

Healthcare-associated Infections (HAIs)

CDC's National Healthcare Safety Network (NHSN) Healthcare-associated Infections Summary Data Reports Q and A

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The National and State Healthcare-associated Infections (HAI) Standardized Infection Ratio Reports give a snapshot of where the country stands in its efforts to prevent HAIs. They provide both national and state-specific information and are based on data that is reported to CDC's National Healthcare Safety Network (NHSN). Healthcare facilities using NHSN have real-time access to their own best-in-class performance data. This annual report provides analysis of national and state-level HAI data to help identify areas of HAI prevention.

How can these reports be used?
These data are being used for two important purposes. From the national perspective, these reports provide information on overall public health in the U.S. Department of Health and Human Services Action Plan to Reduce Healthcare-associated Infections. The state-level information helps leaders identify areas of state-level HAI prevention progress and state-level strengths or areas that need attention.

What do these reports tell us about how states are doing at preventing central-line associated bloodstream infections (CLABSI)?
A central line is a tube that is placed in a large vein of a patient's neck or chest to give important medical treatment. When not used in correctly or kept clean, central lines can become a doorway for germs to enter the blood and cause serious infections. These reports show decreases in national central-line associated bloodstream infections (CLABSI) incidence. As part of the National Action Plan to Prevent Healthcare-associated Infections, NHSN has set a goal of reducing the national SIR for CLABSI from 1.14 in 2011 to 0.97 by the end of 2015. The data included in this report indicate that facilities are making steady progress towards the goal of a 1.0 SIR.

What do these reports tell us about progress in preventing surgical site infections (SSIs)?
Through a national analysis of the infection rate linked to the most common surgical procedures, including hip arthroplasty, knee arthroplasty, cesarean section, hysterectomy, cardiac surgery, performance retractor bypass surgery, abdominal aortic aneurysm repair, hip surgery, neck surgery, abdominal hysterectomy, and prostatectomy, NHSN reported in 2011 that most surgical procedures met or exceeded the target. As of 2011, SSIs are down nationally by 1.7 percent. As of 2011, CAUTI are down nationally by 7.7 percent.

What do these reports tell us about progress in preventing catheter-associated urinary tract infections?
Although this report shows a national decrease in catheter-associated urinary tract infections (CAUTI) between 2010 and 2011, while there was no additional reduction between 2010 and 2011, while there were improvements in infection among primary care settings between 2010 and 2011. The overall progress in reducing catheter-associated urinary tract infections (CAUTI) remains concerning because these infections drive antibiotic use, drive antibiotic resistance, and are a significant risk factor for complications including a deadly disease caused by the bacteria *Candida* infection.

What is a Standardized Infection Ratio (SIR)?
The standardized infection ratio (SIR) is a benchmark measure used to track HAIs at a national, state, or facility level over time. The SIR adjusts for the fact that each healthcare facility treats different types of patients. For example, the proportion of HAIs at a hospital with a large burn unit is higher when the patients are more at risk of acquiring infections (cannot be directly compared to a facility without a burn unit).

The method of calculating an SIR is similar to the method used to calculate the Standardized Mortality Ratio (SMR), a statistic widely used in public health to analyze mortality data. In HAI data analysis, the SIR compares the actual number of HAIs in a facility or state with the baseline U.S. experience (i.e., standard population), adjusting for several risk factors that have been found to be most associated with differences in infection rates.

How should the SIR be interpreted?
If the SIR is 1, then the number of infections reported is both the same as the number of predicted infections. Another way to think about this: if the SIR is 1, then we saw the same number of infections in 2011 as we did predict for the baseline period - no progress has been made in reducing infections above the baseline period.
If the SIR is less than 1, then there were fewer infections reported in 2011 than what we would have predicted given the baseline data. In other words, progress has been made since the baseline period.
If the SIR is greater than 1, then there were more infections reported in 2011 than what we would have predicted given the baseline data.

SIR less than 1	SIR greater than 1
<ul style="list-style-type: none">• Fewer infections than what would have been predicted given baseline data.• Infections have been prevented since the baseline period.• If there is an SIR of 0.85 (patient reduction), for example, the SIR of 0.85 means that there were a 15 percent reduction in 2011 from the baseline period.	<ul style="list-style-type: none">• More infections than what would have been predicted given baseline data.• Infections have increased since the baseline period.• SIR values > 1 patient increase. For example, the SIR of 1.25 means that there were a 25 percent increase in 2011 from the baseline period.

What does it mean that some states are violating their data?
Healthcare facilities and states are encouraged to validate, or double-check, their infection data. In many cases, validating data involves completing an assessment to ensure that all of the required reports were captured in the system. Currently, states that are validating are using different systems. For example, some may evaluate one facility while others may look more broadly. CDC is exploring ways to improve the validation process and to develop standards for validation that can assist states in their validation efforts.

Why do some states have a higher SIR?
States that validate data and employ other advanced tools for assessing HAIs are likely to discover and report more infections. For this reason, we have indicated in the report those states that are violating data so that these efforts are taken into consideration when evaluating the state's performance.

What does "modified number of infections" mean?
The predicted number is an estimated number of HAIs based on infections reported to NHSN during January 2009-December 2008. This is known as the standard population. This number is not adjusted and includes data captured from facilities under state mandates or not. To calculate the SIR, CDC compares the number of infections that occurred during a certain time period to the number of infections that would be expected based on the standard population.

How do these reports adjust for different types of patients seen in different hospitals?
Hospitals may vary different patients, referred to as a hospital's patient mix. The CLABSI and CAUTI SIRs are adjusted by type of operation, care location, hospital affiliation with a medical center, and bed size. The SSI SIRs are adjusted by procedure, site, patient adjustment, and the type of surgery. Surgical wound class, use of endoscopic, status as an operation, patient age, and patient assessment at time of establishment (ASA scores) to provide the best possible adjustment for differences in patient mix within each type of surgery.

Why are some reasons a state SIR is higher than 1.0?
In many cases, high SIRs simply reflect a need for stronger HAI prevention efforts. Several other factors may also play a role such as better validation of reported data leading to the discovery and reporting of more infections.
It is important to note that an SIR of less than 1.0 is a positive finding, but it does not mean that the work is done. Research has shown that rates of HAI can be reduced further.

Why are some reasons a state SIR is lower than 1.0?
In many cases, low SIRs are a reflection of robust HAI prevention strategies. These approaches are ongoing, and CDC is working with each facility and states to learn and share best practices. CDC is also providing the right mix of data, and support to help states. It is important to note that the reports are not meant to compare states. These reports are meant to look at how an individual state is doing and to show a state's prevention over time.
It is important to note that an SIR of less than 2.0 is a positive finding, but it does not mean that the work is done. Research has shown that rates of HAI can be reduced further.

What is CDC doing about low-performing healthcare facilities?
The report is the first to provide information on the patient mix environments that are at risk of having facility-specific performance. For each major location group and preventive category, roughly 25% of the facilities reported an SIR or SIR ratio significantly greater than 1.0, or significantly more infections were reported than predicted. These include:

- 54 facilities who had SIRs significantly higher than 1.0 for central-line-associated bloodstream infections
- 133 facilities who had SIRs significantly higher than 1.0 for catheter-associated urinary tract infections
- 25 facilities who had SIRs significantly higher than 1.0 for surgical site infections associated with hip arthroplasty
- 30 facilities who had SIRs significantly higher than 1.0 for surgical site infections associated with knee arthroplasty
- 20 facilities who had SIRs significantly higher than 1.0 for surgical site infections associated with open surgery
- 15 facilities who had SIRs significantly higher than 1.0 for surgical site infections associated with abdominal hysterectomy

There are relatively small numbers of facilities compared to the total number of facilities reporting in 2011 (e.g., 3,488 reporting CLABSI, 1,952 reporting CAUTI, 2,130 reporting SSI). However, having efforts on these facilities may be one strategy to ensure that prevention resources are utilized most wisely at critical points.
CDC is contacting the facilities that have significantly high SIRs and connecting them with existing prevention initiatives including:

- State health department collaboratives
- OHP initiatives funded by the Agency for Healthcare Research and Quality
- Partnership for Patients initiative
- CMS Quality Improvement Organizations

By moving these hospitals towards more prevention, we hope to see even greater reductions next year.

What is CDC doing about the states with high SIR?
CDC is taking a proactive approach with all states. The agency offers training and technical assistance to assist in high-level identify and assist healthcare facilities with performance data that reflect effective prevention work. Understanding the state-level data to implement prevention efforts in areas where patients need and to show prevention impact over time.

What is the benefit of state HAI reporting?
CDC believes public reporting of HAIs are an important component of national HAI prevention and control. CDC believes public reporting of HAIs will be important when healthcare facilities and clinicians are aware of their infection issues and implement concrete strategies to prevent them, rates of certain hospital infections can be decreased by more than 70 percent. Infection data can help healthcare facilities and public health agencies the knowledge needed to design, implement, and evaluate prevention strategies that protect patients and save lives.

Why is NHSN a good surveillance tool to measure HAI?
The benefits of NHSN include standardized methods and definitions, online training modules, user support, and facility comparison tool. Nearly all U.S. hospital and ambulatory care facilities successfully report to NHSN, making it the largest and most comprehensive reporting system available.

Does my state have a legislative mandate to report healthcare-associated infection data?
Currently, 13 states and the District of Columbia have reporting requirements. In addition to the District of Columbia, 28 states use NHSN to make their reporting requirements. Please see the [state-based reporting information website](#) for more information.

My facility wants to do more to track and reduce infection rates. How can I find out more information?
NHSN offers resources to track and prevent HAIs, which can help improve patient safety. For more information about NHSN and enrollment in NHSN, facilities should contact their local or state health department and visit [CDC's NHSN website](#). CDC can provide enrollment tools and guidance to assist facilities and states.