visible soil on them are not described herein. Additional or different steps might be warranted in an outbreak situation. Consider gathering necessary supplies² prior to Part A.

Part A: Before Beginning Routine Disinfection of the Dialysis Station

Disconnect and takedown used blood tubing and dialyzer from the dialysis machine.

Discard tubing and dialyzers in a leak-proof container².

Check that there is no visible soil or blood on surfaces.

Ensure that the priming bucket has been emptied³.

Ensure that the patient has left the dialysis station⁴.

Discard all single-use supplies. Move any reusable supplies to an area where they will be cleaned and disinfected before being stored or returned to a dialysis station⁵.

Remove gloves and perform hand hygiene.

PART B: Routine Disinfection of the Dialysis Station – AFTER patient has left station

Wear clean gloves.

Apply disinfectant $^{\underline{6}}$ to all surfaces 2 in the dialysis station using a wiping motion (with friction).

Ensure surfaces are visibly wet with disinfectant. Allow surfaces to air-dry⁸.

Disinfect all surfaces of the emptied priming bucket². Allow the bucket to air-dry before reconnection or reuse.

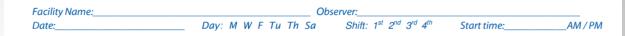
Keep used or potentially contaminated items away from the disinfected surfaces.

Remove gloves and perform hand hygiene.

Do not bring patient or clean supplies to station until these steps have been completed.

ntrol and Prevention tional Center for Emerging and





Audit Tool: Hemodialysis station routine disinfection observations^{*}

(Use a " $\sqrt{"}$ if action performed correctly, a " Φ " if not performed/performed incorrectly. If not observed, leave blank. All applicable actions within a row must have " $\sqrt{"}$ 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: Num

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.



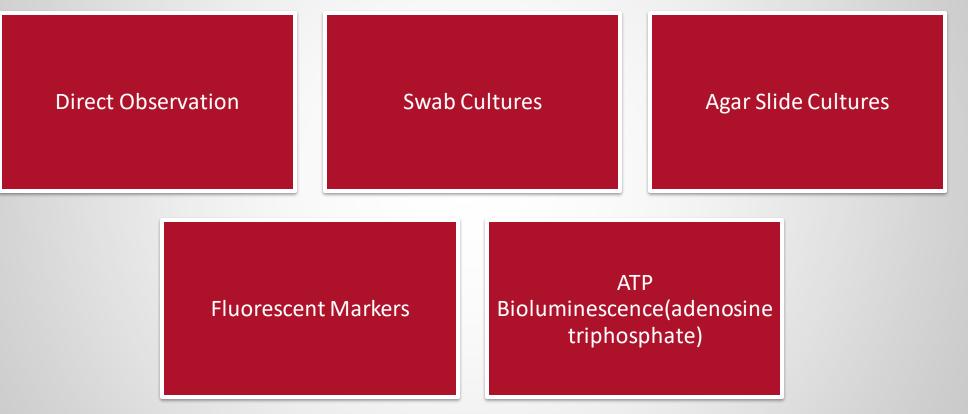
National Center for Emerging and Zoonotic Infectious Diseases Division of Healthcare Quality Promotion

C CDC

Resource Center | Dialysis Safety | CDC

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Monitoring and Surveillance



Options for Evaluating Environmental Cleaning | HAI | CDC



Questions



NEBRASKA INFECTION CONTROL ASSESSMENT AND PROMOTION PROGRAM



Continuing Education Event:

Quality Control in Sterile Processing: The Role of Chemical and Biological Indicators

> Course Description: Learn how the use of chemical and biological indicators play a role in a comprehensive quality control program in Sterile Processing

> > Date: November 29th, 2023 Time: 12:00-1:00 pm (CT)

Location: Live via Zoom https://unmc.zoom.us/webinar/register/WN_DMcSyD04QleDeik9B6Wdbg

This activity has been submitted to the Midwest Multistate Division for approval to award contact hours. The Midwest Multistate Division is accredited as an approver of nursing continuing professional development by the American Nurses Oredentialing Center's Commission on Accreditation

or more information regarding contact hours, please call Candi Kennedy 402-552-2572 or email at cakennedy@nebraskamed.com



Inpatient Dialysis Assessments

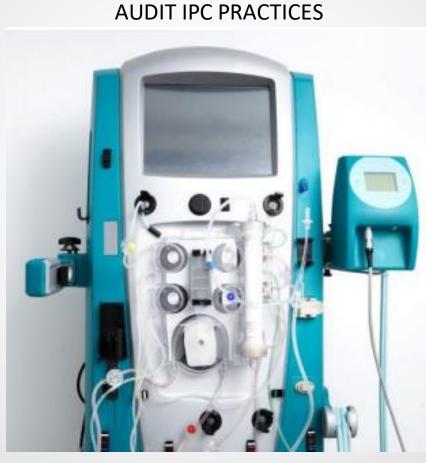
INJECTION PRACTICES

HAND HYGIENE



MEDICATION PREP

PPE USE



FISTULA/GRAFT ACCESS

CATHETER ACCESS



DIALYSIS SITE CARE

CLEANING & DISINFECTION



Benefits

Free	Free onsite infection prevention and control(IPC) assessments (upon request)					
Identify	Identify improvement opportunities for the facility					
Provide	Provide a just-in-time coaching to staff					
Help	Help NE ICAP to identify common IPC gaps in dialysis practices and processes Develop strategies, tools, and resources Build basic IPC remote training program for dialysis staff					



ICAP Contact Information

Call 402-552-2881

Office Hours are Monday – Friday 8:00 AM - 4:00 PM Central Time Weekends and Holidays 8:00-4:00 On-call hours are available for <u>emergencies only</u>



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Scan the QR Code to be taken to our <u>NE ICAP Contact Form</u>. You can request to be connected to an Infection Preventionist that specializes in your area, get added to our setting specific communication list for webinar and training invites, sign up for newsletters and reminders, or request an ICAR review for your facility.



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