

# Healthcare-associated Infections (HAIs)

**Healthcare-associated Infections**

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## CDC's Healthcare-Associated Infection Progress Report: Questions and Answers

**About the Reports**  
CDC's National Healthcare Safety Network (NHSN) enables healthcare facilities to collect and report healthcare-associated infection (HAI) data. CDC, states, healthcare facilities, and other patient safety organizations and advocates use this data to identify problem areas, measure progress of prevention efforts, and ultimately eliminate HAIs.

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**Related Links**

- [Antibiotic / Antimicrobial Resistance](#)
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- [Get Smart: Know When Antibiotics Work](#)
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## What is the healthcare-associated infection progress report?

CDC's HAI progress report gives a snapshot of how each state and the country is doing in eliminating HAIs. These reports describe the progress in preventing for the following types of HAIs:

- **Central line-associated bloodstream infections (CLABSI)** happen when a central line (a tube that a doctor usually places in a large vein of a patient's neck or chest to give important medical treatment) isn't put in correctly or kept clean. This allows the central line to become a freeway for germs to enter the body and cause serious bloodstream infections.
- **Surgical site infections (SSI)** are infections that occur after surgery in the part of the body where the surgery took place.
- **Catheter-associated urinary tract infections (CAUTI)** are infections that involve any part of the urinary system, including urethra, bladder, ureters, and kidney.

The reports are based on data reported to the CDC's NHSN. NHSN provides a secure way for healthcare facilities to track HAI data. Researchers use the data to calculate a standardized infection ratio (SIR) for each reporting state and facility.

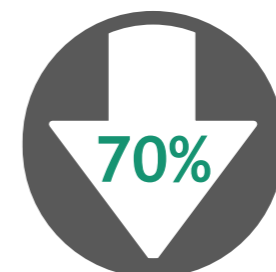
## How is this report used to prevent healthcare-associated infections?

Federal, state, and local government; healthcare facilities; and patient safety organizations and advocates can use these data to lower HAI rates.

- From a national perspective, the data measure progress toward the HAI prevention goals outlined in the U.S. Department of Health and Human Services (HHS) [Action Plan to Prevent Healthcare-associated Infections](#).
- At the state level, the information helps assess the impact of [state-based HAI prevention programs](#). It also indicates any local facilities that have significantly more infections than others in the area.

## What is the benefit of reporting healthcare-associated infection data?

Research shows that when healthcare facilities and clinicians are aware of infection problems and take specific steps to prevent them, **rates of certain HAIs can decrease by more than 70 percent.**



Infection data can give healthcare facilities and public health agencies the knowledge they need to design, implement, and evaluate prevention strategies that protect patients and save lives.

CDC believes that public reporting of HAI rates is an important part of overall healthcare transparency efforts and of national HAI elimination.

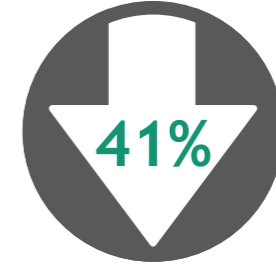
## What makes the National Healthcare Safety Network a good measurement tool?

With more than 12,000 healthcare facilities participating, NHSN is the largest HAI reporting system in the United States. NHSN provides standard methods and definitions, online training modules, user support, and facility comparison tools. Nearly all U.S. hospitals and dialysis facilities are able to successfully report to NHSN, making it an important tool for national HAI tracking and elimination.

## Report Findings

### Have we made progress in reducing central line-associated bloodstream infections?

The reports show a national decrease in the incidence of central line-associated bloodstream infections (CLABSI). **As of 2011, CLABSIs 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 to prevent CLABSI.



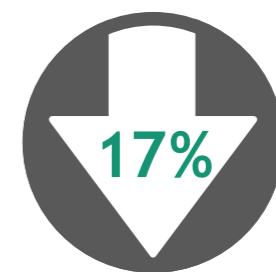
A central line is a tube placed in a large vein of a patient's neck or chest to give important medical treatment. When not put in correctly or kept clean, a central line can become a highway for germs to enter the body and cause a serious bloodstream infection.

**HHS has set a goal of reducing CLABSI nationally by 50 percent by the end of 2013.**



### Have we made progress in reducing surgical site infections?

**As of 2011, surgical site infections (SSI) are down nationally by 17 percent;** however, there is a wide variation in SSI rates for specific surgical procedures. In hospitals who have been continuously reporting to CDC's NHSN, only SSIs following hip arthroplasty decreased from 2010 to 2011. This means we, as a healthcare community, have substantial opportunities to improve prevention efforts across many surgical procedures.



The report includes a national snapshot of the infection risk linked to the following [common surgical procedures](#):

- Hip or knee arthroplasty
- Coronary artery bypass graft
- Cardiac surgery
- Peripheral vascular bypass surgery
- Abdominal aortic aneurysm repair
- Colon or rectal surgery
- Abdominal or vaginal hysterectomy

**HHS has set a goal of reducing SSIs nationally by 25 percent by the end of 2013.**

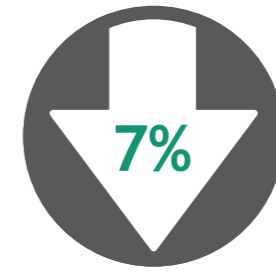




## Have we made progress in reducing catheter-associated urinary tract infections?

**As of 2011, catheter-associated urinary tract infections (CAUTI) are down nationally by 7 percent.**

The reports show a [national decrease in \(CAUTI\)](#) from 2009 to 2010. There was no additional reduction from 2010 to 2011. CAUTI rates were down moderately among patients in general wards, but there was basically no reduction of CAUTI rates in critical care patients between 2010 and 2011.



Reducing CAUTI among critical care patients is a special concern because these infections drive antibiotic use. While antibiotics are essential for treating bacterial infections, they also increase patients' risk for complications. One potentially deadly complication is severe diarrhea caused by the bacteria *Clostridium difficile*.

**HHS has a goal of reducing CAUTI nationally by 25 percent by the end of 2013.**



## What is the standardized infection ratio?

The standardized infection ratio (SIR) is a summary measure used to track HAI over time. It compares actual HAI rates in a facility or state with baseline rates in the general U.S. population. The CDC adjusts the SIR for risk factors that are most associated with differences in infection rates.

In other words, the SIR takes into account that different healthcare facilities treat different types of patients. For example, HAI rates at a hospital that has a large burn unit (where patients are at higher risk of acquiring infections) can't be directly compared to a hospital that doesn't have a burn unit.

## How does the CDC calculate the standardized infection ratio?

The method of calculating an SIR is similar to the method of calculating the standardized mortality ratio (SMR), a statistic that's widely used by public health researchers to analyze mortality data.

The SIR is adjusted differently depending on the infection rate being measured. The SIR for CLABSI and CAUTI are adjusted by:

- Type of patient care location
- Hospital affiliation with a medical school
- Bed size of the patient care location

Other factors, such as facility bed size, aren't associated with differences in the SIR, so they aren't part of the risk adjustment.

The SIR for SSI takes into account all known procedure-related risk factors, in order to adjust for patient differences within each type of surgery. Surgical risk factors include:

- Duration of surgery
- Surgical wound class
- Use of endoscopes
- Re-operation status
- Patient age
- Patient assessment at time of anesthesiology

## What does the standardized infection ratio number mean?

### If the SIR is less than 1:

- Infection rates have decreased since the baseline period.
- The number of infections reported in 2011 is lower than the number of predicted infections.
- Usually, low SIR reflect the results of robust HAI prevention strategies. These scenarios are exciting, and CDC is working with facilities and states to learn and share best practices.
- CDC is also considering the degree, if any, of underreporting in the data. It's important to note that these reports aren't meant to compare states — they're meant to track the results of each state's prevention efforts over time.
- It's also important to note that while an SIR of less than 1 is a positive finding, it doesn't mean the work is done. We've made progress toward reducing infections, but research has shown that we can reduce HAI rates even more.

### If the SIR is 1:

- No progress has been made toward reducing infections since the baseline period.
- The number of infections reported in 2011 is the same as the number of predicted infections.

### If the SIR is greater than 1:

- Infection rates have increased since the baseline period. The number of infections reported in 2011 is higher than the number of predicted infections.
- A high SIR usually reflects a need for stronger HAI prevention efforts.
- Other factors may also play a role in a high SIR, such as data validation that leads to the discovery and reporting of more infections than in previous years.

The CDC uses the SIR to figure out the percent change in infection rates for each type of HAI. The table below shows the method for calculating the percent change.

To calculate a percent REDUCTION (SIR less than 1):	To calculate the percent INCREASE (SIR greater than 1):
<p>1 minus the SIR = percent reduction.</p> <p>For example, with an SIR of 0.80:  <math>1.00 - 0.80 = 0.20</math>  <math>0.20 = 20\%</math></p> <p>So, an SIR of 0.80 means there was a <b>20% reduction</b> in 2011 from the baseline period.</p>	<p>SIR minus 1 = percent increase.</p> <p>For example, with an SIR of 1.25:  <math>1.25 - 1.00 = 0.25</math>  <math>0.25 = 25\%</math></p> <p>So, an SIR of 1.25 means there was a <b>25% increase</b> in 2011 from the baseline period.</p>

## What’s the “predicted number of infections”?

The predicted number of infections (also called the standard population) is an estimate based on infections reported to NHSN in January 2006 through December 2008. The number is risk-adjusted and includes data from all facilities, whether or not they’re under state mandates. To calculate a state or facility’s SIR for a certain time period, CDC compares the standard population number to the number of infections reported in that time period.

## Prevention Initiatives

### How many healthcare facilities have a high standardized infection ratio?

In each major location group and procedure category, between 2% and 9% of the facilities reported SIR significantly greater than 1. An SIR greater than 1 means that more infections were observed than predicted.

The following table shows the total number of facilities that had an SIR significantly greater than 1 for different types of HAIs. These numbers are relatively small compared to the total number of facilities that reported data in 2011.

Type of HAI	Number of facilities with high SIR for this HAI in 2011
Central line-associated bloodstream infections (CLABI)	54
Catheter-associated urinary tract infections (CAUTI)	133
Surgical site infections (SSI) associated with hip arthroplasty	25
Surgical site infections (SSI) associated with knee arthroplasty	30
Surgical site infections (SSI) associated with colon surgery	20
Surgical site infections associated with abdominal hysterectomy	15

In coming years, we can focus prevention efforts on these facilities to make efficient use of resources.

## What is CDC doing about healthcare facilities with high standardized infection ratios?

CDC is contacting these facilities and connecting them with prevention initiatives such as:

- State health department collaboratives
- Comprehensive Unit-based Safety Program (CUSP)
- Partnership for Patients
- CMS Quality Improvement Organizations

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

## What is CDC doing about states with high standardized infection ratio?

CDC is taking a proactive approach with all states. We offer training and technical assistance to help states identify and assist healthcare facilities whose performance doesn't show effective prevention work. We encourage states to monitor their SIR so they can aid prevention efforts in problems areas and measure the effects of prevention work over time.

## What is data validation and why is it important?

CDC encourages healthcare facilities and states to validate (double-check) the infection data they submit to NHSN. Validating data usually involves completing an assessment to ensure that all relevant infections were captured in the system.

Currently, different states use different systems to validate data. For example, some states only double-check the data from one facility while other states double-check more widely. CDC is working with states to determine best practices and develop effective validation standards.

## Will states that look harder for infections have higher standardized infection ratios?

States that validate data and use other advanced tools for detecting HAI are likely to discover and report more infections than states that don't use such tools. The reports indicate which states are validating data, so those efforts can be taken into account when the state's performance is evaluated.

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