APIC NC Conference
May 2024

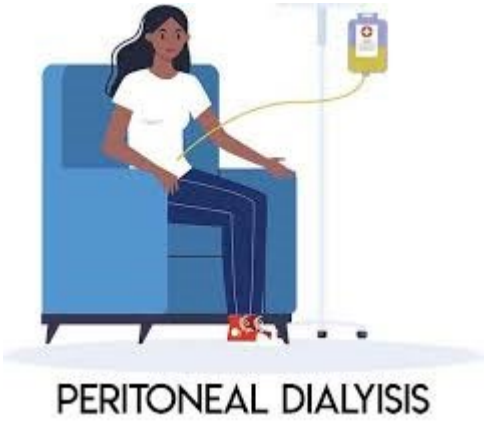
Infection Prevention and Control in the Dialysis Setting

Presented by: Tara Millson, DNP, RN, CIC, FAPIC
no financial disclosures

LEARNER OUTCOMES

At the conclusion of the presentation, learners will be able to:

- Define infection control risks in the dialysis setting
- Implement evidence-based practices to prevent infection in the dialysis setting
- Integrate standardized tools from APIC/AHRQ/CDC to perform practice audits



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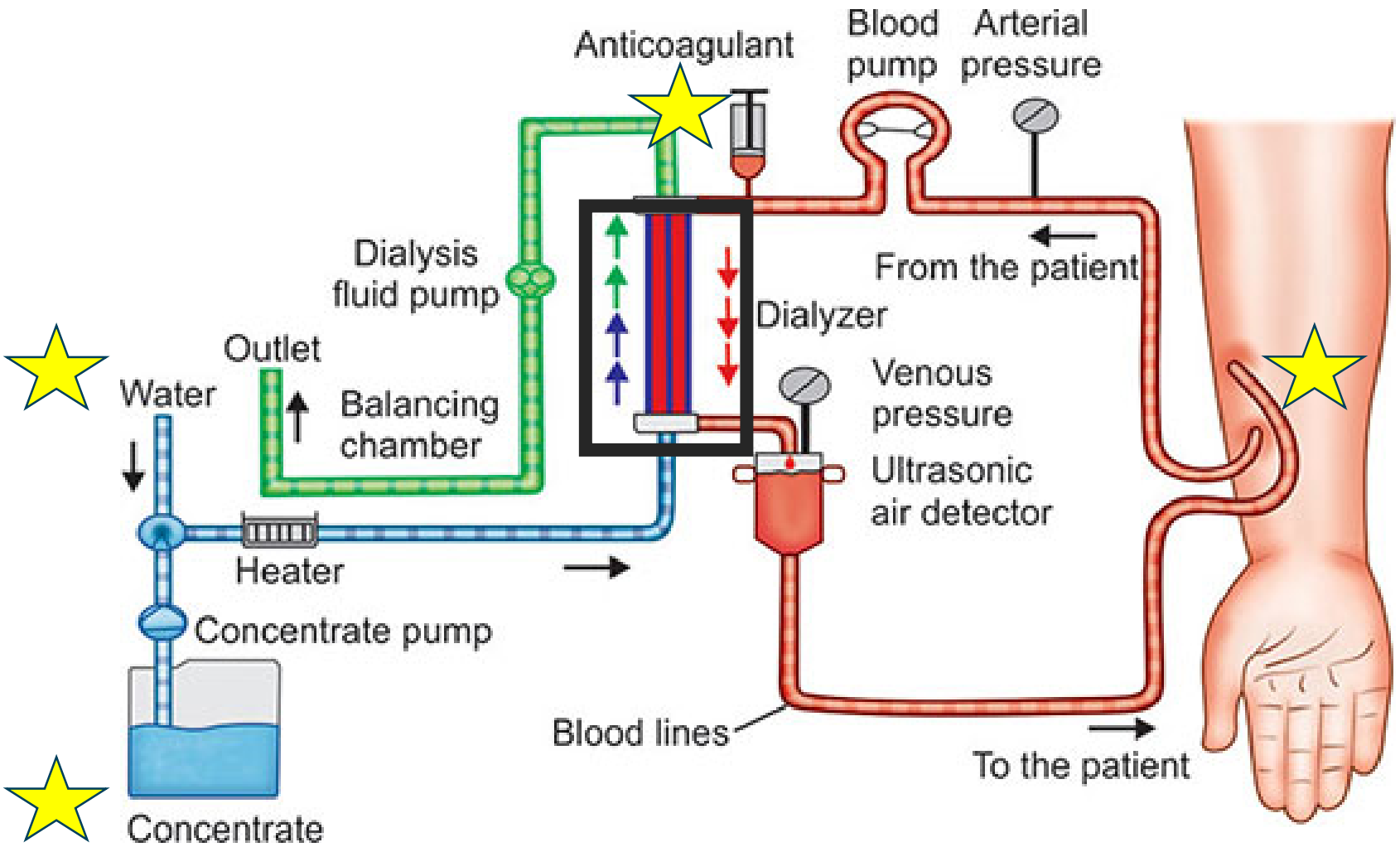
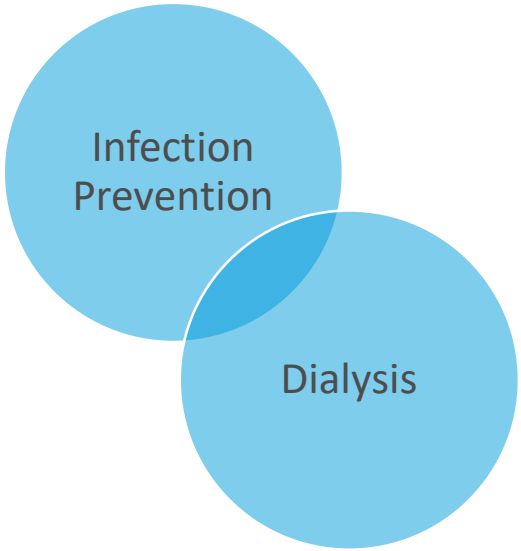
Is Infection Prevention and Control in Dialysis Beyond your Comfort Zone?

The Hemodialysis Circuit



https://www.niddk.nih.gov/health-information/kidney-disease/kidney-failure/hemodialysis

Is Infection Prevention and Control in Dialysis Beyond your Comfort Zone?



- While the specific risks may differ, the basic principles of infection prevention and control apply regardless of the setting
- Although infections can spread easily, controlling the risk is relatively straightforward and simple measures can be effective

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A TYPICAL DIALYSIS UNIT?

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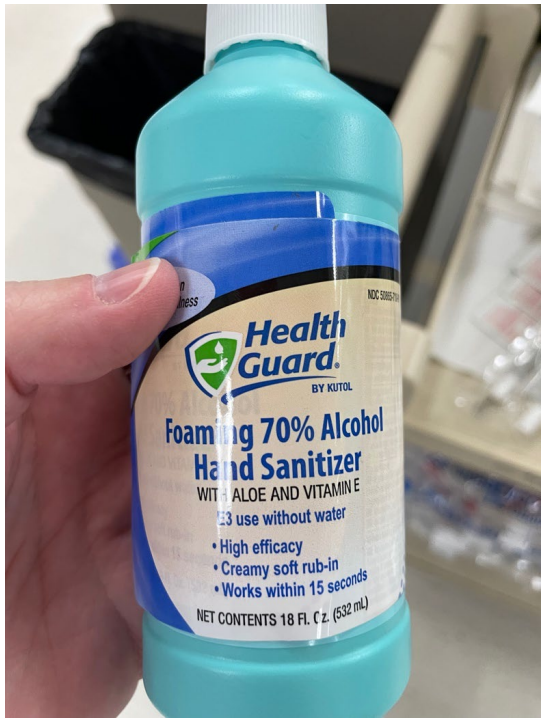
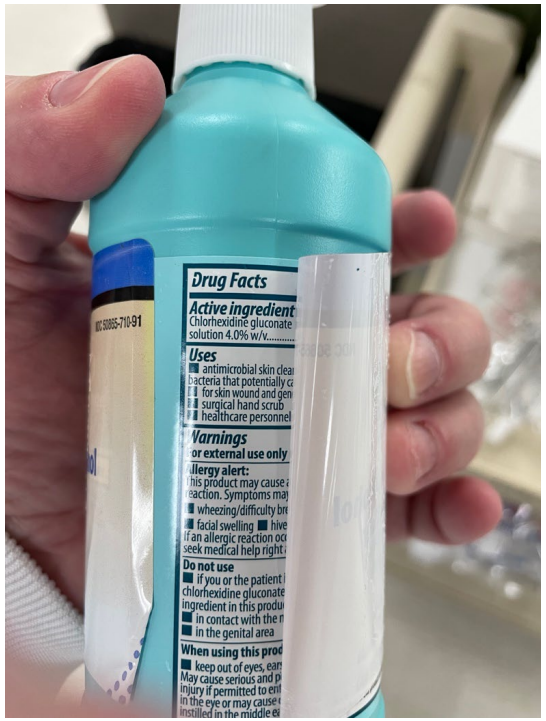
A TYPICAL DIALYSIS UNIT?





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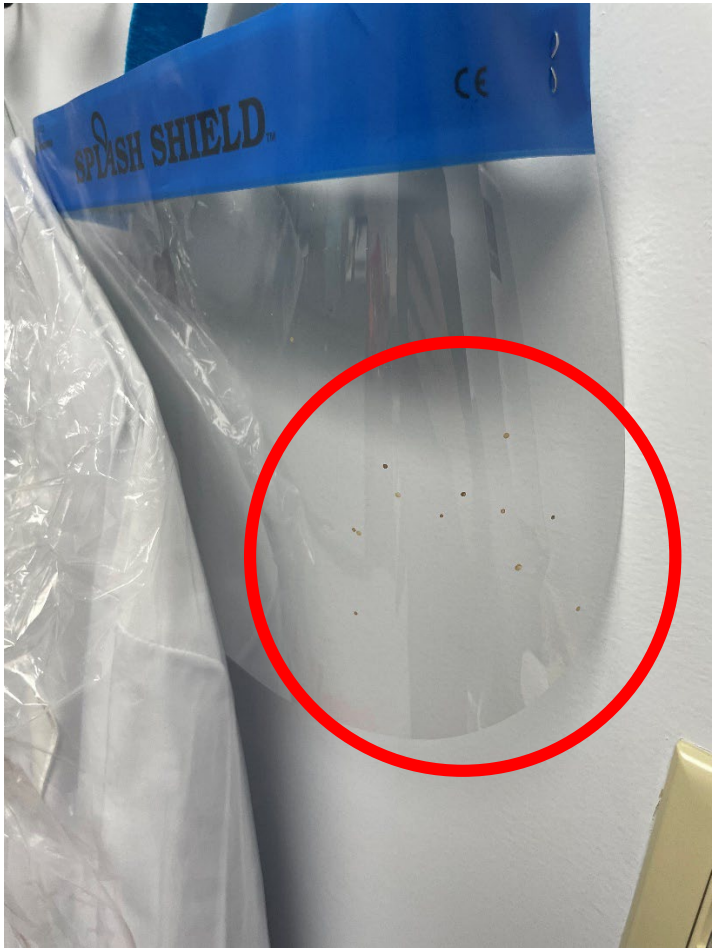
A TYPICAL DIALYSIS UNIT?



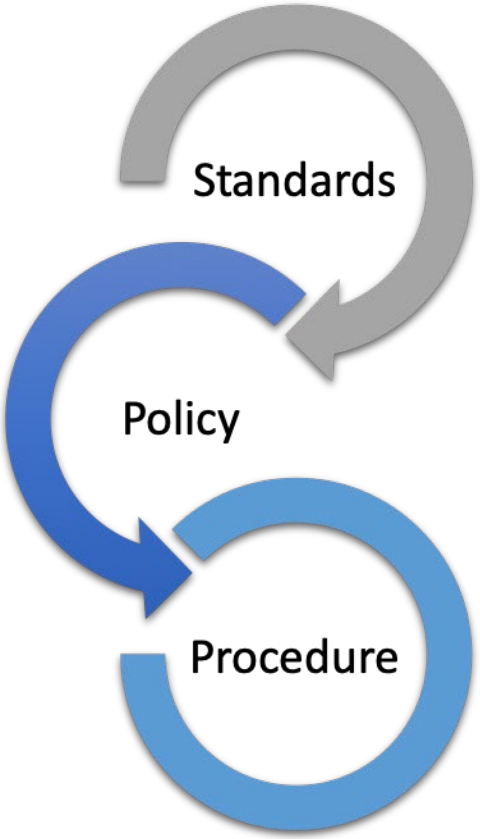
High risk = highly regulated

PART 494 CONDITIONS FOR COVERAGE FOR END-STAGE RENAL DISEASE FACILITIES
Interpretive Guidance

CMS Conditions for Coverage for End Stage Renal Disease Facilities Interpretive Guidance

Dialysis Policies and Procedures

- Vascular access care and maintenance
- Periodic competency check
- Water Testing
  - Water standard/action level
  - Who performs the testing?
  - Method of notification
- Dialysis-related infections
  - Who performs surveillance?
  - Internal and external reporting
- Education and training
  - On hire and annually

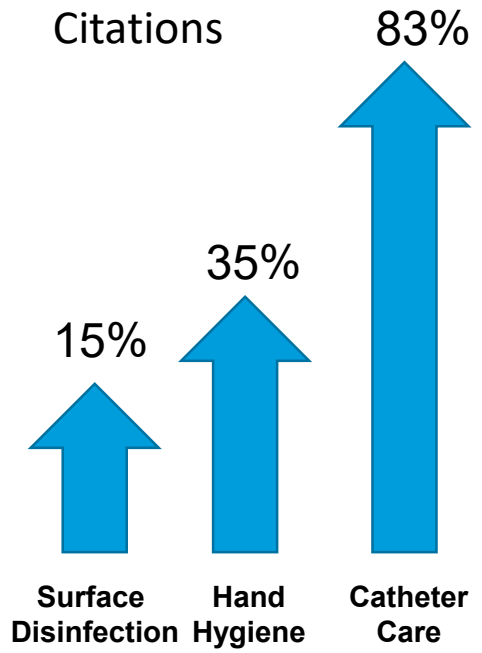


U.S. Dialysis Facilities Do Not Reliably Follow Basic Infection Control

- Standard Surveys - 1928 surveys/6414 Active Providers

#	V-Tag	Tag Description	# Citations	% Surveys Cited
1	V113	IC-Wear Gloves/Hand Hygiene	648	33.6%
2	V122	IC-Clean, disinfect surfaces & equipment/written protocols	581	30.1%
3	V543	POC-Manage volume status	323	16.8%
4	V403	PE-Equipment maintenance- manufacturer's DFU	307	15.9%
5	V147	IC-Staff education re catheters/catheter care	269	14.0%

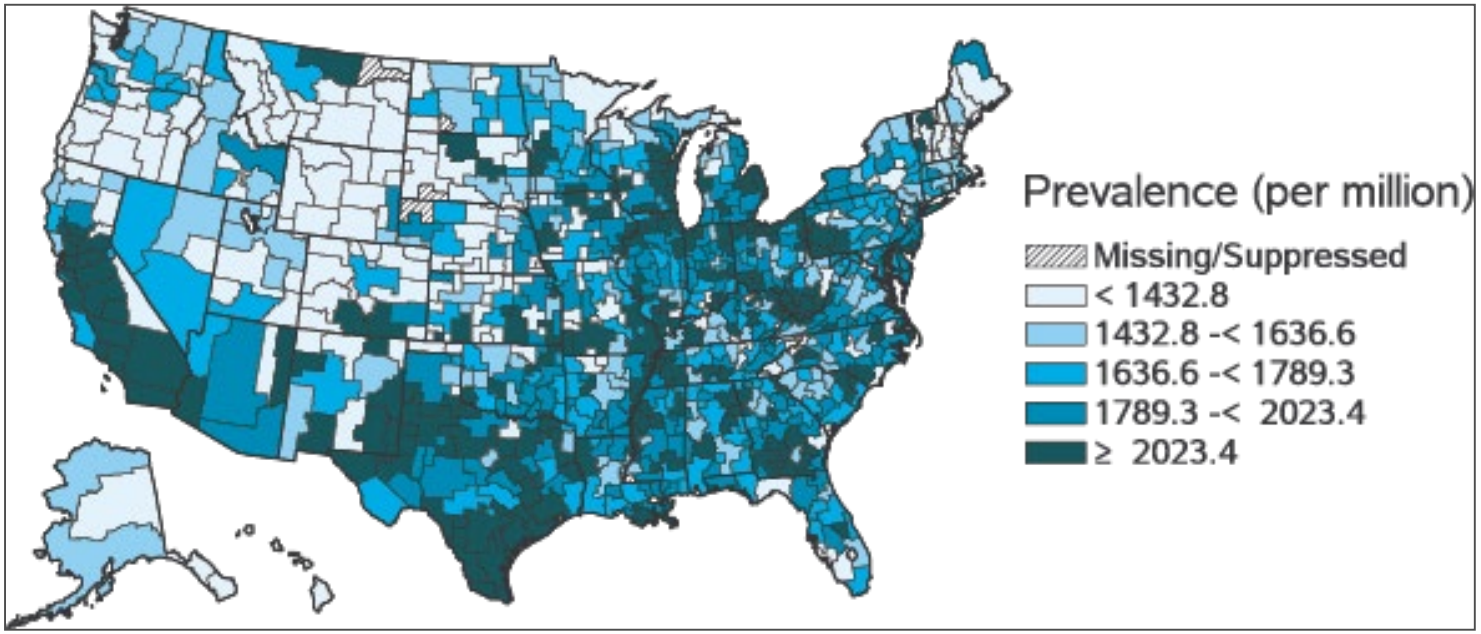
The number of citations is increasing each year



NNI July 30, 2015

Renal Disease Prevalence

- Over 700,000 people in the US with ESRD
- 1 in 7 American adults has chronic kidney disease (CKD)



Map of standardized prevalence of ESRD in the US population, 2012-2016;
USRDS, 2018

The Risk of Infection in the Dialysis Setting

Infections are the leading cause of hospitalization, and second leading cause of death, in dialysis patients

Individual risk factors

- Access type
- Disturbances in innate and adaptive immunity

Interpersonal risk factors

- Frequent contact with the healthcare environment
- Frequent bloodstream access
- Poor infection control practices

Organizational risk factors

- No requirement for trained infection preventionist on staff

Infections in Dialysis Patients

Infections in Dialysis Patients

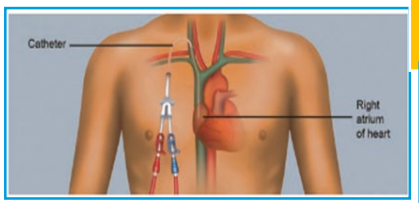
- Bloodstream infections most common cause of mortality
- 100x more likely to acquire MRSA infection
  - 1 in 4 will develop serious, life-threatening infection
- Antimicrobial resistance
- Waterborne infection
- Respiratory infection
- Peritonitis
- Hepatitis B and C
- Emerging infection

MMWR 2007/ 56(09); CDC *Infection Prevention in Dialysis Settings*

Vascular Access and Infection

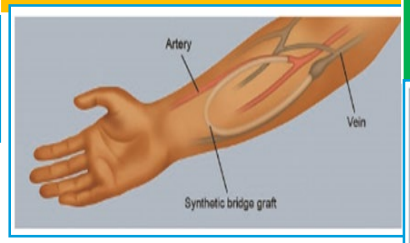
Vascular access type is the most important risk factor for BSI among hemodialysis patients

Highest risk-central catheter



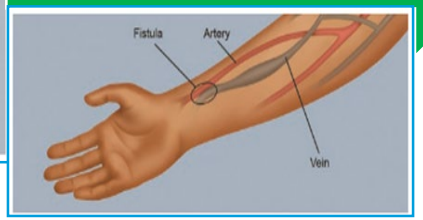
Fresenius Kidney Care

Intermediate risk-AVG



Fresenius Kidney Care

Lowest risk-AVF



Fresenius Kidney Care

Risk of Infection

Hepatitis in Dialysis

Hepatitis B and C are relatively stable and can remain viable for days on environmental surfaces at room temperature

- HBV and HCV have been detected on clamps, scissors, dialysis machine control panels
- HBV at low titers can be present on environmental surfaces in the **absence** of any visible blood and still result in transmission
- Numerous outbreaks of Hepatitis C in recent years related to poor infection control practices
- Newly acquired HCV infections are increasing in dialysis patients

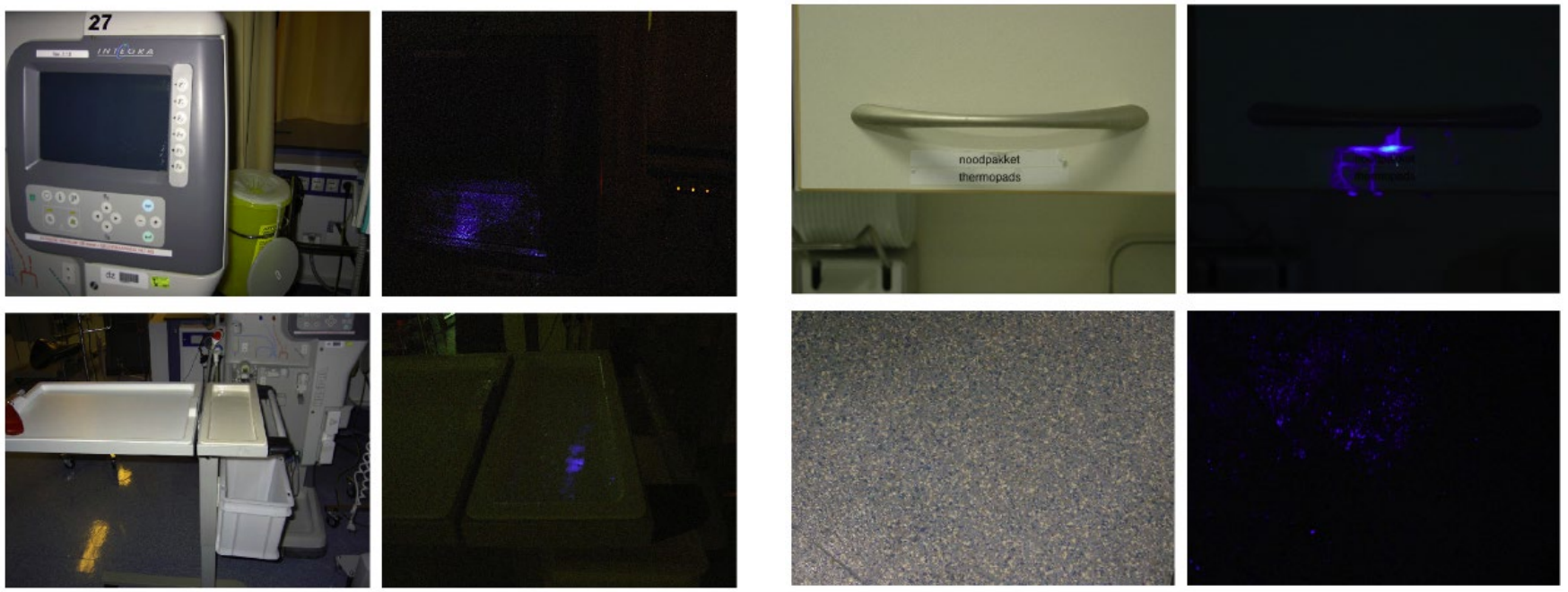
CDC Urging Dialysis Providers and Facilities to Assess and Improve Infection Control Practices to Stop Hepatitis C Virus Transmission in Patients Undergoing Hemodialysis

HAN
HEALTH ALERT NETWORK

Distributed via the CDC Health Alert Network
Wednesday, January 27, 2016, 10:30 EST (10:30 AM EST)
CDCHAN-00386

NVH
This is an official CDC HEALTH ADVISORY

Luminol Study in Dialysis



Bergervoet, PWM, van Riessen, N, Sebens, FW, & van der Zwet, WC. (2008). Application of forensic Luminol for blood in infection control. Journal of Hospital Infection 68:329-333

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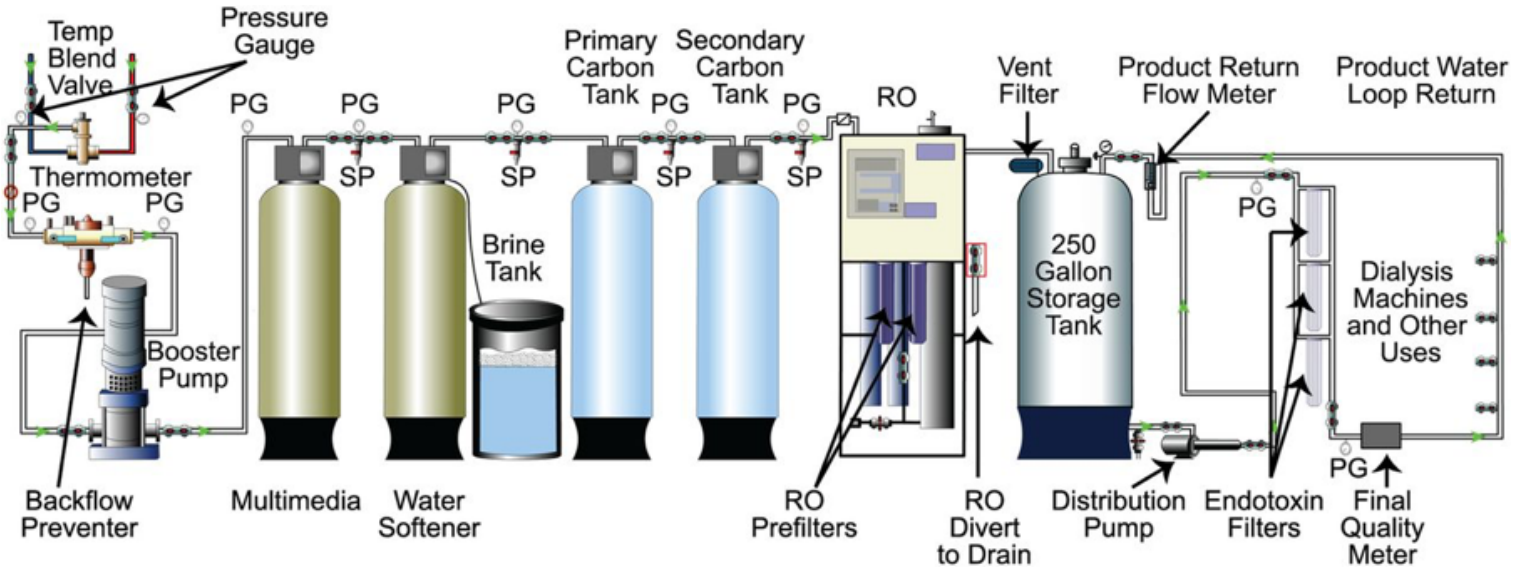
Water Treatment Room

Hemodialysis patients exposed to 300-600 L water/week
Vital to ensure that water is free of chemical and biologic contaminants



AAMI Water Standards

Outbreaks associated with water exposure in dialysis

- Improper formulation of dialysate with contaminated water
- Contamination of injectable medications
- Reprocessing dialyzers with contaminated water

Table 7.2. AAMI Standards for Water in Dialysis Centers

	Total Viable Count, CFU/mL		Endotoxin Level, EU/mL	
Reference Document	**Allowable Level**	**Action Level[a]**	**Allowable Level**	**Action Level[a]**
AMMI RD52:2004[12] (minimum regulatory requirement)	<200	≥50	<2	≥1
ANSI/AMMI/ISO 13959:2014[13] (CDC preferred recommendation)[11]	<100	≥50	<0.25	≥0.125

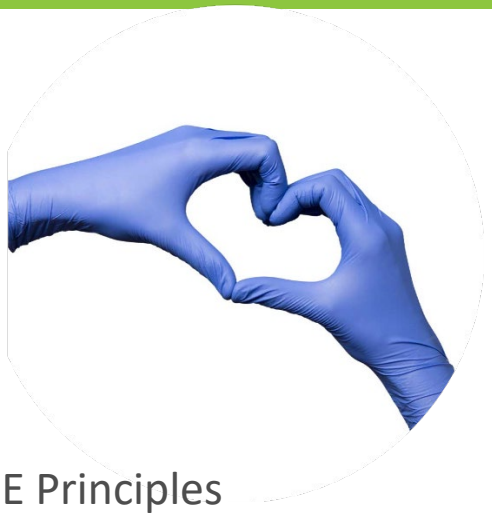
Abbreviations: AAMI, Association for the Advancement of Medical Instrumentation; CFU, colony-forming unit; EU, endotoxin unit.

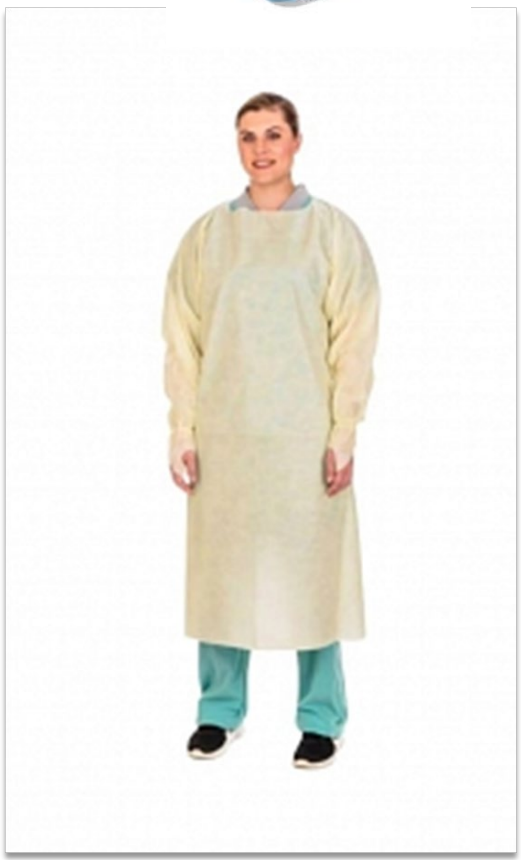
https://www.cdc.gov/dialysis/guidelines/water-use.html

Respiratory Infections

- Pneumonia
  - Streptococcal
  - Viral (influenza)
  - Bacterial (secondary to influenza)
- Tuberculosis
- COVID-19

PPE use (excluding isolation)





PPE Principles

- A long cover gown may be worn from patient to patient in the absence of soiling to protect HCW clothes
- Eye protection should be worn any time the circuit is open, during access/deaccess, medication administration
- Gloves should be worn and changed frequently during all care, and anytime the machine is touched
- Masks should be worn during CL access/deaccess, exit site care

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Isolation and PPE

- Identify and consider isolation for acute transmissible infections
  - Uncontrolled diarrhea
  - Draining infected wounds
  - Acute respiratory infection
- Separate symptomatic patients by at least 6 ft. from other patients
- PPE should be changed after caring for the isolated patient (including cover gown)
- CDC does not currently recommend contact precautions for colonization with MDROs
- Hepatitis B positive/unknown patients have dedicated isolation room and equipment
  - Staff should be immune and cannot care for HBV susceptible patients at the same time
  - In acute settings, these patients may be dialyzed at the bedside with dedicated equipment

Screening and Vaccination

Important tactics for primary and secondary prevention

Healthcare Workers

- HCWs should have a baseline screening for TB
- HCWs should be offered HBV and influenza vaccines

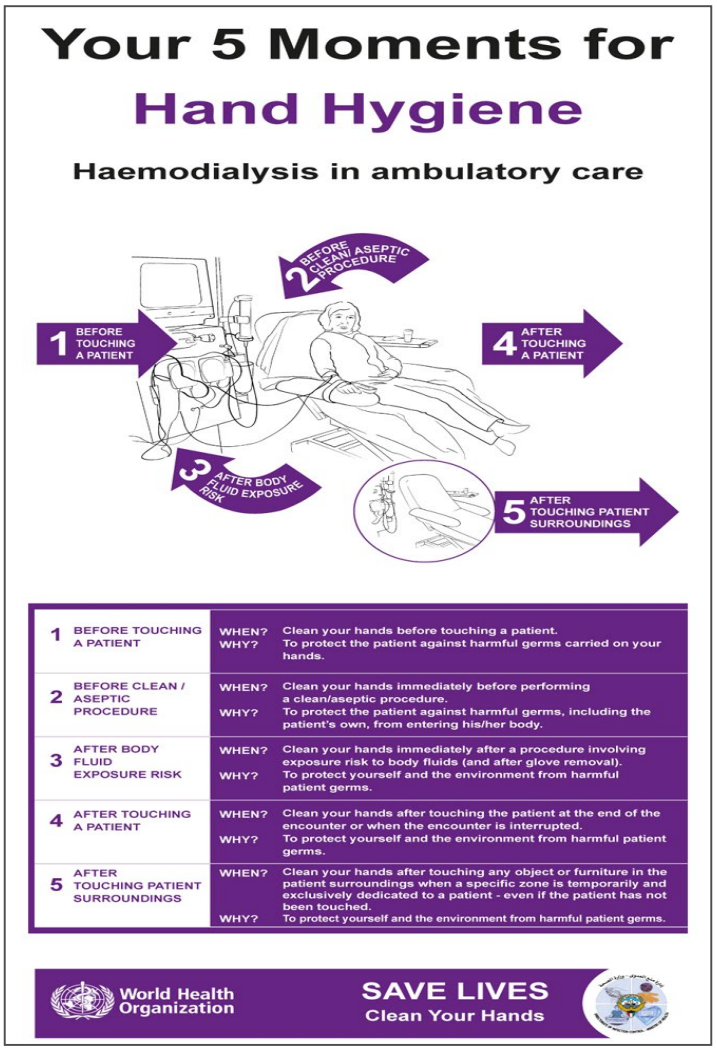
Patients

- Screen patients for TB, HBV, HCV on admission to program
- Screen patients at each visit for new, acute illnesses
- Offer vaccination to patients for respiratory infections, HBV
- Routinely screen patients for HCV antibodies
- Report disease clusters or HCV conversions to public health partners

Hand Hygiene

- Hand hygiene a significant predictor of infection rate (p=0.02)
- Most likely to occur before and after procedure, least likely during

Chenoweth et al., 2015



CDC Core Interventions

Set of 9 Interventions

Evidence-based
CDC recommendations

CDC Approach to BSI Prevention in Dialysis Facilities

(i.e., the Core Interventions for Dialysis Bloodstream Infection (BSI) Prevention)

1. Surveillance and feedback using NHSN
Conduct monthly surveillance for BSIs and other dialysis events using CDC's National Healthcare Safety Network (NHSN). Calculate facility rates and compare to rates in other NHSN facilities. Actively share results with front-line clinical staff.

2. Hand hygiene observations
Perform observations of hand hygiene opportunities monthly and share results with clinical staff.

3. Catheter/vascular access care observations
Perform observations of vascular access care and catheter accessing quarterly. Assess staff adherence to aseptic technique when connecting and disconnecting catheters and during dressing changes. Share results with clinical staff.

4. Staff education and competency
Train staff on infection control topics, including access care and aseptic technique. Perform competency evaluation for skills such as catheter care and accessing every 6-12 months and upon hire.

5. Patient education/engagement
Provide standardized education to all patients on infection prevention topics including vascular access care, hand hygiene, risks related to catheter use, recognizing signs of infection, and instructions for access management when away from the dialysis unit.

6. Catheter reduction
Incorporate efforts (e.g., through patient education, vascular access coordinator) to reduce catheters by identifying and addressing barriers to permanent vascular access placement and catheter removal.

7. Chlorhexidine for skin antisepsis
Use an alcohol-based chlorhexidine (>0.5%) solution as the first line skin antiseptic agent for central line insertion and during dressing changes.*

8. Catheter hub disinfection
Scrub catheter hubs with an appropriate antiseptic after cap is removed and before accessing. Perform every time catheter is accessed or disconnected.**

9. Antimicrobial ointment
Apply antibiotic ointment or povidone-iodine ointment to catheter exit sites during dressing change.***

* Povidone-iodine (preferably with alcohol) or 70% alcohol are alternatives for patients with chlorhexidine intolerance.

** If closed needleless connector device is used, disinfect device per manufacturer's instructions.

*** See information on selecting an antimicrobial ointment for hemodialysis catheter exit sites on CDC's Dialysis Safety website (http://www.cdc.gov/dialysis/prevention-tools/core-interventions.html#sites). Use of chlorhexidine-impregnated sponge dressing might be an alternative.

For more information about the Core Interventions for Dialysis Bloodstream Infection (BSI) Prevention, please visit http://www.cdc.gov/dialysis

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

https://www.cdc.gov/dialysis/prevention-tools/core-interventions.html

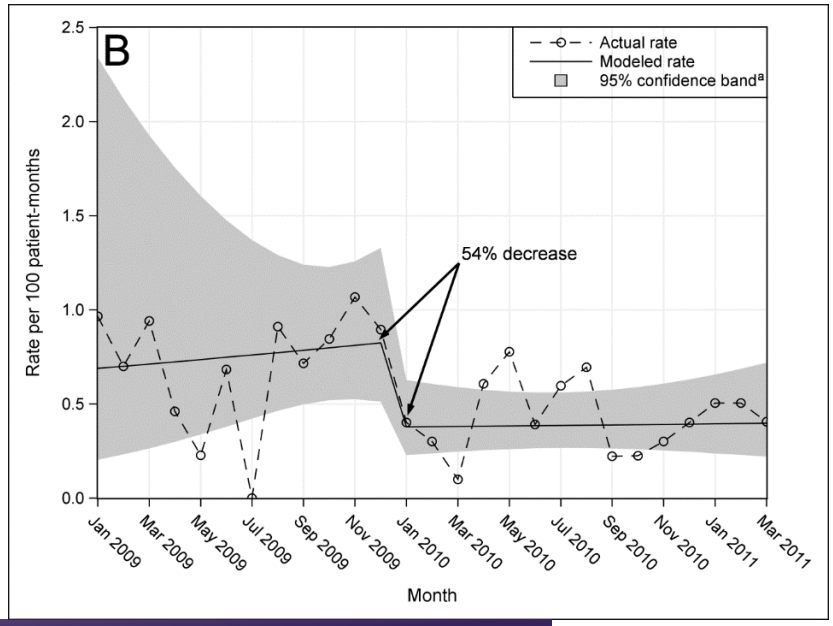
Results of Core Interventions

AJKD
Original Investigation

Bloodstream Infection Rates in Outpatient Hemodialysis Facilities Participating in a Collaborative Prevention Effort: A Quality Improvement Report

Priti R. Patel, MD, MPH,[1] Sarah H. Yi, PhD,[1] Stephanie Booth, CCHT,[2] Virginia Bren, MPH, RN, CIC,[3] Gemma Downham, MPH, CIC,[4] Sally Hess, CIC, MPH,[5] Karen Kelley, RN, BSN, CNN,[2] Mary Lincoln, BSN, MHA,[6] Kathy Morrissette, RN, RVT,[7] Curt Lindberg, DMan,[8] John A. Jernigan, MD, MS,[1] and Alexander J. Kallen, MD, MPH[1]

- **54% reduction** in vascular Access-Related Bloodstream Infection (ARBSI) Rates
- **Sustainable**



Am J Kidney Dis. August 2013, 62(2): 322–330

Cleaning and Disinfection of Station

"Turnover"

- Establish procedure to clean and disinfect stations between patients
- Commence once station is empty
- Allow sufficient patient-free time to thoroughly clean and disinfect

Any item coming to the dialysis station must be disinfected, dedicated, or disposed of

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.

Use EPA-registered hospital disinfectant

- For convenience, select one with tuberculocidal/HIV/HBV kill claims

Cleaning and Disinfection of Machine

Establish and monitor cleaning logs for each machine

- External after each patient with station cleaning
- Follow Manufacturer Instructions for Use for frequency and compatible disinfection products
- Internal pathways may be disinfected after each patient or at the end of each day
- A separate disinfection step may take place weekly
    - Bleach should be used at least weekly
- For HBV+ patients, disinfect after each patient
- If blood leak occurs, disinfect before use

Wall Boxes – A Unique Risk

- Can form biofilm
- Linked to gram-negative BSI and outbreaks
- Ensure that these are included in water management plan
- Ensure daily disinfection- add to logs
- Hand hygiene

https://www.cdc.gov/dialysis/guidelines/wall-boxes.html
https://www.jointcommission.org/standards/standard-faqs/ambulatory/environment-of-care-ec/000002334/

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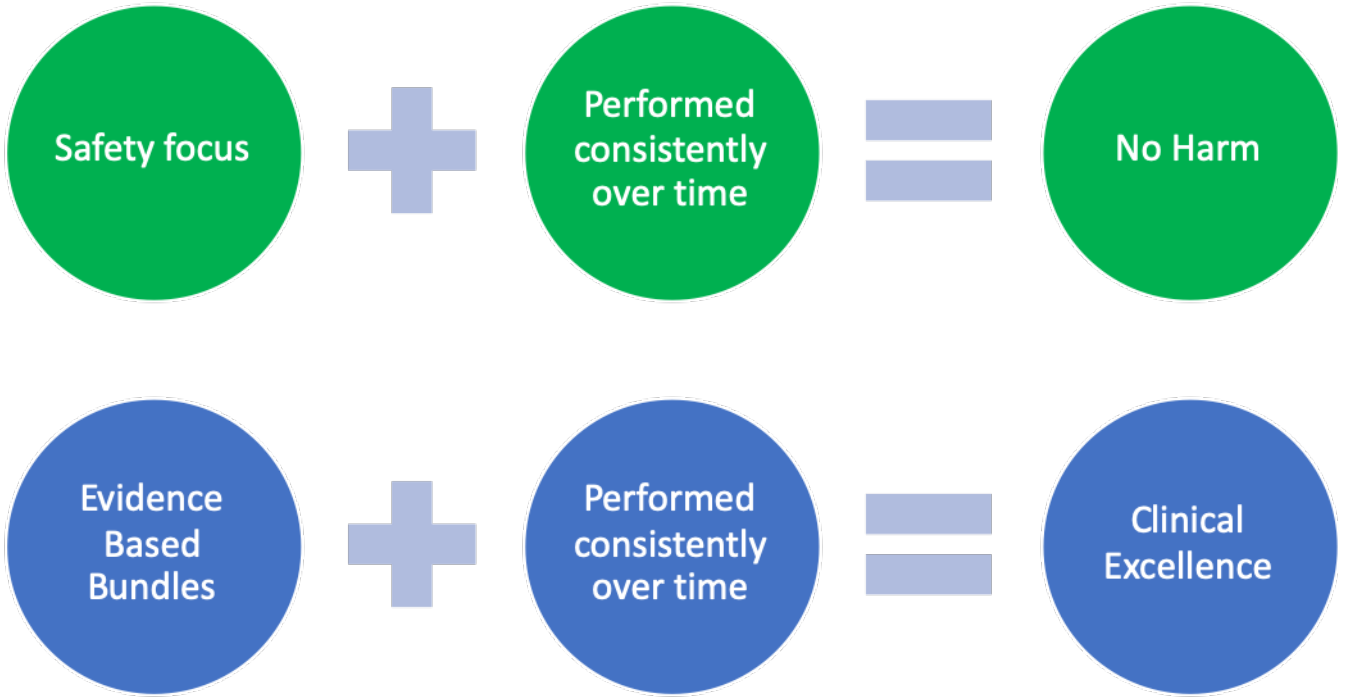
Other Important Environmental Considerations

- Regulated waste
- Cleaning and disinfection of reusable supplies (eg, clamps)
- Separation of clean and dirty supplies
- Dedicated hand hygiene sink(s)
- If in use, HBV isolation room is strictly dedicated
- Clean, physically separate space for preparing injectable medications
- Sharps containers are large enough for intended purposes

Safe Injection Practices

- Preparation of injectable medications must be done in a designated clean area that is free of obvious contamination (blood, used equipment, tap water, etc.)
- Medication should be administered as soon as possible after preparation
- Do not use common carts to bring medication supplies to patients

The Importance of "AND"



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The Culture of Safety

- Patient safety culture has been shown to be related to:
  - Clinician behavior
  - Adverse events
  - Patient mortality
- Dialysis is a complex procedure performed on high-risk patients
- Few studies have examined the impact of patient safety culture in the dialysis setting

Patient Safety Culture in Nephrology Nursing Practice Settings (NNPS)

Modified two AHRQ survey assessment tools

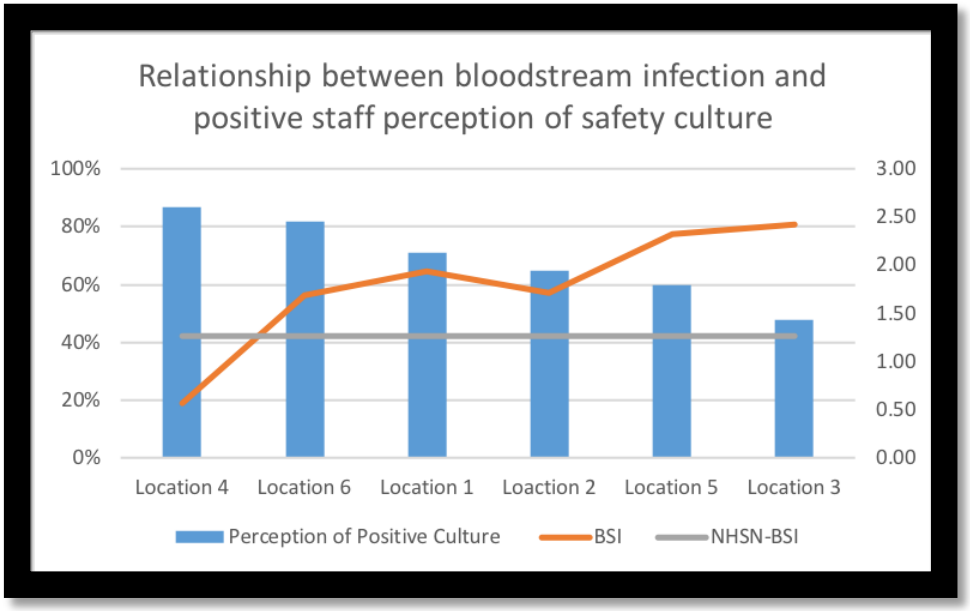
- 929 nephrology nurses-ANNA members
- AHRQ survey databases used for comparison

First national study to examine the culture of safety in nephrology nurse practice settings

- Identified safety issues:
  - Handoffs
  - Infection control
  - Medication errors
  - Staffing workload
- Perceived need to rush
- Management consistently rated safety culture higher than direct care staff

Ulrich B, Kear T. Patient Safety and Patient Safety Culture: Foundations of Excellent Health Care Delivery. Nephrol Nurs J. 2014 Sep-Oct;41(5):447-56. PMID: 26295088.

Safety Culture and Infection Control Practice



Kendall's tau-b = -0.867 (p-value 0.017)

Staff Surveys/Interviews

- Intense time crunch at patient turnover
- RN admits to **taking shortcuts** to save time
- Techs admits putting patient on machine prior to RN assessment
- RN admits to **not encouraging fistulas** because catheters are easier to care for
- Staff expressing symptoms of **burnout**

Conclusion

- Staff know the correct clinical steps but perceive **not enough time**
- Staff perceive that **omitted steps are not important,** do not endanger patients

Millson, Hackbarth, & Bernard, AJIC, 2019

National Opportunity to Improve Infection Control in ESRD (NOTICE)

Findings:

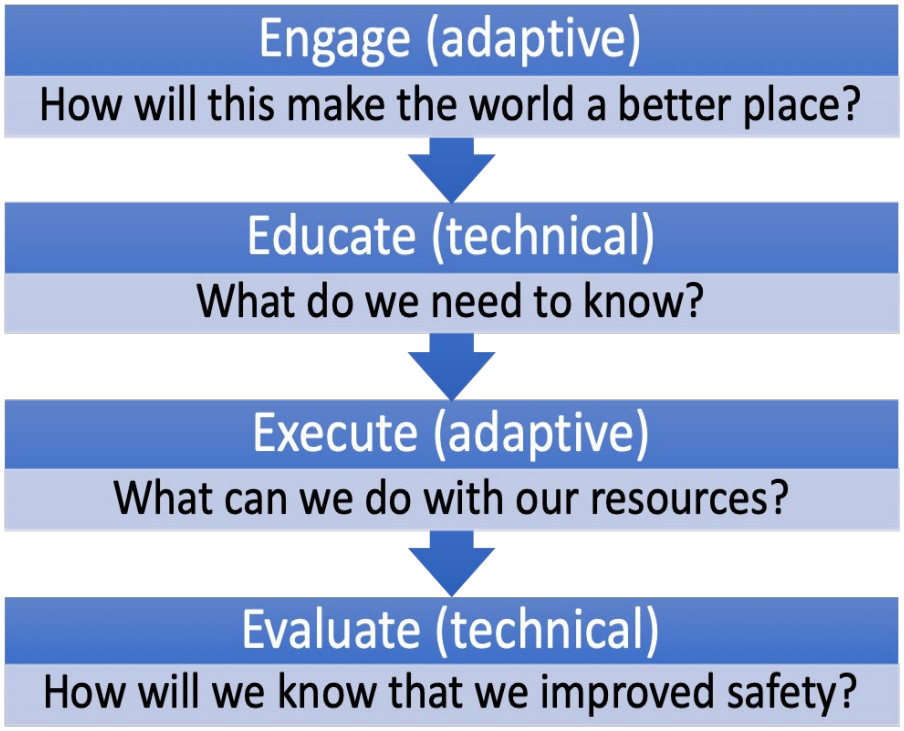
- there was considerable practice variance between facilities
  - Ex: CHG use 19% overall, range 0-35% of facilities use this
  - Ex: Hand hygiene average was 72%, range 35-95%
- Hand hygiene a significant predictor of infection rate (p=0.02)
  - Most likely to occur before and after procedure, least likely during

Implementation of checklists, audits

- ARB decreased by 44% (p=0.001), BSI 43%
- 91% of staff reported increased adherence to infection control
- 85% of staff reported project as a positive experience

Chenoweth, C., Hines, S., Hall, K., Saran, R., Kalbfleisch, J., Spencer, T., . . . Messana, J. (2015). Variation in Infection Prevention Practices in Dialysis Facilities: Results From the National Opportunity to Improve Infection Control in ESRD (End-Stage Renal Disease) Project. *Infection Control & Hospital Epidemiology, 36*(7), 802-806. doi:10.1017/ice.2015.55

4E's Model



Adaptive (context) and technical (content) change components

Modules in the Toolkit:

1. Create a culture of safety
2. Follow clinical best practices
3. Use of evidence-based checklists and audit tools
4. Patient engagement

https://www.ahrq.gov/patient-safety/settings/esrd/resource.html

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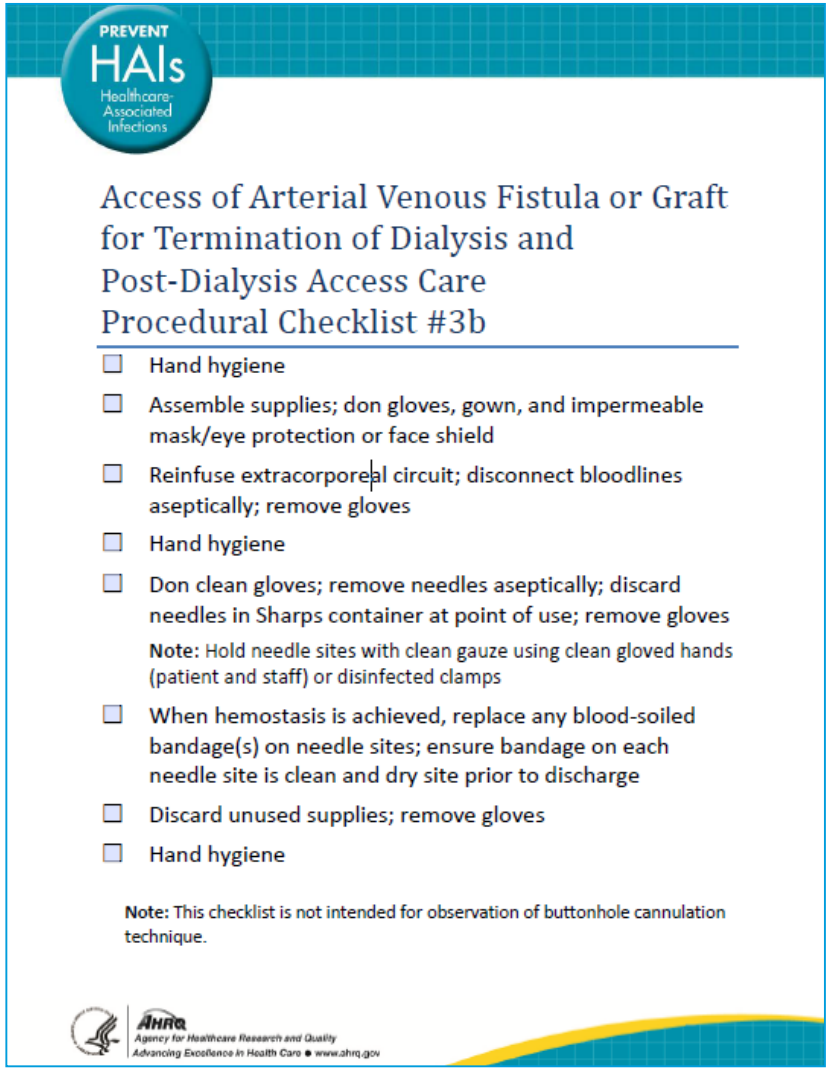
Staff Education and Competency

Important note: be aware of the yearly education and competency status of employed and contracted staff

- Gloving and hand hygiene
- Catheter dressing change technique
- Vascular access technique
- Safe injection and safe medication practices
  - Medication preparation and handling
  - Use of aseptic technique
  - Proper use of single-use vials

AHRQ Checklists and Audit Tools



PREVENT HAIs Healthcare-Associated Infections

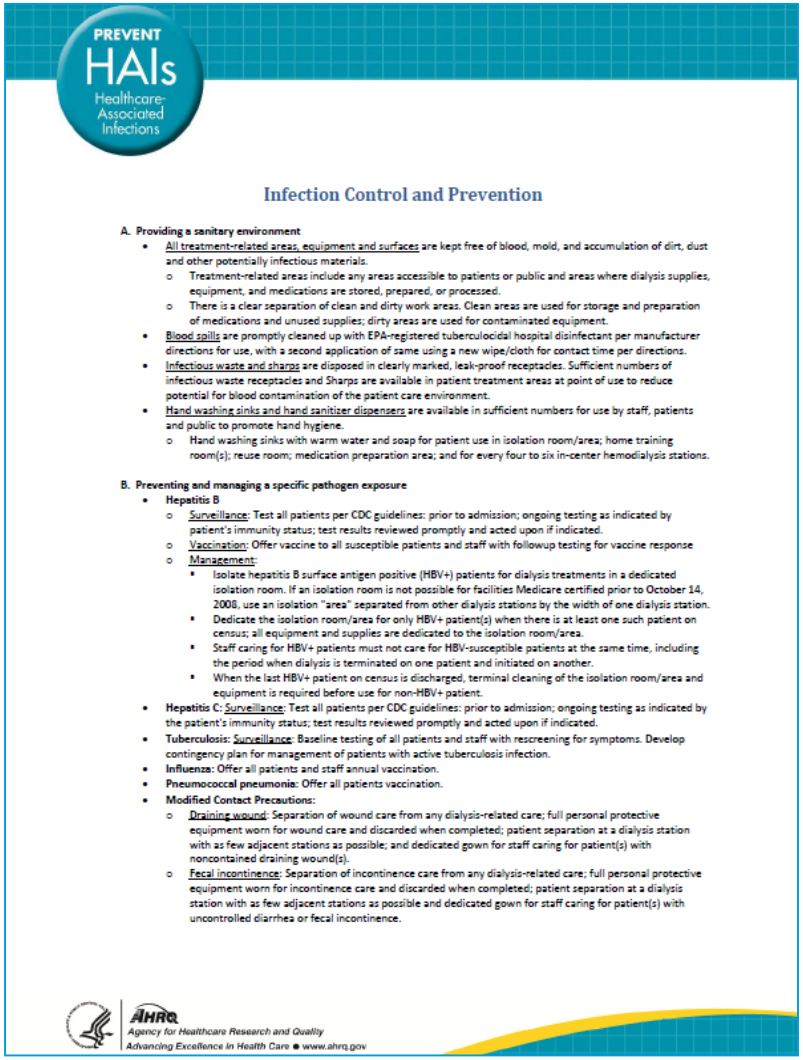
Access of Arterial Venous Fistula or Graft for Termination of Dialysis and Post-Dialysis Access Care Procedural Checklist #3b

- ☐ Hand hygiene
- ☐ Assemble supplies; don gloves, gown, and impermeable mask/eye protection or face shield
- ☐ Reinfuse extracorporeal circuit; disconnect bloodlines aseptically; remove gloves
- ☐ Hand hygiene
- ☐ Don clean gloves; remove needles aseptically; discard needles in Sharps container at point of use; remove gloves

  Note: Hold needle sites with clean gauze using clean gloved hands (patient and staff) or disinfected clamps
- ☐ When hemostasis is achieved, replace any blood-soiled bandage(s) on needle sites; ensure bandage on each needle site is clean and dry site prior to discharge
- ☐ Discard unused supplies; remove gloves
- ☐ Hand hygiene

Note: This checklist is not intended for observation of buttonhole cannulation technique.

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care ● www.ahrq.gov



PREVENT HAIs Healthcare-Associated Infections

Infection Control and Prevention

A. Providing a sanitary environment

- All treatment-related areas, equipment and surfaces are kept free of blood, mold, and accumulation of dirt, dust and other potentially infectious materials.
  - Treatment-related areas include any areas accessible to patients or public and areas where dialysis supplies, equipment, and medications are stored, prepared, or processed.
  - There is a clear separation of clean and dirty work areas. Clean areas are used for storage and preparation of medications and unused supplies; dirty areas are used for contaminated equipment.
- Blood spills are promptly cleaned up with EPA-registered tuberculocidal hospital disinfectant per manufacturer directions for use, with a second application of same using a new wipe/cloth for contact time per directions.
- Infectious waste and sharps are disposed in clearly marked, leak-proof receptacles. Sufficient numbers of infectious waste receptacles and Sharps are available in patient treatment areas at point of use to reduce potential for blood contamination of the patient care environment.
- Hand washing sinks and hand sanitizer dispensers are available in sufficient numbers for use by staff, patients and public to promote hand hygiene.
  - Hand washing sinks with warm water and soap for patient use in isolation room/area; home training room(s); reuse room; medication preparation area; and for every four to six in-center hemodialysis stations.

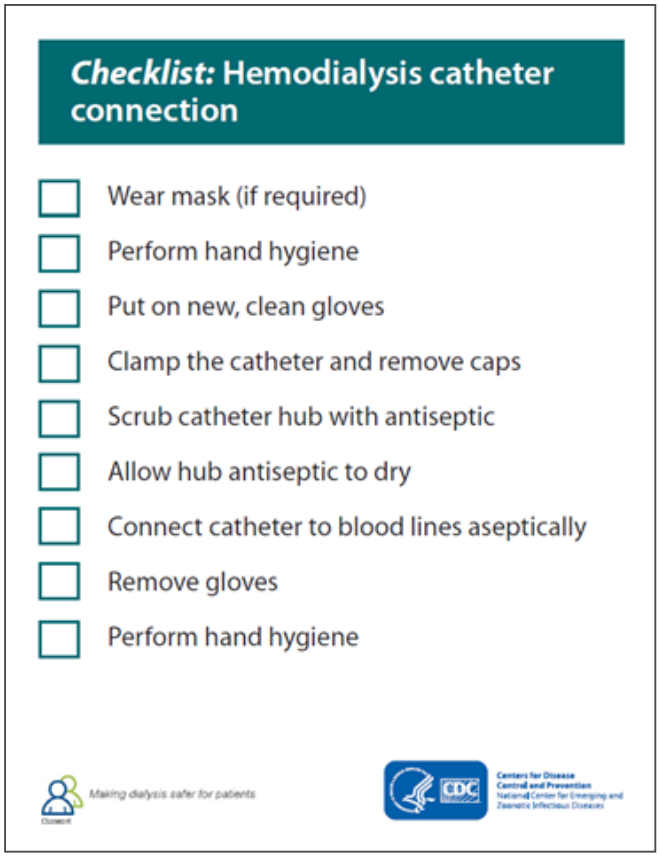
B. Preventing and managing a specific pathogen exposure

- **Hepatitis B**
  - Surveillance: Test all patients per CDC guidelines: prior to admission; ongoing testing as indicated by patient's immunity status; test results reviewed promptly and acted upon if indicated.
  - Vaccination: Offer vaccine to all susceptible patients and staff with followup testing for vaccine response
  - Management:
    - Isolate hepatitis B surface antigen positive (HBV+) patients for dialysis treatments in a dedicated isolation room. If an isolation room is not possible for facilities Medicare certified prior to October 14, 2008, use an isolation "area" separated from other dialysis stations by the width of one dialysis station.
    - Dedicate the isolation room/area for only HBV+ patient(s) when there is at least one such patient on census; all equipment and supplies are dedicated to the isolation room/area.
    - Staff caring for HBV+ patients must not care for HBV-susceptible patients at the same time, including the period when dialysis is terminated on one patient and initiated on another.
    - When the last HBV+ patient on census is discharged, terminal cleaning of the isolation room/area and equipment is required before use for non-HBV+ patient.
- **Hepatitis C:** Surveillance: Test all patients per CDC guidelines: prior to admission; ongoing testing as indicated by the patient's immunity status; test results reviewed promptly and acted upon if indicated.
- **Tuberculosis:** Surveillance: Baseline testing of all patients and staff with rescreening for symptoms. Develop contingency plan for management of patients with active tuberculosis infection.
- **Influenza:** Offer all patients and staff annual vaccination.
- **Pneumococcal pneumonia:** Offer all patients vaccination.
- **Modified Contact Precautions:**
  - Draining wound: Separation of wound care from any dialysis-related care; full personal protective equipment worn for wound care and discarded when completed; patient separation at a dialysis station with as few adjacent stations as possible; and dedicated gown for staff caring for patient(s) with noncontained draining wound(s).
  - Fecal incontinence: Separation of incontinence care from any dialysis-related care; full personal protective equipment worn for incontinence care and discarded when completed; patient separation at a dialysis station with as few adjacent stations as possible and dedicated gown for staff caring for patient(s) with uncontrolled diarrhea or fecal incontinence.

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care ● www.ahrq.gov

https://www.ahrq.gov/patient-safety/settings/esrd/resource.html

CDC Checklists and Audit Tools

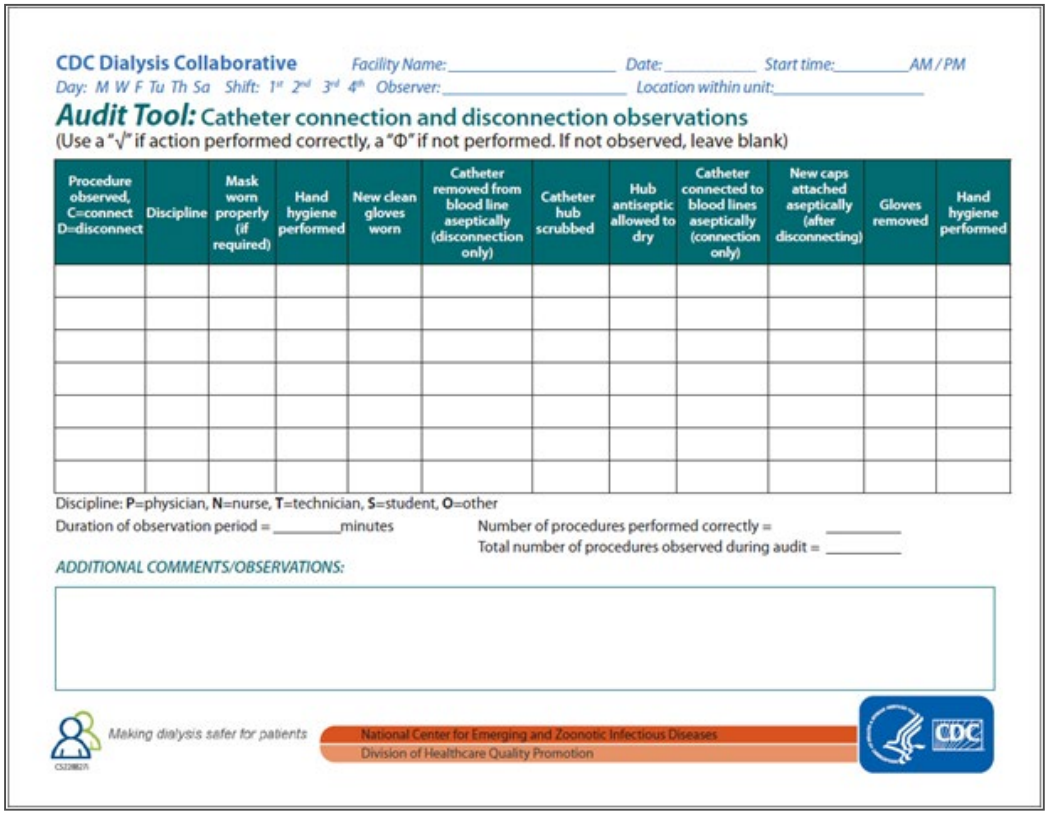


Checklist: Hemodialysis catheter connection

- ☐ Wear mask (if required)
- ☐ Perform hand hygiene
- ☐ Put on new, clean gloves
- ☐ Clamp the catheter and remove caps
- ☐ Scrub catheter hub with antiseptic
- ☐ Allow hub antiseptic to dry
- ☐ Connect catheter to blood lines aseptically
- ☐ Remove gloves
- ☐ Perform hand hygiene

Making dialysis safer for patients

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



CDC Dialysis Collaborative Facility Name:_____ Date:_____ Start time:_____AM / PM
Day: M W F Tu Th Sa Shift: 1st 2nd 3rd 4th Observer:_____ Location within unit:_____

Audit Tool: Catheter connection and disconnection observations
(Use a "√" if action performed correctly, a "Φ" if not performed. If not observed, leave blank)

Procedure observed, C=connect D=disconnect	Discipline	Mask worn properly (if required)	Hand hygiene performed	New clean gloves worn	Catheter removed from blood line aseptically (disconnection only)	Catheter hub scrubbed	Hub antiseptic allowed to dry	Catheter connected to blood lines aseptically (connection only)	New caps attached aseptically (after disconnecting)	Gloves removed	Hand hygiene performed

Discipline: **P**=physician, **N**=nurse, **T**=technician, **S**=student, **O**=other
Duration of observation period = _____minutes
Number of procedures performed correctly = _____
Total number of procedures observed during audit = _____

ADDITIONAL COMMENTS/OBSERVATIONS:

Making dialysis safer for patients
National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

https://www.cdc.gov/dialysis/prevention-tools/core-interventions.html

Disinfection Procedures

https://www.cdc.gov/dialysis/prevention-tools/core-interventions.html

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 supplies[1] 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 container[2].
- ☐ Check that there is no visible soil or blood on surfaces.
- ☐ Ensure that the priming bucket has been emptied[3].
- ☐ Ensure that the patient has left the dialysis station[4].
- ☐ 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 station[5].
- ☐ Remove gloves and perform hand hygiene.

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

- ☐ Wear clean gloves.
- ☐ Apply disinfectant[6] to all surfaces[7] in the dialysis station using a wiping motion (with friction).
- ☐ Ensure surfaces are visibly wet with disinfectant. Allow surfaces to air-dry[8].
- ☐ Disinfect all surfaces of the emptied priming bucket[3]. 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.

MAKING DIALYSIS SAFER COALITION

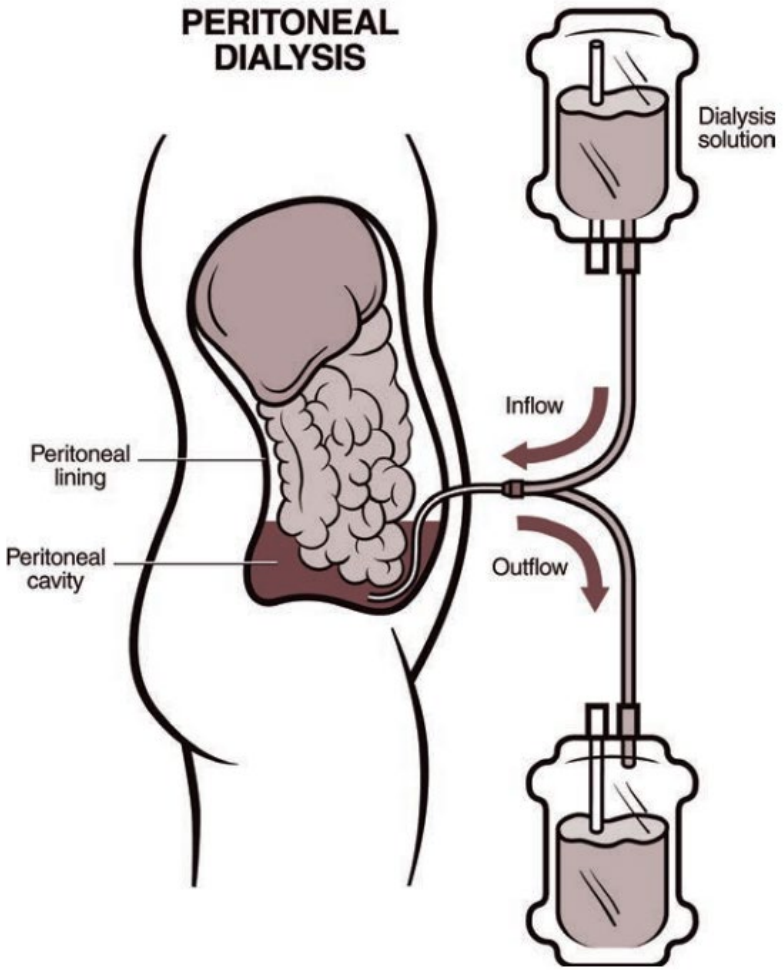
CDC Centers for Disease Control and Prevention National Center for Emerging and Zoonotic Infectious Diseases

Considerations for Outpatient Center

Outpatient Hemodialysis Centers

- Most common setting (~67% of ESKD patients receive in-center HD)
- Patients typically receive treatment in the same center for many months or years
- Usually open bays to maximize visualization by staff
- Water treatment room
- Isolation room-dedicated for HBV
- Acid bath-centralized, or individual containers
- Easy-to-clean surfaces
- Spatial separation between clean and dirty
- No moveable carts
- Gloves and ABHR close to chairs

Considerations for Peritoneal Dialysis



- ~7% of ESKD patients
- Most common home dialysis therapy
- Continuous ambulatory peritoneal dialysis (CAPD) at left uses gravity
- Automated peritoneal dialysis (APD) uses a machine called a cycler
- Most common complication is peritonitis

Considerations for Acute Dialysis

- iHD in the acute care setting- in unit or at bedside
  - Often contracted service
- Acute hemodialysis may require non-tunneled CVC
  - Bedside (portable) hemodialysis uses portable reverse osmosis (RO) water treatment system
    - Must have air gap between discharge tubing and drain
  - Continuous Renal Replacement Therapy (CRRT) requires ICU setting
  - High risk of infection
    - IP should observe practices related to line care, maintenance, machine cleaning, and supply storage
  - Convert to tunneled line or place graft/fistula if >3 weeks
- Acute peritoneal dialysis may be the best option for critically ill patients with AKI
  - Useful during pandemic
  - Gentler, less risk of serious infection

https://apic.org/wp-content/uploads/2022/04/Dialysis_ImplementGuide3.pdf

Considerations for Home Hemodialysis

- ~2% of ESKD are on home hemodialysis (HHD)
  - Doubled in previous 10 years, may continue to rise
- Less risk of healthcare-acquired infections
  - Respiratory (eg, COVID-19)
- Less interruption to daily life (work, family, etc.)
- Must be able to perform treatments independently or with caregiver away from the direct supervision of dialysis staff
  - Requires intensive training, reliable subjects
  - CMS requires HHD to do home visits
  - Home must meet water and dialysate standards, HHD program must monitor
- IPs may act as a resource for HHD program

Davita

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Considerations for Long-Term Care

- ~10% of nursing home residents are dialysis patients
- Approved nursing homes may contract with CMS-approved home dialysis provider to perform HD or PD in the facility
  - CMS considers SNF to be a residents home
- Unique infection prevention and control challenges
  - 2019 HCV transmission epidemiologically linked to 2 patients receiving HD in SNF
- IP oversight of program is critical
  - High risk of infection due to age, condition
  - Fistulas and grafts are more difficult to place in older adults
  - May take place in resident room or other special area that may not have adequate space, cleanable surfaces, or medication prep areas
  - Initial and ongoing competency of staff must be assessed

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Considerations for Pediatric Patients

- Kidney transplant is preferred treatment for kids with ESKD
  - May enter HD or PD program while waiting for suitable organ
- Few pediatric-only centers in the US
- Skin is more fragile, may present complications with frequency of disinfectant use/dressing changes
- Children may pull at or manipulate external lines
- Vein preservation is critical to support a lifetime of renal replacement therapy
- May use toys or other diversional items not typically considered for disinfection
  - Will usually have a visitor in-center (parent or guardian)

Cincinnati Children's Hospital Dialysis Unit

Cincinnati Children's Hospital Dialysis Unit

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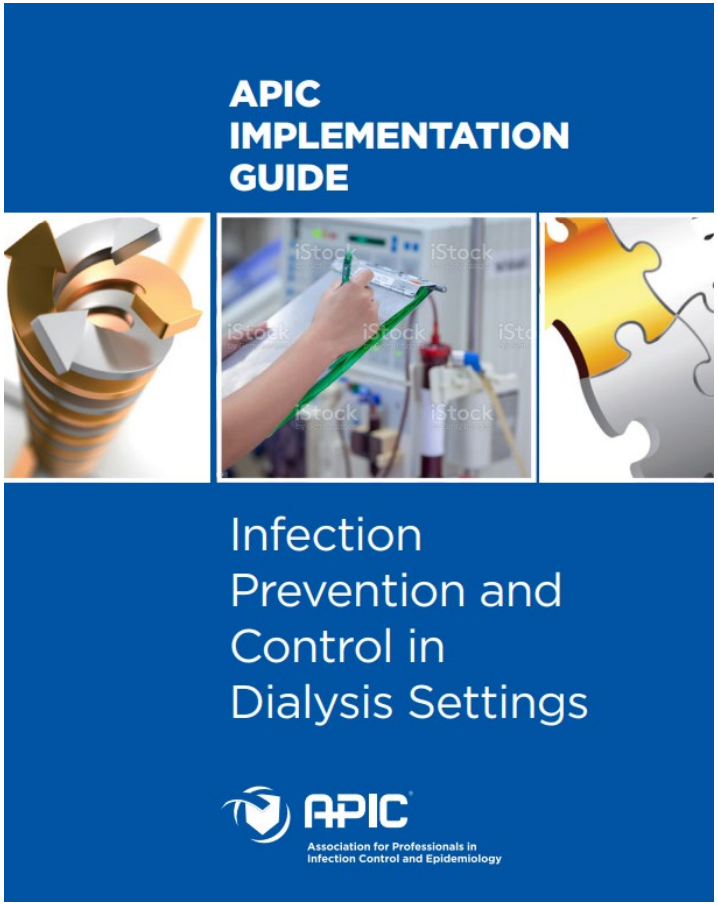
APIC
Association for Professionals in Infection Control and Epidemiology

Infection Prevention Strategies for the Dialysis Setting

Dialysis is complex, but the IP principles are the same as every other healthcare setting

- Reduce number of central lines
- Encourage vaccination for staff and patients
- Monitor for outbreaks, hepatitis titers
  - Consult with local DOH
- Ensure cleanliness of the environment, appropriate disinfection products are in use
- Perform periodic audits and competency checks for
  - Hand Hygiene
  - Access/deaccess
  - Exit site care
  - Medication preparation
  - Station cleaning
- Use validated theoretical framework to address culture while implementing change

APIC Implementation Guide



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QUESTIONS?