INFECTIONS IN DIALYSIS UNIT:
The Medical Director and the National Safety Strategy

Annual Dialysis conference, February 10\textsuperscript{th}, 2020

Vikram Aggarwal, MD, FASN
Assistant Professor,
Northwestern University- Feinberg School of Medicine, Chicago, Illinois.
DISCLOSURE

• None
Objectives

• Dialysis infection crisis in USA
• National Safety strategy: Nephrologists Transforming Dialysis Safety project (NDTS)
• Role of Medical Director of dialysis units in prevention of infections
• Infections in home dialysis population (Advancing American Kidney Health & mission of promoting home therapies)
MORTALITY: One Year STD* Death Rates by CVD vs Infection 1996-2014

Incident

19% decline

42% decline

6% decline

Prevalent

CVD 51% decline since 1996

Infection 40% decline since 1996

Peer Report Dialysis Care & Outcomes in the United States, 2014
HOSPITALIZATION RATES FOR ESRD (HD): cause specific (2007-2016)
Total Medicare fee-for-service inpatient spending by cause of hospitalization, 2004-2014

Medicare fee-for-service inpatient spending on infections in dialysis units has nearly doubled since 2004, and is approaching the cost of cardiovascular disease.

Data Source: USRDS ESRD Database. Total Medicare costs from claims data. Abbreviation: ESRD, end-stage renal disease. Unknown hospitalization cost (<0.01%) was combined with ‘Other’.
Morbidity/mortality due to Infections in ESRD

- Infection is the second leading cause of death and the number one cause for hospitalization in patients on dialysis
- 1/3 infection-related hospital discharges lead to readmission/death
- There are more hospital days for infections than for CVD
- The National Healthcare Safety Network (NHSN) reported 29,516 bloodstream infections (BSI) in outpatient hemodialysis centers in 2014 and 77% were considered vascular access–related.
- Nearly 70% of access-related bloodstream infections occurred in patients with a central venous catheter (CVC)

USRD 2018
Nyguen et al, CJASN 2017
Infections in ESRD patients

- Antimicrobial resistance rates are among the highest in patients requiring chronic hemodialysis
- Methicillin-resistant Staphylococcus aureus (MRSA) infections are 100 times more likely in maintenance dialysis patients than in the general US population
- Hemodialysis was associated with 13-fold higher risk of ESBL-producing *Klebsiella pneumoniae* infections

- Hepatitis C infections, 5 times more likely, in maintenance dialysis patients than in the general US population

RPA Project: Nationwide safety/attitude survey of dialysis patients and providers

<table>
<thead>
<tr>
<th>Safety Issues during the Prior 3 Months</th>
<th>Professional Staff Response (%)</th>
<th>Patient Response (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients worried or concerned about safety/staff communication</td>
<td>Patients communicated concerns sometimes or always: 63 Easy to communicate with patients: 94</td>
<td>Sometimes or always worried: 49 Uncomfortable/somewhat uncomfortable communicating with staff: 18</td>
</tr>
<tr>
<td>BP or weight not recorded prior to dialysis</td>
<td>Happened sometimes: 13</td>
<td>Happened sometimes: 10</td>
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<tr>
<td>Mistakes in membrane or bath set up</td>
<td>Happened sometimes: 60</td>
<td>Happened sometimes: 6</td>
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<tr>
<td>Lapses in infection control (hand hygiene)</td>
<td>Reported event occurred: 27</td>
<td>Reported event occurred: 11</td>
</tr>
<tr>
<td>Medication errors</td>
<td>Missed or incorrect dose occurred sometimes: 23</td>
<td>Always discussed all medications with staff: 23</td>
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<tr>
<td>Difficulty with access needles</td>
<td>Rare or no difficulty inserting: 66 Sometimes: 15</td>
<td>Pain at access site during treatment: 39 Sometimes: 23 Reported event occurred: 5</td>
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<tr>
<td>Prolonged access bleeding</td>
<td>Needle dislodgement prior to end of treatment</td>
<td>Reported no events occurred: 73</td>
</tr>
<tr>
<td>Medical mistakes in prior 3 months</td>
<td>Reported no events occurred: 70</td>
<td></td>
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Garrick et al. cJASN 2012
Plight of patients on dialysis!
Dialysis related infections
Initiatives to reduce Infections in ESRD

• CMS lead Fistula first program – 2003
• ESRD Quality Incentive Program (QIP) – 2011
• Accountable Care Organization task force from ASN
• DHHS lead - National Action Plan to Prevent Health Care Associated Infections (HAI) (CDC, CMS,AHRQ)
• National Healthcare Safety Network(NHSN)- platform for HAI reporting for the ESRD Quality Incentive Program
• “Making dialysis safer coalition “ (CDC)
National dialysis infection prevention recommendations:

<table>
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<tr>
<th>CDC 2016 Core Interventions for Bloodstream Infection Prevention</th>
<th>HHS 2013 5-yr National Metrics and Evaluation Targets</th>
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</thead>
<tbody>
<tr>
<td>Decrease catheter prevalence</td>
<td>All bloodstream infections by access type</td>
</tr>
<tr>
<td>Chlorhexidine for catheter site skin antisepsis</td>
<td>Access-related bloodstream infections by type</td>
</tr>
<tr>
<td>Antimicrobial ointment at catheter site</td>
<td>Seasonal influenza vaccine</td>
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<tr>
<td>Catheter and vascular care access observations</td>
<td>NHSN reporting</td>
</tr>
<tr>
<td>Staff education and competency</td>
<td>Catheter use in patients on hemodialysis</td>
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<tr>
<td>Hand hygiene observations</td>
<td>Screening for hepatitis C antibody</td>
</tr>
<tr>
<td>Surveillance and feedback using the NHSN</td>
<td>Hepatitis B vaccine in patients on hemodialysis</td>
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<tr>
<td>Patient education and engagement</td>
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CDC, Centers for Disease Control and Prevention; HHS, Department of Health and Human Services; NHSN, National Healthcare Safety Network.
The Dialysis Infection Crisis in the United States: A Call to Action

In 2016, ASN partnered with the US Centers for Disease Control and Prevention (CDC) to develop the Nephrologists Transforming Dialysis Safety (NTDS) Project to promote infection prevention in outpatient dialysis facilities.

“To enhance the quality of life for people with kidney failure by engaging nephrologists as team leaders in transformational change that continuously improves the safety of life sustaining dialysis”
Key goals of NDTS -

• Promote better *dissemination and implementation* of existing CDC infection control guidelines in dialysis facilities,

• Provide *better education and tools to clinicians and trainees* to stop infections from developing,

• Establish *antibiotic stewardship programs for dialysis facilities*, and

• Develop *stronger ties between nephrologists and HAI experts* at the state and federal levels
NDTS – Role of Nephrologists

• Nephrologists are at the forefront of taking leadership roles in preventing infections, as attending physicians for individual patients and Medical Directors of outpatient HD facilities, with additional management and population healthcare responsibilities.

• Engage nephrologists/ medical directors to target zero infections in hemodialysis facilities

• Develop a systems approach to preventing infections in the HD unit
A systems blueprint for transforming dialysis safety at key levels of leadership

MACRO-SYSTEM
- Business model
- Public policy
- Professionalism

MICRO-SYSTEM
- Operational model
- Facility leadership
- Culture change

Organizational perspective
- Medical directors
- Dialysis middle management

Direct perspective
- Nephrologists
- Dialysis facility staff
- Patients

Strategic perspective
- NTDS-ASN
- Dialysis organizations
- CDC-MDS coalition

Alignment
Systems Approach in implementing National safety strategy –
A TEAM SPORT IN A DIALYSIS UNIT

- Lead by example
- Be aware of CDC tools and recommendations for infection prevention
- Perform and review frequent infection control audits
- Address infection control during monthly QAPI meetings
- Practice hand hygiene

- Practice hand hygiene
- Consistent use of aseptic techniques
- Follow standard infection control precautions
- Scrub-the-Hub
- Clean vascular access site with antiseptic solution before cannulation
- Prepare and administer medications and saline flushes in recommended manner

- Follow recommended catheter care practices at home
- Keep vascular access area clean
- Clean vascular access area on arrival to HD unit
- Observe infection control practices and speak up
- Practice hand hygiene

- Separate room or area for medication preparation
- Clean and disinfect station and equipment between patients
- Follow recommended guidelines for dialyzer re-use

Vijayan et al. cJASN 2018
Various leadership roles

• Leader: A person who sets directions, provides clarity and motivates others to accomplish a mission. Has ability to influence beliefs, emotions and behaviors of followers.

• Designated leader: Acts based on official position and authority.

• Situational leader: Supports designated leaders mission. Actions based on self-initiative and pursuit of common goals.
Medical director

§494.250 Condition: Responsibilities of the dialysis facility medical director
- Delivery of patient care
- Outcomes
- Quality of care

NTDS Webinar, May 23, 2017
<table>
<thead>
<tr>
<th>Table 1. Centers for Medicare &amp; Medicaid Services Conditions for Coverage § 494.150 Condition: Responsibilities of the Medical Director</th>
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<tbody>
<tr>
<td><strong>Medical director responsibilities include, but are not limited to, the following:</strong></td>
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<tr>
<td>(a) Quality assessment and performance improvement program (QAPI)</td>
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<tr>
<td>(b) Staff education, training and performance</td>
</tr>
<tr>
<td>(c) Policies and procedures. The medical director must:</td>
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<tr>
<td>(1) <em>Participate in the development, periodic review and approval of a “patient care policies and procedures manual” for the facility; and</em></td>
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<tr>
<td>(2) <em>Ensure that—</em></td>
</tr>
<tr>
<td>(i) All policies and procedures relative to patient admissions, patient care, infection control, and safety are adhered to by all individuals who treat patients in the facility, including attending physicians and nonphysician providers; and</td>
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<tr>
<td>(ii) The interdisciplinary team adheres to the discharge and transfer policies and procedures specified in § 494.180 (f)</td>
</tr>
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Medical director in dialysis unit

• ROLE MODEL – by practicing hand hygiene and speak up about infection control practices to the staff during rounds

• COLLABORATE - with the nurse manager to perform staff audits of key infection control measures, such as appropriate precautions when accessing the HD catheter and cannulating the vascular access

• ENGAGE/MOTIVATE - their staff/patients in infection control measures and encourage staff/patients to speak up and ask questions without fear of retaliation

• PROMOTE - Antibiotic stewardship – to minimize multi-drug resistant organisms
QAPI – Infection control

• Ensure a philosophy of zero tolerance for infections.
• Monitoring of BSIs, reporting to the NHSN
• Review blood-borne pathogens (e.g., hepatitis B and C) and immunizations
• Use continuous quality improvement activities (PDSA Plan-Do-Study-Act cycle) to conduct root cause analyses and generate action plans to address deficiencies
QAPI – Infection control

A) Analyze and document the incidence of infection to identify trends and establish baseline information on infection incidence

B) Develop recommendations and action plans to minimize infection transmission, promote immunization; and

C) Take actions to reduce future incidents.
CDC Dialysis Infection Prevention Audit Tools


**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
TOGETHER LET’S KEEP DIALYSIS PATIENTS SAFE

DAYS SINCE LAST BLOODSTREAM INFECTION

Our last bloodstream infection was on XX/XX/XXXX

To learn more about dialysis safety, visit www.cdc.gov/dialysis
What is Human Factors?

...discovers and applies information about human behavior, abilities, limitations, and other characteristics to the design of tools, machines, systems, jobs, and environments for productive, safe, comfortable, and effective human use.
Human Factors Areas of Focus

- Interruptions
- Alarms
- Task-Stacking
- Clean vs. Dirty
Mahomes = Medical director
Coach = CDC/Recommendations
Human factors = Players/MD
ENSURE “culture of safety”

Acknowledge the high-risk nature of the activity
Establish safety as a key goal in policies and procedures
Evaluate errors as “system failures,” not as an individual’s failures
Commit needed resources, including time and technology
Recognize that a “safe” environment is not error free
Report “near misses” and events in blame- and retaliation-free environment
Develop processes for peer review and analysis of root cause
Role of effective leader

- Walk the talk
  - Demonstrate behaviors

- Spread the word
  - Communicate expectations

- Foster learning
  - Focus on processes

- Give feedback
  - Positive reinforcement

Image: deming.org accessed April 21, 2017
Nephrologist role to Transform dialysis safety

- Create a vision and purpose
  "Target Zero Infections"

- Make people identify with you
  "Walk the Talk"

- Empower those around you
  "Create Psychological Safety"

- Build your reputation
  "Learn and Give Feedback"

Source: Organizational Behavior in Health Care 2nd ed. By Nancy Borkowski
<table>
<thead>
<tr>
<th>Problem</th>
<th>Linear Thinking</th>
<th>Linear Solution</th>
<th>Unintended Consequence</th>
<th>Systems Thinking</th>
<th>Fundamental Solution</th>
<th>System Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialysis staff members do not reliably follow policies</td>
<td>Staff are poorly trained and educated</td>
<td>Re-educate and retrain staff in infection policies</td>
<td>False security that problem is solved after remediation</td>
<td>Identify the work stressors causing workarounds</td>
<td>Correct workflow problems leading to shortcuts</td>
<td>Human factors designed work processes</td>
</tr>
<tr>
<td>High rate of bloodstream infections</td>
<td>The problem is related to high catheter use</td>
<td>Create vascular access nurse lead to increase AVFs</td>
<td>Failure to recognize other contributors</td>
<td>Perform a broad and thorough root cause analysis</td>
<td>Implement a comprehensive QAPI program</td>
<td>Longitudinal, holistic action and surveillance</td>
</tr>
<tr>
<td>Technician or nurse makes a major error</td>
<td>The employee is a “bad” worker and risk to patients</td>
<td>Discipline or terminate employee</td>
<td>Other staff are afraid to admit or report mistakes</td>
<td>Mistakes are an expected outcome of care</td>
<td>Foster psychologic safety for staff</td>
<td>Mutual trust facilitates earlier error detection</td>
</tr>
<tr>
<td>Employees are not accountable for actions</td>
<td>The facility needs to hire “better” people</td>
<td>Discipline or terminate employee</td>
<td>Skepticism and resentment lead to staff turnover</td>
<td>Accountability is a reflection of leadership</td>
<td>Management models consistent behaviors</td>
<td>Climate of shared responsibility for infections grows</td>
</tr>
</tbody>
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Wong cJAN 2018
Infection challenges in Home dialysis – NDTS approach

• PD: ISPD guidelines for peritonitis

• HHD
  - Need protocols to manage infections in HHD patients
  - Management of button-holes and infectious concerns
CASE : HHD CLABSI
REFERENCES

• https://www.asn-online.org/ntds/
• https://www.cdc.gov/dialysis/prevention-tools/audit-tools.html
• https://asn-ccast.echo360.org/media-player.aspx/30/206/1189/6619