

# **Direct Observation of Practices in Hemodialysis Facilities**

## **Checklist, Audit Tools, & Technical Assistance**

### **Hepatitis C**

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The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of Centers for Disease Control and Prevention.



## Outline:

- Background – burden of infection
- CDC Health Advisory – Hepatitis C
- Review CDC Approach to BSI Prevention in Dialysis Facilities
- Introduce use of audit tools and checklists

# Burden of Healthcare-Associated Infections (HAI's)

- CDC Vital Signs report: Central line-associated BSI's <sup>1</sup>
  - Hospital Inpatient's: ~ 42,000 estimated
  - Outpatient hemodialysis: ~ 37,000 estimated
- Infection is the 2<sup>nd</sup> leading cause of death in dialysis
- Invasive methicillin-resistant *Staphylococcus aureus* (MRSA) infections <sup>2</sup>
  - Incidence > 100 times that of the general population
- Hepatitis C virus (HCV infection)
  - Prevalence in dialysis patients ~ 8-14%
  - Compared to 1.6% for general population

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

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This is an official  
**CDC HEALTH ADVISORY**

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Wednesday, January 27, 2016, 10:30 EST (10:30 AM EST)  
CDCHAN-00386

<http://emergency.cdc.gov/han/han00386.asp>

# Hepatitis C

- **Hepatitis C- total 16 outbreaks (2008-2012):**
  - 160 outbreak-associated cases, >90,000 at-risk persons notified for screening.
  - 6 outbreaks occurred in hemodialysis settings, with 50 outbreak-associated cases of HCV and 1,353 persons notified for screening.
  - **2016 UPDATE: Between 2014 and 2015**
    - 36 cases in 19 different clinics in 8 states
- **How long does the Hepatitis C virus survive outside the body?**
  - The Hepatitis C virus can survive outside the body at room temperature, on environmental surfaces, for at least 16 hours but no longer than 4 days.
- *NOTE: No Hepatitis B dialysis associated outbreaks!*

# HCV & Outbreaks

- Hepatitis C virus infection
  - Prevalent in hemodialysis patients
  - Serious outcomes
  - New infection is often asymptomatic
  - Screening to detect
- Outbreaks occur frequently in hemodialysis
  - Should not happen
  - Documented transmission between patients
    - Contaminated environment, movement of contaminated supplies between patients, and/or contaminated medications
  - Better adherence to recommended infection control practices is needed
  - Implications for transmission of other pathogens

# Four Things Centers Can Do to Prevent HCV Transmission

1. Assess current infection control practices and environmental cleaning and disinfection practices within the facility to ensure adherence to infection control standards
2. Address any gaps identified by the assessments
  - Staff training
3. Screen patients for HCV, following CDC guidelines, to detect infections, determine treatment potential, and halt secondary transmission
4. Promptly report all acute HCV infections to the state or local health department.

# 2013: CDC Approach to BSI Prevention

Set of 9 Evidence-based Core Interventions PLUS:

- Disinfection of the Dialysis Station
- Injection Safety

CDC Dialysis website  
<http://www.cdc.gov/dialysis/>

- Audit tools
- Checklists
- Best practice video

## 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 antiseptis

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>



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Division of Healthcare Quality Promotion



[http://www.cdc.gov/dialysis/PDFs/Dialysis-Core-Interventions-5\\_10\\_13.pdf](http://www.cdc.gov/dialysis/PDFs/Dialysis-Core-Interventions-5_10_13.pdf)



# CDC Dialysis Infection Prevention Audit Tools:

<http://www.cdc.gov/dialysis/prevention-tools/index.html>

**Hand  
Hygiene**

**HD Catheter  
Connection/  
Disconnection**

**HD Catheter  
Exit Site Care**

**AV Fistula/  
Graft  
Cannulation/  
Decannulation**

**Injectable  
Medication  
Preparation**

**Injectable  
Medication  
Administration**

**Routine  
Disinfection  
of Dialysis  
Station**

# How to Use the Hand Hygiene Audit Tool: Opportunities

- Each audit includes multiple observations
  - An observation is an opportunity to perform hand hygiene (when warranted)
- If an opportunity is observed and hand hygiene is performed, the observation is marked a success:

## **Audit Tool:** Hemodialysis hand hygiene observations

(Use a "√" for each 'hand hygiene opportunity' observed. Under 'opportunity successful', use a "√" if successful, and leave blank if not successful)

Discipline	Hand hygiene		Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):
	Hand hygiene opportunity	Opportunity successful	
N	√	√	
T	√	√	
N	√		<i>missed opportunity before administering medication</i>

The first two observations were successful because hand hygiene was warranted and was performed.

The third observation was not successful because the warranted opportunity for hand hygiene was missed.

## Tallying Opportunity Audit Results

- Number of Successful Opportunities: Sum of observed instances during which staff hand hygiene was warranted and was successfully performed.
- Total Number Opportunities: Total number of observed instances during which hand hygiene was warranted.

### **Audit Tool: Hemodialysis hand hygiene observations**

(Use a "√" for each 'hand hygiene opportunity' observed. Under 'opportunity successful', use a "√" if successful, and leave blank if not successful)

	Discipline	Hand hygiene		Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.):	
		Hand hygiene opportunity	Opportunity successful		
1	N	√	√		✓
2	T	√	√		✓
3	N	√		<i>missed opportunity before administering medication</i>	
4	P	√	√		✓
5	N	√	√		✓

Discipline: P=physician, N=nurse, T=technician, S=student, D=dietitian, W=social worker, O=other

Duration of observation period = \_\_\_\_\_ minutes    Number of successful hand hygiene opportunities observed = 4 ←

Total number of patients observed during audit = \_\_\_\_\_    Total number of hand hygiene opportunities observed during audit = 5 ←

\*\* See hand hygiene opportunities on back page

## How to Use the Audit Tools: Procedures

- Each audit includes multiple observations
  - An observation is the review of a procedure to indicate which steps were performed correctly or incorrectly
- If each step of a procedure is observed and correctly performed, the observation is marked a success:

### **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
1	C	N	√	√	√	√	Φ	√		√	√
2	D	√	√	√	√	√	√	√	√	√	√

The first observation (catheter connection) was not successful because hub antiseptic was not allowed to dry

The second observation (catheter disconnection) was successful because all steps were observed and completed

## Tallying Procedure Audit Results

- Once all observations have been completed, add the successful observations and note the total number of observations performed:

### **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
<del>C</del>	<del>N</del>	<del>√</del>	<del>√</del>	<del>√</del>		<del>√</del>	<del>Φ</del>	<del>√</del>		<del>√</del>	<del>√</del>
D	N	√	√	√	√	√	√		√	√	√
<del>C</del>	<del>N</del>	<del>Φ</del>	<del>√</del>	<del>√</del>		<del>√</del>	<del>Φ</del>	<del>√</del>		<del>√</del>	<del>√</del>
D	N	√	√	√	√	√	√		√	√	√
C	T	√	√	√		√	√	√		√	√
C	N	√	√	√		√	√	√		√	√
C	N	√	√	√		√	√	√		√	√

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 =

5 ← ←  
7 ← ←

## Using the Audit Tool - Data Collection

- **All audits – observer(s) should try to ensure that observations are as representative as possible of normal practice at the facility:**
  - Observe different staff members on different days and shifts
  - Consider observing during particularly busy times (e.g., shift change), when staff may be less attentive to proper practices
  - Focus on areas where staff interactions with patients are clearly visible
  - Focus on one audit at a time
  - Steps on the audit forms may not occur in order



New CDC tools!



## Checklist: Hemodialysis injectable medication preparation

- Ensure medication preparation area is clean<sup>1</sup>
- Inspect medication vial and discard if sterility is questionable<sup>2</sup>
- Perform hand hygiene
- Prepare medication aseptically
- Disinfect rubber septum of vial with alcohol
- Withdraw medication using a new needle and new syringe<sup>3</sup>
- Discard single-dose vials and store multi-dose vials appropriately<sup>4</sup>

A clean room is preferred to an area within the treatment floor

Free of contamination sources: blood, body fluid, contaminated supplies, tap water

Store multi-dose vials in designated clean area

Prepare close in time to administration

<sup>1</sup>Prepare injectable medications in a designated clean workspace that is free of obvious contamination sources (e.g., blood, body fluids, contaminated equipment, tap water). This workspace should be clearly separated from the patient treatment area, and ideally in a separate room.

<sup>2</sup>Examine appearance of vial contents for signs of possible contamination (e.g., turbidity, particulate matter). Vials should be discarded if sterility is questionable, the expiration date has been exceeded, or the 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.

<sup>3</sup>Medications should be prepared as close as possible to the time of administration. If not immediately administered by the person who prepared the medication, they should be labeled appropriately.

<sup>4</sup>If not discarded, opened multi-dose vials should be stored in a designated clean area in accordance with manufacturer's instructions.



Making dialysis safer for patients  
& CDC Dialysis Collaborative



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Zoonotic Infectious Diseases

## 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.

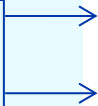
- Perform hand hygiene
- Put on new, clean gloves
- Scrub injection port with antiseptic\*
- Attach syringe and administer medication aseptically
- Discard syringe
- Remove gloves
- Perform hand hygiene

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



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Use aseptic technique



Transport medications directly to station where they will be delivered





# 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<sup>1</sup> prior to Part A.

Removing items and preparing the station

## 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<sup>2</sup>.
- Check that there is no visible soil or blood on surfaces.
- Ensure that the priming bucket has been emptied<sup>3</sup>.
- Ensure that the patient has left the dialysis station<sup>4</sup>.
- 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<sup>5</sup>.
- Remove gloves and perform hand hygiene.

Patient must leave station

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

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

Disinfect all surfaces

Surfaces must be visibly wet, air-dry

Prime bucket

Wait! All steps must be finished

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



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# *Thank you!*

## Questions?

**For more information please contact Centers for Disease Control and Prevention**

1600 Clifton Road NE, Atlanta, GA 30333  
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348  
E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov) Web: [www.cdc.gov](http://www.cdc.gov)



# AUDIT TIPS

## FOR USE AT AUDIT SIMULATION STATIONS

**For more information please contact Centers for Disease Control and Prevention**

1600 Clifton Road NE, Atlanta, GA 30333  
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348  
E-mail: [cdcinfo@cdc.gov](mailto:cdcinfo@cdc.gov) Web: [www.cdc.gov](http://www.cdc.gov)



# Hand Hygiene

## Hand Hygiene Observation Recommendations

- Evaluate if sufficient supplies of alcohol-based hand rubs, soap and paper towels and unrestricted access to sinks
  - Supplies should be readily available and located near point of use
- Examples of situations when hand hygiene is indicated:
  - Before and after direct patient contact
  - After completing tasks at one patient station before moving to another station
  - Before procedures, such as administering intravenous medications
  - Before and after contact with vascular access
  - Before and after dressing changes
  - After contact with items/surfaces at patient stations
- Remember - glove use does not preclude the need for hand hygiene after removing gloves

## HD Catheter Exit Site Care

- **Catheter exit site care:**
  - Alcohol-based chlorhexidine (>0.5%) solution
  - For patients with chlorhexidine intolerance:
    - Povidone iodine (preferably with alcohol)
    - 70% alcohol
  - Ointment
    - CDC recommends application of:
      - Povidone-iodine ointment
      - Bacitracin/gramicidin/polymyxin B ointment (not available in U.S.)
      - Bacitracin/neomycin/polymyxin B ointment (Triple antibiotic) may be an acceptable alternative
    - Use of chlorhexidine-impregnated sponge dressing might be an alternative
    - Not part of corporate policy for some LDOs

## HD Catheter Connection/ Disconnection

- **Masks**

- Data to prevent vascular access infections is lacking
- Recommended for patients and staff in 2000 KDOQI guidelines and CMS ESRD Conditions for Coverage Interpretive Guidance

- **Antiseptic Use and Selection**

- 2011 CDC/HICPAC Guidelines for the Prevention of Intravascular Catheter-Related Infections
- Prior to accessing catheter hub it should be disinfected with an appropriate antiseptic:
  - >0.5% chlorhexidine with alcohol
  - 70% alcohol (sterile)
  - 10% povidone-iodine
  - ❖ Not enough evidence to recommend one over the others

## HD Catheter Connection/ Disconnection

### ▪ Connection – Scrub the Hub Steps

- Disinfect the hub with caps removed using an appropriate antiseptic
  - (Optional) Prior to cap removal, disinfect the caps and the part of the hub that is accessible and discard the antiseptic pad (i.e., use a separate antiseptic pad for the next step)
  - Remove caps and disinfect the hub with a new antiseptic pad for each hub
  - Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood)
  - Using the same antiseptic pad, apply antiseptic with friction to the catheter, moving from the hub at least several centimeters towards the body
    - Hold the limb while allowing the antiseptic to dry
  - Use a separate antiseptic pad for each hub/catheter limb.
  - Leave hubs “open” (i.e., uncapped and disconnected) for the shortest time possible
- Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces

## HD Catheter Connection/ Disconnection

### ▪ Disconnection – Scrub the Hub Steps

- Disinfect the catheter hub before applying the new cap using an appropriate antiseptic
  - (Optional) Disinfect the connection prior to disconnection.
    - If this is done, use a separate antiseptic pad for the subsequent disinfection of the hub
  - Disconnect the blood line from the catheter and disinfect the hub with a new antiseptic pad
  - Scrub the sides (threads) and end of the hub thoroughly with friction, making sure to remove any residue (e.g., blood)
  - Use a separate antiseptic pad for each hub.
  - Leave hubs “open” (i.e., uncapped and disconnected) for the shortest time possible
- Once disinfected, do not allow the catheter hubs to touch nonsterile surfaces.
  - Catheter should be held until the antiseptic has dried
- Attach new sterile caps to the catheter aseptically



# HD Catheter Connection/ Disconnection

## ▪ **Bloodline Disinfection**

- Not required when accessing the line if the ends of the blood lines have not been contaminated (i.e., through careful aseptic technique)
- Can become contaminated during:
  - Connections and disconnections
  - Priming process
    - Contact with contaminated prime waste in prime buckets not properly cleaned and disinfected
    - Backflow from waste handling ports

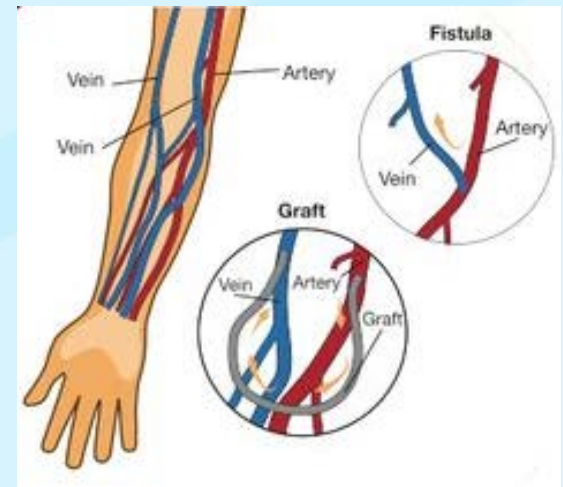
## HD Catheter Connection/ Disconnection

- **Disconnection and Line Reversal**

- Anytime a patient's circuit is disconnected and blood re-circulated the catheter hub and end of the extracorporeal blood line should be disinfected
- Catheter disconnection from the blood lines should be minimized

## AV Fistula/ Graft Cannulation/ Decannulation

- **Site should be cleaned with soap and water**
  - Preferably by the patient
  - Staff should clean site if patient unable
- **Appropriate skin antiseptic:**
  - Alcohol-based chlorhexidine (>0.5%) solution
  - For patients with chlorhexidine intolerance:
    - Povidone iodine (preferably with alcohol)
    - 70% alcohol
- **Allow skin antiseptic to dry**
  - No contact with site after antisepsis
- **Needles should be inserted aseptically**



## Injectable Medication Preparation

- **Staff responsibilities for preparing medications can vary**
- **Designated clean preparation workspace**
  - Use a designated clean workspace free of obvious contamination sources (e.g., blood, body fluids, contaminated equipment, tap water)
    - Should be clearly separated from patient treatment area, ideally in a separate room
  - Common medication carts should NOT be used
  - CDC recommends against drawing saline flushes at the station

## Injectable Medication Preparation

### ▪ Medication vials

- Should be examined for signs of contamination (e.g., turbidity, particulate matter)
- Discarded if:
  - Sterility questionable
  - Expiration date exceeded
  - Beyond-use date exceeded
- Multi-dose vials (if not immediately discarded):
  - Should be labeled upon opening to indicate beyond-use date
  - Stored in a designated clean area in accordance with manufacturer's instructions

## Injectable Medication Administration

- **Injectable Medications:**

- Should be prepared as close as possible to time of administration
- Should be handled and transported from medication preparation area in a manner minimizing risk of contamination
- Provider should ensure correct medication and dose are being administered to the correct patient

- **Appropriate antiseptics for scrubbing injection ports:**

- Chlorhexidine
- Povidone-iodine
- Tincture of iodine
- 70% alcohol

## Routine Disinfection of Dialysis Station

- **When visible blood or other soil is present, surfaces must be cleaned prior to disinfection**
- **Facility should have established procedure performed between patients**
  - Identification of responsible staff
  - Necessary supplies available
  - If used dialyzers and blood tubing transported out of the station before being discarded, transport in a way that prevents leakage
  - Station should be vacated by the patient
  - Disposal/removal of used supplies may occur before and/or after the patient has departed the station
  - Ensure the procedure allows for sufficient disinfectant application to all surfaces
    - Surfaces should be visibly wet

## Routine Disinfection of Dialysis Station

- **Ensure the procedure allows for sufficient disinfectant application to all surfaces**
  - Surfaces should be visibly wet
  - Air dry to allow sufficient disinfectant contact time
  - Don't recontaminate areas that have already been disinfected
- **Surfaces to disinfect:**
  - All surfaces in contact with the patient and frequently contacted by healthcare personnel
    - Dialysis chair
    - Tray tables
    - Blood pressure cuffs
    - Control panel
    - Front and sides of dialysis machine
    - Touchscreens
    - Countertops
    - Computer keyboards

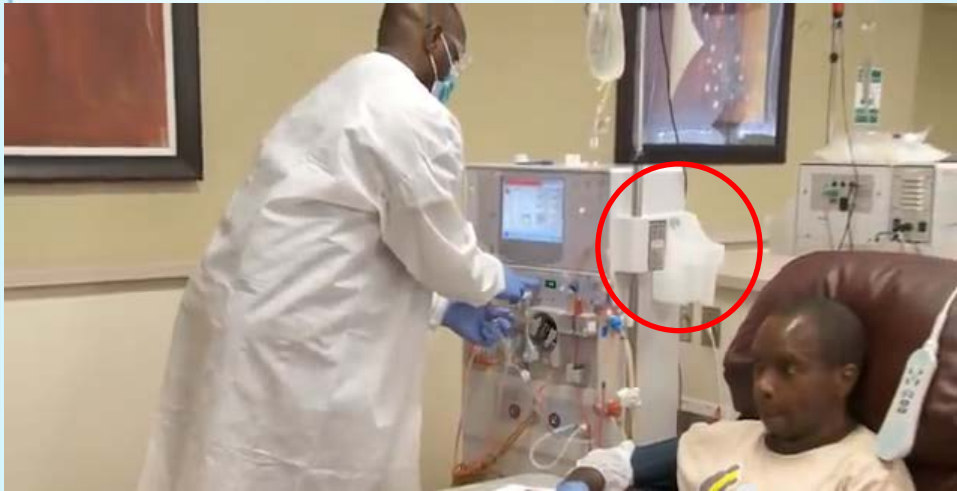




## Routine Disinfection of Dialysis Station

### ■ Priming Buckets

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



## Routine Disinfection of Dialysis Station

- **Disposable Medical Equipment**
  - Should be discarded if brought to the dialysis station
  - Should NOT be dedicated to the patient
- **Computers and keyboards**
  - Should be cleaned after each patient if shared between stations



## Routine Disinfection of Dialysis Station

- **Optimization strategies**

- CDC recommends:
  - Routine surface disinfection should not commence until the patient has left the station
    - Reduces opportunities for cross-contamination and patient exposure to disinfectant fumes
- Additionally:
  - Sufficient patient-free interval at each station
    - Facility-wide patient-free interval between treatment shifts should be considered