Find required training, as well as enrollment and reporting resources on the Dialysis Event Homepage:
http://www.cdc.gov/nhsn/psc_da_de.html
NHSN Dialysis Event Homepage
http://www.cdc.gov/nhsn/psc_da_de.html

Dialysis Events

Dialysis Infections

A leading cause of death among hemodialysis patients, second only to vascular disease, bloodstream and other types of infections are a significant threat to patient safety. CDC helps the dialysis community prevent infections by providing evidence-based guidelines and access to the National Healthcare Safety Network (NHSN), a surveillance system that allows facilities to track infections. These resources are critical for tracking and preventing infections and for evaluating the effectiveness of a specific infection prevention effort.

In 2008, CDC estimated that 37,000 bloodstream infections occurred among hemodialysis patients with central lines. One in four of these infected patients may have died as a result of the infection. Since 1993, hospitalization rates among hemodialysis
Objectives

- Describe the Dialysis Event Protocol
- Review each reporting requirement, including definitions and instructions for completing forms
- Review examples of how the definitions and instructions are applied for reporting
- Introduce NHSN reports to look at data
- How to meet CMS ESRD QIP NHSN Reporting Measure requirements
NHSN SURVEILLANCE
National Healthcare Safety Network

- NHSN is the National Healthcare Safety Network
- It is a secure, internet-based surveillance system
- Public Health Surveillance is the ongoing, systematic collection, analysis, interpretation, and dissemination of data regarding health-related events for use in public health action to reduce morbidity and mortality and improve health
Why perform dialysis surveillance?

- In 2008, more than 350,000 patients were treated with chronic hemodialysis in the U.S.

- Bloodstream infections and localized vascular access infections cause substantial morbidity
  - A CDC report estimates 37,000 bloodstream infections occurred among hemodialysis patients with central lines in 2008
  - Often involve drug-resistant bacteria

- Need to identify and implement best practices for dialysis
  - Requires data for evaluation
Why perform dialysis surveillance?

- Surveillance requires the use of specific instructions and definitions so that data are collected uniformly.

- This allows dialysis facilities to:
  - Make meaningful comparisons
    - between facilities (aggregated)
    - within the facility (over time)
  - Evaluate interventions
  - Identify problems
  - Engage staff by providing regular & consistent feedback
Surveillance as an Intervention

- Dialysis unit in London implemented CDC dialysis surveillance; described their experience over 18 months

- Without any other intervention, tracking rates and feeding back data to staff resulted in reductions in:
  - Access-related bloodstream infection
  - Antibiotic usage

- “Surveillance raised awareness and provided a cornerstone for improved infection control and line care involving all staff of the dialysis unit.”

DIALYSIS EVENT PROTOCOL
Read the Dialysis Event Protocol

- The Dialysis Event Protocol is a document that provides instructions for reporting.

- All users are required to read the Dialysis Event Protocol to become familiar with instructions, definitions and procedures.
Data Reporting Requirements

1. **Outpatient Dialysis Center Practices Survey**
   - Completed upon enrollment and annually thereafter

2. **Monthly Reporting Plan**
   - Indicate what NHSN surveillance your facility will do each month

3. **Denominators for Outpatient Dialysis form**
   - Completed once monthly

4. **Dialysis Event form**
   - Completed monthly, one for each dialysis event that occurs
Outpatient Dialysis Center Practices Survey

- Completed during enrollment in NHSN and annually thereafter
- Survey includes questions about staff and patients during the first week of January
  - It is recommended to complete the survey in January each year
  - Surveys must be completed by April 1

- Print from the Dialysis Event homepage:
  http://www.cdc.gov/nhsn/forms/57.104_PSOutptDialysisSurv_BLANK.pdf
Data Reporting Requirements

1. **Outpatient Dialysis Center Practices Survey**
   - Completed upon enrollment and annually thereafter

2. **Monthly Reporting Plan**
   - Indicate what NHSN surveillance your facility will do each month

3. **Denominators for Outpatient Dialysis form**
   - Completed once monthly

4. **Dialysis Event form**
   - Completed monthly, one for each dialysis event that occurs
Monthly Reporting Plan

- Indicates what Patient Safety Component surveillance modules your facility intends to do:
  - Device-Associated Module >> Dialysis Event “DE”

- If not doing surveillance for a specific month, select ‘No NHSN Patient Safety Modules Followed this Month’ on the Monthly Reporting Plan

- You can submit up to one year of Monthly Reporting Plans in advance
Choose only if your facility is NOT doing any surveillance this month.
Data Reporting Requirements

1. **Outpatient Dialysis Center Practices Survey**
   - Completed upon enrollment and annually thereafter

2. **Monthly Reporting Plan**
   - Indicate what NHSN surveillance your facility will do each month

3. **Denominators for Outpatient Dialysis form**
   - Completed once monthly

4. **Dialysis Event form**
   - Completed monthly, one for each dialysis event that occurs
Infection Risk by Vascular Access

- Risk of infection varies by vascular access type:
  - **LOW RISK**
    - Arteriovenous fistulas
    - Arteriovenous grafts
    - Other access devices (e.g., hybrids)
    - Tunneled central lines
  - **HIGH RISK**
    - Nontunneled central lines

- NHSN data are stratified by vascular access type
Vascular Access Definitions

- **Fistula**: a surgically created direct connection between an artery and a vein to provide vascular access.

- **Graft**: a surgically created connection between an artery and a vein using implanted synthetic tubing for the purpose to provide a permanent vascular access.

- **Tunneled Central Line**: a central venous catheter that travels a distance under the skin from the point of insertion before terminating at or close to the heart or one of the great vessels.

- **Nontunneled Central Line**: a central venous catheter that travels directly from the skin entry site to a vein and terminates close to the heart or one of the great vessels, typically intended for short term use.

- **Other Access Device**: includes hybrid access devices (e.g., HeRO® vascular access device), ports, and any other central vascular access devices not meeting the above definitions.

Use of trade names and commercial sources is for identification only and does not imply endorsement.
Denominators for Outpatient Dialysis Form

- Report all maintenance hemodialysis outpatients treated at your facility on the first 2 working days of the month, stratified by 5 vascular access types
  - Include transient patients

- Count each patient only once:
  - If they have more than 1 vascular access, count that patient under their highest infection risk access only
  - Consider ALL vascular accesses present, not just those being used for dialysis
  - If a patient is present on both working days (e.g., for a make-up appointment) do not count them twice

- Complete this form once per month
Data Reporting Requirements

1. **Outpatient Dialysis Center Practices Survey**
   - Completed upon enrollment and annually thereafter

2. **Monthly Reporting Plan**
   - Indicate what NHSN surveillance your facility will do each month

3. **Denominators for Outpatient Dialysis form**
   - Completed once monthly

4. **Dialysis Event form**
   - Completed monthly, one for each dialysis event that occurs
Dialysis Event Form

- Monitor all maintenance hemodialysis outpatients who are treated at your facility at any time during the month for dialysis events:
  - IV antimicrobial start
  - Positive blood culture
  - Pus, redness, or increased swelling at the vascular access site

- Any patient who receives maintenance hemodialysis treatment at your facility is included in dialysis event reporting:
  - Even if they were not counted on the denominator form
  - Include transient patients who have a dialysis event while receiving hemodialysis treatment at your facility
Dialysis Event Form

- Patient demographics
- Risk Factors
- Other Patient Information
- Dialysis Event type(s) & details
- Problems
- Outcomes
<table>
<thead>
<tr>
<th>Dialysis Event</th>
<th>Date Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV antimicrobial start</td>
<td>Date of first outpatient administration</td>
</tr>
<tr>
<td>Positive blood culture</td>
<td>Date specimen was collected</td>
</tr>
<tr>
<td>Pus, redness, or increased swelling at vascular access site</td>
<td>Sign/symptom onset date</td>
</tr>
<tr>
<td>Combination</td>
<td>Earliest date of the three types</td>
</tr>
</tbody>
</table>
Dialysis Event Type: IV Antimicrobial Start

- Report all outpatient intravenous antibiotic and antifungal starts regardless of the reason for treatment and regardless of duration of treatment
  - Include starts unrelated to vascular access problems
  - Report all IV antibiotic starts, not just vancomycin
  - Do not report IV antiviral starts
  - Report outpatient starts that are continuations of inpatient treatment

- IV antimicrobials must be stopped for 21 or more days and then restarted to be considered a new event
  - If IV antimicrobials are stopped for < 21 days it is still the same event
Dialysis Event Type: Positive Blood Culture

- Report all positive blood cultures collected as an outpatient or collected within 1 calendar day after a hospital admission
  - Even if the patient does not receive treatment
  - Even if the infection is not related to dialysis treatment
  - The date of a blood culture result is based on the date the blood specimen was collected

- If the patient has more than 1 positive blood culture, they must be 21 or more days apart to be considered separate dialysis events
  - Add new organisms from subsequent positive blood cultures that occur within 21 days to the first report
Suspected Source of Positive Blood Culture

- **“Vascular access”** if there is objective evidence of vascular access infection and it is thought to be the source
- **“A source other than the vascular access”** if another source is thought to be the source and either:
  - culture from another site has the same organism as the blood
  - clinical evidence of infection at the site, but site is not cultured
- **“Contamination”** if organism is thought by the physician, infection preventionist, or nurse manager to be a contaminant
- **“Uncertain”** only if there is insufficient evidence to decide among the 3 previous categories
Positive Blood Culture Microorganisms

- For each positive blood culture, report the microorganism(s) identified
  - Suggestion: attach microbiology lab report to paper form

- List up to 3 microorganisms (in order of importance)
  - Usually order of importance is indicated on the laboratory report

- For each microorganism, include antimicrobial susceptibility information
  - i.e., susceptible, resistant, intermediate, or not tested
  - Only certain bug/drug combinations are required
Dialysis Event Type: Pus, Redness or Increased Swelling at the Vascular Access Site

- Report each new outpatient episode of one or more symptoms of pus, greater than expected redness or greater than expected swelling at a vascular access site
  - Even if the patient does not receive treatment
  - Always report pus
  - Report redness or swelling if they are more than expected and suspicious for infection at the time of onset

- There must be 21 or more days between the onset of the first episode and the onset of a second episode of pus, redness, or increased swelling to be considered separate dialysis events
Dialysis Event Problems & Outcomes

- Specify problems associated with the dialysis event
  - Fever, chills or rigors, drop in blood pressure
  - Wound (not related to the vascular access) with pus or increased redness
  - Cellulitis
  - Pneumonia or respiratory infection
  - Other problem

- Specify outcomes associated with either the dialysis event or problems
  - Hospitalization
  - Death
Dialysis Event Combinations

1 Dialysis Event report may have multiple parts, combining:
- IV antimicrobial start
- Positive blood culture
- Pus, redness or increased swelling at vascular access site

For example, if a positive blood culture is the reason that a patient is treated with IV antimicrobials, this is part of the same group of events and they are reported together.
21 Day Rule

- There must be 21 or more days between dialysis events of the same type

- Purpose of the rule is prevent over-reporting of what is likely the same patient problem
21 Day Rule Example

- A patient has two positive blood cultures within 21 days as a result of a bloodstream infection on January 1st and January 9th
  - Report 1 dialysis event
  - Event date is January 1st

- The patient has a third positive blood culture on February 20th
  - Report a second dialysis event
  - Because event date of this new positive blood culture is 21 or more days after the last reported positive blood culture
Reporting Zero Dialysis Events

- If no dialysis events occurred during a month, select “Report No Events” on the Denominators for Outpatient Dialysis form in NHSN
  - No IV antimicrobial starts
  - No positive blood cultures
  - No pus, redness, or swelling at the vascular access site

- The denominator (patient census information) is still reported for that month
Select "Report No Events" to report zero dialysis events for the month.
DIALYSIS EVENT EXAMPLES
**Dialysis Event Case Examples**

<table>
<thead>
<tr>
<th>Case 1</th>
<th>Case 2</th>
</tr>
</thead>
</table>
| - Patient completes 1 week IV antimicrobials  
- 4 weeks after first treatment ends, IV antimicrobials are restarted | - Patient completes 1 week IV antimicrobials  
- 2 weeks after first treatment ends, IV antimicrobials are restarted |
| **REPORT:** 2 separate IV antimicrobial start dialysis events | **REPORT:** 1 IV antimicrobial start dialysis event |
| **WHY?** There is ≥ 21 days between IV antimicrobial starts | **WHY?** There is < 21 days between IV antimicrobial starts |
### Dialysis Event Case Examples continued

<table>
<thead>
<tr>
<th>Case 3</th>
<th>Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Patient has redness and swelling at vascular access site</td>
<td>- Patient has redness and swelling at vascular access site for 4 days</td>
</tr>
<tr>
<td>- As a result, doctor prescribes IV antimicrobials</td>
<td>- Symptoms resolve on their own, then recur 10 days later</td>
</tr>
<tr>
<td><strong>REPORT:</strong> 1 pus, redness or swelling at vascular access site dialysis event, includes IV antimicrobial start</td>
<td><strong>REPORT:</strong> 1 pus, redness or increased swelling at vascular access site dialysis event</td>
</tr>
<tr>
<td><strong>WHY?</strong> IV antimicrobials were started because of redness and swelling, they are clearly related</td>
<td><strong>WHY?</strong> Symptom recurrence was within 21 days of the first onset</td>
</tr>
</tbody>
</table>
### Dialysis Event Case Examples continued

- **Patient has symptoms of a bloodstream infection:**

<table>
<thead>
<tr>
<th>Case 5</th>
<th>Case 6</th>
</tr>
</thead>
</table>
| ▪ Blood is drawn on Monday  
  ▪ Tuesday: IV antimicrobial start  
  ▪ Wednesday: blood culture results are positive | ▪ Patient is hospitalized  
  ▪ 4 hours after admission, blood is drawn, culture results are positive next day |

**REPORT:** 1 Dialysis Event, with positive blood culture and includes IV antimicrobial start

**WHY?** Blood was drawn before antimicrobials started, both relate to same infection

**REPORT:** 1 positive blood culture Dialysis Event, with hospitalization outcome

**WHY?** PBC sample was drawn within a day of admission. Both relate to same infection.
# Dialysis Event Case Examples continued

## Case 7

- Patient’s vascular access site has pus, redness and swelling
- Blood culture grows *Staphylococcus aureus*

**REPORT:** Pus, redness, or increased swelling at the vascular access site Dialysis Event with positive blood culture

**PBC suspected source:** vascular access

**WHY?** There is objective evidence of infection at vascular access site
<table>
<thead>
<tr>
<th>Case 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Patient’s vascular access site has pus, redness and swelling</td>
</tr>
<tr>
<td>▪ Blood culture grows <em>Staphylococcus aureus</em></td>
</tr>
<tr>
<td>▪ Visibly infected leg wound grows <em>Enterococcus</em></td>
</tr>
</tbody>
</table>

**REPORT:** Pus, redness, or increased swelling at vascular access site Dialysis Event with positive blood culture

**PBC suspected source:** vascular access

**WHY?** Objective evidence of infection at vascular access site exists. Different organisms in blood & wound: cannot attribute positive blood culture to a ‘source other than vascular access’
## Dialysis Event Case Examples continued

### Case 9

- Patient’s leg wound has pus, redness and swelling
- Vascular access looks normal
- Wound culture: *Staphylococcus aureus*
- Blood culture: *Staphylococcus aureus*

**REPORT:** Positive blood culture

**Suspected source:** A source other than vascular access site

**WHY?** Evidence of infection at wound site, no evidence at vascular access site. Both wound and blood grow same organism.
REPORT: Positive blood culture
Suspected source: contamination

WHY? Only 1 of 2 blood draws was positive & it was a common skin organism. Doctor was asked for interpretation and indicated the positive was the result of contamination.
RUN REPORTS
Dialysis Event Surveillance

- With NHSN, dialysis facilities can:
  - Calculate risk-stratified dialysis event rates (e.g., vascular access infections)
  - Benchmark against all NHSN facilities reporting dialysis events
  - Use a variety of reports to inform quality improvement decisions

\[
\text{Rate} = \frac{\text{Dialysis Events (numerator)}}{\text{Patient Census (denominator)}} \times 100
\]
Create Reports

- Experiment with the analysis function – you can’t break anything!
- Allow pop-ups from http://*.cdc.gov
- To create reports:
  1. Generate new data sets
  2. Select a report (“output option”) from the list of templates
     - Modify the report, if desired
  3. Press “Run” button to create the report
Review Your Data

- Monthly review is recommended to:
  - Ensure all data have been reported and are accurate

- Review of quarterly data is recommended to:
  - Detect problems in your facility
  - Provide feedback to your staff
  - Get staff engaged in quality improvement

- Better understand your facility’s performance by comparing your facility’s rates against NHSN aggregate rates
Act on Your Data

- Get the most benefit by acting on the data
- Recognize areas for improvement and set measurable goals
- Provide feedback to frontline staff
  - Inspire staff engagement in preventing vascular access infections
- Continue NHSN surveillance, monitor for changes in performance
CREATE A SYSTEM TO COLLECT DATA
Data Collection

- All resources are available on the public NHSN website: www.cdc.gov/nhsn/
  - Protocol & forms

Data Reporting

- The NHSN application is accessed through a secure website: https://sdn.cdc.gov
  - Data entry/reporting
Data Collection System

- Determine how will you capture all dialysis events:
  - IV antimicrobial starts
  - Positive blood cultures
  - Onsets of pus, redness or increased swelling at the vascular access site
  - And problem and outcome information for the form

- If frontline staff are aware of the dialysis event definitions, they can inform the primary data collector/reporter when an event occurs

- Follow-up on hospitalizations to determine if a positive blood culture resulted from a specimen collected within 1 calendar day after admission
CMS ESRD QIP NHSN Reporting Measure 2012

- Complete required training
- Enroll facility in NHSN
- Report a minimum of 3 consecutive months of data as defined by the Dialysis Event Protocol:
  - Annual dialysis practices survey
  - Monthly Reporting Plan with “DE” selected
  - Dialysis denominator reported – patient census information
  - Dialysis numerator reported – at least one dialysis event reported or “Report No Events” to indicate numerator is zero
NHSN Changes & Updates

- NHSN changes & updates occur periodically
  - Reflect changes in healthcare
  - Web improvements

- Changes are communicated via email & NHSN newsletter

- Dialysis Event Homepage is updated with revised protocol, forms, instructions as needed
Help Resources

- Refer to the Protocol and Tables of Instructions
  - These can be found along with other reporting resources on the Dialysis Event Homepage
    http://www.cdc.gov/nhsn/psc_da_de.html

- Use the “Help” link to search the NHSN Online Manual

- Ask the NHSN Helpdesk at nhsn@cdc.gov
Summary

- NHSN is a secure, internet-based surveillance system
- Surveillance improves outcomes
- Data must be collected in a standardized way – as described by the Dialysis Event Protocol
Summary

- **Reporting requirements**
  - Once a year – dialysis practices survey
  - Once a month – reporting plan, patient census, & dialysis events:
    - IV antimicrobial starts
    - Positive blood cultures
    - Pus, redness or swelling at the vascular access site

- Report 3 or more consecutive months of 2012 data as described by the Dialysis Event Protocol to meet the CMS ESRD QIP Rule NHSN Reporting Measure
Summary

- Reports
  - Generally analyses focus on generating rates (events/census)
  - Create reports – experiment with Analysis!
  - Review the reports
  - Provide feedback and act on the information
NHSN Helpdesk email: nhsn@cdc.gov

Dialysis Event Homepage: http://www.cdc.gov/nhsn/psc_da_de.html

For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348
E-mail: cdcinfo@cdc.gov  Web: www.cdc.gov