Targeting Zero Infections: Environmental Decontamination

The fourth webinar of the Targeting Zero Infections series

Engaging nephrologists as team leaders to “target zero infections” by actively pursuing the elimination of preventable infections in dialysis facilities.
Disclosures

Employer: Yale New Haven Health System; Consultancy: American Society of Nephrology, National Institutes of Digestive Disease and the Kidney; Scientific Advisor/Membership: Qualidigm (Quality Improvement Organization); Other interests/relationships: Renal Physicians Association, American Society of Nephrology

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Yale New Haven Health System
Disclosures

Employer: US Centers for Disease Control and Prevention

Priti Patel, MD, MPH
Centers for Disease Control and Prevention
Environmental Disinfection: CDC Recommendations
Definitions of Terms
Definitions

- **Pathogen**: Bacteria, virus, or other microorganism that can cause disease
- **Fomite**: Inanimate object (e.g., dialysis machine, TV, dialysis chair) that can indirectly transmit pathogens
- **Persistence**: Length of time a pathogen can remain viable and infectious in the environment
- **Disinfection**: A process that eliminates many or all pathogenic microorganisms, except bacterial spores, on inanimate objects
- **Cleaning**: Removal of visible soil (e.g., organic material) from objects and surfaces; normally is accomplished manually using water with detergents
- **Decontamination**: Removes pathogenic microorganisms from objects so they are safe to handle, use, or discard

Pathogens identified on surfaces and persistence (i.e., remains viable and infectious in environment)

- **Hepatitis B virus** - [blood]: clamps, scissors, dialysis machine control knobs, and doorknobs\(^1\)
  - Can persist on surfaces for at least 7 days

- **Vancomycin-resistant enterococci (VRE)** - [GI tract]: patient and healthcare worker gowns, door handles, cabinets, floors, blood pressure cuffs, bed rails, urinals, bedpans, and toilet seats
  - Survived on a countertop for up to 7 days\(^2\)

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1. [https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5005a1.htm](https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5005a1.htm)
The Inanimate Environment Can Facilitate Transmission


Photo: Images used with permission
Vancomycin-resistant Enterococci (VRE) Contamination in Hemodialysis

- Australian study assessed VRE contamination in several outpatient settings, including hemodialysis
- Focused on 26 dialysis treatment sessions that involved 7 patients & 15 healthcare staff members
  - Patients were colonized with VRE but *fecally continent* (no diarrhea)
  - Cultured various surfaces immediately after each treatment session
    - Ensured all surfaces were free of contamination prior to treatment session

# VRE Contamination Rate

<table>
<thead>
<tr>
<th>Site/Surface</th>
<th>% of sessions with VRE detected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialysis treatment chair</td>
<td>58%</td>
</tr>
<tr>
<td>Staff gown</td>
<td>30%</td>
</tr>
<tr>
<td>Patient ungloved hands</td>
<td>54%</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>8%</td>
</tr>
<tr>
<td>Blood pressure monitor</td>
<td>11%</td>
</tr>
<tr>
<td>Dialysis machine</td>
<td>4%</td>
</tr>
<tr>
<td>Staff gloved hands</td>
<td>8%</td>
</tr>
<tr>
<td>Staff ungloved, cleaned hands</td>
<td>8%</td>
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Examination of Cleaned Surfaces
Examination of Surfaces for Blood Stains and Hemoglobin

<table>
<thead>
<tr>
<th>Site</th>
<th>Visible blood stain</th>
<th>Hemoglobin test</th>
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<tbody>
<tr>
<td>Biohazard waste bin</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Side of machine, close to blood pressure cuff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom of TV in dialysis station</td>
<td></td>
<td></td>
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<tr>
<td>Dialysis chair side table</td>
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<td>Waiting area chair arm rest</td>
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French study assessed contamination in setting of HCV spread
- Of 740 environmental samples, 82 (11%) were hemoglobin (+)
  - 6 (7%) of the 82 tested HCV RNA (+)
  - Mostly from dialysis machines & shared waste cart
- Viral sequencing data
  - Documented transmission from one patient to another in the unit
  - Identified HCV RNA in the environment from the source patient suggests that HCV in the environment could have contributed to spread

Summary of Data on Environmental Contamination

- Pathogens and blood contamination have been identified on surfaces in dialysis centers
  - Contamination not always visible
- Contamination can lead to spread of infections
  - Particularly via hands of healthcare staff

- Routine processes are needed for cleaning and disinfection that will reliably remove contamination and make surfaces safe for use
- How good and error-proof are the disinfection processes in your center?
CDC has tools for Routine Disinfection of the Dialysis Station

- What is “Routine” Disinfection?
  - Disinfection of environmental surfaces in the dialysis station and surrounding areas between patient treatments
  - “Routine” applies when no visible blood or soil is present
    - If blood or soil is present, address immediately with a cleaning step
    - Dirt, blood, and other organic matter can interfere with the effectiveness of disinfection
Important Steps in Routine Disinfection
Part A: Before Beginning Routine Disinfection

Before beginning routine disinfection of the dialysis station:

- Observe for evidence of visible blood or other soil on surfaces
  - If present, a cleaning step should be implemented

https://www.cdc.gov/dialysis/PDFs/collaborative/Env_checklist-508.pdf
Part A: Before Beginning Routine Disinfection

Before beginning routine disinfection of the dialysis station:

- Remove all used items (e.g., blood tubing, dialyzer, gauze, tape) and discard single-use supplies
- Remove and empty the priming bucket
- The patient should leave the station
  - Risk of recontamination
- Remove gloves and perform hand hygiene

https://www.cdc.gov/dialysis/PDFs/collaborative/Env_checklist-508.pdf
Part B: Routine Disinfection of a Dialysis Station

- After patient leaves
  - Put on new clean gloves
  - Apply disinfectant to all surfaces using a wiping motion (with friction)
  - Apply sufficient disinfectant to all surfaces, including priming bucket
    - Surfaces should be visibly wet with disinfectant
    - Air dry and allow sufficient disinfectant contact time

https://www.cdc.gov/dialysis/PDFs/collaborative/Env_checklist-508.pdf
Part B: Routine Disinfection of a Dialysis Station

- Keep used or potentially contaminated items away from the disinfected surfaces
  - Don’t re-contaminate areas that have already been disinfected
  - Don’t bring a patient or clean supplies to the station until all steps have been completed

https://www.cdc.gov/dialysis/PDFs/collaborative/Env_checklist-508.pdf
What NOT to do:
Set-up for Failure of Disinfection Processes

Notice the crowded environment
Technician cleaning the machine
Patient is sitting in the chair, clamps on vascular access (still bleeding)
Staff often are tending to patients while also cleaning surfaces (enabling transfer of pathogens from contaminated sites to cleaned surfaces)

Contamination can happen without visible evidence (these are MICRO-organisms)
Not all contamination is from direct contact
  -There can be respiratory droplets, splashes of blood, dialysate, or other fluid
Important Considerations for Implementation
Implementing Best Practices for Environmental Surface Disinfection

- Establish procedure for disinfecting dialysis station and other areas of the unit
  - Identify responsible staff members
  - Give staff time to properly disinfect the station in between patients

- Make supplies available
- Think about difficult to clean surfaces (e.g., computer keyboards)

Environmental Surface Disinfection in Dialysis Facilities: Notes for Clinical Managers

Photo: PPT "Creative Commons"
Implementing Best Practices for Environmental Surface Disinfection

- Make sure all surfaces in the station are disinfected
  - Consider a standardized order of wiping down objects and surfaces
  - Establish procedure for prime bucket cleaning and disinfection
- Train staff on the procedures and routinely assess their practice
Choose Your Surfaces with Disinfection in Mind

When possible, choose surfaces that are easy to clean, and that show stains, blood spills.

Difficult to visualize blood on chair

Relatively easy to wipe down

Photo: Images used with permission  Source: CDC

Photo: PPT “Creative Commons”
Clean Dialysis Units Can Save Lives
Disclosures

Employer: Chevron; Other interests/relationships:
Forum of ESRD Networks – Kidney Patient
Advisory Council Chair and Board Member, ESRD
Network #17 – Patient Advisory Committee Chair
and Network Board Member, NKF – volunteer,
member of Public Policy Committee, and Regional
Leader of Kidney Advocacy Committee
A Patients View From The Chair

Derek L Forfang
National Forum of ESRD Networks KPAC Chair
HSAG ESRD Network #17 PAC Chair
NKF Patient Advocacy Committee Regional Leader
Patient Engagement, Aligning Goals is Key to Achieving Zero

Excuse me; I’m part of the dialysis team too.
Feeling Safe in the Chair, Fostering Open Communication

Blood Blood and more Blood

- Our chair our safe zone
- Keeping blood where it belongs
- A terrifying experience, not just for me

“Go ahead speak freely. This is a safe space”

- Is communication welcome
- Quality through corrective feedback
- Can it work
- Do policy’s matter
Celebrate Success Together and Focus on Challenges Together

Achieving Milestones
- Provide Lunch
- Give a $1.00 Scratch ticket
- Protein smoothies

Look for Improvement
- Create a cross functional Quality Team including patients
- Shift awareness discussions
- Keep results good or bad out for all to see
- How did I improve, think out of the box
Disclosures

Employer: Northrop Grumman. Contractor to the Centers for Disease Control and Prevention as an Infection Prevention Educator for the Making Dialysis Safer for Patients Coalition

Stephanie Booth, BSHCA Contractor
Centers for Disease Control and Prevention
Introduction

I. Definitions
   I. CHALLENGE: Something that by its nature or character serves as a call to battle, contest, special effort, etc.
   II. OPPORTUNITY: A situation or condition favorable for attainment of a goal

II. Dialysis Challenges
   I. Physical Challenges
   II. Staffing Challenges
   III. Practice Challenges

“In the middle of every difficulty lies opportunity.”
– Albert Einstein
Recognized Challenges in Dialysis Clinics

- **Physical Challenges**
  - a. Unit Configuration
    - a. Dialysis clinic shape / size
    - b. Waiting areas / triage rooms
  - b. Station Configuration
    - a. Close proximity
    - b. Computer / television terminals
  - c. Equipment Design
    - a. Multifaceted surfaces
    - b. Disinfectant/Material compatibility
Recognized Challenges in Dialysis Clinics

- **Staffing Challenges**
  - a. Turn-over time
    - a. Staff rushing
    - b. Families / other extra bodies
  - b. Staffing matrix/ratio
    - a. Clinic differences
    - b. Increased demands
      - a. Patients
        - a. Time
        - b. Acuity
        - c. Needs
Challenges in Dialysis Clinics

- **Standardized Practice**
  a. Inconsistent practice
  b. Assigned responsibilities
  c. Policies / Procedures
  d. Auditing / checklists
Tools and Checklists

- Checklist
- Audit tool
- Notes for Clinical Managers

Some other Tools

Preventing Bloodstream Infections in Outpatient Hemodialysis Patients:
BEST PRACTICES FOR DIALYSIS STAFF

Routine Disinfection of the Dialysis Station
Disclosures

Employer: St. Joseph Hospital; Scientific Advisor/Membership: Nephrology Nursing Certification Commission and Nephrology News and Issues Editorial Advisory Board; Other interests/relationships: National Kidney Foundation and ESRD Network 18

Danilo Concepcion
CBNT, CCHT-A, FNKF
St. Joseph Hospital
In every difficulty lies opportunity

- Frontline challenges
- Practical strategies to improve performance
Examples of Opportunities

- Creating Structure

<table>
<thead>
<tr>
<th>DIALYSIS CLEANING/DISINFECTION TEMPLATE AND KEY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functions</strong></td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Damp Dust all surfaces (counter tops, sinks)</td>
</tr>
<tr>
<td>Damp Dust trash cans, linen carts, tv arms</td>
</tr>
<tr>
<td>Dialysis Machine</td>
</tr>
<tr>
<td>Dialysis Machine</td>
</tr>
<tr>
<td>Dialysis Machine - dialyzer blood leak incident</td>
</tr>
<tr>
<td>Dialysis Chair</td>
</tr>
<tr>
<td>TV Monitors</td>
</tr>
<tr>
<td>Independent conductivity meter</td>
</tr>
<tr>
<td>Glucose meter</td>
</tr>
<tr>
<td>BP Cuff bags</td>
</tr>
<tr>
<td>Mini infusers</td>
</tr>
<tr>
<td>medication prep area</td>
</tr>
<tr>
<td>Prime bucket</td>
</tr>
<tr>
<td>Bicarb Loop</td>
</tr>
<tr>
<td>Central RO Systems</td>
</tr>
<tr>
<td>Portable RO Systems</td>
</tr>
<tr>
<td>Bicarbonate jugs refillable</td>
</tr>
<tr>
<td>Bicarbonate jugs refillable</td>
</tr>
<tr>
<td>Surface soiled or bloody</td>
</tr>
<tr>
<td>Sharps Container</td>
</tr>
<tr>
<td>Ancillary Items (plastic clamps, access clamps)</td>
</tr>
<tr>
<td>Scrub Floors</td>
</tr>
<tr>
<td>Wash Walls</td>
</tr>
<tr>
<td>Cleaning Ceiling</td>
</tr>
</tbody>
</table>

**Key:** L = low level; I = intermediate level

Light Blue = EVS; Light green = Staff

Source: St. Joseph Hospital
Another Opportunity

- Is there a formal procedure on how to perform disinfection
II. POLICY:

A. Splash zone shall be defined a 6 feet radius from the patient position and the radius shall segregate contaminated versus non-contaminated contact area. Any item within the splash zone is considered contaminated.

B. Gloves will be worn when using the healthcare hydrogen peroxide wipes.

C. Minimum contact time for low-level disinfection with the hydrogen peroxide wipes is 30 seconds. A 1 (one) minute minimum contact time will be adopted as unit policy.

D. Contact time for intermediate-level disinfection is 5 minutes (per “Visible Blood Procedure below”).

E. Canister cover will be secured at all times except during the act of removing wipes from the canister.
F. Only 12” x 11” wipes will be used to disinfect dialysis machine and dialysis chairs. One wipe per item will be used. One wipe is effective to keep a 26.6 square feet area surface wet for 2 minutes; a 17.55 square feet area surface wet for 3 minutes; a 8.5 square feet area surface wet for 4 minutes. One 12” x 11” wipe will be used for the dialysis machine and a second wipe used for the dialysis chair.

G. 6.75” x 9” wipes can be used on ancillary small surfaces not inclusive in the splash zone. One 6.75” x 9” wipe is effective to keep a 12.32 square feet are surface wet for 2 minutes; 6.21 square feet area wet for 3 minutes; 4.45 square feet surface wet for 4 minutes.

H. In the case of positive c. difficile, ONLY bleach product will be used.
III. PROCEDURE:

A. Supplies
   1. Hydrogen Peroxide Cleaner Disinfectant Wipes (12 x 11 size).

B. Steps
   1. Use one 12 x 11 wipe for dialysis chair and a separate 12 x 11 wipe for the dialysis machine and ancillary item in the splash zone.
   2. Uncap the canister and remove the amount of wipe to be immediately used. Immediately is defined as within one minute of removing wipes from container.
   3. Recap the canister immediately after removing the appropriate wipes needed.
   4. Wipe from the cleanest surface to the dirtiest surface.
      a) Dialysis machine wipe shall be from the top, left (non-shunt side), front, right (shunt side).
      b) Chair wipe shall be from head to foot, then non-access side, access side; then (c)
      c) Chair side-arm shall be opened and disinfected.
      d) Use of hydrogen peroxide wipe is a one-step process and does not require pre-cleaning or rinsing.
      e) Allow to air dry.

C. Visible blood procedure
   1. In the event of visible blood, a two tier wipe method must be followed
      a) Use an initial CHP wipe and remove all visible blood from surface. Utilize multiple wipes if necessary to remove all visible blood from surface.
It’s everyone’s responsibility!

- Medical Directors
- Physicians
- Social Workers
- Dieticians
- Nurse Practitioners
- Coordinators

- Managers
- Nurses / Techs
- Bio-Medical
- Medical Reception
- Housekeeping
- Environmental
Disclosures

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Alan S. Kliger, MD
NTDS Project Chair
Yale New Haven Health System
• Be familiar with Surface Decontamination Policies
• Monitor and Review Surface Decontamination Procedures
• Utilize “secret shoppers” or do mock surveys to monitor Surface Decontamination Procedures: Identify and fix deviances
• Make Review of Surface Decontamination part of regular QAPI review
Create Culture of Safety for Patients and Staff

• Encourage medical staff to speak with patients about the importance of Surface Decontamination
• Ensure that patients receive training about infection safety and Surface Decontamination
• Involve patients in facility safety
Disclosures

Employer: American Society of Nephrology
Jay Wish (husband)—Consultancy Agreements: Pfizer, Vifor, Akebia, AstraZeneca, Medscape, Eaiichi-Sanyko, and DaVita (Medical Director Agreement); Honoraria: Pfizer, Keryx, Vifor, Akebia, AstraZeneca, Medscape, and Eaiichi-Sanyko; Scientific Advisor or Membership: JASN and NN&I Editorial Boards; Speakers Bureau: Keryx, Pfizer, and Eaiichi-Sanyko

Susie Stark
NTDS Project Director
American Society of Nephrology
Q&A SESSION
Thank You for Your Participation

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For further questions and comments about this webinar, please contact ntds@asn-online.org.

• ASN Kidney Week – NTDS Annual Session
  • 21st Century Killers – How Nephrologists Can Fight Back
  • Date: Friday, October 26, 2018
  • Time: 2:00 p.m. – 4:00 p.m.

• Webinar: Blood Cultures: Guidance for a Standardized Process
  • Date: Thursday, November 29, 2018
Thank You for Your Participation

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