Healthcare-associated Infections (HAIs)

Healthcare-associated Infections
- HAIs: The Burden
- Monitoring HAIs
- National Healthcare Safety Network (NHSN)
- Emerging Infections Program
- NHSN National HAI Reports
- NHSN State HAI Reports
- Frequently Asked Q and A: Summary Data Reports
- Types of Infections
- Diseases and Organisms
- Preventing HAIs
- Map: HAI Prevention Activities
- Research
- Patient Safety
- Outpatient Settings
- Long-term Care Settings
- Laboratory Resources
- Outbreak and Patient Notifications
- Widgets, Buttons and Badges
- Multistate Meningitis Outbreak

Related Links
- Antibiotic / Antimicrobial Resistance
- Dialysis Safety
- Dialysis BSI Prevention Collaborative
- Get Smart For Healthcare
- Get Smart: Know When Antibiotics Work
- Hand Hygiene in Healthcare Settings
- Healthcare Infection Control Practices Advisory Committee (HICPAC)
- Injection Safety
- Medication Safety
- MRSA Infections
- National Healthcare Safety Network (NHSN)
- Sharps Safety for Healthcare Settings

Healthcare-associated Infections > Monitoring HAIs

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

- What are these reports?
- How can these reports be used?
- What do these reports tell us about how states are doing at preventing Central line-associated bloodstream infections (CLABSIs)?
- What do these reports tell us about progress in preventing surgical site infections (SSIs)?
- What do these reports tell us about progress in preventing catheter-associated urinary tract infections?
- What is a standardized infection ratio (SIR)?
- How should the SIR be interpreted?
- What does it mean that some states are validating their data?
- Will a state that looks hard for infections have a higher SIR?
- What does "predicted number of infections" mean?
- How do these reports adjust for different types of patients seen in different hospitals?
- What are some reasons a state SIR is higher than 1.0?
- What are some reasons a state SIR is lower than 1.0?
- What is CDC doing about low-performing healthcare facilities?
- What is CDC doing about the states with high SIRs?
- What is the benefit of state HAI reporting?
- Why is NHSN a good surveillance tool to measure HAIs?
- Does my state have a legislative mandate to report healthcare-associated infection data?
- My facility wants to do more to track and reduce infection rates. How can I find out more information?

What are these reports?
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 data for local improvement efforts. This annual report provides analysis of national and state-level HAI data to help identify gaps in HAI prevention.

Top of page

How can these reports be used?
These data are being used for two important purposes. From the national perspective, these reports measure progress toward HAI prevention goals outlined in the U.S. Department of Health and Human Services Action Plan to Prevent Healthcare-associated Infections. The state level information helps assess impact of state-based HAI prevention programs and also alerts states if there are certain facilities with significantly more infections than other local facilities.

Top of page

What do these reports tell us about how states are doing at preventing central line-associated bloodstream infections (CLABSIs)?
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 put in correctly or kept clean, central lines can become a freeway for germs to enter the body and cause serious bloodstream infections. These reports show decreases in national central line-associated bloodstream infection (CLABSI) incidence. As part of the National Action Plan to Prevent Healthcare-Associated Infections, HHS has set a goal of reducing central line-associated bloodstream infections by 50 percent by the end of 2013. The data included in this report indicate that facilities are making steady progress towards the goal of a 50 percent reduction in central line-associated bloodstream infections over the course of five years.

> HHS has a national goal to reduce CLABSI by 50 percent by the end of 2013.
>
> As of 2011, CLABSI are down nationally by 41 percent.

These encouraging findings reflect the work of clinicians and facilities; local, state, and federal government; and cross-cutting partnership groups that have taken on CLABSI prevention efforts. We hope that all states and healthcare facilities will be motivated to continue and strengthen efforts preventing CLABSIs.

Top of page

What do these reports tell us about progress in preventing surgical site infections (SSIs)?
The report also includes a national snapshot of the infection risk linked to ten common surgical procedures, including: hip arthroplasty, knee arthroplasty, coronary artery bypass graft, cardiac surgery, peripheral vascular bypass surgery, abdominal aortic aneurysm repair, colon surgery, rectal surgery, abdominal hysterectomy, and vaginal hysterectomy. Although in 2011 there were national improvements from baseline in overall surgical site infections (SSIs) as well as for 9 of the 10 procedure types, there was a wide range in procedure-specific improvements. When limited to continuous reporting hospitals, only SSIs following hip arthroplasty improved between 2010 and 2011. This demonstrates substantial opportunities to improve prevention efforts across all surgical procedures.

> HHS has a national goal to reduce SSIs by 25 percent by the end of 2013.
>
> As of 2011, SSIs are down nationally by 17 percent.

Top of page

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 2009 and 2010, there was no additional reductions between 2010 and 2011. While there were modest reductions in infections among patients in general wards, there was essentially no additional reduction in critical care locations between 2010 and 2011. The slower progress in reducing catheter-associated urinary tract infections among ICU patients is concerning because these infections drive antibiotic use. While antibiotics are critical for treating bacterial infections, they also put patients at risk for complications including a deadly diarrhea caused by the bacteria *Clostridium difficile*.

> HHS has a national goal to reduce CAUTI by 25 percent by the end of 2013.
>
> As of 2011, CAUTI are down nationally by 7 percent.

Top of page

What is a standardized infection ratio (SIR)?
The standardized infection ratio (SIR) is a summary 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 experience with HAIs at a hospital with a large burn unit (a location where 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.

Top of page

How should the SIR be interpreted?
If the **SIR is 1**, then the number of infections reported to NHSN is 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 during the baseline period – no progress has been made in reducing infections since 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
• Fewer infections than what would have been predicted given baseline data	• More infections than what would have been predicted given baseline data
• Infections have been prevented since the baseline period	• Infections have increased since the baseline period
• 1 minus the SIR = percent reduction: For example, the SIR of 0.80 means that there was a 20 percent reduction in 2011 from the baseline period	• SIR minus 1 = percent increase: For example, the SIR of 1.25 means thatg there was a 25 percent increase in 2011 from the baseline period.

Top of page

What does it mean that some states are validating 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 infections 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 working with states to determine best practices and to develop standards for validation that can assist states in their validation efforts.

Top of page

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

Top of page

What does "predicted number of infections" mean?
The predicted number is an estimated number of HAIs based on infections reported to NHSN during January 2006–December 2008. This is known as the standard population. This number is risk adjusted and includes data collected from all 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 in this standard population.

Top of page

How do these reports adjust for different types of patients seen in different hospitals?
Hospitals may see different patients, referred to as a hospital's patient mix. The CLABSI and CAUTI SIRs are adjusted by type of patient care location, hospital affiliation with a medical school, and bed size of the patient care location. Other factors, such as facility bed size, were not associated with differences in the risk of infection and, therefore, were not included in the SIR. The SIRs are risk adjusted for this report specifically for this report, evaluating all available procedure-related risk factors (e.g., duration of surgery, surgical wound class, use of endoscopes, status as re-operation, patient age, and patient assessment at time of anesthesiology [ASA score]) to provide the best possible adjustment for differences in patient-mix within each type of surgery.

Top of page

What 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 by hospitals.

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 HAIs can be reduced further.

Top of page

What 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 scenarios are exciting, and CDC is working with such facilities and states to learn and share best practices. CDC is also considering the degree, if any, of under-reporting of HAIs in these data. 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 track a state's prevention over time.

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Top of page

What is CDC doing about low-performing healthcare facilities?
The report is the first to provide some perspective on the potential improvements that can occur with facility-specific engagement. For each major location group and procedure category, roughly 2-9% of the facilities reported standardized infection ratios (SIRs) significantly greater than 1.0, or significantly more infections were observed 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 colon surgery
- 15 facilities who had SIRs significantly higher than 1.0 for surgical site infections associated with abdominal hysterectomy

These are relatively small numbers of facilities compared to the total number of facilities reporting in 2011 (e.g., 3,468 reporting CLABSI, 1,802 reporting CAUTI, 2,130 reporting SSIs). However, focusing efforts on these facilities may be one strategy to ensure that prevention resources are utilized most wisely in coming years.

CDC is contacting the facilities that have significantly high SIRs and connecting them with existing prevention initiatives including:

- State health department collaboratives
- CUSP 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.

Top of page

What is CDC doing about the states with high SIRs?
CDC is taking a proactive approach with all states. The agency offers training and technical assistance to states to help them identify and assist healthcare facilities whose performance does not reflect effective prevention work. Understanding SIRs will allow states to implement prevention efforts in areas where problems exist and to show prevention impact over time.

Top of page

What is the benefit of state HAI reporting?
CDC believes public reporting of HAIs is an important component of national HAI elimination and overall healthcare transparency efforts. Research shows that 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 give healthcare facilities and public health agencies the knowledge needed to design, implement, and evaluate prevention strategies that protect patients and save lives.

Top of page

Why is NHSN a good surveillance tool to measure HAIs?
The benefits of NHSN include standard methods and definitions, online training modules, user support, and facility comparison tools. Nearly all U.S. hospitals and dialysis facilities successfully report to NHSN, making it the largest HAI reporting system available.

Top of page

Does my state have a legislative mandate to report healthcare-associated infection data?
Currently, 33 states and the District of Columbia have reporting. In addition to the District of Columbia, 30 states use NHSN to meet their reporting requirements. Please see the state-based HAI prevention website for more information.

Top of page

My facility wants to do more to track and reduce infection rates. How can I find out more information?
NHSN provides a secure way to track and analyze HAI data, which can help improve infection rates. For more information about NHSN and enrollment in NHSN, facilities should contact their local or state health department and visit CDC's NHSN web site. CDC also provides prevention tools and guidelines to assist facilities and states.

Top of page

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National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)
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Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC-INFO

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