BENCHMARKING DIALYSIS BLOODSTREAM INFECTIONS:

A MINI EDUCATIONAL OVERVIEW ON STANDARDIZED INFECTION RATIO "SIR"

SLIDE 2

Do you ever wonder how your facility compares to other facilities when it comes to taking care of your patients and preventing infections? You are not alone.

A process called benchmarking is a process that compares your facility to other facilities that perform similar activities and services, such as dialysis.

Example (or make your own up)
Imagine you and your friends take a math test. After grading, the teacher says:

- The **average score** for the whole class is **80 points**.
- Your score is **85 points**—that means you did **better than most**! 🎉
- Another friend got **75 points**, so they might want to **study a little more next time**. 📚

Hospitals do the same thing with **infections and patient care**. They compare their numbers to other hospitals to see if they are doing:

- **Better than most** (great job! ✅)
- **Worse than most** (needs improvement! ❌)
- **About the same** (keep up the good work! 👍)

By comparing numbers, hospitals can learn from the best ones and **find ways to get better at keeping patients safe**. 😊

SLIDE 3

Dialysis centers in the U.S. track certain types of infections to improve patient safety. There are four types of infections reported to the National Healthcare Safety Network (NHSN), and each is measured using a statistic called the Standardized Infection Ratio (SIR).
As we review each infection type, think about which one would be the best benchmark for your facility. This can be discussed with your team. **The Four Infection Types:**

Bloodstream Infections (BSIs):
These are serious infections where bacteria enter the blood, sometimes from dialysis access sites (like catheters or grafts), or from other sources like wounds. This type includes all BSIs, even those not caused by dialysis care, so they may not fully reflect your facility's performance.

Access-Related Bloodstream Infections (AR-BSIs):
These are BSIs that are clearly linked to dialysis access. Tracking AR-BSIs helps show how well your facility prevents infections directly related to treatment.. I usually recommend AR-BSI as the best to benchmark, because it focuses on what your team can control the better infection to track.

Local Access Site Infections (LASIs):These are signs of infection (like redness or pus) around the dialysis access site, but excludes AR-BSI.

Vascular Access Infections (VAIs):
This is a broader category that includes both LASIs and AR-BSIs.

SLIDE 4

The Standardized Infection Ratio (SIR) compares the number of infections your facility actually had to the number that was predicted, based on national data from NHSN. This prediction adjusts for key factors, such as patient population and facility characteristics, to ensure a fair comparison. By tracking your access-related bloodstream infection (BSI) SIR by quarter, you can identify trends over time, seeing whether your infection rates are staying stable, getting better, or getting worse. What does the number mean?

- An SIR of 1 means your facility had exactly the number of infections NHSN predicted—no more, no less—after adjusting for your specific risks.
- An SIR above 1 means more infections occurred than expected.
- An SIR below 1 means fewer infections occurred than expected.

Think of 1.00 as the comparison point, not necessarily a “goal.” The aim should always be to stay below 1 if possible, because that reflects fewer infections than predicted.
It's important to review values periodically and identify trends that can help you put isolated spikes or outliers in perspective and focus on long-term progress.
Using the NHSN SIR allows your facility to compare performance to other outpatient dialysis facilities across the country. NHSN has already done the complex statistical work to make this possible, pulling data from all participating centers and adjusting for key differences to allow meaningful comparisons.

SLIDE 5

Okay! Imagine you have a big jar of jellybeans, and you know from past years that if you shake the jar a certain way, about **10 jellybeans** usually fall out. That’s what you **expect** to happen based on past experience.
Now, let’s say you shake the jar today, and **12 jellybeans** fall out. That’s more than expected! Or maybe only **8 jellybeans** fall out—less than expected.

In hospitals, doctors and nurses track infections kind of like that. They look at past data to predict how many infections should happen based on things like how many patients they have, how sick the patients are, and what medical tools they use. This is called **expected infections**.
Then, they compare it to the actual number of infections that happen.

- If the actual number is **higher than expected**, the hospital might need to find out why and fix the problem.
- If it’s **lower than expected** that’s great—it means they’re doing a good job keeping infections away!

Hospitals use this system to keep patients safe and work on making healthcare better.

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SLIDE 6

NHSN tracks **access-related bloodstream infections (ARBSIs)** in dialysis patients by looking at how infections happen based on the type of access used for treatment. Here’s a simple breakdown of how they calculate it:

1. Dialysis centers **report all blood stream infections**, and the type(s) of dialysis accesses their patients have.
2. **Look at the Risk** - Not all dialysis access types have the same risk. **Catheters** have a higher chance of infection than **fistulas or grafts**. NHSN will adjusts for this by considering the type of access the patient had.
3. They compare the **actual infections** to the **expected infections** to see if the rate is higher or lower than normal.
4. **Calculate the Infection Rate:**

- They use a formula to find out how often infections happen per **1,000 dialysis sessions** (to keep the numbers fair across different centers).
- The result helps clinics see if they have **more, fewer, or about the same** infections as expected.

This helps dialysis centers improve safety by finding ways to lower infection risks, like by auditing their compliance practices on accessing and deaccessing vascular access sites, hand hygiene, and disinfection practices to determine if there are any gaps in practices.

SLIDE 7

The next few slides go through examples of how to compare SIR values between different facilities. They are real examples using dialysis data from NHSN. You may do as many examples as you want.

SLIDE 8

Facility A is larger with an expected infection number or count of 5.09 vs facility B who is much smaller with a much lower expected infection number or count of 2.15.
Both facilities had the same number of infections, 4. but Facility A performed better. Why?

- Facility A had 4 infections and had a SIR of 0.79, which is below 1.00 which shows that the facility is performing above average.
- Facility B also had 4 infections, but their SIR was 1.87, which is higher than 1.00. This facility has more infections than is expected for a facility of their size and patient demographics.

Point: The same number of infections in each facility does not mean they performed the same.

SLIDE 9

These facilities have identical SIRs, so they performed the same, even though one facility had 6 infections, and the other one had 2 infections.

Point: This is how NHSN can use their formulas to calculate infection risk. (Remember when we discussed how dialysis uses 1,000 dialysis sessions)? It keeps the numbers comparable across different centers. This way facilities can compare themselves to other facilities, even though they are different sizes and have different types of patients.
(Refer to slide 6 if needed)

Both have an SIR of 0.77, which is below 1.00, meaning they both had less infections than expected.

SLIDE 10

Facility B performed better than Facility C, though both facilities had the same number of infections.

Both facilities performed well with SIRs below 1.00. Both facilities had fewer infections than expected.

Point: To reinforce how NHSNs' formula works to compare facilities of different sizes to each other.

What if Facility B had an SIR of 0.35 the previous year with 3 infections?

- <u>They did not improve.</u> Should they be concerned?
- An SIR of 0.45 is still below 1.00, which is less than expected. But the infection rate is increasing, so the facility would want to investigate why the infections occurred.
    - Drill down on each individual infection to determine possible causes.
    - Increase auditing of staff infection prevention and control practices. (i.e., vascular access care, access/deaccess practices, injection practices, hand hygiene, cleaning and disinfection).

SLIDE 11

<u>Now, looking at the same Facility A with Facility E.</u>
Facility E performed better than Facility A, though both facilities had the same number of infections.

Both facilities performed well with SIRs below 1.00. Both facilities had fewer infections than expected.

Point: To reinforce how NHSNs' formula works to compare facilities of different sizes to each other.

What if Facility E had an SIR of 0.35 the previous year with 3 infections?

- They did not improve. Should they be concerned?
- A SIR of 0.45 is still below 1.00, which is less than expected. But the infection rate is increasing, so the facility would want to investigate why the infections occurred.
    - Drill down on each individual infection to determine possible causes.
    - Increase auditing of staff infection prevention and control practices. (i.e., vascular access care, access/deaccess practices, injection practices, hand hygiene, cleaning and disinfection).

SLIDE 12

Comparing facilities of various sizes to each other.

What do you think about the SIRs?
Any similarities?

- The smaller facilities have similar expected infections, they all had the same number of infections: 4.

Any differences?

- Even though they had they same number of infections, they all had different SIRs.

Which facility performed the best?

- Facility E had the lowest SIR. We do not know how these facilities performed in prior performance periods. It may be possible that Facility F had an SIR of 3.00 prior to the SIR of 1.85 and Facility A had a SIR of 0.78. How would that change the outlook?

Which facility performed the worst?
Do any of the facilities need to improve?

Facilities can assess their SIR in NHSN monthly or quarterly to monitor how they are doing.

SLIDE 13

- A SIR greater than 1 is not necessarily a failure, it's a starting point for assessing opportunities for improvement.
- The purpose of this slide is to show that even SIRs - above expected (greater than 1) can be positive and no one should be discouraged if the SIR is an improvement. The goal is to show improvement over time. Decreasing SIRs shows that the facility has put in processes to prevent infections that are working.
- Consider a facility F with an SIR of 1.85 and 4 infections. They increase their audits and discover a gap in their staff practice of accessing central lines. Staff are not waiting for the manufacturers recommended 15 seconds to allow the 70% alcohol disinfectant to dry after scrubbing the hub. They provide education for staff, and to increase observations. The following year they had 3 infections with an SIR of 1.23.
- The SIR also helps to adjust for changes in a facility such as an increase or decrease in census, allowing a facility to show trends over a period.
- A facility can have an SIR of 0.57 one year, then have an SIR of 0.98 the following year. Both are below 1.00, which is less than expected, but they still had an increase in infections which is a cause for concern.

SLIDE 14

Key Takeaway:
Don't focus solely on whether the SIR is above or below 1.0.

Focus on:

- Trends over time
- Actions taken to reduce infection risk
- Continuous improvement

Even when the SIR is greater than 1.0, a decreasing trend shows progress and that interventions are making a difference.

Improvement matters more than having a perfect score, and recognize that even SIRs above 1.0 can reflect progress.

SLIDE 15

Which facility performed better?
Can you compare facilities of different sizes to each other?

Since the SIR is below 1, the facilities all performed better than expected, but they still have infections and should strive to improve every year. By monitoring your SIR throughout the year, it allows a facility to see how they are doing. If their rates start to increase, then the facility can start the process of drilling down to see if there are any processes (i.e., hand hygiene, cleaning & disinfection, etc.) they may need to work on. Auditing practices can be key to staying on top of facility practices.

SLIDE 16

This is a downloadable poster to assist facilities in tracking and trending their facility SIR.
Facilities can fill in their own name and facility information and post in a location to share with staff.
The first poster is an example with some of the information filled in with fake facility information.
The smaller version is what the poster looks like when it is downloaded before you enter your information into it.