



The 2015 National and State Healthcare-associated Infection Data Report

Executive Summary

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The Centers for Disease Control and Prevention (CDC) is committed to helping all Americans receive the best and safest care. Preventing healthcare-associated infections (HAIs) is a top priority for CDC and its partners in public health and healthcare. The following 2015 *National and State Healthcare-Associated Infections Data Report (2015 HAI Data Report)* uses the [updated national baseline \(https://web.archive.org/web/20180626084448/https://www.cdc.gov/nhsn/2015rebaseline/index.html\)](https://web.archive.org/web/20180626084448/https://www.cdc.gov/nhsn/2015rebaseline/index.html) to provide a summary of select HAIs across four healthcare settings; acute care hospitals (ACHs), inpatient rehabilitation facilities (IRFs), long-term acute care hospitals (LTACHs) and critical access hospitals (CAHs). IRFs include hospitals, or part of a hospital, that provide intensive rehabilitation services using an interdisciplinary team approach. LTACHs provide treatment for patients who are generally very sick and stay, on average, more than 25 days. The designation of CAH is assigned by the Centers for Medicare and Medicaid Services (CMS) to hospitals, which have 25 or fewer acute care inpatient beds and that maintain an annual average length of stay of 96 hours or less for acute care patients.

The data included in this report were submitted to CDC's National Healthcare Safety Network (NHSN), the nation's most widely used HAI tracking system. More than 23,000 hospitals and other healthcare facilities provide data to NHSN. This vital information is then used for reporting, including for this HAI Report, and for care improvement by facilities, states, regions, quality groups, and national public health agencies including CDC.

This report, along with the detailed technical tables, provide national and state-level data about HAI incidence during 2015. For detailed methods, references, and definitions please refer to the [Technical Appendix](#) and [Glossary](#).

To help improve healthcare quality and safeguard against adverse healthcare events, CDC tracks infections, responds to outbreaks, provides infection prevention expertise and guidelines, spearheads prevention research, and serves as the nation's gold-standard microbiology laboratory for the pathogens most often implicated in HAIs. NHSN is critical in this work.

The *2015 HAI Data Report* includes data on central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTIs), ventilator-associated events (VAEs), surgical site infections (SSIs), methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections, and *Clostridium difficile* (*C. difficile*)

events.

For each of the four healthcare settings, the report consists of national factsheets and detailed technical tables; the national factsheets provide a high-level view of HAIs at a national level, while the technical tables include additional statistics about HAIs, reporting mandates, and data validation efforts in each state and select US territories.

The report's national factsheets, as well as the detailed technical tables, include infection-specific standardized infection ratios (SIRs), which measure progress in reducing HAIs compared to a baseline time period. This report is the first iteration to show SIRs calculated using the 2015 updated national baseline and risk adjustment models. Because of this, the report makes no comparisons of 2015 data to the previous year. A measure of progress, under the new 2015 baseline, will be made in next year's report when 2016 data will be compared to 2015 data. In the interim, an assessment of historic and ongoing prevention progress through 2016, using a combination of new and old national baselines, is presented for ACHs in the accompanying *Healthcare-associated Infections in the United States, 2006-2016: A Story of Progress*.

In addition to the SIRs, the *2015 HAI Data Report* introduces the standardized utilization ratios (SURs), also using the 2015 baseline and risk adjustment calculations. The SUR is a risk-adjusted summary measure that is used to describe device use by comparing the number of observed device days to the number of predicted device days. More information about the new 2015 SIR baseline can be found here: [Paving the Path Forward: 2015 Rebaseline](#)

This report includes national data for the following HAI and facility types:

Acute Care Hospitals (ACHs)

- CLABSI
- CAUTI
- VAE
- IVAC Plus
- SSI
- *C. difficile*
- MRSA bacteremia

Inpatient Rehabilitation Facilities (IRFs)

- CLABSI
- CAUTI
- *C. difficile*
- MRSA bacteremia

Long Term Acute Care Hospitals (LTACH)

- CLABSI
- CAUTI
- VAE
- IVAC Plus
- *C. difficile*

- MRSA bacteremia

Footnote: National SSI data includes 39 inpatient surgical procedure categories reported to NHSN.

On the state and territories level among acute care hospitals:

- 29 states performed **better** than the national SIR on at least two infection types
- 11 states performed **better** than the national SIR on at least three infection types
- 3 states performed **better** than the national SIR on at least four infection types
- 25 states performed **worse** than the national SIR on at least two infection types
- 11 states performed **worse** than the national SIR on at least three infection types
- 3 states performed **worse** than the national SIR on at least four infection types

The number of states and territories performing better than the nation by infection type:

Acute Care Hospitals (ACHs)

- CLABSI – 15 states
- CAUTI – 13 states
- VAE – 13 states
- SSI, colon surgery – 9 states
- SSI, abdominal hysterectomy – 3 states
- *C. difficile* infections – 16 states
- MRSA bacteremia – 19 states

Inpatient Rehabilitation Facilities (IRFs)

- CLABSI – 1 state
- CAUTI – 5 states
- *C. difficile* infections – 7 states
- MRSA bacteremia – 1 state

Long Term Acute Care Hospitals (LTACH)

- CLABSI – 7 states
- CAUTI – 8 states
- VAE – 3 states
- *C. difficile* – 5 states
- MRSA bacteremia – 2 states

The number of states and territories performing worse than the nation by infection type:

Acute Care Hospitals (ACHs)

- CLABSI – 13 states
- CAUTI – 12 states

- VAE – 19 states
- SSI, colon surgery – 8 states
- SSI, abdominal hysterectomy – 4 states
- *C. difficile* infections – 15 states
- MRSA bacteremia – 11 states

Inpatient Rehabilitation Facilities (IRFs)

- CLABSI – 3 states
- CAUTI – 6 states
- *C. difficile* infections – 6 states

Long Term Acute Care Hospitals (LTACH)

- CLABSI – 6 states
- CAUTI – 10 states
- VAE – 4 states
- *C. difficile* – 8 states
- MRSA bacteremia – 3 states

Healthcare-associated infections impact thousands of patients and their families each year, demonstrating the need for improved infection prevention in U.S. healthcare facilities. Steps can be taken to control and prevent healthcare-associated infections in a variety of settings.

Full engagement between local, state and federal public health agencies and their partners in the healthcare sector is vital to sustaining and extending HAI surveillance and prevention progress. CDC will continue its prevention, tracking, lab, and guideline work to push the country further toward the goal of eliminating HAIs.

2015 HAI Data Report

National Factsheets

- [Acute Care Hospitals – 2015 HAI Data Report National Factsheet](#) [PDF – 727 KB]
- [Long Term Acute Care Hospitals – 2015 HAI Data Report National Factsheet](#) [PDF – 385 KB]
- [Inpatient Rehabilitation Facilities – 2015 HAI Data Report National Factsheet](#) [PDF – 429 KB]

State Factsheets

Alabama

- [Alabama ACH Factsheet](#) [PDF – 553 KB]
- [Alabama LTACH Factsheet](#) [PDF – 553 KB]

- [Alabama IRF Factsheet](#) [PDF – 553 KB]

Alaska

- [Alaska ACH Factsheet](#) [PDF – 548 KB]
- [Alaska LTACH Factsheet](#) [PDF – 548 KB]

- [Alaska IRF Factsheet](#) [PDF – 548 KB]

Arizona

- [Arizona ACH Factsheet](#) [PDF - 559 KB]
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- [Arizona IRF Factsheet](#) [PDF - 559 KB]
- [Arkansas ACH Factsheet](#) [PDF - 553 KB]

Arkansas

- [Arkansas LTACH Factsheet](#) [PDF - 553 KB]
- [Arkansas IRF Factsheet](#) [PDF - 553 KB]

California

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- [California LTACH Factsheet](#) [PDF - 548 KB]
- [California IRF Factsheet](#) [PDF - 548 KB]

Colorado

- [Colorado ACH Factsheet](#) [PDF - 609 KB]
- [Colorado LTACH Factsheet](#) [PDF - 609 KB]
- [Colorado IRF Factsheet](#) [PDF - 609 KB]

Connecticut

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- [Connecticut IRF Factsheet](#) [PDF - 610 KB]

Delaware

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- [Delaware LTACH Factsheet](#) [PDF - 541 KB]
- [Delaware IRF Factsheet](#) [PDF - 541 KB]

District of Columbia

- [District of Columbia ACH Factsheet](#) [PDF - 693 KB]
- [District of Columbia LTACH Factsheet](#) [PDF - 693 KB]
- [District of Columbia IRF Factsheet](#) [PDF - 693 KB]

Florida

- [Florida ACH Factsheet](#) [PDF - 546 KB]
- [Florida LTACH Factsheet](#) [PDF - 546 KB]
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Georgia

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Guam

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Hawaii

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Idaho

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Illinois

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Iowa

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Kansas

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Kentucky

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Louisiana

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Maine

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Maryland

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Montana

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Nebraska

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Nevada

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New Hampshire

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New Jersey

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New Mexico

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New York

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North Carolina

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North Dakota

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Ohio

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Oklahoma

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Oregon

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Pennsylvania

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Puerto Rico

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Rhode Island

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South Carolina

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South Dakota

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Tennessee

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Texas

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Utah

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Vermont

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Virgin Islands

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Virginia

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Washington

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West Virginia

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Wisconsin

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Wyoming

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- [Wyoming IRF Factsheet](#) [PDF - 541 KB]

Data Tables

- [Acute Care Hospitals – 2015 National and State HAI Data Report](#) [XLS - 524 KB]
- [Critical Access Hospitals – 2015 National and State HAI Data Report](#) [XLS - 313 KB]
- [Long Term Acute Care Hospitals – 2015 National and State HAI Data Report](#) [XLS - 121 KB]
- [Inpatient Rehabilitation Facilities – 2015 National and State HAI Data Report](#) [XLS - 99 KB]
- [Standardized Utilization Ratios – 2015 National and State HAI Data Report](#) [XLS - 79 KB]

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Technical Appendix

Methods

The *2015 National and State Healthcare-Associated Infections Data Report (2015 HAI Data Report)* presents data reported to the National Healthcare Safety Network (NHSN) for the calendar year 2015 using the [updated national baseline](#). The healthcare-associated infection data were reported in response to state or federal reporting requirements (via the Centers for Medicare and Medicaid Services, CMS)¹⁻³, or were reported voluntarily, from healthcare facilities in all 50 states, Washington, D.C., Virgin Islands, Guam, and Puerto Rico.

Data included in the annual report use standard NHSN definitions for central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTIs), ventilator-associated events (VAEs), surgical site infections (SSIs), laboratory-identified (LabID) methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream events, and LabID *Clostridium difficile* (*C. difficile*) events.⁴⁻⁸ To account for delayed reporting, 2015 data reported to NHSN through August 1, 2016 were included.

National and state data included in this report are shown separately for acute care hospitals (ACHs), long-term acute care hospitals (LTACHs), inpatient rehabilitation facilities (IRFs, including CMS-certified IRF units within a hospital), and critical access hospitals (CAHs).

The standardized infection ratios (SIRs) published in this report compare the observed number of infections reported to NHSN during 2015 to the predicted number of infections based on the updated 2015 national baseline and risk adjustment calculations, which apply to all HAI and facility types. The [risk adjustment methodology](#) [696 KB] used to produce the CLABSI, CAUTI, VAE, SSI, MRSA bacteremia, and *C. difficile* SIRs for all facility types are summarized in NHSN's SIR Guide.⁹ SSI data were risk adjusted using a logistic regression model (CDC's Complex Admission/Readmission model), and the device-associated and LabID event SIRs were risk adjusted using a negative binomial regression model. SIRs are only calculated when at least five healthcare facilities reported 2015 data for the specific stratum, and/or at least one infection is predicted to occur. A complete list of risk factors used in the calculation of all SIRs can be found in the technical [Data Tables](#) associated with this report. SIRs were assessed for statistical significance using a mid-p exact test.

In previous HAI progress reports, SIRs were calculated using historical national baselines and risk adjustment calculations.¹⁰ Due to several modifications to NHSN surveillance protocols since the historical baseline time periods, as well as changes in the size and service characteristics of facilities reporting to NHSN since that time, CDC updated the [SIR baselines and risk models](#) (<https://web.archive.org/web/20180626084448/https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>) for all HAI and facility types using 2015 data reported to NHSN. Additional information about the process of the rebaseline is located at <https://www.cdc.gov/nhsn/2015rebaseline/index.html> (<https://web.archive.org/web/20180626084448/https://www.cdc.gov/nhsn/2015rebaseline/index.html>). Because the *2015 HAI Data Report* is the first report in which national and state SIRs are calculated using the updated 2015 baseline, these 2015 SIRs cannot be compared to SIRs from the prior year. In future iterations of this report, SIRs will be compared to those from the prior year in order to assess progress over time. A separate report is available describing the 2015 SIRs calculated under the historical baselines.¹¹

The CLABSI, CAUTI, and VAE data shown in the *2015 HAI Data Report* are inclusive of data reported from all eligible locations within healthcare facilities, however the SIRs were also stratified by location type for critical care units (ICUs), neonatal critical care units (NICUs) (CLABSI only), and inpatient wards. For this report, "wards" included step-down units, mixed acuity units, and specialty care areas including hematology/oncology and bone marrow transplant units.

When sufficient data were available, national SSI SIRs were calculated for ACHs and CAHs for each of the 39 specific procedure categories specified by NHSN; the 10 select procedures that approximate the procedures included in the Centers for Medicare & Medicaid Services (CMS) Surgical Care Improvement Project (SCIP) are shown separately.

National SIRs were stratified by adult and pediatric patients. State-level SSI SIRs were calculated for 15 select procedures types, including those within the SCIP and additional procedure categories with a high volume of reported procedures. Due to insufficient pediatric SSI data at the state-level, the state SSI SIRs are calculated using data from adult patients only. Only deep incisional and organ/space SSIs, regardless of closure technique, detected during the same admission as the inpatient procedure or upon readmission to the same hospital that performed the inpatient procedure were included in the SSI SIRs; superficial incisional SSIs and those identified on post-discharge surveillance or upon readmission to another facility were excluded.

MRSA bacteremia and *C. difficile* LabID event SIRs included applicable specimens classified as hospital-onset (i.e., were collected on or after day 4 of admission) in which the specimen was collected from any inpatient location in the facility excluding CMS-certified inpatient psychiatric (IPF) units. *C. difficile* LabID event surveillance also excludes events from neonatal critical care units and well-baby units. Community-onset cases are reported to NHSN and are included in the risk adjustment of the LabID event SIRs.

This report introduces national standardized utilization ratios (SURs) to measure device utilization for central lines, urinary catheters, and ventilators among the four main facility types. The SUR provides a summarized risk adjusted metric which allows organizations to compare device use to a national 2015 baseline. SURs are calculated by dividing the number of observed device days by the number of predicted device days; the number of predicted device days is calculated using a logistic regression model. A complete list of risk factors used in the calculation of the SURs can be found in the technical [Data Tables](#) associated with this report.

The majority of facilities were required to report select HAI data to NHSN in 2015 for participation in various CMS Quality Reporting Programs (QRPs). The table below provides additional details on these requirements¹²:

2015 NHSN Required Data Elements for Participation in CMS QRPs, by Facility Type

HAI Type	Acute Care Hospitals	LTACHs	IRFs
CLABSI	ICUs, NICUs, select wards	LTACH ICUs and Wards	Not applicable
CAUTI	ICUs and select wards	LTACH ICUs and Wards	IRF Wards
VAE	Not applicable	Not applicable	Not applicable
SSI	SSI data following adult inpatient colon surgeries and abdominal hysterectomies	Not applicable	Not applicable
MRSA bacteremia & <i>C. difficile</i> LabID Event	Facility-wide inpatient (FacWideIN) and IRF units	Facility-wide inpatient (FacWideIN)	Facility-wide inpatient (FacWideIN)

Facility-specific SIRs were calculated if the facility had at least one predicted HAI for a given location category or surgical procedure. These facility-specific SIRs were used to create percentile distributions for each HAI if at least 20 facilities had sufficient data to calculate an SIR. Percentile distributions among the national data are shown in increments of 5, from 5-95%; SIRs at key percentiles are calculated for state-level data (10%, 25%, 50%, 75%, 90%). Additionally, the facility-specific SIRs were compared to the nominal value equal to the national SIR for each HAI type; if at least 10 facilities in each category had sufficient data to calculate an SIR, the percent of facilities with an SIR significantly higher or lower than the value of the national SIR was calculated both nationally and by state. If at least 5 facilities reported 2015 data in a state, the state-specific SIRs were then calculated for each HAI type, location category or surgical procedure by pooling 2015 data from all reporting facilities in the state. Additionally, state SIRs were compared to the

national SIRs which were re-calculated with the state's data removed.

In addition to the NHSN data used to produce the SIRs in this report; the factsheets and the detailed technical tables, several external data sources were used to provide additional metrics. State health department HAI programs provided CDC with the status and specific requirements of state HAI reporting mandates to NHSN and efforts to validate 2015 HAI data. An indicator for a state mandate was provided for mandates enacted by either the state health department or the state's hospital association. Validation efforts were classified into two categories for each HAI type – data checked for quality and additional in-depth data review. The following criteria were used to assign credit to states that performed data quality checks: state health department had access to 2015 NHSN data, performed regular data cleaning/quality checks on at least 6 months of 2015 data prior to August 1, 2016, and contacted hospitals if data errors, outliers, or missing information were found. A state received credit for additional in-depth data review if the state performed an audit of their hospitals' medical or laboratory records prior to August 1, 2016, meaning the state health department reviewed hospital records to confirm proper case ascertainment and data entry into NHSN. Validation efforts should be taken into account when evaluating an individual state's performance. States that perform more vigorous data validation activities are more likely to find hospital records of infections, and therefore these states may have higher SIRs compared to states that do not perform validation. Not all state health departments have access to NHSN data or have access to NHSN data from every hospital included in this report. Data validation efforts were self-reported by state health departments to CDC and may vary between states.

The total number of acute care hospitals residing in each state was computed from the American Hospital Association (AHA) annual survey for fiscal year 2015, after excluding rehabilitation hospitals, long-term acute care hospitals, and any facility that was not operational in 2015. (Available at <http://www.ahadataviewer.com/about/hospital-database/> (<https://web.archive.org/web/20180626084448/http://www.ahadataviewer.com/about/hospital-database/>)). The response rate of the survey is about 75 percent. Because of this methodology, these counts may differ slightly from counts provided by state regulatory authorities. The total number of acute care hospitals reporting to NHSN was calculated for each state, HAI type, location category, and surgical procedure.

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References

1. Centers for Medicare and Medicaid Services. Hospital Inpatient Quality Reporting Program. Available at <https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/hospitalqualityinits/hospitalrhqdapu.html> (<https://web.archive.org/web/20180626084448/https://www.cms.gov/medicare/quality-initiatives-patient-assessment-instruments/hospitalqualityinits/hospitalrhqdapu.html>). Accessed July 14, 2017.
2. Centers for Medicare and Medicaid Services. Long-Term Care Hospital Quality Reporting. Available at <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/LTCH-Quality-Reporting/>. (<https://web.archive.org/web/20180626084448/https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/LTCH-Quality-Reporting/%20>) Accessed July 14, 2017.
3. Centers for Medicare and Medicaid Services. Inpatient Rehabilitation Facilities (IRF) Quality Reporting Program (QRP). Available at <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/index.html> (<https://web.archive.org/web/20180626084448/https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/IRF-Quality-Reporting/index.html>). Accessed July 14, 2017.
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Glossary

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Organizations and Hospitals

Acute care hospital: a hospital is an institution that mainly provides diagnostic and therapeutic services to inpatients, including medical diagnosis, treatment, and care. The Centers for Medicare & Medicaid Services requires that all patients in hospitals be under the care of a physician and provided 24-hour nursing assistance.

Centers for Disease Control and Prevention (CDC) (<https://web.archive.org/web/20180626084448/http://www.cdc.gov/>): Housed within U.S. Department of Health and Human Services (<https://web.archive.org/>

[web/20180626084448/http://www.hhs.gov/](http://www.hhs.gov/)), CDC is charged with protecting the public health of the Nation by providing leadership and direction in the prevention of and control of diseases and other preventable conditions, and responding to public health emergencies. CDC works 24/7 to protect America from health, safety and security threats, both foreign and in the U.S.

Emerging Infections Program (EIP): A national resource utilized for surveillance, prevention, and control of emerging infectious diseases. EIP is a network of state health departments and their collaborators in local health departments, academic institutions, other federal agencies, and public health and clinical laboratories; infection preventionists; and healthcare providers.

Hospital Compare (<https://web.archive.org/web/20180626084448/http://www.medicare.gov/hospitalcompare/search.html>): A consumer-oriented website that provides information about the quality of care at over 4,000 Medicare-certified hospitals. Hospital Compare was created through the efforts of the **Centers for Medicare & Medicaid Services** (<https://web.archive.org/web/20180626084448/http://www.cms.gov/>) (CMS), in collaboration with organizations representing consumers, hospitals, doctors, employers, accrediting organizations, and other Federal agencies. Hospitals participating in the CMS quality reporting program submit healthcare-associated infection data to CDC's National Healthcare Safety Network (NHSN). NHSN shares these data with CMS for public posting on Hospital Compare to help consumers make informed decisions about their health care.

Inpatient rehabilitation facilities (IRF): Hospitals, or part of a hospital that provide intensive rehabilitation services using an interdisciplinary team approach. Admission to an IRF is appropriate for patients with complex nursing, medical management, and rehabilitative needs. Data in this report are reported from free-standing IRFs and CMS-certified IRF units within other hospitals.

Long-term acute care hospital (LTACH): Acute care hospitals that provide treatment for patients who are generally very sick and stay, on average, more than 25 days. Services include comprehensive rehabilitation, respiratory therapy, head trauma treatment, and pain management. Most patients are transferred from an intensive or critical care unit.

National Healthcare Safety Network (NHSN): CDC's NHSN is the nation's most widely used healthcare-associated (HAI) infection tracking system. NHSN provides facilities, states, regions, and the nation with data needed to identify problem areas, measure progress of prevention efforts, and ultimately eliminate HAIs. In addition, NHSN allows healthcare facilities to track blood safety errors and important healthcare process measures such as healthcare personnel influenza vaccine status and infection control adherence rates.

Infections Reported

Catheter-associated urinary tract infection (CAUTI): A urinary tract infection (UTI) is an infection involving any part of the urinary system, including urethra, bladder, ureters, and kidney. When a urinary catheter is not put in correctly, not kept clean, or left in a patient for too long, germs can travel through the catheter and infect the bladder and kidneys. *In this report*, the CAUTI data include all infections reported to National Healthcare Safety Network from all applicable locations, including intensive care units and wards.

Central line-associated bloodstream infection (CLABSI): When a tube is placed in a large vein and not put in correctly or kept clean, it can become a way for germs to enter the body and cause deadly infections in the blood. *In this report*, the CLABSI data include all infections reported to National Healthcare Safety Network from all applicable locations, including intensive care units, neonatal intensive care unit, and wards.

***Clostridium difficile* (C. difficile):** When a person takes antibiotics, good bacteria that protect against infection are destroyed for several months. During this time, patients can get sick from *C. difficile*, bacteria that cause life-threatening diarrhea. Often, *C. difficile* infections occur in hospitalized or recently hospitalized patients. *In this report*, the *C. difficile*

data include all laboratory identified hospital-onset infections reported to National Healthcare Safety Network from all inpatient locations in the facility, with the exception of the neonatal intensive care units and well-baby locations.

Healthcare-associated infection (HAI): Infection patients can get while receiving medical treatment in hospitals, outpatient clinics, nursing homes, and other facilities where people receive care.

Hospital-onset HAI: For reporting to National Healthcare Safety Network, an infection is considered hospital-onset if the patient begins to show infection symptoms on or after the fourth day of admission.

Laboratory identified (LabID) Event: For reporting to National Healthcare Safety Network, an infection is considered laboratory identified when a patient sample is tested and confirmed by laboratory test only (i.e., clinical evaluation of the patient is not required).

Methicillin-resistant *Staphylococcus aureus* (MRSA): A type of staph bacteria that is resistant to many antibiotics. *In this report*, the MRSA data include all laboratory identified hospital-onset MRSA bacteremia (bloodstream infections) reported to National Healthcare Safety Network from all inpatient locations in the facility.

Surgical site infection (SSI): When germs get into an area where surgery is or was performed, patients can get a surgical site infection. Sometimes these infections involve only the skin. Other SSIs can involve tissues under the skin, organs, or implanted material (an object or material inserted or grafted into the body, such as prosthetic joints).

Prevention Collaboratives

Antibiotic stewardship: Coordinated efforts and programs to improve the use of antimicrobials in healthcare settings to ensure that hospitalized patients receive the right antibiotic, at the right dose, at the right time, and for the right duration.

Antibiotic resistance (antimicrobial resistance): Antibiotic resistance is the result of bacteria changing in ways that reduce or eliminate the effectiveness of antibiotics. Antimicrobial resistance is result of microorganisms changing in ways that reduce or eliminate the effectiveness of drugs, chemicals, or other agents used to cure or prevent infections. Antibiotic resistance is one type of antimicrobial resistance.

Carbapenem-resistant Enterobacteriaceae (CRE) infections: A family of germs that is difficult to treat because they have high levels of resistance to antibiotics. CRE infections are most commonly seen in people with exposure to healthcare settings, like hospitals and long-term care facilities.

Hand hygiene: The practice of cleaning hands to prevent the spread of disease-causing germs.

Healthcare personnel influenza vaccination: Influenza, or the flu, is a mild to severe respiratory illness caused by a virus. The contagious illness can easily spread from person to person, including from healthcare workers to patients. Vaccination is the best way to prevent getting and spreading the flu.

Long-term care facilities (LTCF): Nursing homes, skilled nursing facilities, and assisted living facilities (collectively known as long-term care facilities) provide a variety of services, both medical and personal care, to people who are unable to manage independently in the community.

Multidrug-resistant organism (MDRO) infections: An infection caused by a germ that are resistant to multiple classes of antimicrobials. In some cases, the germs have become so resistant that no available antibiotics are effective against them.

Prevention collaboratives: Prevention projects that consist of multiple hospitals within a state to target an infection as a team, implement prevention strategies, share experiences between facilities, measure progress as a group, and provide feedback to clinicians and staff.

Targeted Assessment for Prevention (TAP) strategy: a method developed by the Centers for Disease Control and Prevention (CDC) to use data for action to prevent healthcare-associated infections (HAIs). The TAP strategy targets healthcare facilities and specific units within facilities with a disproportionate burden of HAIs to address infection prevention gaps.

Ventilator-associated events (VAE): A ventilator is a machine used to help a patient breathe by giving oxygen through a tube placed in a patient's mouth or nose, or through a hole in the front of the neck. An infection may occur if germs enter a patient through the tube, such as pneumonia or bacterial infections in the blood.

Calculations

National baseline:

Aggregated data reported to the National Healthcare Safety Network (NHSN) by all facilities during a baseline period that is used to "predict" the number of infections expected to occur in a hospital, state, or in the country. *In this report*, the number of predicted infections is an estimate based on infections reported to NHSN during the 2015 national baseline for all facility types.

Infection types presented have different baseline years for comparison. Moving forward, HAI prevention progress for 2016 and subsequent years will be measured in comparison to infection data from 2015.

Statistical significance: Term used in the context of a statistical hypothesis test to determine if a finding is unlikely to have occurred by chance alone. A statistically significant test result means it is unlikely that the two groups sampled are different simply by chance alone (suggesting that the two populations sampled are, in fact, different). *In this report*, statistical hypothesis testing is used to compare a calculated Standardized Infection Ratio value (see **SIR**) to the value of 1.0. A statistical significant result from this test means there is statistical evidence that the calculated SIR is different than what would be predicted from the national data. *In this report*, statistical hypothesis testing is also used to compare two SIRs to each other.

Standardized Infection Ratio (SIR): A summary statistic that can be used to track healthcare-associated infection (HAI) prevention progress over time; lower SIRs are better. The SIR compares the number of infections in a facility or state to the number of infections that were "predicted" to have occurred, based on previous years of reported data (see **National baseline**). The SIR is not calculated when the number of predicted infections is less than 1. *In this report*, the SIRs compare the observed number of infections reported to the National Healthcare Safety Network (NHSN) during 2015 to the predicted number of infections based on the referent period, adjusting for key risk factors.

Risk adjustment: A process used to level the playing field by adjusting for the differences in risk. When the data are risk-adjusted, it makes it possible to fairly compare hospital performance. *In this report*, the SIRs are adjusted for risk factors that may impact the number of infections reported by a hospital, such as type of patient care location, bed size of the hospital, patient age, and other factors.

National 2015 SIR: A summary statistic calculated from all reported HAIs that occurred in the country in 2015. It was calculated as the total number of observed infections in the country, divided by the total number of predicted infections in the country in 2015.

State 2015 SIR: A summary statistic calculated from all reported HAIs that occurred in an individual state in 2015. It was calculated as the total number of observed infections from all hospitals in the state, divided by the total number of predicted infections in the state in 2015.

State mandate (for data reporting): A state legislative or regulatory requirement (enacted by the state's government)

requiring hospitals in the state to report healthcare-associated infections to the National Healthcare Safety Network.

Validation: Double-checking, or confirming, healthcare-associated infection (HAI) data reported to the National Healthcare Safety Network (NHSN). This generally involves an assessment to ensure all relevant infections were captured in the system. It may also involve checking the accuracy, or quality, of the submitted data. Currently, state health departments may use different methods to validate the HAI data that hospitals submit to NHSN. For example, some states only validate data from one facility while other states validate more widely. Validation efforts should be taken into account when evaluating an individual state's performance. States that validate data or use advanced tools to detect HAIs may find and report more infections than states that do not validate.

In this report, state validation efforts are specified and classified into two categories for each HAI type: data checked for quality and additional in-depth data review.

Data Quality: State health departments may assess a hospital's overall reported HAI data for data entry errors, outliers, or missing information. This does not involve reviewing medical records.

In this report, the following criteria were used to assign credit to states that performed data quality checks:

- State health department had access to 2015 data from NHSN.
- State health department performed quality checks on at least 6 months of 2015 NHSN data prior to August 1, 2016.
- State health department contacted hospitals when data errors, outliers, or missing information were found.

"Additional In-depth Data Review": State health departments may perform a review, or "audit", of a hospital's medical records to ensure the hospital defined and reported all appropriate HAIs to NHSN. The auditing process may identify more HAIs in a hospital than originally reported. As such, states that perform data audits may have a higher SIR when compared to states that do not perform data audits. *In this report*, credit is given to states that performed any type of audit of their hospitals' 2015 medical or laboratory records prior to August 1, 2016.

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