ESRD NCC Healthcare-Associated Infection (HAI) Learning and Action Network (LAN) Discovery Event

August 31, 2016
Prevention of Bloodstream Infections in Hemodialysis & the Making Dialysis Safer for Patients Coalition

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August 31, 2016
Outline

- Bloodstream infections (BSI) in hemodialysis patients
- Evolution of CDC bloodstream infection prevention efforts and Core Interventions
- Evidence: outcomes of prevention efforts
- Making Dialysis Safer for Patients Coalition
Bloodstream Infections (BSI) in Hemodialysis Patients
Dialysis and Burden of Bloodstream Infections (BSIs)

- Central line-associated BSIs (CLABSIs)
  - 37,000 estimated in hemodialysis outpatients, 2008
  - 41,000 in all inpatients
  - Attributable mortality: 12-25%
  - Cost: $3,700 - $28,000 per episode

- Bloodstream infections in hemodialysis
  - Potentially decreasing: ~16,000 estimated CLABSIs (30,000 all BSIs) reported to NHSN in 2014
    - Nationwide efforts to prevent BSIs
    - But also, recognized underreporting of ~60%

CDC. MMWR 2011; 60(08);243-248
Invasive Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infections, 2014

- Incidence of invasive MRSA infections\(^1\)
  > 100 X rate in nondialysis population

- Dialysis patients\(^1\)
  - ~0.2% of the U.S. population
  - 14% of all invasive MRSA infections

- Invasive MRSA in dialysis\(^2\)
  - 86% were bloodstream infection (BSI)
  - 90% required hospitalization, mortality = 17%

2. CDC. MMWR 2007; 56(09):197-9
Evolution of CDC Bloodstream Infection Prevention Efforts
State of Evidence and Prevention Efforts

- Data from several sources established that BSIs are an important problem in hemodialysis patients
  - BSI rates and burden estimates from National Healthcare Safety Network (NHSN)
  - Rates of hospital admissions for bacteremia/sepsis from US Renal Data System
  - Disproportionate burden of MRSA infections in dialysis patients, most of which are BSI
- Lots of CLABSI prevention efforts in hospitals
  - No organized BSI prevention efforts in dialysis centers
CDC Dialysis BSI Prevention Collaborative
2009 - 2016

- Collaborative approach to BSI prevention
- Goal to demonstrate preventability
  - Through increased adherence to existing recommendations
- Measure infection rates using NHSN
- Intervention package
  - Based on CDC/HICPAC recommendations
  - Focus on catheter maintenance practices

HICPAC = Healthcare Infection Control Practices Advisory Committee

Set of 9 Interventions

1. Surveillance and feedback using NISN
   - Conduct monthly surveillance for BSI and other dialysis events using CDC's National Healthcare Safety Network (NISN). Calculate facility rates and compare to rates in other NISN facilities. Actively share results with staff, particularly dialysis staff.

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

3. Catheter/vascular access care observations
   - Perform observations of vascular access care and catheter access quarterly. Provide staff adherence to accepted techniques when opening and disconnecting catheters and changing dressing.

4. Staff education and competency
   - Train staff on infection control topics, including access care and patient education.

5. Patient education/engagement
   - Provide standard education to all patients on infection prevention topics including vascular access care, hand hygiene, and patient education.

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

7. Chlorhexidine for skin antiseptic
   - Use an alcohol-based chlorhexidine (e.g., Hibiclens) solution as the first line skin antiseptic agent for central line insertion and during catheter changes.

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

9. Antimicrobial ointment
   - Apply antimicrobial ointment or providone-iodine ointment to catheter exit sites during catheter change.

* Povidone-iodine (preferably with alcohol) or 70% alcohol alternatives for patients with iodine allergies.
** If closed needleless catheter device is used, follow device manufacturer's instructions.

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

Evidence-based CDC recommendations

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

1. Surveillance and feedback using NHSN

Conduct surveillance for BSIs and other dialysis events using CDC’s NHSN

Calculate facility rates and compare to rates in other facilities using NHSN

Actively share results with front-line clinical staff
2. Hand hygiene observations

Perform monthly hand hygiene audits with feedback of results to clinical staff.
3. Catheter care/vascular access care observations

Perform observations of vascular access care and catheter accessing quarterly.

Assess 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 & aseptic technique.**

Perform competency evaluation for skills such as catheter care and accessing every 6-12 months & 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
- Instructions for access management when away from the dialysis unit
6. Catheter reduction

Pursue 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.

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

Povidone-iodine, preferably with alcohol, or 70% alcohol are alternatives for patients with chlorhexidine intolerance.
8. Catheter hub disinfection

Scrub catheter hubs with an appropriate antiseptic after the cap is removed and before accessing.

Perform every time catheter is accessed or disconnected.

If closed needleless connector device is used, disinfect per manufacturer’s instructions.
9. Antimicrobial ointment

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

Triple antibiotic ointment might have similar benefit to bacitracin/gramicidin/polymyxin B

Chlorhexidine-impregnated sponge dressing might be an alternative

* Off-label use

For more information about the Core Interventions for Dialysis Bloodstream Infection (BSI) Prevention, please visit http://www.cdc.gov/dialysis
Evidence
Following CDC Protocols Cuts Dialysis Bloodstream Infections in Half

*CDC provides tools to help all U.S. dialysis facilities reduce potentially deadly infections*

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

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Trends in Access-Related BSIs among 17 Facilities Participating in CDC Collaborative

Intervention implementation

54% decrease
A Single Collaborative Facility in New Jersey

Only 1 ARBSI in 2011

Downham, G. et al. MMWR 2012; 61:169-173
Initial Results

- Relatively rapid reduction
- Individual facility-level improvements
- Limitations
  - Observational, amount of pre-intervention data
  - Generalizability
  - Ability to model vascular access strata-specific rates
Fresenius Catheter Care Study

- Matched cluster-randomized controlled trial
- Implemented & assessed CDC-recommended catheter care practices
  - 2% Chlorhexidine with 70% alcohol for exit site care
  - 70% Alcohol pads for scrubbing end caps and hubs at initiation, termination and any time dialysis lines disconnected
- Facility assignment: 211 intervention group facilities; 211 continued usual care
- Outcomes:
  - 22% reduction in CVC-BSI rates at 3 months; 41% reduction at 1 year
  - 21% reduction in IV antibiotic starts at 3 months
  - 27% reduction in hospitalizations due to sepsis at 1 year

Collaborative Sustainability Assessment

- Assess sustainability of interventions over extended time period, through 48 mos past intervention implementation
- Reduction in all ARBSIs
  - Especially in CVC group
  - Sustained over time

Evidence Summary

- CDC Collaborative – small demonstration project
  - 54% reduction in access-related BSIs
  - Individual facility-level impact
  - Data demonstrating sustainability 48 mos after initial intervention implementation

- FMC Study – large randomized trial
  - 22% reduction in CVC-BSI rates at 3 months; 41% reduction at 1 year
  - Reductions in important, related outcomes
What We Now Know & Other Thoughts about BSI Prevention using CDC Interventions

- BSIs in dialysis patients are preventable
  - There is a lot you can do
  - Catheter care likely to be high impact
  - Improved infection rates can occur relatively rapidly and can be sustained for prolonged time; important secondary benefits for patients

- If you’re not yet doing these things, get on board
  - Many tools and resources, support available

- Engage all staff
  - Should feel connected to infection tracking using NHSN data
  - Involve staff in assessments of practice and coming up with ways to improve
Audit Tools are Part of Prevention Efforts

改善实践

Making Dialysis Safer for Patients Coalition
Making Dialysis Safer for Patients Coalition

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Making Dialysis Safer Coalition Goals

**Improve** adherence to CDC infection prevention recommendations

**Engage** dialysis facilities and other partners to reduce infections

**Empower** dialysis patients and caregivers
Making Dialysis Safer for Patients Coalition

Core
- Technical Consultants
  - Guide, Review, Provide

Partners
- Large Organizations
  - Identify and Address, Disseminate, Adopt, Collaborate

Members
- Clinics, Small Organizations, or Individuals
  - Train, Adopt, Use, Advocate
Coalition Activities

**Provider Activities:**
- Train staff to use all CDC Core Interventions to prevent BSI
- Adopt and implement all CDC interventions
- Use available CDC checklists, audit tools, and conversation starter
- Promote or Incorporate CDC training

**Organizational Activities:**
- Endorse Coalition during launch
- Write and share press releases
- Promote the campaign on your website or homepage
- Host training session, provider webinar, or workshop session
- And More!
Coalition Commitments

- In addition to the recommended activities, Coalition members will be asked to:
  - Participate in periodic calls with CDC staff and other coalition partners to share experiences and learn from other member activities
  - Track coalition participation and activities; periodically provide updates to the CDC Foundation
Benefits to Joining the Coalition

- Access to CDC expertise
- Free dialysis infection prevention materials
- Present at regional and national meetings
- Featured on the CDC Dialysis Safety webpage
- Network with other coalition members
- Get input on challenges from prevention experts
- Chance to help your patients!
Campaign Resources

- Coalition Welcome Kit
- Social Media
- Web Buttons
- CDC Expert Commentaries on Medscape (video)
- Audit Tools and Checklists
- Patient Q & A documents
- Web Resource Center
BSI Prevention Toolkit

All items are available to order or download free of charge

Patient and Staff Education

- Put Together the Pieces to Prevent Infections in Dialysis Patients (Poster and Card / English and Spanish)
- Patient Conversation Starter
- Hemodialysis Central Venous Catheter Scrub-the-Hub Protocol
- Environmental Surface Disinfection in Dialysis Facilities: Notes for Clinical Manager

BSI Prevention Toolkit

All items are available to order or download free of charge

Checklists

- Hemodialysis Catheter Connection Checklist
- Hemodialysis Catheter Disconnection Checklist
- Dialysis Station Routine Disinfection Checklist
- Hemodialysis Catheter Exit Site Care Checklist
- Hemodialysis Injection Safety: Medication Preparation Checklist
- Hemodialysis Injection Safety: Medication Administration Checklist
- Arteriovenous Fistula & Graft Cannulation Checklist
- Arteriovenous Fistula & Graft Decannulation Checklist

BSI Prevention Toolkit

All items are available to order or download free of charge

Audit Tools

- Hand Hygiene Audit Tool
- AV Fistula & Graft Cannulation and Decannulation Audit Tool
- Catheter Connection and Disconnection Audit Tool
- Dialysis Station Routine Disinfection Audit Tool
- Catheter Exit Site Care Audit Tool
- Injection Safety: Medication Preparation & Administration Audit Tool

Next Steps

- Join the coalition by visiting the website:
  - www.cdc.gov/dialysis
  - or emailing: DialysisCoalition@cdc.gov.
For more information, contact CDC
1-800-CDC-INFO (232-4636)

http://www.cdc.gov/dialysis/

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.
For questions, comments, or to join the ESRD NCC HAI LAN Workgroup, contact:

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Thank you!