

The Standardized Infection Ratio (SIR) – What it is and why you care

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The Standardized Infection Ratio (SIR) is a summary measure used to compare healthcare associated infection (HAI) rates across geographies, between facilities, or over time. The benefit of using an SIR to compare HAI rates is that the SIR controls for risk factors known to be significantly associated with differences in infection incidence. You should have a basic understanding of the SIR because national reporting of HAI is trending toward using the SIR in place of raw rates. To help you understand better how the SIR works, let's walk through an example. Let's say that our hospital has a Burn ICU, a Trauma ICU, and a Medical/Surgical ICU and we are a major teaching hospital. It would not be fair to compare our hospital's central line-associated bloodstream infection (CLABSI) rate with the CLABSI rate at St. Somewhere Hospital, which is not a teaching hospital, and which has only a Medical/Surgical ICU. Our patients are higher risk! So how can we level the playing field? By comparing our hospital's SIR to St. Somewhere Hospital's SIR. But how does the SIR work?

We know, based on national NHSN data, what the average CLABSI rate is in each of the types of ICUs we are trying to compare and we can compare each of our hospitals' CLABSI rates to the national average to get the SIR. Essentially, we are asking, is our Burn ICU, for example, doing better than we would expect based on the experience of other Burn ICUs. The way that is calculated (don't worry – NHSN does these calculations for you!) is by looking at how many central line-days we had in our Burn ICU and determining the number of CLABSI we would have expected to see if our Burn ICU had the same rate as the national average for Burn ICUs, and then comparing the number of CLABSI we expected with the number we actually had. The SIR is simply the number of cases we reported divided by the number of cases we expected. An SIR of 1 means we saw exactly the number of cases that we would have expected. An SIR greater than 1 means we saw *more* cases than we would have expected – we have room for improvement. An SIR less than 1 means we saw *fewer* cases than we would have expected – our focus on prevention is paying off and we need to keep up our work to keep that SIR low. Once we calculate the SIR for our Burn ICU, we can calculate the SIR for our other locations, or even calculate an SIR for our entire facility, and then compare it to the SIR for St. Somewhere Hospital. Since we have controlled for the differences in risk between our populations, the comparison is much fairer. We are no longer asking which facility has fewer infections; now we are asking how is each facility doing in relation to the national average. Is one facility doing better than we might expect? If they are both doing better than we would expect, which is doing the best?

The risk factors the SIR controls for when calculated for CLABSI are the type of unit and for medical/surgical ICUs, the teaching status and bed size of the hospital. The SIR for Surgical Site Infections is a little more complicated to calculate (again, don't worry – NHSN does the actual calculations for you!) and is based on specific patient risk factors (e.g., age, BMI, duration of the surgery, etc.) for the specific type of surgery you are monitoring. Your SIR is available in NHSN under the Analysis functions, but there are a couple of things you should be aware of if you go looking for it. First, the SIR is calculated in NHSN by half-years. It can only be calculated for a time period that is fully complete, so if you just started reporting your CLABSI data in January 2010, the first time you will be able to check your facility's SIR will be after you've entered all your data for January through June 2010. If you have a small ICU and you don't have enough central line-days for a stable comparison, NHSN will not calculate an SIR; however you might be able to calculate one for a longer time frame, like a year. Finally, if you want to get your SIR for your SSIs, remember that the number of expected infections is based on your individual procedure denominator data. If you have any procedure records that are missing risk factors that NHSN needs to calculate the SIR, they will be excluded from the calculation, and may artificially inflate your SIR by decreasing your denominator. There is a report in NHSN that you can run to help you identify and fix these records.

More information on the SIR is available at:

http://www.cdc.gov/nhsn/PDFs/Newsletters/NHSN_NL_OCT_2010SE_final.pdf