Infection Control
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Objectives
- Define infection control in the hemodialysis clinic
- Detail implementation of the CDC Core Interventions in dialysis facilities
- Distinguish ways to overcome barriers to be successful in decreasing bloodstream infection rates
- Describe ways to move beyond checklists

Infections: A Major Patient Safety Problem in Dialysis
- 2nd Leading Cause of Death

Bloodstream infections (BSIs) are a dangerous complication of hemodialysis. In 2009 the Centers for Disease Control and Prevention (CDC) started the Dialysis BSI Prevention Collaborative. The goal of CDC’s Dialysis BSI Prevention Collaborative is to work together to prevent BSIs in hemodialysis and spur a broader interest in preventing infections among the dialysis community.

Proceedings of “ESRD: Status of the Art and Charting the Challenges for the Future” Boston MA, April 2009, BItz, CAN 2009

The Challenge of the “Perfect Storm” in Hemodialysis
- High risk for spread of bacterial and other pathogens
- Staff caring for multiple patients
- Loss of undertangled blood pressure
- ESRD patients are immunocompromised

Are the odds against Infection Control in HD Patients?
- Infection related hospitalizations in HD patients increased by 34% between 1993 - 2012
  - HD patients are 100 times more likely to acquire an invasive infection caused by MRSA than the general population
  - Average cost of treating a BSI is $24,034/episode

Making Health Care Safer for HD Patients
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1 in 20
41,000
37,000

Vital signs
Making Health Care Safer
Adjusted Rates of Hospitalization for a Primary Diagnosis of Infection in Medicare Patients, Age 66 and Older, by CKD Status and Stage, 2012

<table>
<thead>
<tr>
<th>CKD Status</th>
<th>Stage 1-2</th>
<th>Stage 3</th>
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<tr>
<td>No CKD</td>
<td>56.7</td>
<td>69.5</td>
<td>78.7</td>
<td>78.2</td>
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<tr>
<td>All CKD</td>
<td>79.6</td>
<td>69.5</td>
<td>78.7</td>
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</tbody>
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Per 1000 Patient Years at Risk

Source: USRDS, 2014

Healthcare Providers CONTROL the odds against Infection in HD Patients

Healthcare providers hold the key to infection control by following three simple steps:

1. Prevent infection and transmission by adhering to the basic essentials of infection control procedures (hand hygiene & PPE)
2. Identify and treat infections effectively
3. Surveillance: Antimicrobial stewardship

Infection Control Basics

• Washing your hands is the Single Most Important precaution for preventing infection

• Adequate hand hygiene is:
  ➢ Apply alcohol-based hand rub to cover all hand surfaces, rub to dry OR
  ➢ Wet hands, apply soap to cover all surfaces, rinse-process to take 40-60 seconds

Why Wash Hands?

• Each year poor hand washing affects 1.7 million patients in the United States
• Annual cost of $6.5 billion
• More than 90,000 deaths per year

Your 5 Moments for Hand Hygiene

1. Before touching a patient
2. Before you inject or infuse a medication
3. Before you cannulate a fistula/graft or access a catheter
4. After you touch a patient
5. After you touch blood, body fluids, mucous membranes, wound dressings, or dialysis fluids (e.g., spent dialysate)
6. When moving from a contaminated body site to a clean body site during patient care
7. After touching medical equipment or other items at the dialysis station
8. After glove removal

Remember: perform hand hygiene between each patient or station
How many surfaces do you touch with your hands in a day?

What’s growing on your hands?

- 390 samples taken from hands and phones
- 92% of phones had bacteria on them
- 82% of hands had bacteria on them
- 16% of hands and 16% of phones had E. coli bacteria

Cell phones carry 10 times more bacteria than a toilet seat!

Hand Washing and Computers

- Transmission of bacteria from keyboards to hands increased:
  - 92% for MRSA
  - 50% for VRE
  - 19% for PSAE

(Hand Washing and Computers, 2010)

Why Hand Hygiene & Surface Disinfection Are Vital

<table>
<thead>
<tr>
<th>Organisms remain viable on surfaces for prolonged periods</th>
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<tbody>
<tr>
<td>Hepatitis B</td>
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<tr>
<td>Hepatitis C</td>
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<tr>
<td>Influenza</td>
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<td>MRSA</td>
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<td>VRE</td>
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<tr>
<td>C. Difficile spores</td>
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</table>

Healthcare workers touch as many as 7 surfaces after touching a contaminated one!

Kramer A, Schwebeke I, Kampf G. BMC Infect Dis 6:130, 2006

“SuperBugs”

- MRSA & VRE
- CRE (carbapenem-resistant Enterobacteriaceae)
  - Kill up to half of patients who get BSIs from them
  - These germs have become resistant to almost all antibiotics
- Other Unusual Pathogens
  - CR-P. aeruginosa, CR-A. baumannii;
  - Highly Drug-R Enterobacteriaceae, P. aeruginosa, A. baumannii;
  - Colistin/Polyoxin B-R P. aeruginosa, A. baumannii;
  - Carbapenem-I/R P. aeruginosa, A. baumannii;
  - Daptomycin NS & Linezolid-R Enterococcus spp.
  - Daptomycin NS & Linezolid-R & VI S. aureus
  - VRSA, VRSE

(“SuperBugs”, 2010)

Personal Protective Equipment

- Gloves
- Gowns
- Face shields
- Protective eyewear and masks
PPE Concerns

- Study from Cleveland Veterans Affairs Medical Center reveals PPE can be dangerous to HCWs if not removed properly
- Volunteer HCWs were given a half milliliter of fluorescent lotion that glowed under a black light, rubbed lotion on gloved hands, wiped on gowns, and applied clean gloves
- Average contamination rate after PPE removal was 46%

CDC Press Release 2009

- Total of 33 identified HBV and HCV outbreaks outside of hospitals in 15 states during the past decade
  - 6 in hemodialysis centers
  - patients were exposed because health care personnel failed to follow basic infection control procedures
  - contaminated devices, equipment and surfaces

Common infection control breaches identified during HCV outbreak investigations

1. Failure to change gloves, perform hand hygiene between tasks or patients
2. Inadequate cleaning and disinfection of environmental surfaces between patients, e.g. treatment chair, dialysis machine
3. Clean and contaminated equipment/items stored together
4. Use of mobile cart to transport medications, supplies between patients
5. Preparation of injections in contaminated environment, e.g. at the dialysis station, where blood is being processed
6. Use of medication vials for more than one patient

Sequence for removing PPE

- Gloves
- Face shield or goggles
- Gown
- Mask or respirator

Hepatitis C Virus (HCV) Transmission in HD Units

- "HCV is the most common bloodborne infection among chronic hemodialysis patients in the United States"
- Most likely due to blood contamination of the patient care environment or medical devices, caused by healthcare workers lapses in infection control practices

2016 CDC Health Advisory on Hepatitis C

This is an official CDC HEALTH ADVISORY

Summary

- The Centers for Disease Control and Prevention (CDC) investigated an increased number of reports of newly acquired hepatitis C virus (HCV) infection in patients undergoing hemodialysis dialysis treatments. Infection control lapses in dialysis care were risk factors for patients with HCV. This review of current CDC guidelines to prevent HCV transmission includes recent guidelines for dialysis facilities.

- Patient, healthcare professional, and environmental exposure planning and implementation are key to maintaining infection control standards.

- Follow guidelines for dialysis patients and healthcare professionals to prevent infection transmission and infection control lapses.
Healthcare Workers Thought It Was Clean!

Invisible Blood Stain on Patient Chair's Side Table After Cleaning

"Splash Zone"

- Any items (i.e. Infusion pumps, IV poles, thermometers, medications, tape, etc.) taken to a patient station must be...
  - Discarded
  - Disinfected
  - Designated

Challenges

- Turnover, Turnover, Turnover
- Multiple shifts of patients
- Close proximity of patients in the dialysis environment

Input from Staff during Turnover

When asked how do you feel during turnover, staff replied...
  - "overwhelmed"
  - "pressure from patients"
  - "behind schedule"
  - "need a 5 minute mental break"

How can we stop breaches in infection control practices due to the pressures felt by staff during turnover?

Observations: Environmental Disinfection

Checklist: Dialysis Station Routine Disinfection

For A Safe Beginning: Routine Disinfection of the Dialysis Station

1. No visible blood or bodily fluids on equipment.
2. Check that there is no visible water based on reflex.
3. Never had any equipment to be disinfected.
4. 30% isopropyl alcohol solution.
5. Clean equipment is available from the equipment.
6. Equipment is cleaned after the device is cleaned.
7. Equipment is cleaned after each patient.
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50. Equipment is cleaned after each patient.
Safe Use of Medication Vials

- Prepare all individual patient doses in a clean area away from dialysis stations
- Prepare doses as close as possible to the time of use
- Do not carry medications from station to station
- Do not prepare or store medications at patient stations
- CDC recommends that dialysis facilities:
  - Use single-dose vials whenever possible and dispose of them immediately after use

Implement Evidence-Based Practice

- CDC Core Intervention #7 was implemented for all access care skin antisepsis

"Scrub the Hub"

- CDC Core Intervention #8, "Scrub the Hub" was implemented for catheter connection and disconnection

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.
Impact Quality

• Following CDC protocols cuts BSls in half—32 percent decrease in overall bloodstream infections and a 54 percent decrease in vascular access-related bloodstream infections (ARBSls) after CDC prevention guidelines were used (CDC Press Release, May 2013).
• Since our participation in the CDC Dialysis Collaborative, we have decreased our ARBSls in half as well!

Keep in Mind the Top 7 Citations

Infection control ALWAYS most frequently cited—HUGE opportunities for improvement.

<table>
<thead>
<tr>
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<th>#Cited</th>
<th>Frequency</th>
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<td>7</td>
<td>143</td>
<td>11.1%</td>
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PDQ Data FY 2014: 1,293 recent surveys uploaded

Put on Your Surveyor Hat

• What are surveyors looking for when they visit your clinic?
• What opportunities for improvement do you look for everyday?
• Let’s play...“What’s wrong with this picture?”

What’s wrong with this picture?

• Spilled blood left at the chairside
• Discard of any items with visible blood immediately

What’s wrong with this picture?

• Drawing up medications at the patient station
• Prepare all individual patient medications in a clean area away from dialysis stations
What’s wrong with this picture?

- Next treatment supplies on the machine
- DO NOT bring patient or clean supplies to the dialysis station until all of the steps of disinfection have been completed.

What’s wrong with this picture?

- Contaminated items in a designated "clean" sink
- Contaminated items should be discarded in a designated "dirty" area

What’s wrong with this picture?

- Touching the machine without gloves
- Gloves must be worn when touching potentially contaminated items in the dialysis station

What’s wrong with this picture?

- PPE wasn’t worn during the administration of medications through the extracorporeal circuit
- PPE needs to be worn whenever there is a potential for contact with body fluids, hazardous chemicals, contaminated equipment and environmental surfaces.

What’s wrong with this picture?

- Mask does not cover the nose
- Masks should cover the nose and mouth to prevent exposure from airborne contaminants from staff and patients.
What's wrong with this picture?

- Patient not wearing a glove when holding access site post-treatment
- Patients need to wear a glove when holding their access site post-treatment

What is the purpose of checklists?

- Provides step by step directions to educate staff on the proper order of a procedure
- Orient new employees of the proper steps of dialysis procedures
- Describes the purpose of dialysis procedures with emphasis on infection control
- Develops best practices (i.e. good habits) for all employees

Checklists Serve a Purpose

- The emergency landing on the Hudson River by Captain “Sully” Sullenberger in 2009 was achieved by using airline industry checklists (Downham, 2012).
- Reduces the potential for human error
- Hemodialysis centers participating in the CDC Dialysis Collaborative have decreased ARBSIs by half and have proved to sustain infection reduction by following CDC...

CHECKLISTS!

Moving Beyond the Checklist

Goal of Checklists

- What are organizations expecting when they provide staff with checklists/protocols and procedures?
- Compliance with best practices, right?
- What do staff hear when new checklists/protocols and procedures are introduced?

Outcome of Checklists

- Prevent infections
- Improve patient safety
- Increase patient satisfaction

Ways to Move Beyond the Checklist

- Coming together to be successful with best practices...
- Participate in meetings and discuss barriers with implementing new procedures.
- Ask questions when you don’t understand the purpose or the expected outcome.
- Engage your patients – listen to them!
- Remember why you are here and why you chose to be a healthcare worker...

FOR THE PATIENTS!!!
Summary

• Infection control is necessary in dialysis clinics to prevent infections and improve patient safety.
• A CDC Collaborative Approach with infection prevention strategies helps identify and eliminate challenges with infection prevention in the dialysis environment.
• Implementation of the CDC Core Interventions decreases BSI rates in dialysis facilities.
• Moving beyond the mindset of infection control checklists requires healthcare workers and patients to understand the rationale behind the checklists and work together to achieve them.

When you think of them as...
(Fill in the blank)

... Something amazing happens!

References