NHSN Dialysis Event Surveillance: Improving and Using Data for Infection Monitoring

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Outline

- **Review common causes of poor data quality and how to avoid them**
- **Review monthly Dialysis Event Surveillance reporting criteria**
  - How to apply the protocol to various reporting examples
  - Emphasis on most challenging areas
- **Introduction to NHSN analysis and reports**
- **How to interpret NHSN rate tables to assess facility infection prevention performance**

CAUSES OF COMMON DIALYSIS EVENT DATA ERRORS & STRATEGIES TO AVOID THEM

Common Causes of Poor Dialysis Event Surveillance Data Quality

- Person collecting, reporting and/or reviewing data is not familiar with or misunderstands the Dialysis Event Protocol
- Problems with data collection processes
- Lack of data quality checks

Strategies to Prevent Reporting Errors

- ✓ Acquire knowledge and understanding of the Protocol
- ✓ Implement data collection processes to capture necessary surveillance data
- ✓ Review reported data for completeness and accuracy

DIALYSIS EVENT PROTOCOL

Strategies to Prevent Reporting Errors

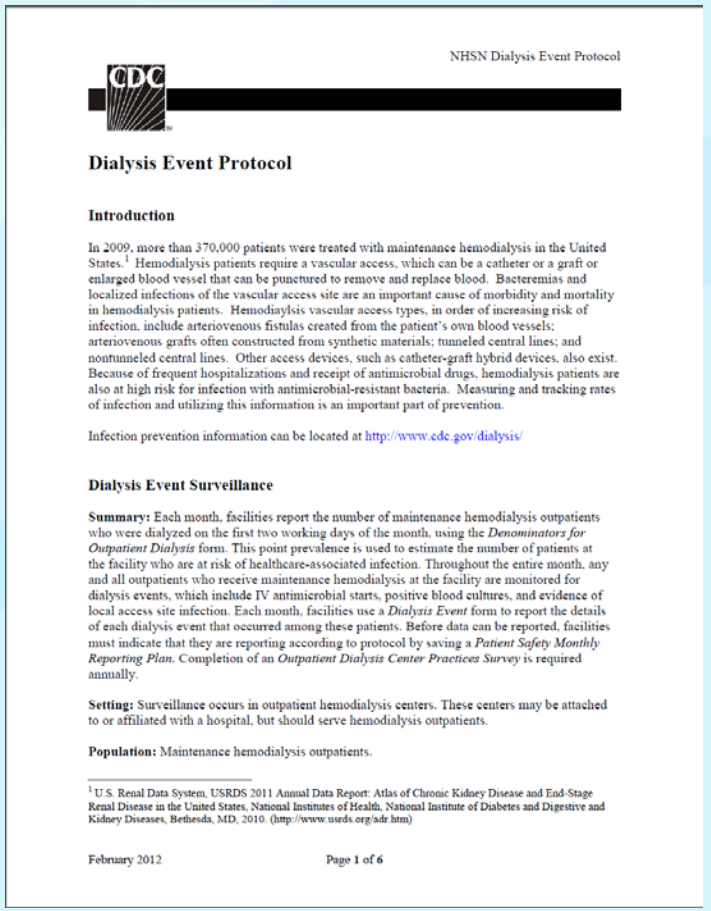
- ✓ **Acquire knowledge and understanding of the Protocol**
- ✓ **Implement data collection processes to capture necessary surveillance data**
- ✓ **Review reported data for completeness and accuracy**

Training

- **All staff involved in data collection or reporting should complete training annually and as needed**
- **Required reading: Dialysis Event Protocol**
  - Includes surveillance definitions and reporting Instructions: http://www.cdc.gov/nhsn/dialysis/dialysis-event.html
- **Self-paced, online instruction: Dialysis Event Surveillance Training**

Required Reading: Dialysis Event Protocol

- The Dialysis Event Protocol is a document that provides instructions for reporting in NHSN
- All users must read the Dialysis Event Protocol to become familiar with instructions, definitions and procedures



NHSN Dialysis Event Protocol

Dialysis Event Protocol

Introduction

In 2009, more than 370,000 patients were treated with maintenance hemodialysis in the United States.[1] Hemodialysis patients require a vascular access, which can be a catheter or a graft or enlarged blood vessel that can be punctured to remove and replace blood. Bacteremias and localized infections of the vascular access site are an important cause of morbidity and mortality in hemodialysis patients. Hemodialysis vascular access types, in order of increasing risk of infection, include arteriovenous fistulas created from the patient's own blood vessels; arteriovenous grafts often constructed from synthetic materials; tunneled central lines; and nontunneled central lines. Other access devices, such as catheter-graft hybrid devices, also exist. Because of frequent hospitalizations and receipt of antimicrobial drugs, hemodialysis patients are also at high risk for infection with antimicrobial-resistant bacteria. Measuring and tracking rates of infection and utilizing this information is an important part of prevention.

Infection prevention information can be located at http://www.cdc.gov/dialysis/

Dialysis Event Surveillance

Summary: Each month, facilities report the number of maintenance hemodialysis outpatients who were dialyzed on the first two working days of the month, using the *Denominators for Outpatient Dialysis* form. This point prevalence is used to estimate the number of patients at the facility who are at risk of healthcare-associated infection. Throughout the entire month, any and all outpatients who receive maintenance hemodialysis at the facility are monitored for dialysis events, which include IV antimicrobial starts, positive blood cultures, and evidence of local access site infection. Each month, facilities use a *Dialysis Event* form to report the details of each dialysis event that occurred among these patients. Before data can be reported, facilities must indicate that they are reporting according to protocol by saving a *Patient Safety Monthly Reporting Plan*. Completion of an *Outpatient Dialysis Center Practices Survey* is required annually.

Setting: Surveillance occurs in outpatient hemodialysis centers. These centers may be attached to or affiliated with a hospital, but should serve hemodialysis outpatients.

Population: Maintenance hemodialysis outpatients.

[1] U.S. Renal Data System, USRDS 2011 Annual Data Report: Atlas of Chronic Kidney Disease and End-Stage Renal Disease in the United States, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, Bethesda, MD, 2010. (http://www.usrds.org/adr.htm)

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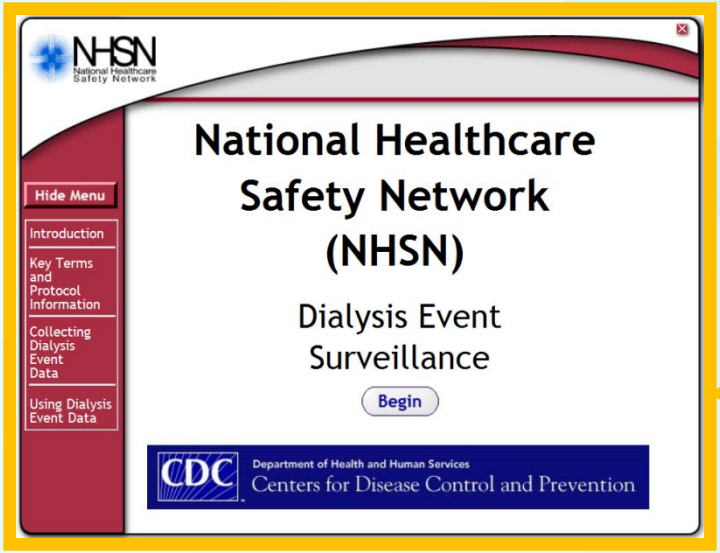
http://www.cdc.gov/nhsn/PDFs/pscManual/8pscDialysisEventcurrent.pdf

Training

- **New! Self-paced, online instruction: Dialysis Event Surveillance Training**
  - Includes knowledge checks and ends with a multiple-choice test
  - Dialysis Event Training Page:
    http://www.cdc.gov/nhsn/dialysis/dialysis-event.html#train



Free Continuing Education Credit!

- **1.3 CNE (nurses)**
- **1.5 CME (physicians)**
- **0.1 CEU (other)**

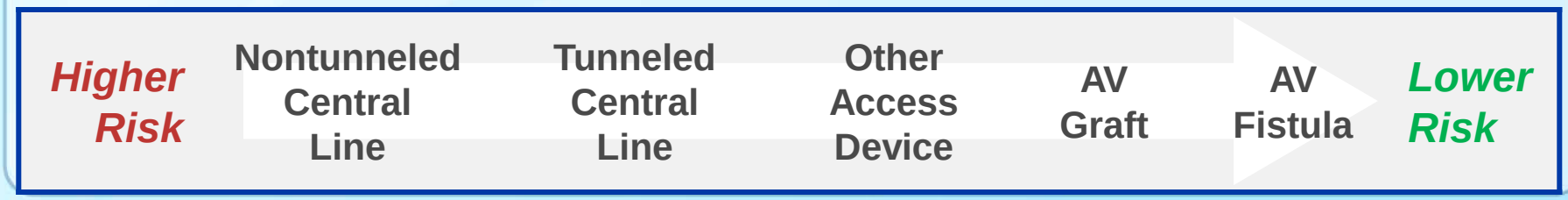
Protocol Terminology and Components of a Rate

- ***Numerator*** **= number of dialysis events**
  - Information from “Dialysis Event” form
- ***Denominator*** **= count of patients by vascular access type used to estimated number of patient-months considered at risk for dialysis events**
  - Information from “Denominators for Outpatient Dialysis” form
- $$\textit{Rate} = \frac{\text{Dialysis Events (numerator)}}{\text{Patient-Months (denominator)}} \times 100$$
- **Both numerator and denominator data must be correct to calculate valid rates**

DE PROTOCOL: DENOMINATORS

Protocol: Report Denominator Data Monthly

- **Each month, report the number of hemodialysis outpatients by vascular access type who received hemodialysis at the center during the first two working days of the month.**
  - Report all hemodialysis outpatients, including transient patients.
  - Exclude non-hemodialysis patients and exclude inpatients.
- **Count each patient only once by vascular access type; if the patient has multiple vascular accesses, report only the vascular access with the highest risk of infection.**
  - This may not be the vascular access currently in use for dialysis.



“Working Days”

- Working days are days hemodialysis treatment occurs at the facility.
- The first two “working days” of the month should provide the opportunity to capture all regularly scheduled hemodialysis shifts and patients.
- Remember to count each patient only once!

Working Day Examples

- A facility dialyzes patients 6 days a week, Mon-Sat. If the 1st day of the month is a Sunday, then Mon/Tues are the 1st two "working days" of the month.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 Closed	2 **Working Day 1**	3 **Working Day 2**	4	5	6	7

- A facility dialyzes patients Mon/Wed/Sat, and a nocturnal only shift on Sunday. If the 1st day of the month is a Sunday, then Mon/Wed are the 1st two "working days" of the month.

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1 Nocturnal Only	2 **Working Day 1**	3 Closed	4 **Working Day 2**	5 Closed	6	7

Count each patient only once.

Protocol: Report Denominator Data Monthly

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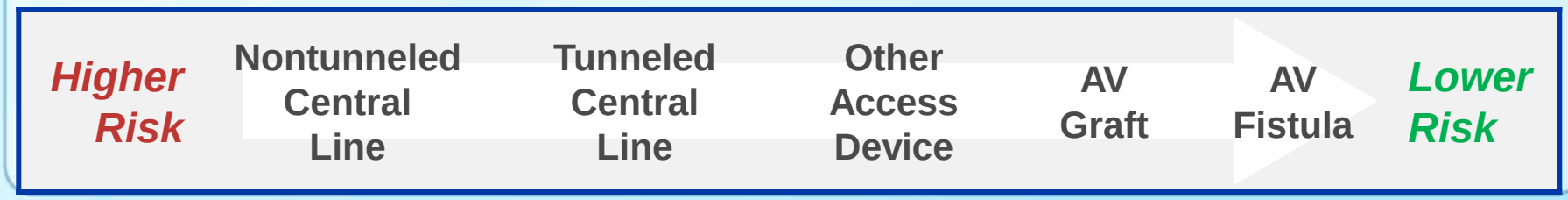

Refer to Protocol for Vascular Access Definitions

- **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.
- **Tunneled central line:** a central venous catheter that travels a distance under the skin from the point of insertion before entering a vein, and terminates at or close to the heart or one of the great vessels
  - E.g., Hickman® or Broviac® catheters*
- **Graft:** a surgically created connection between an artery and a vein using implanted material (typically synthetic tubing) to provide a permanent vascular access for hemodialysis.
- **Fistula:** a surgically created direct connection between an artery and a vein to provide vascular access for hemodialysis.
- **Other access device:** includes catheter-graft hybrid access devices (e.g., HeRO® vascular access device*), ports, and any other vascular access devices that do not meet the above definitions.

*Use of trade names and commercial sources is for identification only and does not imply endorsement.

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  - E.g., Hickman
- **Graft:** a surgic a vein using implanted mate anent vascular acces
- **Fistula:** a surg ery and a vein to provide
- **Other access** devices (e.g., HeRO® vascular access device*), ports, and any other vascular access devices that do not meet the above definitions.

Consider all vascular accesses present, even if they are not used for dialysis, and even if they are abandoned/non-functional.

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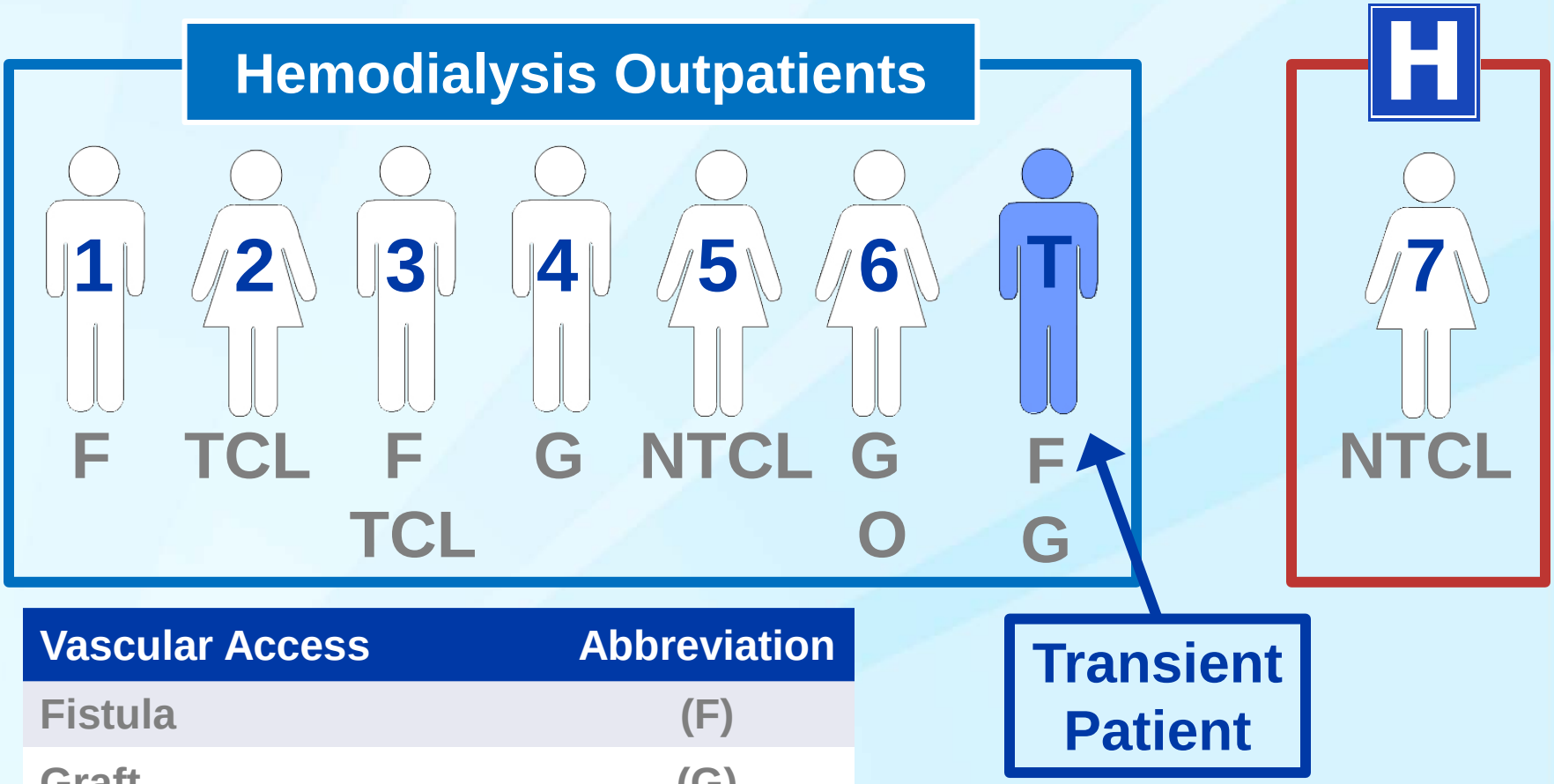
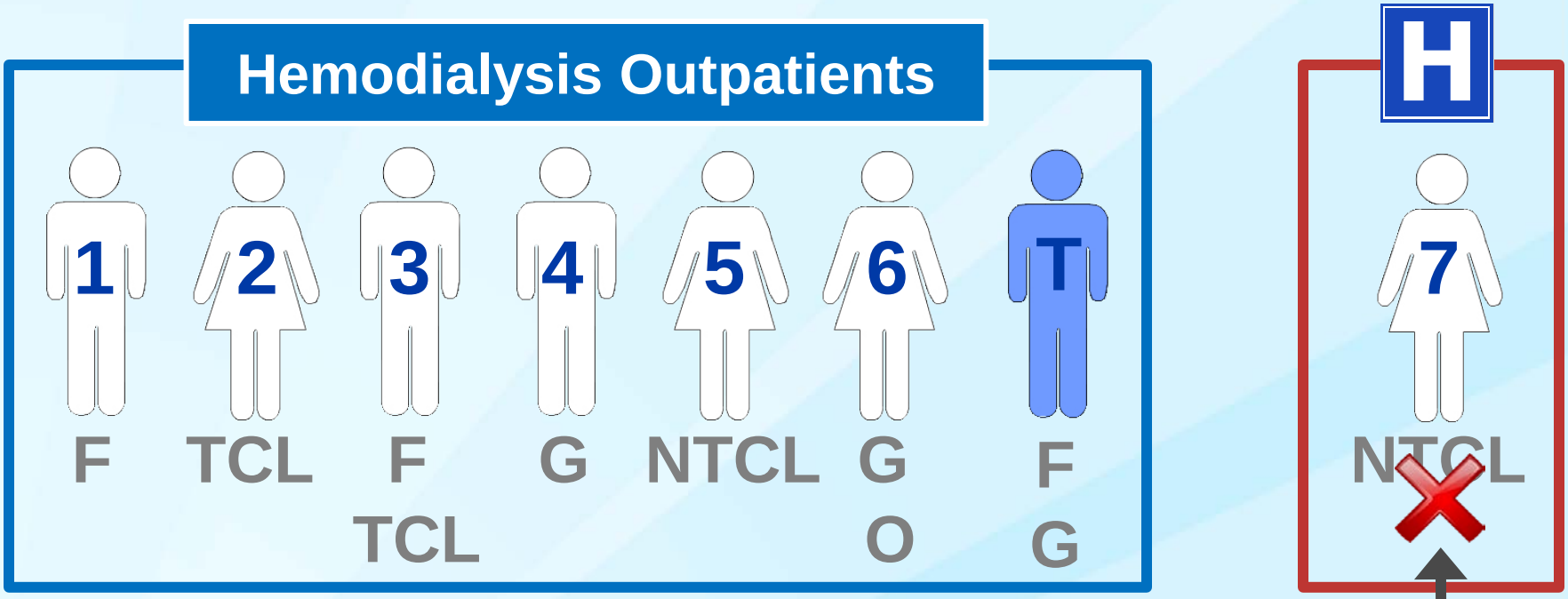
Denominator Data Collection Example



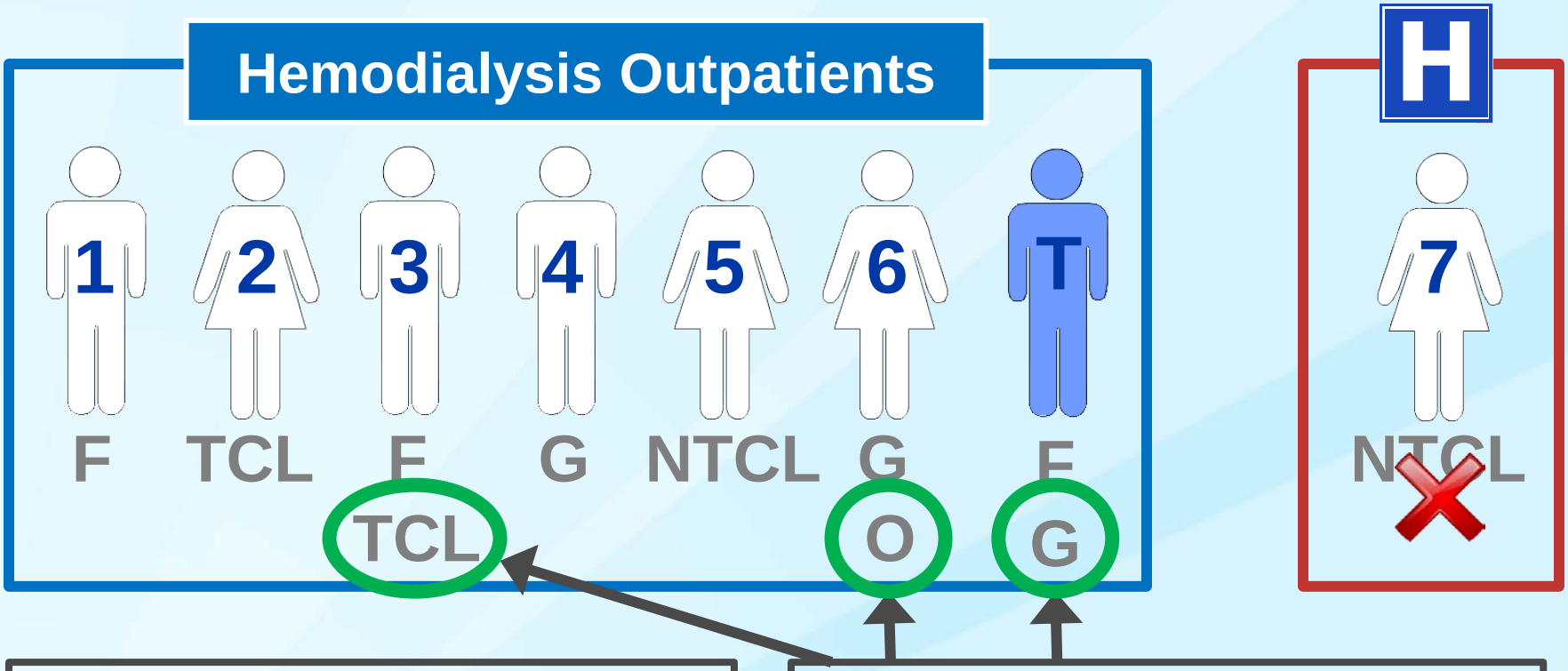
Vascular Access	Abbreviation
Fistula	(F)
Graft	(G)
Tunneled CL	(TCL)
Nontunneled CL	(NTCL)
Other Access Device	(O)

Denominator Data Collection Example



For the Denominator form, exclude patients who are not physically present for outpatient hemodialysis treatment on the first two working days of the month (such as hospitalized patients).

Denominator Data Collection Example



HIGHER RISK

LOWER RISK

Nontunneled central lines

Tunneled central line

Other access devices

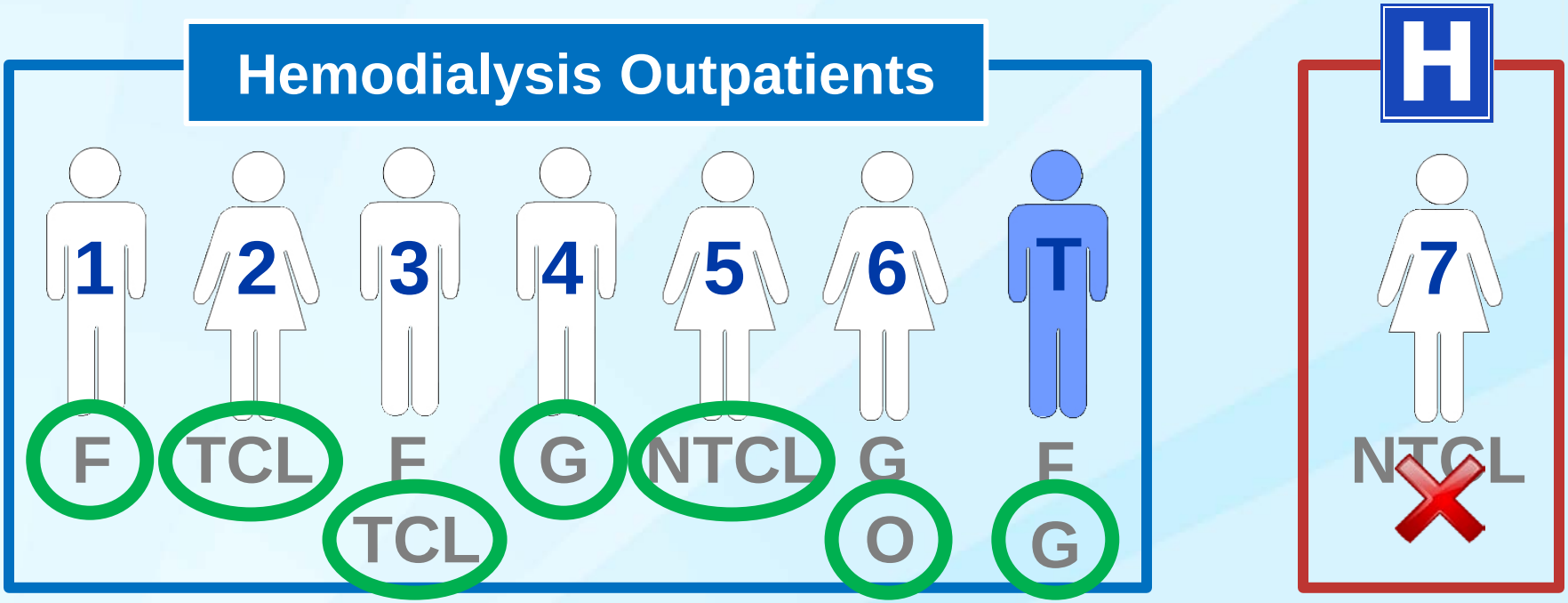
Arteriovenous grafts

Arteriovenous fistulas

For the Denominator form, count each patient only once.

Among patients with more than 1 vascular access, identify their highest infection risk access.

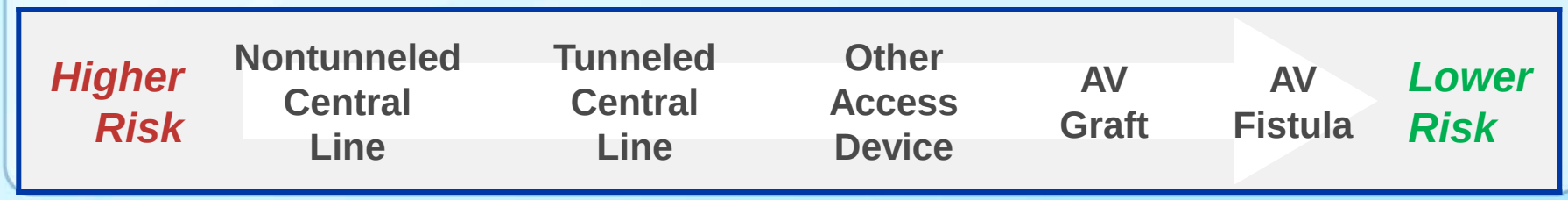
Denominator Data Collection Example



Vascular Access		#
Fistula	(F)	1
Graft	(G)	2
Tunneled CL	(TCL)	2
Nontunneled CL	(NTCL)	1
Other Access Device	(O)	1
Total		7

Denominator Data Summary

- **Each month, report the number of hemodialysis outpatients who received in-center hemodialysis during the first two working days of the month.**
  - The first two days of the month that the facility provides hemodialysis treatment and are days that include all regular shifts
- **Count each patient only once**
- **If the patient has multiple vascular accesses, report the vascular access with the highest risk of infection.**
  - This may not be the vascular access currently in use for dialysis.



DE PROTOCOL: NUMERATORS

Protocol: Report Numerator (Event) Data

- **Throughout the month, monitor all outpatients who undergo hemodialysis at your facility for dialysis events.**
  - Even if they were not counted on the denominator form.
  - Include transient patients who have an event at your facility.
- **Report a dialysis event for any of the following:**
  - IV antimicrobial start
  - Positive blood culture
  - Pus, redness or increased swelling at the vascular access site
- **On the event form under Risk Factors, report all of the patient's vascular accesses, regardless of whether they are in use for hemodialysis, abandoned/non-functional.**

Protocol: Report Numerator Data
Dialysis Event Types

- **IV antimicrobial start: Report all starts of intravenous antibiotics or antifungals administered in an outpatient setting.**
  - A "start" is defined as a single outpatient dose or first outpatient dose of a course.
  - Report regardless of the reason for administration or duration of treatment.
- **Positive blood culture: Report all positive blood cultures from specimens collected as an outpatient or collected on the day of or the day following hospital admission.**
  - Report regardless of whether the infection is thought to be related to hemodialysis or whether or not a true infection is suspected.
- **Pus, redness, or increased swelling at the VA site: Report each new outpatient episode where the patient has pus, >expected redness, and/or >expected swelling at any vascular access site.**
  - Report regardless of whether the patient receives treatment for infection.
  - Always report pus.
  - Report redness or swelling if greater than expected and suspicious for infection.

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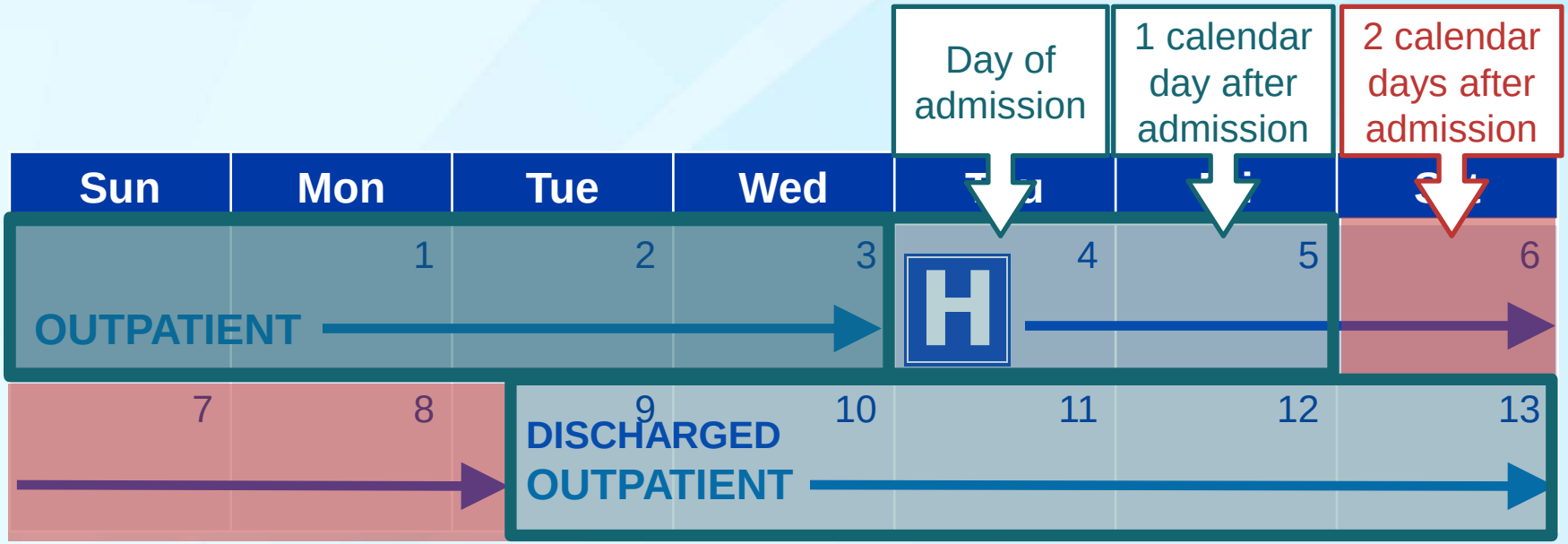
  - Report regardless of whether the patient receives treatment for infection.
  - Always report pus.
  - Report redness or swelling if greater than expected and suspicious for infection.

Reportable Positive Blood Cultures

- **Report all positive blood cultures (PBC)**
  - Collected as an outpatient
  - Collected within 1 calendar day after a hospital admission



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  - Always report pus.
  - Report redness or swelling if greater than expected and suspicious for infection.

Protocol: Report Numerator Data

- **21 Day Rule: 21 or more days must pass between two dialysis events of the *same* type for the second occurrence to be reported as a separate (new) dialysis event.**

Event Type	Date of Event	21 Day Rule
IV Antimicrobial Start	Date of first outpatient dose of an antimicrobial course	Days from the **end** of one IV antimicrobial course to the **beginning** of a second IV antimicrobial start (even if antimicrobials differ)
Positive Blood Culture	Date of specimen collection	Days **between specimen collection** dates (even if microorganisms differ)
Pus, Redness, or Swelling at VA Site	Date of onset	Days from first **onset** to second **onset**
Combination of the above events	Earliest date of the 3 event types	Individual 21 day rules still apply

21 Day Rule Applies Across Calendar Months

Sun	Mon	Tue	Wed	Thu	Fri	Sat
21	Positive Blood Culture 22	23	24	25	26	27
28	29	30	31			

1 2 3 4 5 6 7 8 9

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	~~Positive Blood Culture 6~~	7	8	9	10

10 11 12 13 14

21 Day Rule: IV Antimicrobial Starts

- **There must be 21 or more days from the end of the first outpatient IV antimicrobial course to the beginning of a second outpatient IV antimicrobial start for two starts to be reported separately.**
  - Even if different antimicrobials are used.
  - If IV antimicrobials are stopped and then restarted within 21 days, the second start is NOT considered a new dialysis event and is not reported.
- **For outpatient IV antimicrobial starts that are continuations of inpatient treatment, consider the start day to be the first day of outpatient administration.**

IV Antimicrobial Starts on the 21st Day

21 Day Rule: IV Antimicrobial Starts (continued)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Final IV Antimicrobial Dose	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20 IV Anti-microbial Start
21 IV Anti-microbial Start	22	23	24	25	26	27
28	29	30	31			

Report new IV antimicrobial starts that occur on or after 21 days without antimicrobials have passed.

IV Antimicrobial Administrations Longer than 21 Days

21 Day Rule: IV Antimicrobial Starts (continued)

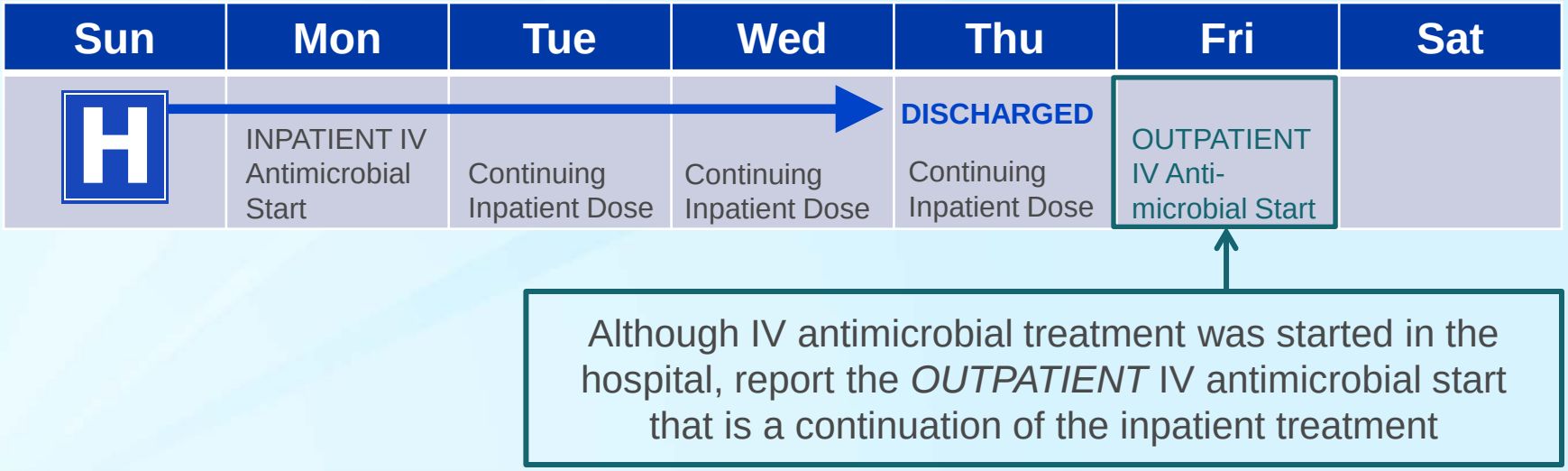
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 IV Anti-microbial Start	2	3 Continuing Dose	4	5 Continuing Dose	6
7	8 Continuing Dose	9	10 Continuing Dose	11	12 Continuing Dose	13
14	15 Continuing Dose	16	17 Continuing Dose	18	19 Continuing Dose	20
21	22 Continuing Dose	23	24 Continuing Dose	25	26 Final Dose	27
28	29	30	31			

Do NOT report a new IV antimicrobial start, unless 21 days without antimicrobials have passed.

IV Antimicrobial Start Continuations

21 Day Rule: IV Antimicrobial Starts (continued)

- **Report all occurrences where IV antibiotics or antifungals are administered in an outpatient setting, regardless of the reason and duration of treatment**
- **Report outpatient starts that are continuations of inpatient treatment**



21 Day Rule: Positive Blood Cultures

- **There must be 21 or more days between positive blood cultures for each positive blood culture to be considered a separate dialysis event, even if organisms are different.**
  - Positive blood cultures are attributed to the date the blood specimen(s) were collected.
  - If positive blood cultures occur less than 21 days apart, the second positive blood culture(s) is NOT considered a new dialysis event and therefore, is not reported.
  - If different organisms grow from these subsequent positive blood cultures, add the new organisms to the initial report.

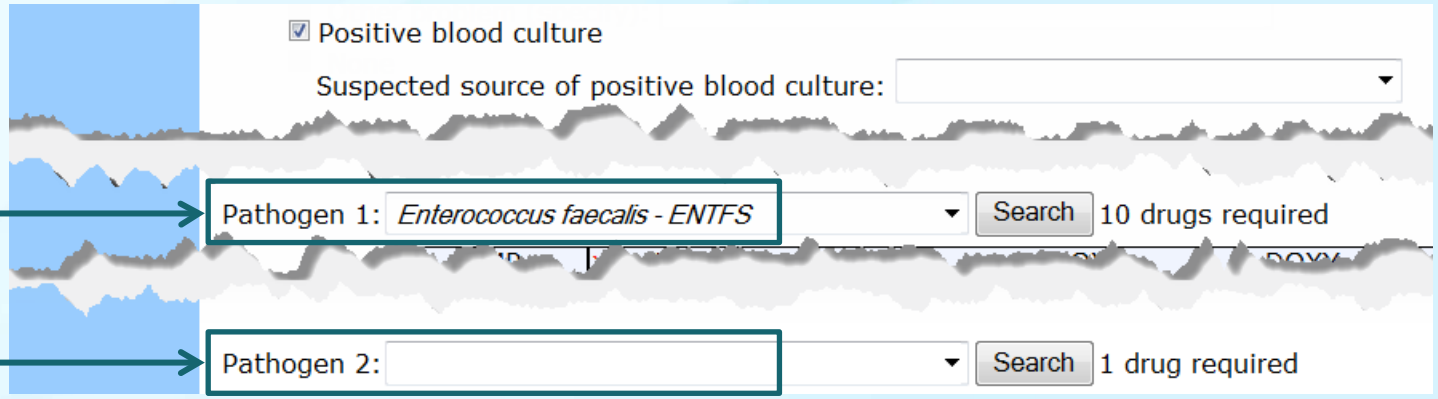
21 Day Rule: Positive Blood Cultures with Multiple Microorganisms

- If different microorganisms grow from subsequent positive blood cultures, add the new organism(s) to the initial report

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Positive Blood Culture	1	2	Positive Blood Culture 3	4	5	6

Enterococcus faecalis × ***Enterococcus faecalis***

✓ ***Staphylococcus epidermidis***



21 Day Rule: Pus, Redness, Increased Swelling

- **There must be 21 or more days between the onset of a first episode and the onset of a second episode of pus, redness, or increased swelling at a vascular access site for the two episodes to be considered separate dialysis events.**
  - If an episode of pus, redness, or increased swelling at a vascular access site resolves and then recurs at the same site within 21 days of the first onset, the recurrence is NOT considered a new dialysis event and therefore, is not reported.

Pus, Redness, or Increased Swelling at the Vascular Access Site 21 Day Rule Example

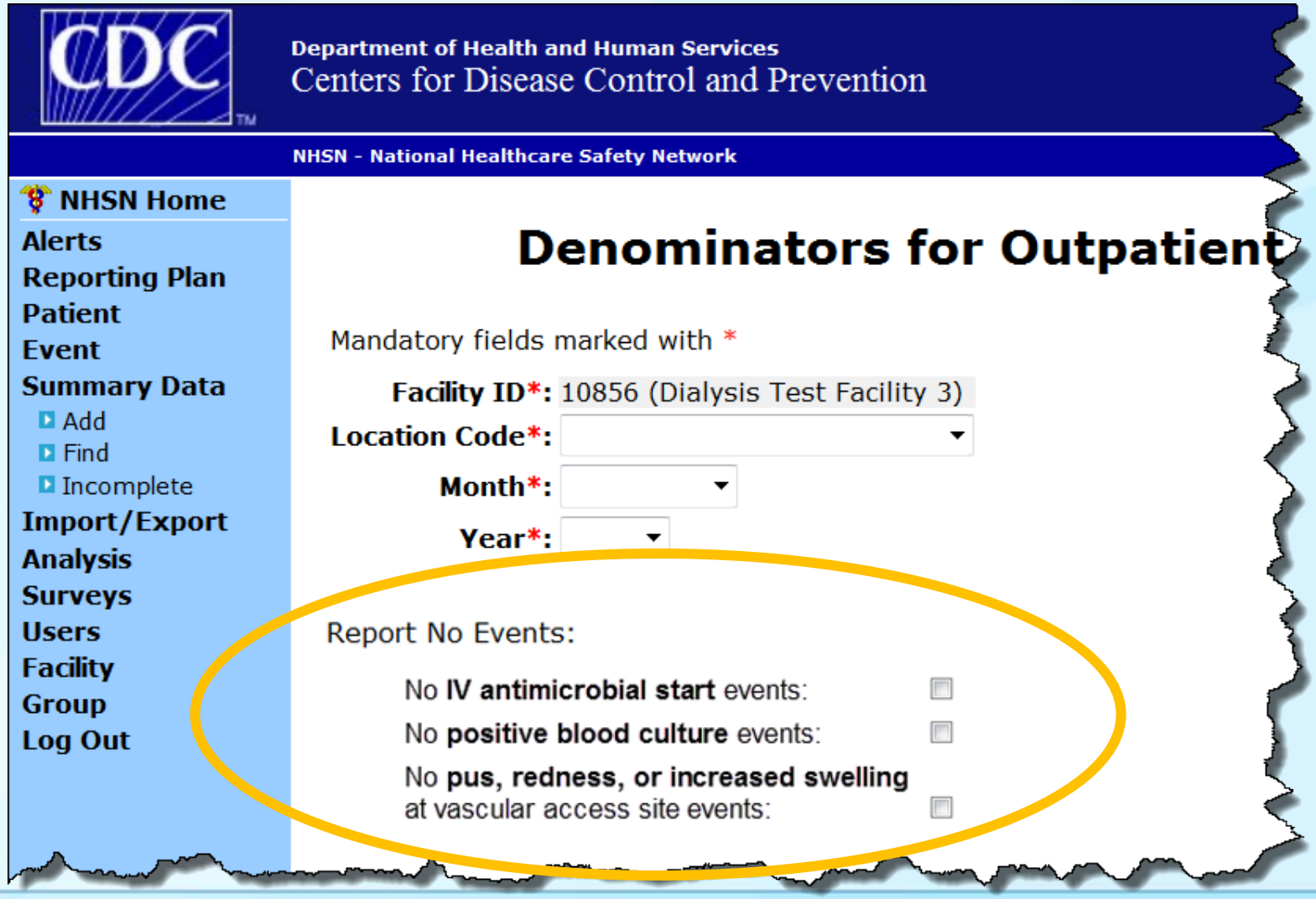
Sun	Mon	Tue	Wed	Thu	Fri	Sat
Onset of redness	1 Redness continues	2	3	4	5	6
7	8 Onset of pus; redness continues	9 Pus and redness continue	10	11	12	13
14	15	16	17 Symptoms resolve	18	19	20
21 Onset of redness	22	23	24	25	26	27

Report the new onset of redness because the 21 days are counted from onset to onset.

“Report No Events”

- Each dialysis event type needs to be accounted for every month.
- Either the event type is reported on one or more Dialysis Event forms or the “report no events” box for that event type must be checked on the Denominators for Outpatient Dialysis form to confirm no events (i.e., zero) of that type occurred during the month.
- If you “report no events,” that numerator = 0.

“Report No Events”



Numerator (Event) Data Summary

- **Report a dialysis event for any of the following:**
  - IV antimicrobial start
  - Positive blood culture
  - Pus, redness or increased swelling at the vascular access site
- **Apply the 21 day rule across calendar months**
  - 21 or more days must pass between two dialysis events of the *same* type for the second occurrence to be reported as a separate (new) dialysis event
- **Account for each event type each month:**
  - If there no events occurred, “report no events” for that event type on that month’s denominator form

IMPLEMENT PROSPECTIVE DATA COLLECTION PROCESSES AND VERIFY THEY ARE COMPLETE

Strategies to Prevent Reporting Errors

- ✓ Acquire knowledge and understanding of the Protocol
- ✓ **Implement data collection processes to capture necessary surveillance data**
- ✓ Review reported data for completeness and accuracy

Denominator Data Collection Process

- **Each month, report the number of hemodialysis outpatients by vascular access type who received hemodialysis at the center during the first two working days of the month.**
  - Report all hemodialysis outpatients, including transient patients.
  - Exclude non-hemodialysis patients and exclude inpatients.
- **Count each patient only once by vascular access type; if the patient has multiple vascular accesses, report only**

Does your facility's denominator data collection process:

1. **Correctly identify the first two working days of the month? and collect data for those days only?**
2. **Include transient patients?**
3. **Exclude patients who did not receive hemodialysis treatment?**

Denominator Data Collection Process

Does your facility's denominator data collection process:

1. **Count each patient only once?**
2. **Collect all of a patient's vascular accesses, even those not currently in use or not in use for dialysis?**
3. **Report that patient by their highest infection risk access?**

- Report all hemodialysis outp ents, including transient patients.
- Exclude non-hemodialysis ts and exclude inpatients.

- **Count each patient only once by vascular access type; if the patient has multiple vascular accesses, report only the one with the highest risk of infection**
  - This may not be the vascular access currently in use for dialysis.

All Numerator Data Collection Processes

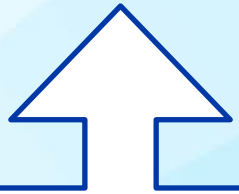
- **Throughout the month, monitor all outpatients who undergo hemodialysis at your facility for dialysis events**
  - Even if they were not counted on the denominator form.
  - Include transient patients who have an event at your facility.
- **On the event form under Risk Factors, report all of the patient's vascular accesses, regardless of whether they are in use for hemodialysis**

Do your facility's event data collection processes:

1. **Capture events for transient patients?**
2. **Include all of a patient's vascular accesses?**

Numerator Data Collection Process:
IV Antimicrobial Starts

- **IV antimicrobial start: Report all starts of intravenous antibiotics or antifungals administered in an outpatient setting.**
  - A "start" is defined as a single outpatient dose or first outpatient dose of a course.
  - Report regardless of the reason for administration or duration of treatment.



Does your facility's IV antimicrobial start data collection process:

1. **Capture all outpatient administrations?**
2. **Capture single doses?**
3. **Capture administrations not related to hemodialysis infections?**

Numerator Data Collection Process:
Positive Blood Cultures

- **Positive blood culture: Report all positive blood cultures from specimens collected as an outpatient or collected on the day of or the day following hospital admission.**
  - Report regardless of whether the infection is thought to be related to hemodialysis or whether or not a true infection is suspected.

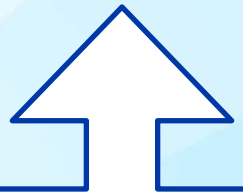
Does your facility's positive blood culture data collection process:

1. **Capture all outpatient positive blood cultures?**
2. **Follow-up on hospitalizations?**
3. **Include positives regardless of diagnosis or treatment?**

Numerator Data Collection Process:

Pus, Redness, Increased Swelling at Vascular Access Site

- **Pus, redness, or increased swelling at the VA site: Report each new outpatient episode where the patient has pus, >expected redness, and/or >expected swelling at any vascular access site.**
  - Report regardless of whether the patient is treated for infection.
  - Always report pus. Report redness or swelling if greater than expected and suspicious for infection.



Does your facility's pus, redness, swelling data collection process:

1. **Capture all three symptoms prospectively?**
2. **Capture all three symptoms regardless of diagnosis or treatment?**

Checking Data Collection Methods

- **For manual methods (either direct observation of patients or review of patient records):**
  - Two facility staff members can collect surveillance data independently and compare their findings
- **For electronic methods (e.g., using electronic health record reports):**
  - One staff member can collect data manually and compare to their findings to electronic data
- **Follow-up:**
  - Determine the source of any discrepancies and adjust data collection processes as needed
  - Correct NHSN records as needed
  - Continue checking until there is agreement

INTRODUCTION TO NHSN ANALYSIS AND REPORTS

Introduction to NHSN Analysis & Reports

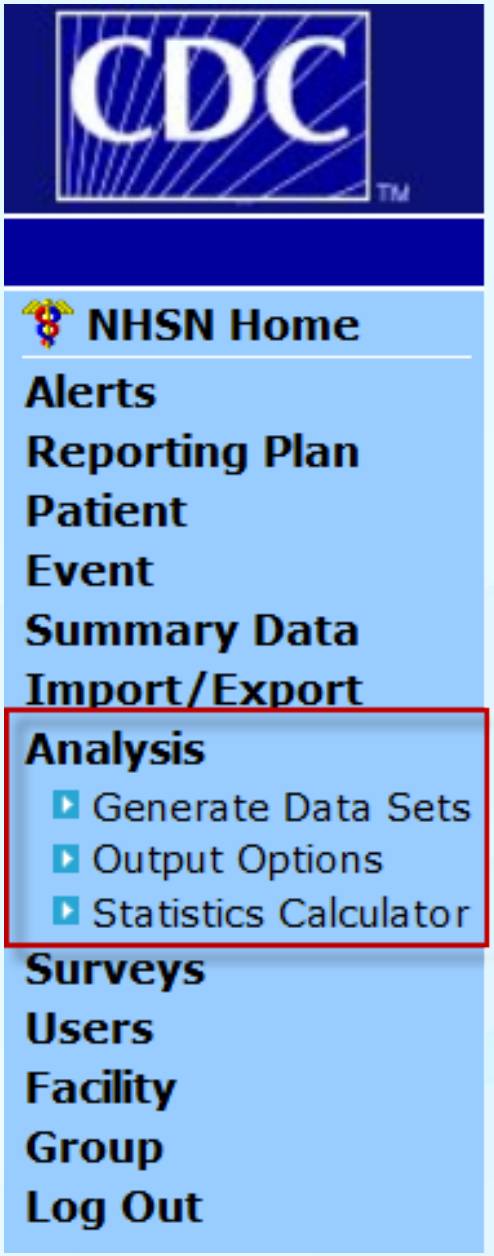
- **NHSN includes reports that you can run at any time to review your surveillance data**
- **Different reports are available to choose from**
  - NHSN can summarize what has been reported to date and display infection rates for you
- **Use reports to:**
  - Track infections
  - Inform prevention
  - Evaluate and improve performance
    - Evaluate specific infection prevention interventions
    - Identify other areas for improved performance

Strategies to Prevent Reporting Errors

- ✓ Acquire knowledge and understanding of the Protocol
- ✓ Implement data collection processes to capture necessary surveillance data
- ✓ **Review reported data for completeness and accuracy**

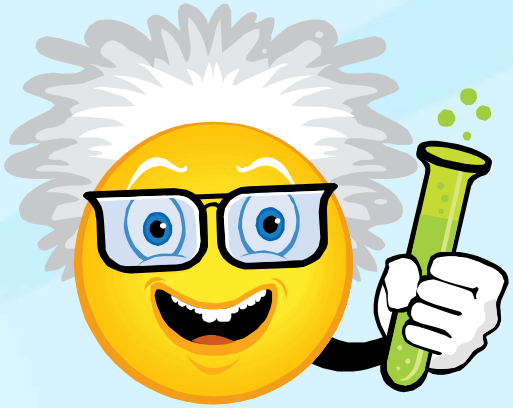
Review Your Data

- **Monthly to:**
  - Ensure all data have been accurately reported
- **Quarterly 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**

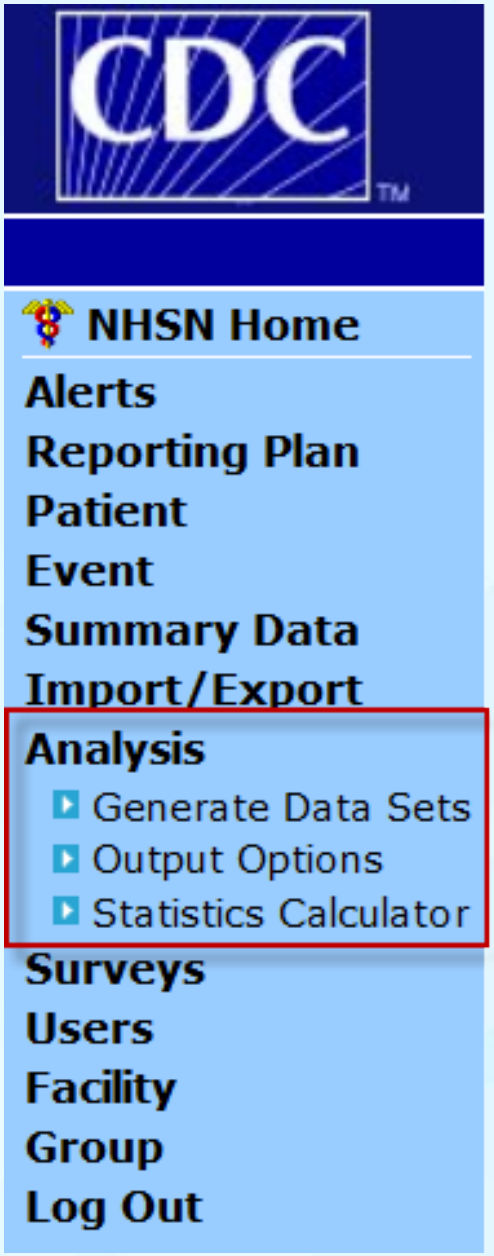


Creating Reports in NHSN

- Experiment with the analysis function – you can't break anything!



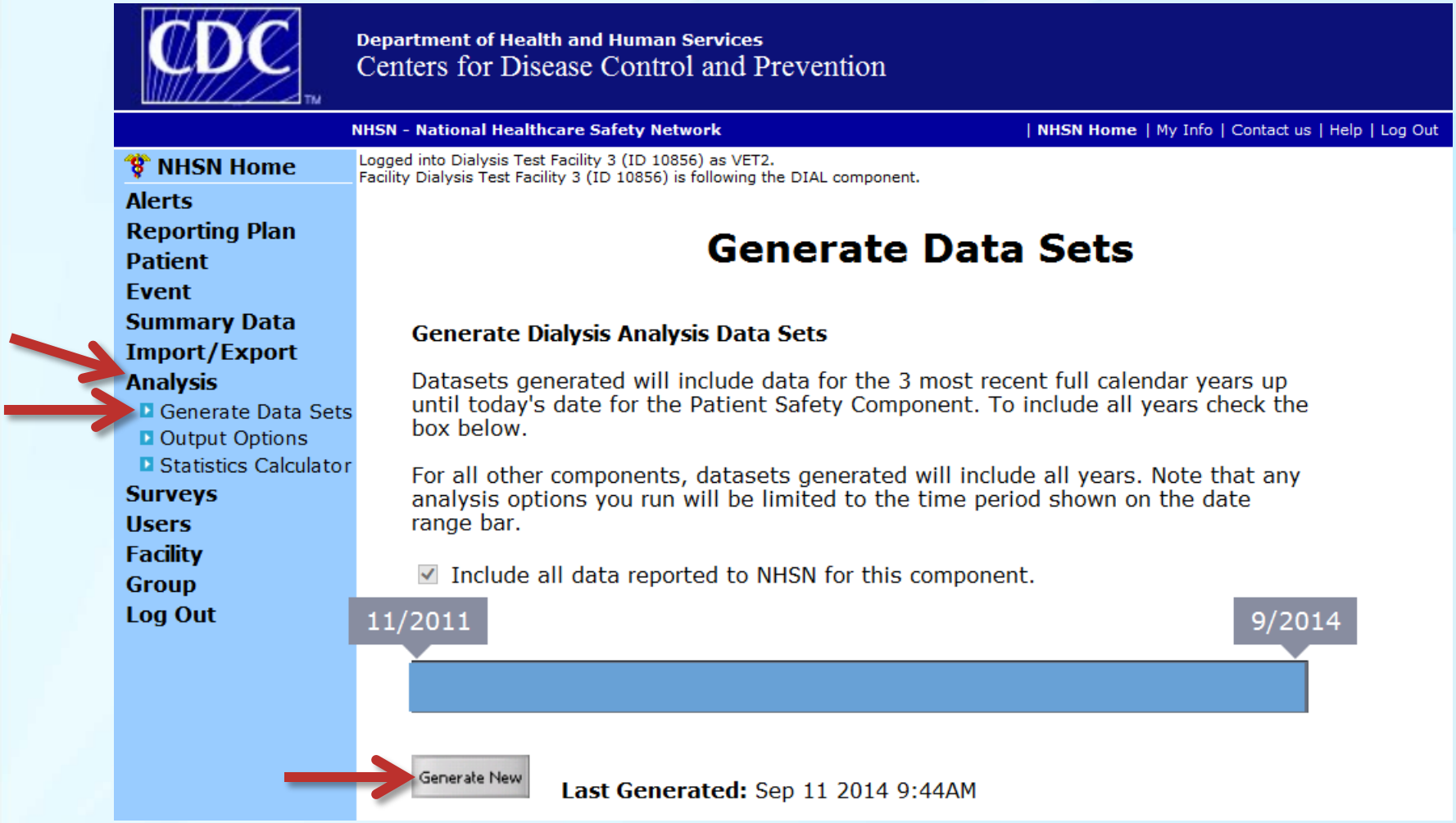
- NHSN does the work for you!



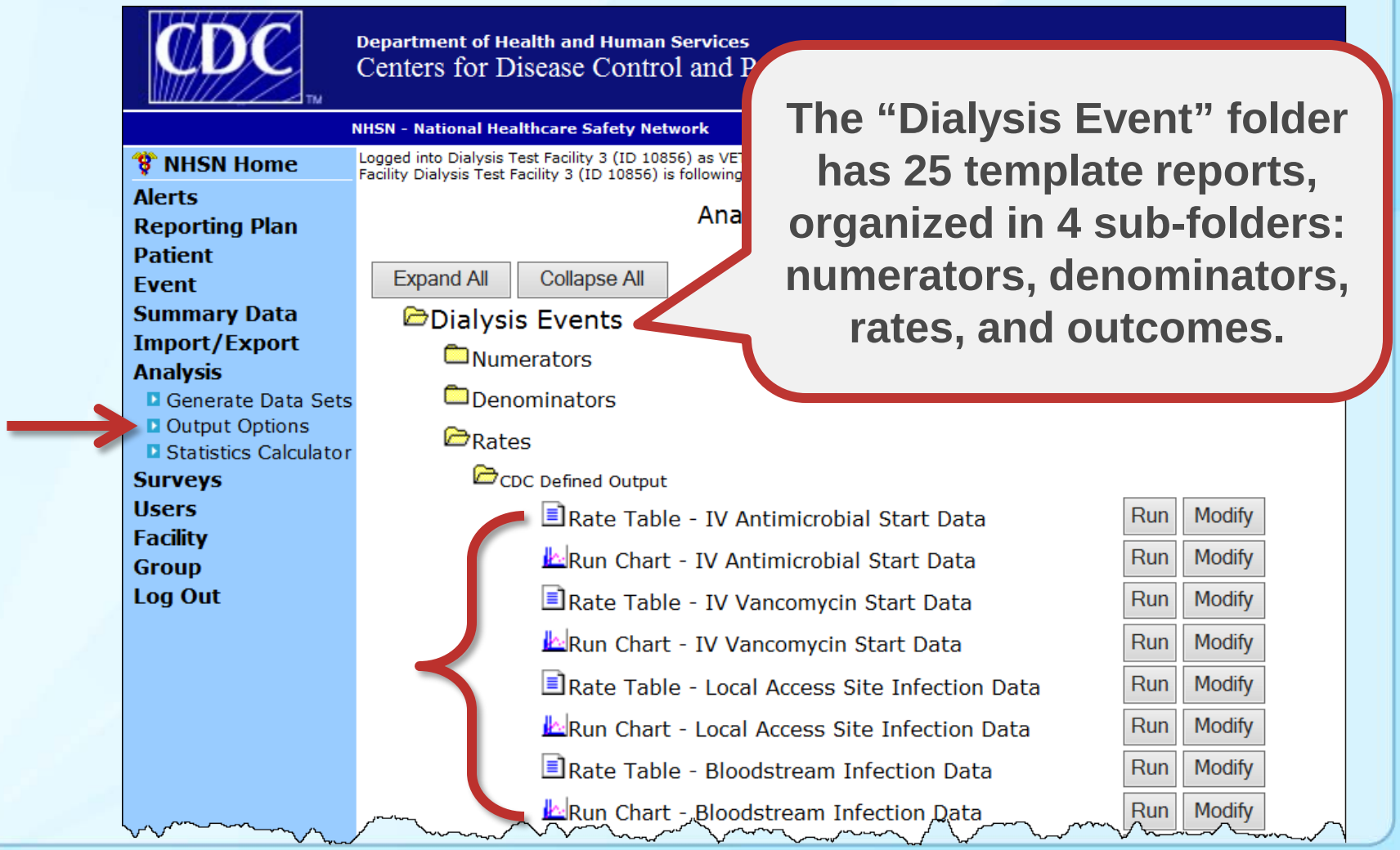
Steps to Use the Analysis Function

1. Generate new data sets
2. Select the CDC-defined output option (report)
   - Modify output (optional)
3. "Run" the report

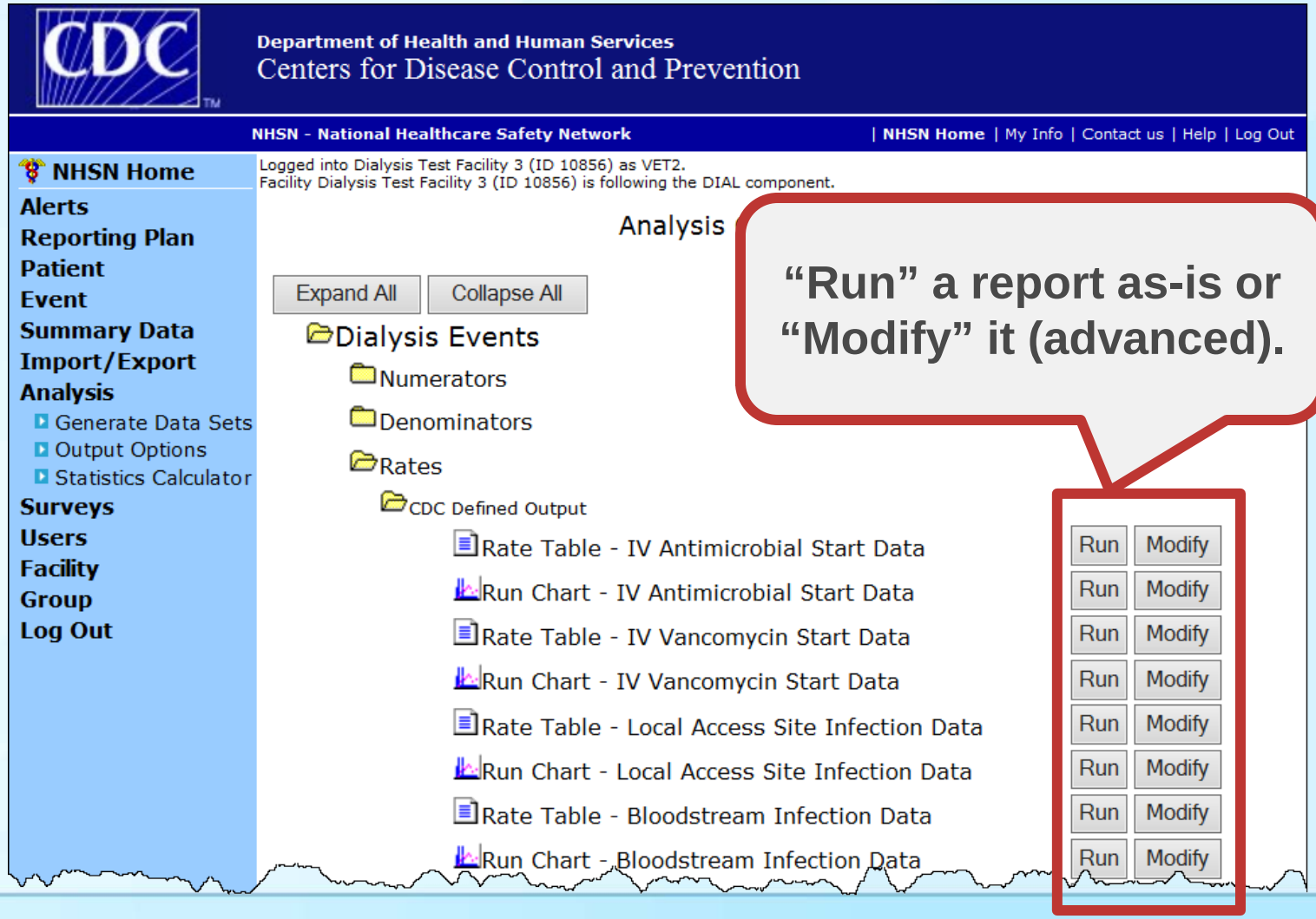
NHSN Analysis: (1) Generate new data sets



NHSN Analysis: (2) Select output option (report)



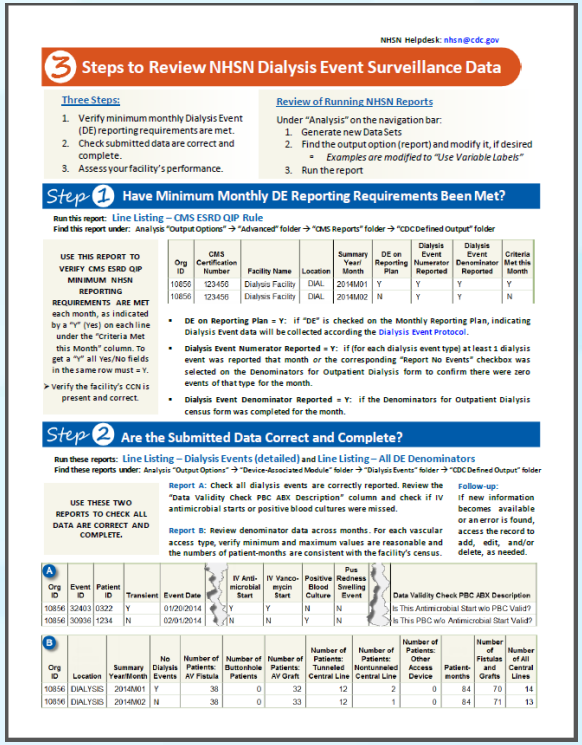
NHSN Analysis: (3) “Run” output option (report)



Reference Guide: 3 Steps to Review NHSN Dialysis Event Surveillance Data

- Refer to the illustrated, two-page guide:
  http://www.cdc.gov/nhsn/PDFs/dialysis/3-Steps-to-Review-DE-Data-2014.pdf

1. Verify minimum monthly reporting requirements are met
2. Verify data submitted are correct and complete
3. Verify how your facility is doing



NHSN Helpdesk: nhsn@cdc.gov

3 Steps to Review NHSN Dialysis Event Surveillance Data

Three Steps:

1. Verify minimum monthly Dialysis Event (DE) reporting requirements are met.
2. Check submitted data are correct and complete.
3. Assess your facility's performance.

Review of Running NHSN Reports

Under "Analysis" on the navigation bar:

1. Generate new Data Sets
2. Find the output option (report) and modify it, if desired
   - *Examples are modified to "Use Variable Labels"*
3. Run the report

Step 1 Have Minimum Monthly DE Reporting Requirements Been Met?

Run this report: Line Listing – CMS ESRD QIP Rule
Find this report under: Analysis "Output Options" → "Advanced" folder → "CMS Reports" folder → "CDC Defined Output" folder

USE THIS REPORT TO VERIFY CMS ESRD QIP MINIMUM NHSN REPORTING REQUIREMENTS ARE MET each month, as indicated by a "Y" (Yes) on each line under the "Criteria Met this Month" column. To get a "Y" all Yes/No fields in the same row must = Y.

➢ Verify the facility's CCN is present and correct.

Org ID	CMS Certification Number	Facility Name	Location	Summary Year/ Month	DE on Reporting Plan	Dialysis Event Numerator Reported	Dialysis Event Denominator Reported	Criteria Met this Month
10856	123456	Dialysis Facility	DIAL	2014M01	Y	Y	Y	Y
10856	123456	Dialysis Facility	DIAL	2014M02	N	Y	Y	N

- **DE on Reporting Plan = Y:** if "DE" is checked on the Monthly Reporting Plan, indicating Dialysis Event data will be collected according the Dialysis Event Protocol.
- **Dialysis Event Numerator Reported = Y:** if (for each dialysis event type) at least 1 dialysis event was reported that month *or* the corresponding "Report No Events" checkbox was selected on the Denominators for Outpatient Dialysis form to confirm there were zero events of that type for the month.
- **Dialysis Event Denominator Reported = Y:** if the Denominators for Outpatient Dialysis census form was completed for the month.

Step 2 Are the Submitted Data Correct and Complete?

Run these reports: Line Listing – Dialysis Events (detailed) and Line Listing – All DE Denominators
Find these reports under: Analysis "Output Options" → "Device-Associated Module" folder → "Dialysis Events" folder → "CDC Defined Output" folder

USE THESE TWO REPORTS TO CHECK ALL DATA ARE CORRECT AND COMPLETE.

Report A: Check all dialysis events are correctly reported. Review the "Data Validity Check PBC ABX Description" column and check if IV antimicrobial starts or positive blood cultures were missed.

Report B: Review denominator data across months. For each vascular access type, verify minimum and maximum values are reasonable and the numbers of patient-months are consistent with the facility's census.

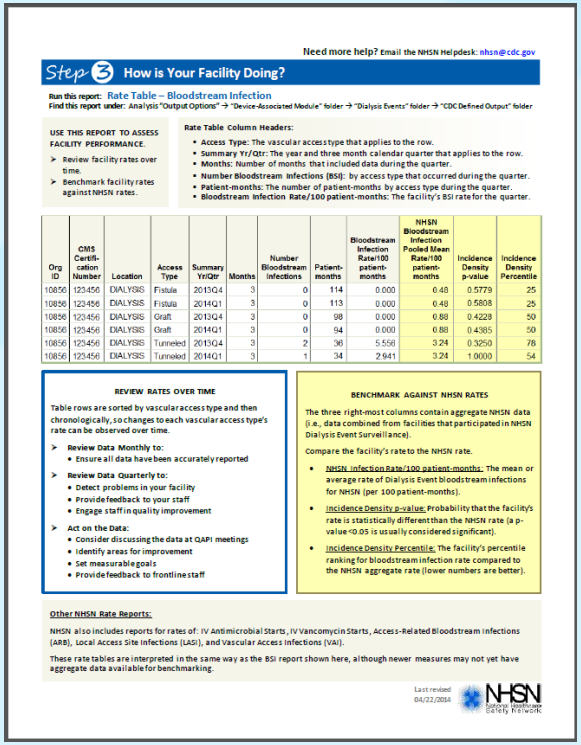
Follow-up: if new information becomes available or an error is found, access the record to add, edit, and/or delete, as needed.

A

Org ID	Event ID	Patient ID	Transient	Event Date	IV Anti-microbial Start	IV Vanco-mycin Start	Positive Blood Culture	Pus Redness Swelling Event	Data Validity Check PBC ABX Description
10856	32403	0322	N	01/20/2014	Y	Y	N	N	Is This Antimicrobial Start w/o PBC Valid?
10856	30936	1234	N	02/01/2014	N	N	Y	N	Is This PBC w/o Antimicrobial Start Valid?

B

Org ID	Location	Summary Year/Month	No Dialysis Events	Number of Patients: AV Fistula	Number of Buttonhole Patients	Number of Patients: AV Graft	Number of Patients: Tunneled Central Line	Number of Patients: Nontunneled Central Line	Number of Patients: Other Access Device	Patient-months	Number of Fistulas and Grafts	Number of All Central Lines
10856	DIALYSIS	2014M01	Y	38	0	32	12	2	0	84	70	14
10856	DIALYSIS	2014M02	N	38	0	33	12	1	0	84	71	13



Need more help? Email the NHSN Helpdesk: nhsn@cdc.gov

Step 3 How is Your Facility Doing?

Run this report: Rate Table – Bloodstream Infection
Find this report under: Analysis "Output Options" → "Device-Associated Module" folder → "Dialysis Events" folder → "CDC Defined Output" folder

USE THIS REPORT TO ASSESS FACILITY PERFORMANCE.

➢ Review facility rates over time.
➢ Benchmark facility rates against NHSN rates.

Rate Table Column Headers:

- **Access Type:** The vascular access type that applies to the row.
- **Summary Yr/Qtr:** The year and three month calendar quarter that applies to the row.
- **Months:** Number of months that included data during the quarter.
- **Number Bloodstream Infections (BSI):** by access type that occurred during the quarter.
- **Patient-months:** The number of patient-months by access type during the quarter.
- **Bloodstream Infection Rate/100 patient-months:** The facility's BSI rate for the quarter.

Org ID	CMS Certification Number	Location	Access Type	Summary Yr/Qtr	Months	Number Bloodstream Infections	Patient-months	Bloodstream Infection Rate/100 patient-months	NHSN Bloodstream Infection Pooled Mean Rate/100 patient-months	Incidence Density p-value	Incidence Density Percentile
10856	123456	DIALYSIS	Fistula	2013Q4	3	0	114	0.000	0.48	0.5779	25
10856	123456	DIALYSIS	Fistula	2014Q1	3	0	113	0.000	0.48	0.5808	25
10856	123456	DIALYSIS	Graft	2013Q4	3	0	98	0.000	0.88	0.4228	50
10856	123456	DIALYSIS	Graft	2014Q1	3	0	94	0.000	0.88	0.4385	50
10856	123456	DIALYSIS	Tunneled	2013Q4	3	2	36	5.556	3.24	0.3250	78
10856	123456	DIALYSIS	Tunneled	2014Q1	3	1	34	2.941	3.24	1.0000	54

REVIEW RATES OVER TIME

Table rows are sorted by vascular access type and then chronologically, so changes to each vascular access type's rate can be observed over time.

➢ **Review Data Monthly to:**
- Ensure all data have been accurately reported

➢ **Review Data Quarterly to:**
- Detect problems in your facility
- Provide feedback to your staff
- Engage staff in quality improvement

➢ **Act on the Data:**
- Consider discussing the data at QAPI meetings
- Identify areas for improvement
- Set measurable goals
- Provide feedback to frontline staff

BENCHMARK AGAINST NHSN RATES

The three right-most columns contain aggregate NHSN data (i.e., data combined from facilities that participated in NHSN Dialysis Event Surveillance).

Compare the facility's rate to the NHSN rate.

- NHSN Infection Rate/100 patient-months: The mean or average rate of Dialysis Event bloodstream infections for NHSN (per 100 patient-months).
- Incidence Density p-value: Probability that the facility's rate is statistically different than the NHSN rate (a p-value <0.05 is usually considered significant).
- Incidence Density Percentile: The facility's percentile ranking for bloodstream infection rate compared to the NHSN aggregate rate (lower numbers are better).

Other NHSN Rate Reports:

NHSN also includes reports for rates of: IV Antimicrobial Starts, IV Vancomycin Starts, Access-Related Bloodstream Infections (ARB), Local Access Site Infections (LASI), and Vascular Access Infections (VAI).

These rate tables are interpreted in the same way as the BSI report shown here, although newer measures may not yet have aggregate data available for benchmarking.

Last revised 04/22/2014 NHSN National Healthcare Safety Network

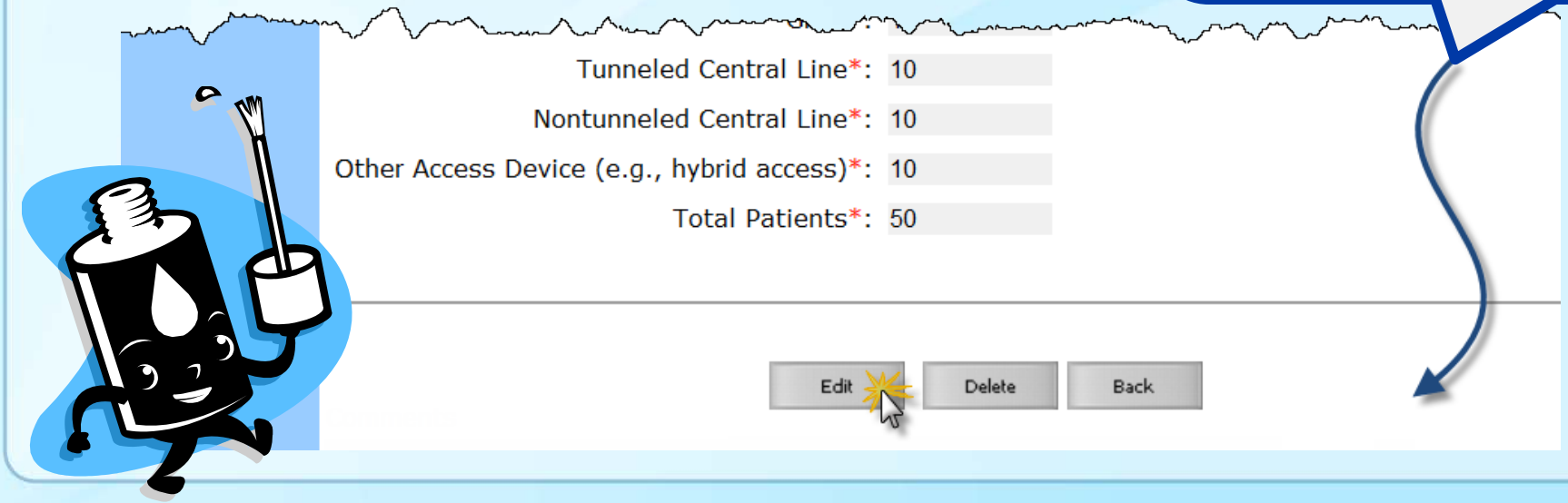
Summary of Strategies to Prevent Errors

1. **Know and understand the Protocol**
   - Especially definitions and rules
   - Email the NHSN Helpdesk (nhsn@cdc.gov) with any questions
2. **Implement robust, prospective data collection processes**
   - Verify processes capture all necessary data
3. **Review reported data for completeness and accuracy**

Corrections

- **Even if QIP reporting deadlines have passed, corrections can be made:**
  - Improve your data for facility performance assessments
  - Improve national data quality for CDC analyses (benchmarking)

Find the record, scroll to the bottom and click the “Edit” button.



Using Reports to Assess Facility Infection Prevention Performance

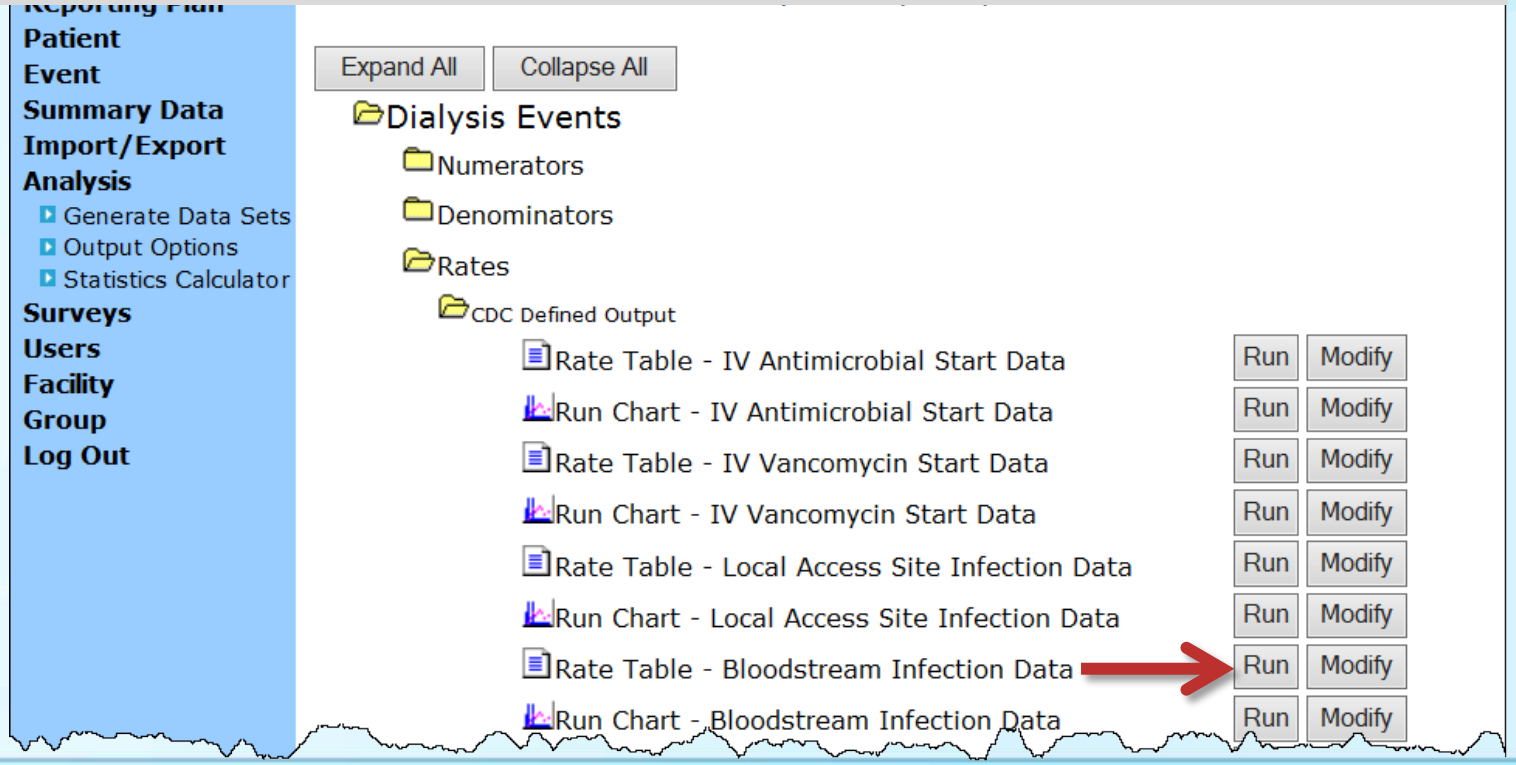
NHSN BSI RATE TABLE

Dialysis Event Metrics

- **Data entered into NHSN are used to calculate specific metrics including rates for:**
  - **Bloodstream infection (BSI)**
    - Any positive blood culture
  - **Access-related bloodstream infection (ARB)**
    - Positive blood culture with the suspected source identified as the vascular access site or uncertain
  - **Local access site infection (LASI)**
    - Pus, redness, or swelling of the vascular access site and access-related bloodstream infection is not present
  - **Vascular access infection (VAI)**
    - Either a local access site infection or an access-related bloodstream infection

Click “Run” for the “Rate Table – Bloodstream Infection Data”

- On the nav bar: “Analysis,” then “Output Options”
- Open folders:
  - Dialysis Events > Rates > CDC Defined Output



Bloodstream Infection Rate Table

Access Type	Summary Yr/Qtr	Months	Number Positive Blood Cultures	Patient-months	Bloodstream Infection Rate/100 patient-months	NHSN Bloodstream Infection Rate/100 patient-months	Incidence Density p-value	Incidence Density Percentile
All	2014Q2	3	2	211	0.948	1.27	0.4998	.
Fistula	2014Q2	3	0	97	0	0.48	0.6271	25
Graft	2014Q2	3	0	63	0	0.88	0.5750	50
Other Acc.	2014Q2	3	0	3	0	.	.	.
Tunneled	2014Q2	3	1	45	2.222	3.24	0.0572	46
Nontunneled	2014Q2	3	1	3	33.333	2.78	0.0799	100
Any CVC	2014Q2	3	2	48	4.167	3.21	0.4551	69

Non-shaded (white) area is the *facility data*.

Shaded (yellow) area is aggregate data from *all of NHSN*.
Use it to compare the facility to the rest of NHSN (i.e., benchmark).

Bloodstream Infection Rate Table

Access Type	Summary Yr/Qtr	Months	Number Positive Bl Cultures	mo				
All	2014Q2	3	2	2				
Fistula	2014Q2	3	0					
Graft	2014Q2	3	0					
Other Acc.	2014Q2	3	0					
Tunneled	2014Q2	3	1	45				46
Nontunneled	2014Q2	3	1	3	33.333	2.78	0.0799	100
Any CVC	2014Q2	3	2	48	4.167	3.21	0.4551	69

"Months" is the number of months for the time period that data were reported (i.e., a quarter may have 1 - 3 months).

- **"Summary Yr/Qtr" = "Summary Year/Quarter"**
  - Quarter 1 = Jan/Feb/Mar
  - Quarter 2 = Apr/May/Jun
  - Quarter 3 = July/Aug/Sept
  - Quarter 4 = Oct/Nov/Dec

Bloodstream Infection Rate Table

Access Type	Summary Yr/Qtr	Months	Number Positive Blood Cultures	Patient-months	Bloodstream Infection Rate/100 patient-months	NHSN Bloodstream Infection Rate/100 patient-months	Incidence Density p-value	Incidence Density Percentile
All	2014Q2	3	2	211	0.948	1.27	0.4998	.
Fistula	2014Q2	3	0	97	0	0.48	0.6271	25
Graft	2014Q2	3	0	63	0	0.88	0.5750	50
Other Acc.	2014Q2	3	0	3	0	.	.	.
Tunneled	2014Q2	3	1	45	2.222	3.24	0.0572	46
Nontunneled	2014Q2	3	1	3	33.333	2.78	0.0799	100
Any CVC	2014Q2	3	2	48	4.167	3.21	0.4551	69

Numerators Denominators Facility Rates

$$\text{Rate} = \frac{1}{45} \times 100 = 2.222 \text{ BSI/100 patient-months for tunneled central lines}$$

Bloodstream Infection Rate Table

Compare the facility's rate to this NHSN average rate.

The mean rate of BSI in patients with tunneled central lines for all of NHSN was higher than for this facility (3.24 BSI per 100 patient-months versus 2.222 BSI per 100 patient-months).

Patient-months	Bloodstream Infection Rate/100 patient-months	NHSN Bloodstream Infection Rate/100 patient-months	Incidence Density p-value	Incidence Density Percentile
211	0.948	1.27	0.4998	.
97	0	0.48	0.6271	25
63	[illegible]	[illegible]88	0.5750	50
3	[illegible]	[illegible]	.	.
45	2.222	3.24	0.0572	46
3	33.333	2.78	0.0799	100
48	4.167	3.21	0.4551	69

This column shows the mean or average RATE (per 100 patient-months) for all dialysis facilities reporting to NHSN

Bloodstream Infection Rate Table

Access Type	Summary Yr/Qtr	Months	Number Positive Blood Cultures	Patient-months	Bloodstream Infection Rate/100 patient-months	NHSN Bloodstream Infection Rate/100 patient-months	Incidence Density p-value	Incidence Density Percentile
All	2014Q2	3	2	211	0.948	1.27	0.4998	.
Fistula	2014Q2	3	0	97	0	0.48	0.6271	25
Graft	2014Q2	3	0	63	0	.88	0.5750	50
Other Acc.	2014Q2	3	0	3	0		.	.
Tunneled	2014Q2	3	1	45	2.222	3.24	0.0572	46
Nontunneled	2014Q2	3	1	3	33.333	2.78	0.0799	100
Any CVC	2014Q2	3	2	48	4.167	3.21	0.4551	69

"p-value" and "percentile" are provided to assist with rate comparisons.

Comparing Rates Using Percentiles and p-values

- **The percentile indicates how a facility ranks for the event among all NHSN facilities**
  - The lower the percentile, the better the facility is ranked for that event (i.e., fewer BSIs)
- **A p-value is a measure of statistical significance that indicates the probability that any difference between the facility's rates and NHSN aggregate rates is due only to chance**
  - Typically, a p-value of <0.05 is considered a statistically significant difference between rates

Rate Table Interpretation Examples

#	BSI Rate/ 100 patient-months	NHSN BSI Rate/100 patient-months	Incidence Density p-value	Incidence Density Percentile
1	0.000	3.24	0.0013	10
2	3.333	3.24	0.6215	58
3	13.333	3.24	0.0173	98

- **Example 1: Facility rate is zero, NHSN rate is 3.24**
  - Percentile (10) is low
  - p-value is statistically significant (i.e., rates *are* statistically different)
  - Conclusion: facility has a lower than average BSI rate
- **Example 2: Facility rate is 3.333, NHSN rate is 3.24**
  - Percentile (58) is medium
  - p-value is not statistically significant (i.e., rates *are not* statistically different)
  - Conclusion: facility has an average BSI rate
- **Example 3: Facility rate is 13.333, NHSN rate is 3.24**
  - Percentile is (98) high
  - p-value is statistically significant (i.e., rates *are* statistically different)
  - Conclusion: facility has a higher than average BSI rate

Act on the Data

- **Get the most benefit by acting on the data**
- **Recognize areas for improvement**
  - Suggestion: look at your rates for BSI, do any vascular access types have higher rates than expected?
  - Set measurable goals
- **Provide feedback to frontline staff**
  - Inspire staff engagement in preventing dialysis events
- **Continue NHSN surveillance, monitor for changes in rates**

Resources for Infection Prevention in Dialysis

- **Go to http://www.cdc.gov/dialysis/ for tools and resources:**
  - Free Continuing Education: Infection Prevention in Outpatient Dialysis
  - Training Video for Preventing Bloodstream and Other Infections in Outpatient Hemodialysis Patients (11 minutes)
  - The list of CDC's Core Interventions for Dialysis BSI Prevention
  - Protocols, checklists, and audit tools can help promote and reinforce CDC-recommended practices
    - In January 2015, track the results of audits using NHSN and run reports to track the percent adherence over time
      - Dialysis Component "Prevention Proccess Measures" Module

SUMMARY

Summary

- **Most data errors result from inadequate understanding of protocol reporting requirements or incomplete data collection processes**
- **Avoid data quality problems by:**
  - Completing training
  - Reading the Protocol and referring to it when reporting
  - Asking for help (nhsn@cdc.gov)
  - Implementing thorough data collection processes
  - Verifying those processes for completeness
  - Reviewing reported data
- **It's not too late to make corrections!**

Summary

- **NHSN analysis is a tool for:**
  - Reviewing reported data for completeness and accuracy
  - Assessing facility performance (if data quality is good)
- **Create an NHSN report in 3 steps:**
  - Generate new data sets
  - Locate the output option (report)
  - “Run” the report
- **“Rate Table – Bloodstream Infection Data” calculates BSI rates by quarter and vascular access type:**
  - Report includes NHSN aggregate rate data for benchmarking
  - Low rates/low incident density percentile = better performance

Summary

- **Act on the data for the most benefit:**
  - Recognize areas for improvement
  - Provide feedback to frontline staff
  - Continue NHSN surveillance, monitor for changes in rates
- **Use the available infection prevention resources at http://www.cdc.gov/dialysis/**

Thank you!

NHSN Helpdesk: nhsn@cdc.gov

Include “Dialysis” in the subject line

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