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Infection Prevention in Dialysis Care

Stephanie Huskey RN CDN
Quality Improvement Manager
Heartland Kidney Network
Objectives

- Overview of barriers to infection prevention in dialysis
- Review of recommended infection prevention practices in dialysis
- How to actively assess infection prevention practices in dialysis
- Review of tools and resources available for staff and patient education
Bloodstream Infection Reduction in Dialysis

Why focus on reducing bloodstream infections in dialysis?

- CMS recognizes that infections are the second leading cause of death in patients with end-stage renal disease.
- CMS set a five-year target to guide national health promotion and management: by 2023, reduce the national rate of bloodstream infections in dialysis patients by 50% of the bloodstream infections that occurred in 2016.

CMS objective in reducing BSI in dialysis facilities:

- Bloodstream infections will be reduced through the support of NHSN, participation in the ESRD NCC HAI LAN, and implementation of the CDC Core Interventions.
- Review of infection causes and prevention measures at the local facility level, including factors such as Dialysis Access, adherence to the CDC Core Interventions, vaccinations of preventable diseases, and patient demographics.
- Reduce overall BSI rate by 20%.
Barriers to Infection Prevention in Dialysis
Barriers to Infection Prevention in Dialysis Facilities and ESRD Patients

- Frequent access to bloodstream through catheters and needles
- Ineffective communication between dialysis units and hospitals, nursing homes, etc.
- Risk of contamination from improperly disinfected supplies and machines and cross-contamination
- Weakened immune system
- Frequent hospitalizations and surgeries
- High exposure to water and environmental elements

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- CMS Scope of Work for ESRD Networks called for a decrease by at least 2 percentage points from January to June of 2018
- Heartland Kidney Network baseline 20.08% in June of 2017
- **Goal Met 15.35%** as of June 2018 data
Hospitalization

Hospitalization for Infection

![Graph showing hospitalization rates for various dialysis types over years 2006 to 2015. The graph compares hospitalization days per patient year for All ESRD, Hemodialysis, Peritoneal dialysis, and Transplant patients.]
Mortality

(a) Overall, dialysis, and transplant

Deaths per 1,000 patient years

Year

2001 2003 2005 2007 2009 2011 2013 2015

Overall
Dialysis
Transplant
In-center Hemodialysis Unit

- Add pictures of dialysis unit
Cross-contamination by Staff

1st
- PCT donned glove to answer a machine alarm

2nd
- Touched machine and patient at that station

3rd
- Touched neighboring patients MOUTH and CHIN with the same glove
Cross-Contamination by Patients

1st
• Patient held site with gloved hand

2nd
• Touched the control panel of the scale with the dirty glove

3rd
• Scale control panel not disinfected by staff

4th
• Another patient touched the scale with an ungloved hand
Environmental Disinfection

Dialysis Station Disinfection Tools

Audit Tool: Hemodialysis station routine disinfection observations

C-Diff

Hepatitis B

Hepatitis C

HIV
Association for the Advancement of Medical Instrumentation (AAMI) has established chemical and microbiologic standards for the water used to prepare dialysate

Standards address:

1. Equipment and processes used to purify water for the preparation of dialysate
2. Devices used to store and distribute the purified water to dialysis machines

- Purified through reverse osmosis
- Monthly Cultures drawn
For a standard single-pass HD system running at a dialysate flow rate of 500-600ml/min, how much water is consumed in 1 hour?

30 liters
Higher Patient Acuity

- Reducing hospitalizations and readmissions has lead to “sicker” patients at outpatient dialysis facilities
  - Tracheostomy
  - Wound Vac
  - Ventilator
Staffing Ratios

- No regulatory guidelines have been set by CMS
- Staffing models vary between dialysis providers

- Large dialysis organization
  - 30 stations
    - 2 registered nurse (1:15)
    - 6 technicians (1:5)

- Private dialysis unit
  - 16 stations
    - 2 registered nurses (1:8)
    - 4 technicians (1:4)
Recommended Infection Prevention Practices in Dialysis

How to actively assess infection prevention practices in dialysis
Best Practices

Core Interventions for Dialysis Bloodstream Infections Prevention

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 antisepic 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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Heartland Kidney Network
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
Hand Hygiene Observations

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

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)

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Hand hygiene opportunity</th>
<th>Opportunity successful</th>
<th>Describe any missed attempts (e.g., during medication prep, between patients, after contamination with blood, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-physician</td>
<td>N-nurse</td>
<td>T-technician</td>
<td>S-student</td>
</tr>
</tbody>
</table>

Duration of observation period = _______ minutes
Number of observations = _______
Total number of hand hygiene opportunities observed = _______
Total number of hand hygiene opportunities observed during audit = _______

** See hand hygiene opportunities on back page

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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
# Catheter Tools

**Audit Tool: Catheter connection and disconnection observations**

(Use a "Y" if action performed correctly, a "N" if not performed. If not observed, leave blank)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Observation</th>
<th>Mask worn</th>
<th>Hand hygiene</th>
<th>Hand scrubbed</th>
<th>Wipe site</th>
<th>Wipe hands</th>
<th>Swab</th>
<th>New equipment used</th>
<th>Glove removed</th>
<th>Hand hygiene performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td>Observation</td>
<td>Mask worn</td>
<td>Hand hygiene</td>
<td>Hand scrubbed</td>
<td>Wipe site</td>
<td>Wipe hands</td>
<td>Swab</td>
<td>New equipment used</td>
<td>Glove removed</td>
<td>Hand hygiene performed</td>
</tr>
</tbody>
</table>

**ADDITIONAL COMMENTS/OBSERVATIONS:**

## Catheter Exit Site Care Tools

**Audit Tool: Catheter exit site care observations**

(Use a "Y" if action performed correctly, a "N" if not performed. If not observed, leave blank)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Observation</th>
<th>Mask worn</th>
<th>Hand hygiene</th>
<th>Hand scrubbed</th>
<th>Wipe site</th>
<th>Wipe hands</th>
<th>Swab</th>
<th>Sterile gloves used</th>
<th>Glove removed</th>
<th>Hand hygiene performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td>Observation</td>
<td>Mask worn</td>
<td>Hand hygiene</td>
<td>Hand scrubbed</td>
<td>Wipe site</td>
<td>Wipe hands</td>
<td>Swab</td>
<td>Sterile gloves used</td>
<td>Glove removed</td>
<td>Hand hygiene performed</td>
</tr>
</tbody>
</table>

**ADDITIONAL COMMENTS/OBSERVATIONS:**

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

VIDEO: Preventing Bloodstream Infections in Outpatient Hemodialysis Patients
CDC has created a video for frontline dialysis staff to be used as an educational tool in hemodialysis facilities as orientation for new staff or annual in-service training.
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.
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.
Chlorhexidine for Skin Antisepsis

- Use and alcohol-based chlorhexidine (>0.5%) solution as the first line skin antiseptic agent for central line insertion and during dressing changes.
Scrub catheter hubs with an appropriate antiseptic after cap is removed and before accessing. Perform every time catheter is accessed or disconnected.
Antimicrobial Ointment

- Apply antibiotic ointment or povidone-iodine ointment to catheter exit sites during dressing change

Most controversial of all Core Interventions because of conflicting research

CDC has allowed dialysis facilities to NOT adopt this intervention as long as they do not see an increase in BSI rates
ESRD NCC Learning and Action Network

- LANs are mechanisms by which large scale improvement around a goal is fostered, studied, adapted, rapidly spread and sustained regardless of the change methodology, tools, or time-bounded initiative that is used to achieve the goal.
- LANs engage communities around an action based agenda that gains commitment towards the achievement of person-centered outcome-based goals.

Best practices are shared across all 18 ESRD Networks to engage facilities and help guide the works of the Networks to reach goals.
Tool developed by CDC to assist health departments in assessing infection prevention practices

Topics covered include:

- Hand Hygiene
- Environmental Cleaning
- Healthcare Personnel Safety
- Surveillance and Disease Reporting
- Catheter and other Vascular Access Care
- Injection Safety
# Sepsis Assessment tool

## Outpatient Dialysis Early Warning Screen

### Day 1: Date: ___________ Nurse: ___________

<table>
<thead>
<tr>
<th>Subjective Symptoms - Patient Reported</th>
<th>Score</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
<th>1pt</th>
<th>2pt</th>
<th>3pt</th>
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<tbody>
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<td>Temperature</td>
<td>Yes</td>
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<td>Heart Rate</td>
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<td>Presence of colds or feeling chilled</td>
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### Day 2: Date: ___________ Nurse: ___________

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<th>Subjective Symptoms - Patient Reported</th>
<th>Score</th>
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### Objective Clinical Measures - Nurse Assessed

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### Notes/Action Taken:

- ___________
- ___________
- ___________

## Score Range and Clinical Response

- **Green Zone**: 0-1 No action required
- **Yellow Zone**: 2-3 Contact RN/Patient alert to signs/symptoms observed
- **Red Zone**: ≥3 Schedule same day appointment w/PCP if able or recommend ED for evaluation

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**McLaren Northern Michigan**

[www.Qsource.org](http://www.Qsource.org) | [www.heartlandkidney.org](http://www.heartlandkidney.org)
Tools and Resources Available for Staff and Patient Education
Resources

- CDC Website:
  - Audit tools, procedure checklists, clinician training
- National Coordinating Center
- Forum of ESRD Networks
- Making Dialysis Safer for Patients Coalition
- American Society of Nephrology
- Heartland Kidney Network website
- My Kidney Kit website
Words to Run On …

- Education
- Communication
- Patient Partnership
Questions???

Stephanie Huskey RN, CDN
Quality Improvement Manager
Phone: 816-880-1709
Email: shuskey@nw12.esrd.net