

Fundamental Infection Prevention Applied to Inpatient Hemodialysis

A Guide for Infection Preventionist

NEBRASKA

Good Life. Great Mission.

DEPT. OF HEALTH AND HUMAN SERVICES



NEBRASKA INFECTION CONTROL ASSESSMENT AND PROMOTION PROGRAM

Comprehensive Care in Dialysis: Medication Preparation, Environment of Care, and Risk Mitigation Strategies

NEBRASKA

Good Life. Great Mission.

DEPT. OF HEALTH AND HUMAN SERVICES

**Presented by Chris Cashatt RN, BSN, CIC
NE ICAP Infection Preventionist, Dialysis Lead**



NEBRASKA INFECTION CONTROL ASSESSMENT AND PROMOTION PROGRAM

Outcomes

Describe

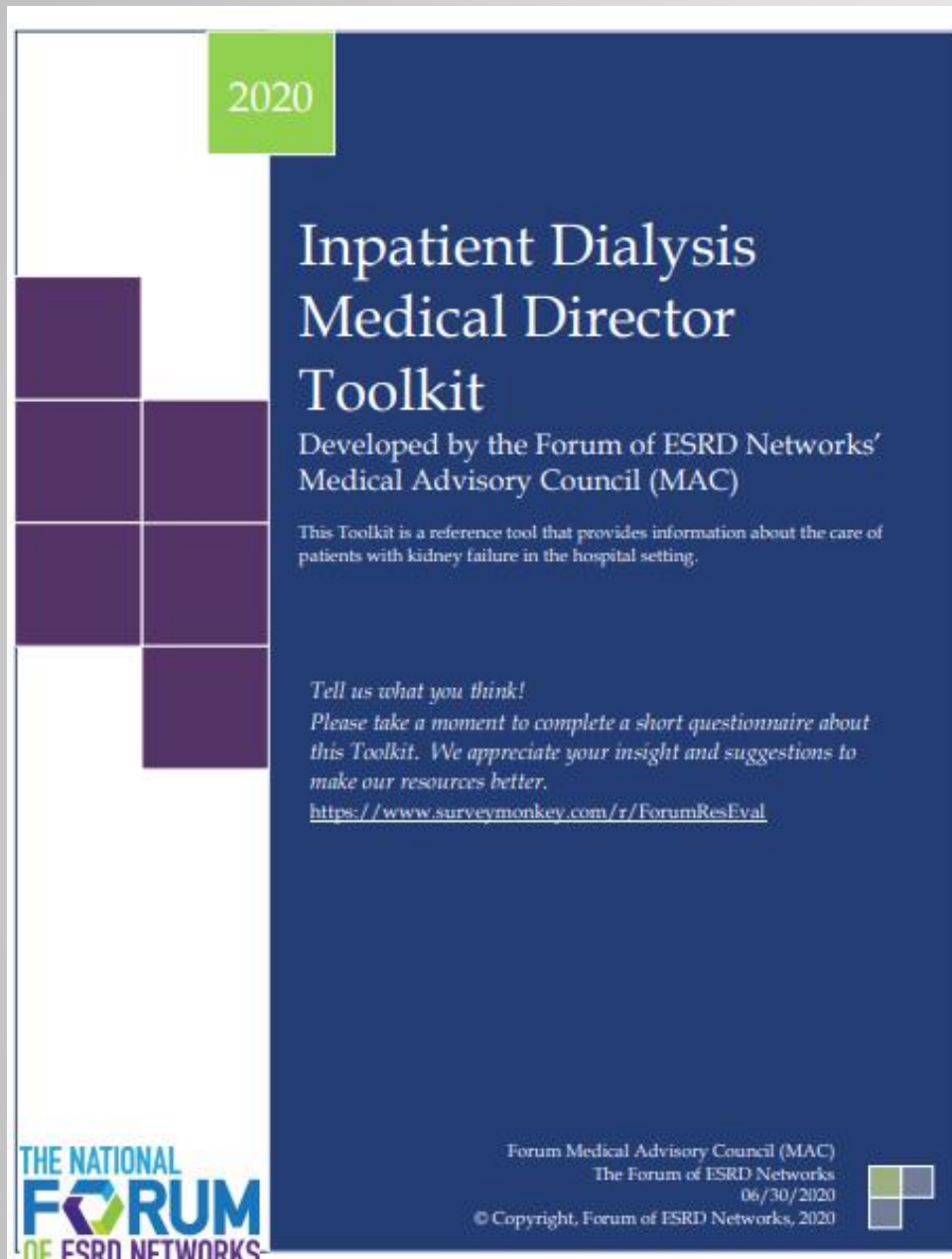
Describe how to conduct an infection risk assessment specific to dialysis units, identifying potential sources of infection and vulnerable points in the process.

Explain

Explain the importance of adherence to best practices in dialysis, focusing on infection prevention measures such as hand hygiene, aseptic techniques, and environmental controls.

Inpatient Dialysis Medical Director Toolkit

ESRD networks created this guide for inpatient dialysis medical directors and is not a regulatory statement.



The Joint Commission



The Joint Commission has identified dialysis as a high-risk area, with a focus on infection control to prevent bloodborne pathogen transmission.

Key measures include:

- hand hygiene and
- catheter care,
- station and equipment disinfection
- isolation precautions

Considerations When Admitting Chronic Dialysis Patients to Acute Care Settings

Outpatient Screening

Hepatitis B (patients and staff)

- Admission, then yearly if evidence of **HBsAb** immunity
- Monthly if **HBsAb** susceptible (refused vaccine or vaccine non-response)
- Those naturally recovered need no additional testing

Hepatitis C

- Admission, then every 6 months

TB

- Admission

HIV

- Admission
- Yearly for those identified as high risk

Inpatient HPV B Admission

Determine HBsAg (Hepatitis B) status on admission

Dialysis performed in own or dedicated room

Dedicated equipment, instruments, supplies, medications

Staff caring for HBsAg-positive dialysis patients must not attend to HBsAg-susceptible patients.

Patient Care Environment



All building surfaces must be maintained free from defects, intact and clean.



Space should be sufficient to provide needed care and prevent cross-contamination



Furniture is maintained to allow effective cleaning and disinfection



Equipment: maintained and functional

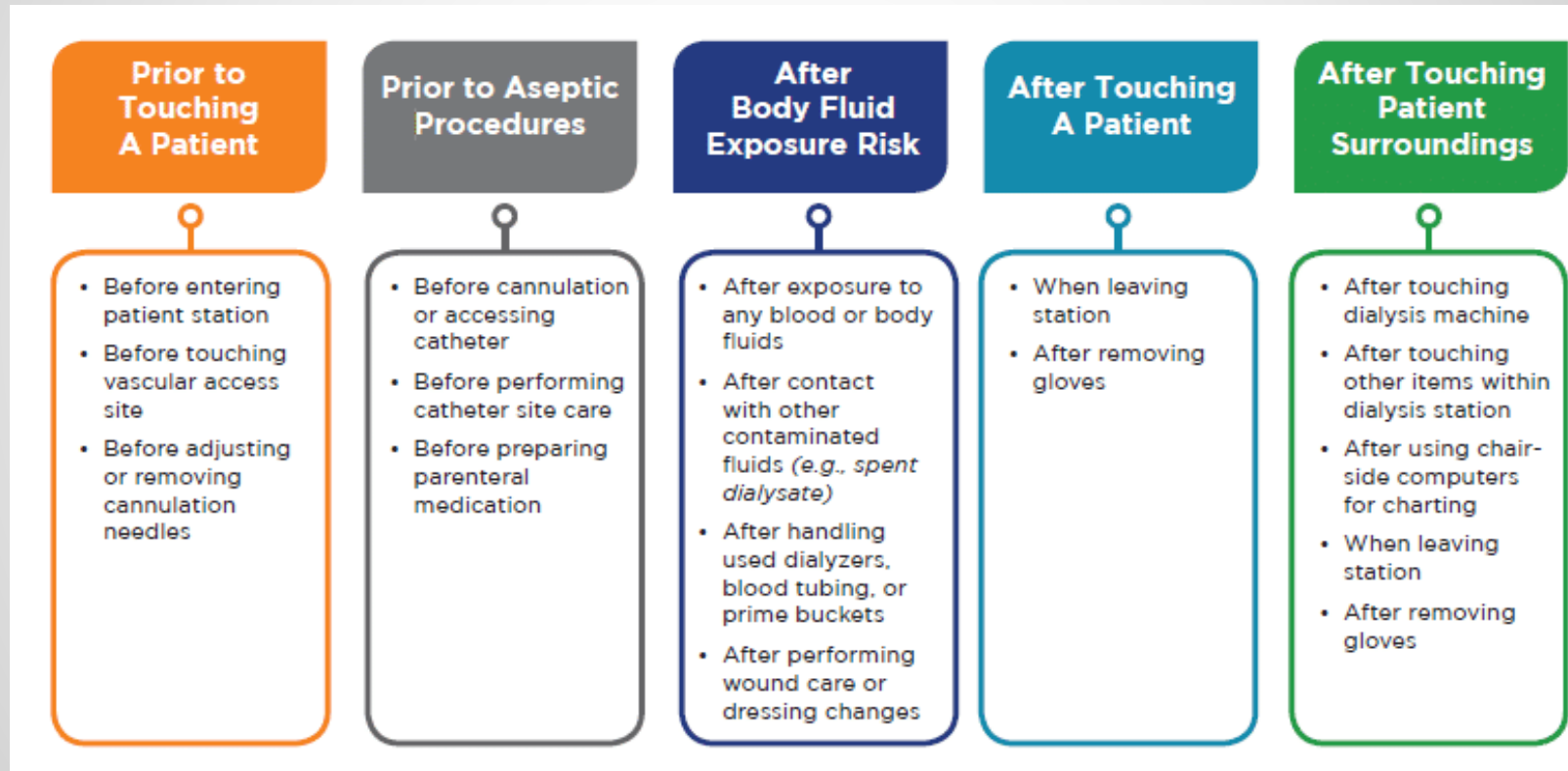


Maintain a comfortable temperature



Patients, their vascular access site, bloodline connections, and face must be visible to staff throughout the treatment.

Hand Hygiene



Guide to Hand Hygiene Opportunities in Hemodialysis

Hand hygiene opportunity category	Specific examples
1. Prior to touching a patient	• Prior to entering station to provide care to patient • Prior to contact with vascular access site • Prior to adjusting or removing cannulation needles
2. Prior to aseptic procedures	• Prior to cannulation or accessing catheter • Prior to performing catheter site care • Prior to parenteral medication preparation • Prior to administering IV medications or infusions
3. After body fluid exposure risk	• After exposure to any blood or body fluids • After contact with other contaminated fluids (e.g., spent dialysate) • After handling used dialyzers, blood tubing, or prime buckets • After performing wound care or dressing changes
4. After touching a patient	• When leaving station after performing patient care • After removing gloves
5. After touching patient surroundings	• After touching dialysis machine • After touching other items within dialysis station • After using chairside computers for charting • When leaving station • After removing gloves

[Audit Tool:
Hemodialysis hand
hygiene observations
\(cdc.gov\)](#)

Please make note of the following during this session.			
	Yes	No	Comments
There is a sufficient supply of alcohol-based hand sanitizer			
There is a sufficient supply of soap at handwashing stations			
There is a sufficient supply of paper towels at handwashing stations			
There is visible and easy access to hand washing sinks or hand sanitizer			



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



PPE

Gowns

- Patient care when contact with blood and body fluids is anticipated.
- Worn during all dialysis to prevent soiling of clothes. Change if soiled with blood, body fluids, secretions, or excretions
- All staff or visitors who are present in the treatment area during initiation and termination of dialysis when risk of blood exposure is the highest.

Gloves

- Anticipate contact with blood, body fluids or other potentially infectious materials
- Anytime when touching the patient equipment.
- Remove gloves after contact with a patient or surrounding.
- Never wear the same pair of gloves for care of more than one patient.

Face Shield or (Mask and Eye protection)

- During accessing or deaccessing HD access process (staff and patients)
- Dressing changes on central lines (staff and patients)

Medication Preparation



Audit Tools and Checklists | Dialysis Safety | CDC

Facility Name: _____ Observer: _____
Date(s): _____ Location of Medication Preparation: _____

Audit Tool: Hemodialysis injectable medication preparation

Observe a medication preparation session. (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.)

Day (i.e., M, Tu, W)	Shift (i.e., 1 - 4)	Discipline	Med prep done in designated area	Med prep area is clean *	All vial(s) are inspected **	Hand hygiene performed	Septum of all vial(s) disinfected	All vials entered with new needle and new syringe	Med prep done aseptically	All single dose vial(s) discarded	All multi dose vial(s) discarded or stored properly

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

Number of sessions performed correctly = _____

Total number of sessions observed = _____

ADDITIONAL COMMENTS/OBSERVATIONS:

*Preparation of injectable medications must be performed in a designated clean area that is free of obvious contamination sources (e.g., blood, body fluids, contaminated equipment, tap water).

**Vial should be discarded if sterility is questionable, or expiration date or beyond-use date has been exceeded. If a multi-dose vial will not be immediately discarded after use, the vial should be labeled upon opening to indicate the beyond-use date.



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



Checklist: Hemodialysis injectable medication administration

Injectable medications should be handled and transported from the medication preparation area in a manner that minimizes contamination risk. The provider administering the medication should also ensure the correct medication and dose are being administered to the correct patient.

- ☐ Perform hand hygiene
- ☐ Put on new, clean gloves
- ☐ Scrub injection port with antiseptic*
- ☐ Attach syringe and administer medication aseptically
- ☐ Discard syringe
- ☐ Remove gloves
- ☐ Perform hand hygiene

*The following are appropriate antiseptics: chlorhexidine, povidone-iodine, tincture of iodine, 70% alcohol



Centers for Disease
Control and Prevention
National Center for Emerging and
Zoonotic Infectious Diseases

Clean Storage/Supplies

Stored in an area clearly separated from contaminated areas

Common supply carts should

- Remain in a designated area away from patient treatment area
- Not be moved between stations
- Supply carts should only be touched with clean hands
- Be cleaned and disinfected if taken into rooms.

Supplies (including medications and alcohol swabs) should never be carried in pockets or fanny packs

Items taken into a dialysis station must either be dedicated to the patient or discarded.

Reusable equipment must be cleaned and disinfected.



Cleaning and Disinfection Processes

Dialysis station

Wall boxes

Portable machines

TABLE 2. Disinfection procedures recommended for commonly used items or surfaces in hemodialysis units

Item or Surface	Low-Level Disinfection*	Intermediate-Level Disinfection*
Gross blood spills or items contaminated with visible blood		X
Hemodialyzer port caps		X
Interior pathways of dialysis machine		X
Water treatment and distribution system	X	X [†]
Scissors, hemostats, clamps, blood pressure cuffs, stethoscopes	X	X [§]
Environmental surfaces, including exterior surfaces of hemodialysis machines	X	

* Careful mechanical cleaning to remove debris should always be done before disinfection.

[†] Water treatment and distribution systems of dialysis fluid concentrates require more extensive disinfection if significant biofilm is present within the system.

[§] If item is visibly contaminated with blood, use a tuberculocidal disinfectant.

Environmental Surface Disinfection in Dialysis Facilities: Notes for Clinical Managers

✓ Select proper disinfectant(s) and determine correct dilution(s) for routine use.

■ Use only Environmental Protection Agency (EPA)-registered hospital disinfectants⁴.

- EPA-registered hospital disinfectants have label instructions explaining how they should be used in healthcare settings.
- EPA-registered sodium hypochlorite or other products for healthcare settings are available and are preferred over household bleach products that are not EPA-registered for disinfection of surfaces.

■ Low-level vs. intermediate-level disinfection:

- Routine disinfection of environmental surfaces can be accomplished using a low-level disinfectant (any EPA-registered hospital disinfectant). However, intermediate-level disinfectants must be available in the dialysis facility for disinfection of surfaces that are visibly soiled with blood or body fluids.
- Intermediate-level disinfectants are sufficiently potent to inactivate mycobacteria and have a tuberculocidal label claim, whereas low-level disinfectants are not strong enough to inactivate these bacteria.
- For convenience, consider selecting and routinely using hospital disinfectants that are tuberculocidal or have label claims of activity against hepatitis B virus (HBV) and human immunodeficiency virus (HIV). These products may be used to perform routine and intermediate-level disinfection.

■ Identify and instruct staff on the correct dilution of the disinfectant agent.

- Read the label carefully and follow the manufacturer's label instructions for proper dilution of the disinfectant. Note, label-specified dilutions for EPA-registered sodium hypochlorite (i.e., bleach) products might not necessarily

conform to a 1:100 or 1:10 dilution. The manufacturer's instructions are specific to the product and should be followed. Some products do not require preparation or dilution and are sold as "ready to use."

- Products with tuberculocidal, HBV, and HIV label claims will also have instructions for cleaning blood spills.

✓ Establish procedure for disinfecting dialysis station between patients.

■ Identify responsible staff.

■ Ensure procedure allows for sufficient disinfectant to be applied to surfaces (surfaces should be visibly wet).

■ Employ strategies to optimize cleaning and disinfection of the station.

- A sufficient patient-free interval is necessary at each station to facilitate adequate cleaning and disinfection. Routine surface disinfection should not commence until the patient has left the station.
- A facility-wide patient-free interval between treatment shifts should be considered to ensure thorough disinfection of surfaces at the dialysis station and to minimize lapses in infection prevention that can occur when processes are performed in a hurried manner.
- Routine disinfection of surfaces at the station should occur with *no patient present* to reduce the opportunities for cross-contamination and to avoid exposing patients to disinfectant fumes.

■ Important considerations regarding moving patients to a post-treatment seating area to facilitate more rapid station turnover:

- Patients should not be removed from the station until they have completed treatment and are clinically stable. If a patient cannot be moved safely, disinfection of the dialysis station should be delayed until the station can be vacated in a safe manner.



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



CDC Notes for Clinical Managers

Verify

- Written standards of practice for disinfection after dialysis in patient room, ensuring that disinfection is occurring before leaving the room.
- Disinfectants are on the facility-approved product list.

- If patients are moved to a separate seating area prior to removing cannulation needles or while trying to achieve hemostasis, the chairs and armrests in those areas must be disinfected in between patients. Avoid creating new opportunities for contamination of shared surfaces with blood or body fluids.

- Establish procedure for cleaning and disinfection of priming buckets.
 - Process should include emptying, cleaning (e.g., if blood is present), disinfection, and air-drying of bucket.
 - Disinfected priming buckets should be dry before reattaching to machine or use.

- Establish procedure for cleaning and disinfection of reusable supplies.

- Disposable medical supplies brought to the dialysis station should be discarded.
 - CDC recommends discarding these supplies instead of dedicating them to a patient.
 - Discard and dispose of these supplies in accordance with your state's regulated medical waste regulations.

- For equipment such as computer touchscreens and keyboards, check with the manufacturer for instructions and compatibility of equipment with disinfecting agent.

- Determine staff personal protective equipment (PPE) needs based on disinfectant product labels.

✓ Ensure staff have been properly trained on:

- Dialysis station cleaning/disinfection protocol;
- How to prepare the appropriate "use-dilution" of the disinfectant;
- Application of sufficient disinfectant to achieve visibly wet surfaces per the product label;
- Proper use of PPE (e.g., gloves, gown); and
- Management of routine disinfection vs. surfaces with visible soil or blood⁵.

✓ Ensure that staff have access to proper supplies, which should include:

- Leak-proof disposal containers;
- Gloves;
- Other appropriate PPE based on product label instructions;
- Properly diluted EPA-registered hospital disinfectants for routine/intermediate-level disinfection; and
- Wipes, cloths, spray bottles and/or buckets.

Footnotes and Select References:

⁴ Environmental Protection Agency. (2012, Oct 22). Selected EPA-registered Disinfectants. Retrieved from <http://www.epa.gov/oppead001/chemregindex.htm>

⁵ Centers for Disease Control and Prevention. Guidelines for Environmental Infection Control in Health-Care Facilities. MMWR 2004;52(RR10):1-42.

For machines that are equipped with waste-handling option ports, see references below:

- Jochimsen EM, Frenette C, Delorme M, Arduino M, Agüero S, Carson L, Ismail J, Lapierre S, Czirny E, Tokars J, Jarvis WR. A cluster of bloodstream infections and pruritic reactions among hemodialysis patients traced to dialysis machine waste-handling option units. *Am J Nephrol* 1998; 18 (6): 48S-9.
- Wang SA, Levine RB, Carson LA, Arduino MJ, Killar T, Grillo FG, Pearson ML, Jarvis WR. An outbreak of gram-negative bacteremia in hemodialysis patients traced to hemodialysis machine waste drain ports. *Infect Control Hosp Epidemiol* 1999; 20 (11): 746-51.
- CDC. Outbreaks of Gram-Negative Bacterial Bloodstream Infections Traced to Probable Contamination of Hemodialysis Machines – Canada, 1995 United States, 1997; and Israel, 1997. *MMWR* 1998;47(03):55-5.

Sodium Hypochlorite



- Strong and effective disinfectant, killing bacteria, bacterial spores, fungi, and viruses
- Widely available
- Low cost
- Recommended surface disinfectant for healthcare facilities



- 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 no 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).



[Safe-and-Effective-Use-of-Bleach-for-Disinfection-in-Healthcare.pdf](#)
([nebraskamed.com](#))

Environmental Cleaning/Disinfection

Dialysis Machines

Dialysis Chairs

Scissors

Hemostats

Clamps, Stethoscopes

Blood pressure Cuffs

Prime Buckets



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

Dialysis Station



Written protocols should be established



Should never be started until the patient has left the station



Enough time should be allowed to give staff to clean, disinfect, and dry completely



Items such as scissors, hemostats, clamps, stethoscopes, and blood pressures cuffs should be removed and disinfected.



Unused single use items should be disposed of they cannot be disinfected.

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 supplies¹ 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 disinfectant⁶ to all surfaces² in the dialysis station using a wiping motion (with friction).
- ☐ Ensure surfaces are visibly wet with disinfectant. Allow surfaces to air-dry⁷.
- ☐ Disinfect all surfaces of the emptied priming bucket³. 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.



Wall Boxes



Facility policies frequency and method for wall box surface disinfection.

Part of facility water management plan for biofilm prevention.



Staff education on risk associated with wall boxes.

Hand hygiene after contact with wall boxes and active surveillance.



Hemodialysis Machines



Disinfection procedures should be documented, including residual disinfection

Single-pass machines may be rinsed and disinfected at the beginning or end of each day

Batch recirculating machines must be drained, rinsed and disinfected after each use.

Contact Us



Call our main department number: 402-552-2881

Office hours are Monday – Friday from 8:00 am – 4:00 pm (CST)

For emergencies, our on-call hours are Saturday – Sunday and Holidays from 8:00 am – 4:00 pm (CST)



**E-mail our department:
NebraskaICAP@NebraskaMed.com**

E-mails will be answered during office hours

Resources

[ESRD Interpretive Guidance Version 1.1 \(cms.gov\)](#)

[Guidelines, Recommendations and Resources | Dialysis Safety | CDC](#)

[CDC Preventing BSIs in OP Hemodialysis Patients](#)

[MMWR-Recommendations for Preventing Transmission of Infections Among Chronic Hemodialysis Patients](#)

[Inpatient Dialysis Medical Director Toolkit](#)

[NTDS: A Curriculum to Achieve Zero Preventable Infections - ASN Excellence in Patient Care \(EPC\) \(asn-online.org\)](#)

[Dialysis | CMS](#)

[ESRD NCC](#)

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

[Preventing Bloodstream Infections in People on Dialysis | VitalSigns | CDC](#)

<https://icap.nebraskamed.com/wp-content/uploads/sites/2/2024/04/Safe-and-Effective-Use-of-Bleach-for-Disinfection-in-Healthcare.pdf>