2011 NATIONAL AND STATE HEALTHCARE-ASSOCIATED INFECTIONS STANDARDIZED INFECTION RATIO REPORT

Using Data Reported to the National Healthcare Safety Network as of September 4, 2012

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National Center for Emerging and Zoonotic Infectious Diseases
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Background

The National Healthcare Safety Network (NHSN) is a public health surveillance system that the Centers for Disease Control and Prevention's (CDC) Division of Healthcare Quality Promotion (DHQP) maintains and supports as a mainstay of its healthcare-associated infection (HAI) prevention program. NHSN is used by healthcare facilities in all 50 states; Washington, D.C.; and Puerto Rico. As of December 2012, 30 states and Washington, D.C. required, or have plans to require, use of NHSN for state-specific HAI reporting mandates. Hospitals participating in the Centers for Medicare and Medicaid Services (CMS) Hospital Inpatient Quality Reporting (IQR) Program use NHSN to report HAI data as part of the program's requirements, including central line-associated bloodstream infections (CLABSI) among adult, pediatric, and neonatal intensive care unit patients beginning in January 2011; in January 2012 required reporting of catheter-associated urinary tract infections (CAUTI) among adult and pediatric intensive care unit patients and surgical site infections (SSI) among colon surgery and abdominal hysterectomy patients began. The HAI data reported via NHSN to CMS are used to qualify hospitals for their annual payment update and for public reporting at the Department of Health and Human Services Hospital Compare web site (1).

Since NHSN's inception in 2005, DHQP has used HAI data from the system for national-level analysis and reporting. Past reporting includes summary data that define the benchmarks used for inter-facility comparison (such as location-specific, device-associated infection rates) (2), risk adjustment models for surgical site infections (3), or summarized antimicrobial resistance data for each HAI type reported (4). Starting in 2009, summary measures of HAIs, national and state-specific, were reported using the standardized infection ratio (SIR) (5). This current SIR report again provides a summary of the characteristics of facilities reporting to NHSN by state and the key metrics of the HAI experience for the United States in 2011. State-specific summary statistics are again presented for CLABSI in this report. However, this report expands upon the 2010 SIR report to include national burden estimates for CLABSI among critical care patients and SSI among select surgical patients; the estimated average reimbursement paid by CMS attributable to a CLABSI also is presented. The goals of this report are to summarize available HAI data on CLABSIs, SSIs, and CAUTIs at the national level for 2011 and to provide an additional perspective on the progress of HAI prevention nationally by comparison to the 2010 experience. This progress report also provides an indication of the extent to which HAI prevention goals established by the Department of Health and Human Services (HHS) Action Plan to Prevent HAIs and by states have been achieved.

Methods

Eligible Data

This report presents data from HAI surveillance during calendar year 2011 that was reported either mandatorily or voluntarily to NHSN from facilities across all 50 states, Washington, D.C., and Puerto Rico. Data included in the report use NHSN definitions that have been in place since 2008 for CLABSI (6) and SSI (7) and 2009 for CAUTI (limited to symptomatic urinary tract infection) (8). These definitions differ slightly from those in use as of January 2013. Any data reported from non-acute care hospitals (e.g., long-term care hospitals, rehabilitation hospitals), outpatient dialysis facilities or inpatient dialysis wards, long term care facilities (e.g., skilled nursing facilities), and outpatient surgical settings were excluded from this report. Data include all reports submitted to NHSN as of September 4, 2012, allowing for a 9-month latency period to allow for complete reporting of infection events and denominator data through December 2011.

Similar to previous reports, the HAI data are summarized across all patient care location types and also stratified into three mutually exclusive categories, by state: critical care units (ICUs), wards (for this report, wards also include step-down and specialty care areas [including hematology/oncology and bone marrow transplant]), and neonatal intensive care units (including Level II/III and Level III). Active efforts by CDC and healthcare facilities reporting to NHSN began in 2011 to more accurately categorize long-term care, long-term acute care, and rehabilitation patient care locations that reside within acute care hospitals; these locations were excluded from this report. Future reports will include these patient care locations and reflect more accurate categorization. Summary statistics of reporting characteristics are presented both nationally and by state for each HAI included in the report. Data external to NHSN were used to construct some of these metrics. To approximate the number of acute care hospitals in each state, CDC used a list of all facilities that have been assigned a CMS Certification Number (CCN), adjusted to account for multiple facilities reporting under the same CCN and to include military and Veterans Affairs hospitals. Additionally, CDC consulted with each state health department to confirm the presence of any mandatory requirements for reporting HAI data to NHSN during 2010 and 2011 and to assess whether or not the health department has performed any internal or external validation studies of NHSN data that they have access to. Validation included data quality assessment for implausible values and detection of outlier facilities (e.g., high or low reported number of infections, rates, denominators) along with more detailed evaluation by health department staff with specific facilities and/or audits of medical records. The SSI data included in this report include only the more commonly reported operative procedures and approximates those targeted for process-of-care improvements by the Surgical Care Improvement Project (SCIP), a national project led by CMS and CMS-funded Quality Improvement Organizations (Appendix A). SSI standardized infection ratios (SIRs) are reported for these procedure categories combined, as well as for each specific procedure category. Only deep incisional and organ/space infections at the primary surgical site detected during the index hospital admission or upon readmission to the same hospital are included in the reported SIR data; superficial incisional SSIs and any SSIs identified through post-discharge surveillance were excluded from the SIR but included in the burden estimates (see below).

Summary HAI Data and Calculation of SIRs

The referent period for this report remains January 2006 through December 2008 for CLABSI and SSI and calendar year 2009 for CAUTI, as in previous SIR reports (2, 9). The CLABSI and CAUTI SIRs presented in this report represent comparisons of an observed number of HAIs during each reporting period to the predicted number based on the rates of infections among all facilities during the referent period, adjusting for key covariates (10). Although over 40 patient care location types are included in the referent period, facilities have reported from location types not included in the referent period during 2010 and 2011. In such cases, the CLABSI and CAUTI SIRs in this report cannot include data from these newer location types.

The covariates used to predict CLABSIs and CAUTIs included type of patient care location, bed size of the patient care location, and hospital affiliation with a medical school. For NICUs, the pooled mean umbilical catheter-associated BSI rates and CLABSI infection rates within each birth weight category were used to predict the number of device-associated BSIs from reporting facilities, referred to as CLABSIs for this report. Clinical sepsis (without laboratory-confirmed bloodstream infection) was not included in the calculations of CLABSI during either the reporting periods or referent period. CAUTIs from NICUs are not reported to NHSN. For SSI SIRs, specific

risk models were constructed that evaluated all available procedure-level risk factors (e.g., duration of surgery, surgical wound class, use of endoscopes, patient age, and patient assessment at time of anesthesiology [ASA score], among others) to predict the risk of deep incisional or organ/space infections identified during admission or readmission to the same hospital (3).

For national and state SIRs, all eligible data were included and the total number of infections predicted was compared to the number of infections reported to NHSN at each level of aggregation. In state-specific reporting of CLABSI SIRs, an SIR is only produced if at least 5 facilities in a state reported any data for the given location category. Facility-specific SIRs were also calculated for each of the summary measures presented nationally. However, if a single facility's predicted number of infections for a specific HAI type (e.g., CLABSI) was <1.0, a facility-specific SIR was not calculated for that HAI. Distributions of facility-specific SIRs in national and state reports were produced only if at least 20 facilities had at least one predicted infection for a given HAI type. Additionally, summary counts of facility-specific SIRs were produced at the national level. The number of facilities that reported significantly fewer infections than what would be predicted and the number of facilities that reported significantly more infections than what would be predicted are shown for each location type and surgical procedure category.

An SIR that has a confidence interval (CI) that includes 1.0 should be interpreted as indicating that the number of HAIs that an entity (e.g., healthcare facility, state) observed and reported to NHSN is no different than if its experience had been the same as the referent population. The CI around the SIR depends on several factors, including the number of facilities reporting data from the relevant patient care location type or surgical procedure, the number of device days or surgical procedures reported, and the types of facilities reporting.

Serial Comparison of SIRs

Progress in preventing HAIs was evaluated by comparing the SIRs between 2010 and 2011. To fairly compare CLABSI and CAUTI SIRs, the patient care location rules used in this report (e.g., removal of data from long-term acute care and rehabilitation facilities) were applied to 2010 data and 2010 SIRs were recalculated. This evaluation was first accomplished by comparing the SIRs between each of the two sequential reporting periods for all data reported from all facilities. A second (sensitivity) analysis was then performed by restricting the facilities included to only those that reported during both 2010 and 2011, referred to as the change in SIR for continuously reporting facilities. A conditional binomial test was performed to assess for statistically significant changes in the pairs of sequential SIRs for each level of aggregation (two-sided P-value less than or equal to 0.05). Because this report uses all data reported to NHSN before September 4, 2012, calculations of 2010 and 2011 SIRs will differ slightly from reports using datasets created earlier in time, including those created by individual state health departments for public reporting.

National Disease Burden Estimates

The calculation of national estimates of the number of CLABSIs in hospitalized critical care patients involved several data sources and steps. CMS Hospital Cost Reports from 1990 through 2009 were used to obtain patient-days specifically occurring in critical care units in all Medicare-certified US hospitals (11), stratified by major hospital types: small (<200 beds) teaching, medium (201-500 beds) teaching, large (>500 beds) teaching, small non-teaching, medium non-teaching, and large non-teaching. Because Federal hospitals do not file Hospital Cost Reports with CMS, we inflated patient-day estimates by between 5% and 10%, based on a weighted estimate of the annual ratio of all patient-days to non-Federal patient-days reported to the American Hospital Association (12). Based on historic secular trends

we used linear regression to project critical care patient-days to 2011 (2009 was the most recent complete data year) and to generate standard errors around annual patient-day estimates for these six acute care hospital types.

To apply overall critical care CLABSI rates to these denominators, we constructed a negative binomial model for each hospital type based on data reported to NHSN from critical care units and generated estimated critical care CLABSI rates (per 1,000 patient-days) for 2011. To address differences between the types of hospitals reporting to NHSN and all hospitals nationally, an average of the six predicted CLABSI rates was calculated for 2011, weighted by the estimated number of national critical care patient-days occurring in each of the six hospital types (i.e., the rates were standardized to the estimated national distribution of critical care patient-days by hospital type).

The total number of CLABSIs in 2011 was calculated by applying estimated CLABSI rates to the estimated number of critical care patient-days nationally for 2011. We used Monte Carlo simulation to quantify the uncertainty around these estimates. Input distributions were created using predicted values and standard errors from the linear models (patient-days and federal inflation factor) and negative binomial models (CLABSI rates) described above. We sampled values from each of the input distributions in 10,000 simulation cycles and used the sampled values to calculate CLABSI estimate for each cycle. We calculated 95% credible intervals based on the 2.5th and 97.5th percentiles of all output distributions. Analyses were conducted using SAS version 9.1 (©2002-2010, SAS Institute Inc., Cary, NC) and @Risk for Excel version 5.7 (©2010, Palisade Corp., Ithaca, NY).

Estimating SSIs for the U.S. in 2011 was performed using the procedure-specific crude infection rates for both deep incisional and organ/space infections as well as superficial infections and included infections detected after discharge among the SCIP procedures. These rates were extrapolated to the entire United States using estimates of the total number of procedures performed from the 2010 National Inpatient Sample (NIS), and adjusted to account for federal facilities performing procedures but not represented in the NIS.

Attributable Medicare Reimbursement for CLABSIs

Confirmed CLABSI cases from eight states reporting to NHSN were linked to claim records in the Medicare Provider Analysis and Review (MedPAR) database using hospital admission date, date of birth, sex, and facility. For both data sources, we limited the population to those over the age of 64 with a valid date of admission from January 2008 through December 2009, a valid date of birth, sex, and facility. In the MedPAR file, patients were also limited to those who aged into the cohort with or without end stage renal disease, enrolled in Medicare Part A and B throughout their eligibility, and never enrolled in a Medicare Advantage (HMO) program. Facility locations between NHSN and MedPAR were linked using an algorithm that matched data from the NHSN facility file and the CMS Cost Reports from 2004-2009. To link, first, the frequency of combinations of admission date, date of birth, sex, and facility was determined for each data source. If a particular combination occurred more than once in either data source, those observations would no longer be considered for linking. Once each data source contained a unique set of records based on those combinations of variables, the two data sources were linked through those variables. Only exact matches were included.

Using this linked dataset, we performed a retrospective cohort study comparing hospitalized patients who had a CLABSI to patients who did not. The primary outcome was Medicare reimbursement for the hospitalization. Frequency matching and multivariate regression were

employed to control for potential confounders. For this analysis, five non-CLABSI control stays were selected such that the frequency of primary ICD-9-CM procedure category, which we found to be a valid predictor of length of stay, and ICU care were similar between CLABSI stays and non-CLABSI stays. The reimbursement attributable to CLABSI was estimated as the difference in medians between exposed and unexposed using multivariate median regression. Multivariate models included terms for age, race, sex, morbidity score, number of secondary procedures prior to infection, CMS wage index, CMS case mix index, facility bed size, teaching status, and number of critical care beds. Presence of an ICD-9-CM procedure code for insertion of a central line was an additional term in the CLABSI model.

Results

Reporting to NHSN

Tables 1a, 1b, and 1c summarize the extent of HAI reporting to NHSN and variability in reporting of CLABSI, CAUTI, and SSI by state. In 2011, CLABSI data were reported by facilities in all 50 states, Washington, D.C., and Puerto Rico. All states had at least five facilities report CLABSI data to NHSN. As a result of the CMS Inpatient Quality Reporting Program's requirement for reporting of CLABSI data in ICUs to NHSN, a large number of facilities began reporting CLABSI data for the first time in 2011, with 3,472 facilities reporting compared to 2,242 in 2010 (an increase of 55%). Facilities reported CLABSI data from 12,122 patient care locations in 2011 (5,722 [47%] ICU, 5,436 ward [45%], 964 [8%] NICU). CAUTI data were reported by 1,807 facilities in all 50 states, Washington, D.C., and Puerto Rico in 2011. Only three states had fewer than five facilities report CAUTI data. CAUTI reporting increased by 84% from 2010 (981 facilities reporting) to 2011. 6,402 different patient care locations reported CAUTI data to NHSN in 2011 (2,633 [41%] ICU, 3,769 [59%] ward). SSI data was reported from 2,130 facilities from 48 states and Washington, D.C. in 2011, an increase of 53% from the 1,388 facilities reporting SSI data in 2010. Seven states had fewer than five facilities report SSI data during 2011. The number of surgical procedures from the eligible categories increased by 40% from 2010 to 2011, with 748,192 procedures reported in 2011, compared to 533,269 in 2010.

National Metrics

National metrics summarizing the HAI experience across the United States are displayed in Table 2. The overall CLABSI SIR uses data from all patient care locations eligible for this report combined, including ICUs, wards, and NICUs (as defined in the Methods). During 2011, 18,113 CLABSIs from these locations were reported to NHSN compared to 30,616.6 CLABSIs that were predicted based on experience in the referent population. The resulting SIR of 0.592 (95% CI 0.583-0.600) translates to an approximate national reduction in the occurrence of CLABSIs from the referent period of 41%. Facility-specific SIRs were calculated for 2,335 facilities reporting sufficient denominators to predict at least one CLABSI. Half of facilities reported SIRs less than 0.469 (the median), and 90% of facilities reported SIRs less than 1.280. When tests of statistical significance were applied, 518 (22%) had an SIR that was statistically significantly less than 1.0 and 54 (2%) had an SIR statistically significantly greater than 1.0. When national SIRs were stratified by each of the three location categories, the lowest SIR was found in ICUs (SIR = 0.557), followed by wards (SIR = 0.642), and then NICUs (SIR = 0.645). All three of the location category-specific SIRs are lower than those reported in the 2010 SIR report. Four facilities only reported CLABSI data from location types that were not available during the referent period; these facilities are excluded from the analysis in Table 2.

During 2011, facilities reported 14,315 CAUTIs to NHSN from patient care locations eligible for inclusion in this report, compared to 15,398.1 predicted based on the experience in the referent population. The resulting SIR was 0.930 (95% CI 0.914-0.945), translating into a 7% reduction in CAUTIs from 2009, the referent period for CAUTI. The SIR in ICU locations (SIR 0.989, 95% CI 0.969-1.010) was not statistically significant, indicating that there has been no reduction or increase in CAUTIs in ICUs compared to the referent period. The SIR from ward locations during 2011 (SIR 0.845, 95% CI 0.823-0.868) was lower than the SIR from ICU locations, and is statistically significant, showing a reduction in CAUTIs in wards of about 15% from the referent period. Of the 1,307 facilities that reported enough data to predict at least one CAUTI during 2011, 172 (13%) had an overall CAUTI SIR significantly less than 1.0 and 133 (10%) had an overall SIR significantly greater than 1.0.

The national SSI SIR for the SCIP procedures (Appendix A) was calculated for all of the procedure categories combined as well as by individual NHSN procedure categories. For the combined national SSI SIR, 6,357 deep incisional and organ/space infections found during admission or on readmission to the same hospital were identified following 748,192 procedures. Based on the various patient and procedural risk factors reported in association with these procedures, 7,682.6 SSIs were predicted, resulting in an SIR of 0.827 (0.807, 0.848). This translates to approximately a 17% reduction in these SSIs among these procedure categories. In the facility-specific overall SSI SIR distribution, 90% of facilities reported an SIR less than 1.716, slightly improved from 2010 where the 90th percentile value was 1.813. There were 1,221 facilities with at least one predicted SSI; 141 (12%) had an SIR statistically significantly lower than 1.0 and 51 (4%) had an SIR statistically significantly greater than 1.0.

In the procedure-specific SSI SIRs, the number of facilities reporting data and the number of procedures reported varied widely among the NHSN procedure categories. Knee arthroplasty was the most commonly reported procedure, with 1,505 facilities reporting 264,155 procedures. Very little reporting was done for rectal surgery, abdominal aortic aneurysm repair, and peripheral vascular bypass surgery, with 260, 165, and 100 facilities reporting, respectively. The procedure-specific SIRs range from 0.543 to 0.896. Nine of the ten procedure-specific SIRs were significantly lower than 1.0, with vaginal hysterectomy being the lone exception (SIR 0.867, 95% CI 0.710-1.048).

State Metrics

State-specific CLABSI SIR data from 2011 are presented in Table 3, stratified by location category. For CLABSIs from all locations (Table 3a), SIRs for all 50 states, Washington, D.C., and Puerto Rico could be calculated: 49 of these jurisdictions had an overall CLABSI SIR that was significantly less than 1.0. All 50 states, Washington, D.C., and Puerto Rico had sufficient reporting from ICU locations to calculate CLABSI SIRs from ICUs (Table 3b): 47 of these jurisdictions had a CLABSI SIR from ICUs that was significantly less than 1.0. Fewer data were available from wards (Table 3c) and NICUs (Table 3d). SIRs that were significantly less than 1.0 were reported from wards in 30 states and NICUs in 28 states. Overall and location-specific CLABSI SIRs and their 95% CIs (by state) are summarized in Table 4.

State Specific Progress in CLABSI Prevention

Serial SIRs for states with sufficient data to produce an overall CLABSI SIR in both 2010 and 2011 are presented in Table 5. Four of the 52 reporting jurisdictions did not have sufficient data to report serial CLABSI SIRs. Of the remaining 48 jurisdictions, 30 had no change in the CLABSI SIR from 2010 to 2011 and 18 reported a decrease

in CLABSI SIR from 2010 to 2011. Of these 18 jurisdictions, 15 retained a significant decrease in CLABSI SIR when the analysis was restricted to continuously reporting facilities. No jurisdictions reported an increase in CLABSI SIR between the two reporting periods when assessing data from all reporting facilities. One state with no change in CLABSI SIR in all reporting facilities from 2010 to 2011 had an increasing CLABSI SIR in continuously reporting facilities.

National Progress

Table 6 presents serial SIRs for national CLABSI, CAUTI, and SSI data for 2011 compared to 2010. For CLABSI, the SIR significantly decreased for the combined all-location metric, as well as each of the three location category-specific SIRs (ICUs, wards, and NICUs) in all reporting facilities; each of these decreases was confirmed in continuously reporting facilities. There was no significant change in the overall CAUTI SIR for all reporting facilities between 2010 and 2011, but when the analysis was restricted to facilities who had reported in both 2010 and 2011, there was a significant decrease in the overall CAUTI SIR. For location-specific SIRs there was a significant decrease in the SIR among ward locations, but no change for critical care locations. These findings persisted when restricting to continuously reporting facilities. SIRs were significantly lower in 2011 compared to 2010 for the combined SSI SIR and for five of the procedure-specific SIRs. However, when only continuously reporting facilities were assessed, these decreases persisted only for the combined SSI SIR and knee arthroplasties.

Estimated Burden of Disease and Attributable Reimbursement in 2011

In 2011, the total number of critical care patient-days was estimated at 21.9 million (95% CI, 20.3-23.5 million), with an estimated 12,400 CLABSIs (95% CI, 11,500-13,300) occurring among critical care patients. The total number of superficial incisional, deep incisional, and organ/space SSIs that occurred among the estimated 3,011,412 (95% CI: 2,745,643-3,277,181) major (i.e. SCIP) surgical procedures in 2011 was 52,567 (45,332-60,844).

The attributable reimbursement (adjusted to 2011 dollars using the Employment Cost Index for all civilian employees working in hospitals) by CMS to hospitals per CLABSI was estimated to be $26,109 (95% CI, $22,885 - $29,330). Attributable reimbursement was not calculated for SSIs.

Discussion

The HAI data summarized in this report demonstrate that healthcare facilities reporting to NHSN during 2011, as a group, reported fewer CLABSIs (41%), CAUTIs (7%), and SSIs (17%) than predicted based on the case-mix of patients and locations that were monitored. Moreover, CLABSI prevention success improved between reporting periods, as the SIR during 2011 was significantly lower compared to the previous year (2010: SIR 0.68, 32% reduction). Improved prevention success was evident in all location groups (critical care, ward, and NICU) for CLABSI. Improvement was more modest for SSIs, for which the overall SSI SIR decreased from 0.93 to 0.83, but was not evident for all of the procedure types and only for knee arthroplasty when limited to continuous reporters. Of note, in 2011 a substantial proportion of all procedures included in this report were reported by facilities in California as they began to report for the first time in response to a state-wide mandate. Measuring progress between the two years therefore may be better assessed by focusing on the continuous reporters. The experience in CAUTI prevention is less clear. Although there were modest reductions in the SIR between 2010 and 2011, the decrease was driven by the 550 facilities reporting CAUTI from wards during both 2010 and 2011. In contrast, there was essentially no significant difference in the SIRs in critical care locations

between the two periods. The lack of significant reductions in CAUTI SIRs may be due to lack of substantial progress in critical care areas, an inability to substantially decrease catheter days in critical care areas (as can be done more easily in wards), or both of these factors. However, at least one state, Michigan, has seen a 25% reduction in CAUTI using a device-day rate based SIR after implementing a series of prevention initiatives. This suggests that with continued prevention efforts, we should expect continued reductions in both critical care and ward-specific CAUTI SIRs using a device-day methodology as described in this report (13).

This SIR 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 SIRs significantly greater than 1.0. Although the specific number of facilities represented by this group varies between HAI type and procedure (e.g., 54 facilities for CLABSI, 133 for CAUTI, 25 for hip arthroplasty, 30 for knee arthroplasty, 20 for colon surgery, and 15 for abdominal hysterectomy), it is a relatively small number of facilities compared to total number of facilities reporting in 2011 (e.g., 3,468 reporting CLABSI, 1,802 reporting CAUTI, 2,130 reporting SSIs). Focusing efforts on these outlier facilities may be one strategy to focus prevention resources in coming years, although most efficient methods to target prevention activities to make substantial reductions nationally are still being explored.

Overall compared to the previous year, there was an increase of about 1,200 facilities reporting CLABSI, 900 facilities reporting CAUTI, and 700 facilities reporting SSI. This dramatic increase is mostly the result of new reporting requirements for hospitals participating in CMS's Hospital IQR Program, requiring participating facilities to report to CMS, through NHSN, ICU CLABSIs starting in 2011 and CAUTI and SSI beginning in 2012(1). Summary data reported through NHSN to CMS as part of this program and posted quarterly on the CMS Hospital Compare website are a subset of the data reported here (some facilities report to NHSN but do not participate in the IQR Program); therefore the summary statistics are expected to vary slightly.

Using the most recent data available in NHSN, we estimated 12,400 CLABSIs (95% CI, 11,500-13,300) occurred among critical care patients in 2011; the estimated total number of superficial incisional, deep incisional, or organ/space SSIs that occurred in 2011 (among the estimated 3,011,412 surgical procedures evaluated) was 52,567 (45,332-60,844). These infections cost CMS approximately $26,000 per CLABSI occurring in ICU patients. The attributable reimbursement from SSIs has not been determined to date. Also, because the distribution of major payer categories (i.e. Medicare, private insurance, and Medicaid) among patients with CLABSIs is unknown, we could not estimate the number of infections and total reimbursements attributable to these infections separately by major payer categories. While approximately 39% of all hospital costs result from care to Medicare beneficiaries, another 16% result from care provided under Medicaid and 35% from beneficiaries of private payers (14). Meanwhile, the per-infection reimbursements from private payers are likely to be considerably higher than that from Medicare and Medicaid (15). Thus, simply multiplying the point estimate of the burden of ICU CLABSIs by the attributable Medicare reimbursement per infection, while equaling approximately $322 million, likely underestimates the national total reimbursements attributable to these infections and borne by all third party payers.

Regarding CLABSI prevention success regionally, almost all of the jurisdictions with sufficient data had overall CLABSI SIRs significantly less than 1.0 in 2011, confirming that national

prevention progress has not been limited to select geographic areas. Prevention success was slightly less widespread in wards and NICUs, although progress was evident in the majority of jurisdictions for these locations as well. Furthermore, most of these jurisdictions reported accelerated prevention success in 2011 compared to 2010.

A major consideration for interpretation of these data and for future reports is assessing the confidence in the validity of the data reported. Completion of validation studies of CLABSI data was reported from 25 states during 2011 (up from 21 in 2010); evaluations included data quality assessment of missing or implausible values and/or detection of outlier facilities (e.g., number of infections, rates, denominators) in all 25 states, and audit of medical records in 14. Such validation studies occurred for CAUTI in 8 states, and for SSI in 15 states. All states provided information about any HAI validation activities that they have performed. Some states without mandatory reporting of a given HAI have performed validation on NHSN data that are voluntarily shared with them by facilities. Validation efforts by state departments of health represent an important step toward a more complete understanding of the HAI data reported to NHSN.

Regardless of the success of validation efforts, inherent variability in case-finding of HAIs will occur between facilities, explaining some of the differences in observed infection rates and facility-specific SIRs. Several efforts are in place to improve the accuracy and confidence in these HAI data. Web-based NHSN surveillance training modules are now available (http://www.cdc.gov/nhsn/training.html), which include webinars, slidesets, and self-paced, interactive, online training courses with continuing education credits available upon successful completion of an assessment. NHSN training is regularly provided during CDC-hosted events and at professional meetings and conferences. Improvements to the NHSN system to improve data accuracy continue to be made, including business rules and cross-field edit checks to prevent data entry errors, system alerts to inform users of missing data, and data quality reports to inform users of aberrant data.

As part of the National Action Plan to Prevent Healthcare-Associated Infections that was established in 2008, HHS has set goals for reducing CLABSI, CAUTI, and SSI by December 2013 (16). The data included in this report indicate that steady progress is occurring towards the goal of a 50% reduction in CLABSI over the course of 5 years (we report a 41% reduction from baseline in the third year) and the 25% reduction goal for SSI (we report a 17% reduction from baseline in the third year). Progress towards the 25% reduction goal for CAUTI is moving more slowly, with a 7% reduction from baseline in 2011 (this is the second year of measurement with a baseline year of 2009), but with sustained prevention efforts, the 2013 goal remains attainable.

The SIRs summarize complex data related to HAIs in a single set of indicators that use national data for a specified time period as a common referent group. The indirect standardization technique used to calculate SIRs is also used in the calculation of standardized mortality ratios (SMRs), a commonly used method in epidemiology for comparing mortality between a group and a referent population. This summary measure should not be used to derive any absolute ranking of facilities, states, or regions, but rather as a tool to identify facilities, states, or regions that may deserve targeted evaluations, which may include validation efforts or assessing potential prevention programs.

As more data is now available, improved methods of risk adjusting HAI data are being explored, including direct standardization of data reported comprehensively, the use of reliability adjusted SIRs, and additional measures of CAUTI prevention (such as a patient-day based rate). Measuring progress and performance from a single

surveillance system has inherent challenges that we are committed to overcoming. Future reports will incorporate these new developments as we continue to explore the value and feasibly of applying new methods and operations to NHSN surveillance methodology and analysis.

Conclusion

This report presents a set of national summary statistics for CLABSIs, CAUTIs, and SSIs for 2011, including serial SIRs for CLABSI, CAUTI, and SSI for 2010-2011. As a single summary measure of prevention success, there has been a large reduction (41%) in CLABSIs among reporting hospitals compared to predictions, with more modest reductions seen for CAUTI (7%) and SSI (17%). Prevention success improved in 2011 compared to 2010 for CLABSI. For SSI, improved prevention success over the two years was documented among five of the nine operative procedures evaluated, but the impact of new reporters in 2011 greatly influenced this observation. Overall, there is still substantial opportunity for improvement across a range of operative procedures. Additional progress can be made in CAUTI prevention, for which most of the national prevention success was limited to ward locations. Analyses using the CLABSI SIR at the state level, including serial comparisons of SIRs, provide a method for monitoring the impact of interventions and assessing the success of state-based and national HAI reduction efforts. As SSI and CAUTI reporting becomes more comprehensive in 2012, future SIR reports will include state-specific metrics for these HAIs as well. Ongoing interactions with state health departments will be critical in determining ways to improve the reporting of HAIs and ways to act on these data to prevent HAIs. The remaining burden from these HAIs, in terms of both numbers of infections (and the implicit associated morbidity and mortality) and increased reimbursements attributable to these infections highlights the ongoing need for HAI prevention as well as the data required to support such prevention. Publication of this report is one step among many in providing data needed for analysis and action at all levels, with the intent of spurring additional progress toward HAI elimination throughout the United States.

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Table 1a. Characteristics of facilities reporting to NHSN by State[1], 2010 and 2011: Central Line-associated Bloodstream Infections (CLABSI)[2]

State	No.of Facilities in State[3]	2010									2011								
		Healthcare Facilities Reporting to NHSN									Healthcare Facilities Reporting to NHSN								
							Locations (n)[2]									Locations (n)[2]			
		No. of Facilities Covered by State Mandate[4]	Any Valid-ation[5]	No.	%[6]	Data Sub-mitted %[7]	Total	ICU	Wards[2]	NICU[8]	No. of Facilities Covered by State Mandate[4]	Any Valid-ation[5]	No.	%[6]	Data Sub-mitted %[7]	Total	ICU	Wards[2]	NICU[8]
Alaska	26	0		1-4	<20.0	81.3	4	3	0	1	0		9	34.6	70.8	30	9	19	2
Alabama	118	0		69	58.5	45.8	157	112	38	7	74	Yes	77	65.3	88.4	185	130	41	14
Arkansas	87	0		21	24.1	52.5	40	29	7	4	45	Yes	47	54.0	82.5	93	61	24	8
Arizona	97	0		21	21.6	56.0	60	43	15	2	0		58	59.8	86.5	142	93	39	10
California	417	M		339	81.3	74.3	2,102	537	1,439	126	389	Yes[a]	350	83.9	87.1	2,237	538	1,565	134
Colorado	94	58	Yes[a]	51	54.3	80.5	98	64	17	17	59	Yes	51	54.3	93.7	119	68	33	18
Connecticut	41	30	Yes[a]	30	73.2	91.5	41	38	0	3	30	Yes[a]	30	73.2	85.8	67	54	2	11
D.C.	12	M	Yes	9	75.0	43.4	34	23	6	5	10	Yes[a]	8	66.7	96.5	33	20	7	6
Delaware	13	8	Yes	8	61.5	85.5	19	13	4	2	8	Yes[a]	8	61.5	93.8	20	13	5	2
Florida	237	0	Yes	45	19.0	52.5	158	81	68	9	0		187	78.9	88.1	633	390	199	44
Georgia	166	0		35	21.1	68.5	148	67	69	12	0		104	62.7	87.2	331	182	114	35
Hawaii	27	0		7	25.9	51.8	14	8	6	0	14		15	55.6	85.5	34	22	10	2
Iowa	122	0		24	19.7	41.2	38	28	8	2	0		40	32.8	82.4	72	45	16	11
Idaho	47	0		1-4	<10.0	41.7	5	2	2	1	0		12	25.5	80.3	30	19	3	8
Illinois	207	149	Yes[a]	147	71.0	87.7	345	227	80	38	186	Yes[a]	150	72.5	84.2	395	227	129	39
Indiana	148	0		32	21.6	49.6	89	47	36	6	0		88	59.5	88.9	248	131	90	27
Kansas	149	0		13	8.7	70.7	37	25	9	3	0	Yes	43	28.9	81.9	90	64	16	10
Kentucky	116	0		21	18.1	70.3	67	45	18	4	0		71	61.2	80.9	169	126	30	13
Louisiana	172	0		30	17.4	51.3	85	43	32	10	0		73	42.4	86.2	189	112	50	27
Massachusetts	95	73	Yes[a]	70	73.7	95.1	150	122	18	10	72	Yes	69	72.6	90.5	192	124	58	10
Maryland	59	45	Yes[a]	47	79.7	81.7	140	84	39	17	45	Yes[a]	47	79.7	87.9	168	88	63	17
Maine	41	0		6	14.6	79.3	27	12	14	1	0		22	53.7	86.6	58	30	25	3
Michigan	157	0		49	31.2	71.0	143	100	34	9	0		94	59.9	88.0	261	174	68	19
Minnesota	144	0		1-4	<10.0	61.9	7	6	1	0	0		50	34.7	83.5	94	74	11	9
Missouri	135	0		10	7.4	92.7	25	18	3	4	0		76	56.3	88.8	170	125	27	18
Mississippi	111	0		13	11.7	78.6	74	27	41	6	0		43	38.7	87.4	137	67	56	14
Montana	64	0		10	15.6	72.5	27	11	13	3	0		12	18.8	94.5	32	13	14	5

Table 1a. Characteristics of facilities reporting to NHSN by State1, 2010 and 2011: Central line-associated Bloodstream Infections (CLABSI)[2]

State	No.of Facilities in State[3]	2010									2011								
		Healthcare Facilities Reporting to NHSN					Locations (n)[2]				Healthcare Facilities Reporting to NHSN					Locations (n)[2]			
		No. of Facilities Covered by State Mandate[4]	Any Valid-ation[5]	No.	%[6]	Data Sub-mitted %[7]	Total	ICU	Wards[2]	NICU[8]	No. of Facilities Covered by State Mandate[4]	Any Valid-ation[5]	No.	%[6]	Data Sub-mitted %[7]	Total	ICU	Wards[2]	NICU[8]
North Carolina	133	0	Yes[a]	37	27.8	65.8	156	79	69	8	0	Yes[a]	93	69.9	84.8	350	173	153	24
North Dakota	48	0		1-4	<10.0	70.8	8	3	4	1	0		6	12.5	92.1	21	11	4	6
Nebraska	95	0		9	9.5	66.9	34	11	21	2	0		19	20.0	89.9	71	26	38	7
New Hampshire	29	25	Yes[a]	24	82.8	86.0	31	26	5	0	26	Yes	24	82.8	91.4	35	27	5	3
New Jersey	94	72	Yes[a]	72	76.6	98.4	159	136	3	20	72	Yes	72	76.6	96.7	179	137	20	22
New Mexico	48	0	Yes[a]	18	37.5	57.1	49	24	23	2	0	Yes[a]	30	62.5	89.6	67	34	29	4
Nevada	46	M		17	37.0	38.4	61	33	25	3	28	Yes[a]	23	50.0	93.0	147	46	92	9
New York	251	182	Yes[a]	180	71.7	92.6	584	366	164	54	177	Yes[a]	177	70.5	92.8	714	367	294	53
Ohio	203	0		26	12.8	73.2	107	59	38	10	0		134	66.0	87.2	388	257	106	25
Oklahoma	144	51		50	34.7	91.4	104	70	31	3	51	Yes[a]	54	37.5	87.6	130	79	43	8
Oregon	64	42	Yes	48	75.0	83.5	77	59	17	1	44	Yes	44	68.8	88.5	87	59	21	7
Pennsylvania	221	221	Yes[a]	179	81.0	83.3	1,424	317	1,061	46	221	Yes	178	80.5	86.6	1,350	301	1,003	46
Puerto Rico	59	0		0	0.0	.	.	.	.	.	0		19	32.2	72.2	102	37	60	5
Rhode Island	14	0		1-4	<30.0	40.8	10	6	3	1	0		11	78.6	92.0	27	19	7	1
South Carolina	81	79	Yes[a]	63	77.8	87.2	400	101	298	1	80	Yes[a]	67	82.7	88.7	410	105	295	10
South Dakota	64	0		1-4	<10.0	38.9	3	2	1	0	0		13	20.3	70.2	43	21	18	4
Tennessee	154	80	Yes[a]	82	53.2	79.0	291	168	96	27	80	Yes	96	62.3	89.0	329	166	139	24
Texas	506	0		80	15.8	44.5	197	131	47	19	M		266	52.6	85.1	655	423	119	113
Utah	53	0		1-4	<10.0	13.9	3	2	1	0	26		25	47.2	92.2	50	36	1	13
Virginia	109	77	Yes[a]	80	73.4	85.9	202	138	58	6	78	Yes	81	74.3	92.7	224	141	58	25
Vermont	16	8		8	50.0	94.2	10	10	0	0	8		8	50.0	95.5	11	10	0	1
Washington	103	62	Yes[a]	63	61.2	93.3	111	81	14	16	62	Yes[a]	62	60.2	95.4	124	80	28	16
Wisconsin	144	0	Yes[a]	42	29.2	55.2	171	61	102	8	0	Yes[a]	78	54.2	86.2	239	97	124	18
West Virginia	58	37	Yes	38	65.5	70.8	104	55	48	1	37		39	67.2	87.9	114	59	52	3
Wyoming	31	0		0	0.0	.	.	.	.	.	0		19	61.3	50.3	26	12	13	1

Table 1b. Characteristics of facilities reporting to NHSN by State[1], 2010 and 2011: Catheter-associated Urinary Tract Infections (CAUTI)[2]

State	Number of facilities in state[3]	2010								2011							
				Healthcare Facilities Reporting to NHSN								Healthcare Facilities Reporting to NHSN					
							Locations								Locations		
		No. of Facilities Covered by State Mandate[4]	Any Validation[5]	No.	%[6]	Data Submitted %[7]	Total	ICU	Wards[2]	No. of Facilities Covered by State Mandate[4]	Any Validation[5]	No.	%[6]	Data Submitted %7	Total	ICU	Wards[2]
Alaska	26	0		1-4	<10.0	100.0	1	1	0	0		5	19.2	51.4	6	4	2
Alabama	118	0		84	71.2	42.3	216	32	184	91	Yes[a]	95	80.5	90.6	243	42	201
Arkansas	87	0		6	6.9	55.8	10	5	5	0		33	37.9	53.8	64	39	25
Arizona	97	0		6	6.2	36.4	27	13	14	0		19	19.6	68.9	59	30	29
California	417	0		70	16.8	75.8	241	95	146	0		101	24.2	78.5	425	138	287
Colorado	94	0		22	23.4	58.8	49	32	17	0		37	39.4	80.4	84	45	39
Connecticut	41	0		1-4	<10.0	77.4	7	7	0	0		6	14.6	41.7	13	13	0
D.C.	12	0		1-4	<30.0	35.8	10	5	5	0		1-4	<40.0	78.8	11	5	6
Delaware	13	0		1-4	<20.0	73.1	9	6	3	0		7	53.8	92.1	19	11	8
Florida	237	0	Yes	29	12.2	45.7	122	55	67	0	Yes[a]	99	41.8	66.3	353	175	178
Georgia	166	0		17	10.2	82.8	83	38	45	0		58	34.9	78.3	170	95	75
Hawaii	27	0		1-4	<10.0	81.3	4	2	2	0		9	33.3	72.7	18	9	9
Iowa	122	0	Yes	42	34.4	30.3	64	21	43	0	Yes[a]	52	42.6	85.8	82	29	53
Idaho	47	0		1-4	<10.0	58.3	4	2	2	0		7	14.9	85.1	14	10	4
Illinois	207	0		23	11.1	82.5	101	46	55	0		55	26.6	66.8	195	97	98
Indiana	148	0	Yes	33	22.3	51.0	94	35	59	0		63	42.6	81.0	189	89	100
Kansas	149	0		11	7.4	78.4	27	23	4	0	Yes	41	27.5	75.7	73	50	23
Kentucky	116	0		12	10.3	72.3	44	29	15	0		33	28.4	82.4	120	60	60
Louisiana	172	0		12	7.0	60.4	44	18	26	0		29	16.9	69.2	78	45	33
Massachusetts	95	0		10	10.5	78.6	14	10	4	0		14	14.7	52.5	34	18	16
Maryland	59	0		12	20.3	63.4	33	24	9	0		28	47.5	71.6	116	56	60
Maine	41	0		1-4	<10.0	92.6	18	5	13	0		6	14.6	86.5	39	12	27
Michigan	157	0		21	13.4	74.4	75	37	38	0		34	21.7	79.4	104	56	48
Minnesota	144	0		1-4	<10.0	66.7	3	2	1	0		6	4.2	81.5	9	8	1
Missouri	135	0		5	3.7	89.9	14	10	4	0		18	13.3	66.4	32	22	10
Mississippi	111	0		5	4.5	91.4	35	16	19	0		23	20.7	72.9	97	45	52
Montana	64	0		9	14.1	81.9	24	9	15	0		12	18.8	92.5	40	12	28

Table 1b. Characteristics of facilities reporting to NHSN by State1, 2010 and 2011: Catheter-associated Urinary Tract Infections (CAUTI)[2]

State	Number of facilities in state[3]	2010								2011							
		Healthcare Facilities Reporting to NHSN					Locations			Healthcare Facilities Reporting to NHSN					Locations		
		No. of Facilities Covered by State Mandate[4]	Any Valid-ation[5]	No.	%[6]	Data Sub-mitted %[7]	Total	ICU	Wards[2]	No. of Facilities Covered by State Mandate[4]	Any Valid-ation[5]	No.	%[6]	Data Sub-mitted %7	Total	ICU	Wards[2]
North Carolina	133	0	Yes[a]	20	15.0	70.6	84	36	48	0	Yes[a]	35	26.3	71.9	166	60	106
North Dakota	48	0		1-4	<10.0	68.3	5	1	4	0		1-4	<10.0	76.4	12	5	7
Nebraska	95	0		5	5.3	77.3	25	7	18			17	17.9	88.5	61	20	41
New Hampshire	29	0		1-4	<20.0	38.3	10	3	7	0		5	17.2	85.4	12	6	6
New Jersey	94	72	Yes	72	76.6	96.5	142	128	14	72	Yes	72	76.6	97.2	152	129	23
New Mexico	48	0		1-4	<10.0	41.7	5	4	1	0		13	27.1	50.6	15	10	5
Nevada	46	0		9	19.6	41.4	34	17	17	0		16	34.8	77.7	94	38	56
New York	251	0		53	21.1	84.6	143	122	21	0		80	31.9	81.7	352	171	181
Ohio	203	0		11	5.4	84.8	61	26	35	0		40	19.7	78.8	177	70	107
Oklahoma	144	0		32	22.2	83.2	70	36	34	0		34	23.6	83.7	73	38	35
Oregon	64	0		15	23.4	92.9	39	21	18	0		22	34.4	90.6	62	33	29
Pennsylvania	221	221	Yes[a]	189	85.5	88.7	1,459	315	1,144	221	Yes	190	86.0	90.6	1,405	302	1,103
Puerto Rico	59	0		0	0.0	.	.	.	.	0		18	30.5	78.4	97	36	61
Rhode Island	14	0		0	0.0	.	.	.	.	0		8	57.1	93.7	21	16	5
South Carolina	81	0		5	6.2	80.4	23	6	17	0		25	30.9	48.6	97	36	61
South Dakota	64	0		1-4	<10.0	38.9	3	2	1	0		10	15.6	54.5	26	9	17
Tennessee	154	0		9	5.8	78.7	41	23	18	0		26	16.9	61.6	96	40	56
Texas	506	0		17	3.4	38.9	58	28	30	0		120	23.7	57.6	276	171	105
Utah	53	0		0	0.0	.	.	.	.	0		5	9.4	67.6	9	6	3
Virginia	109	0		23	21.1	74.3	123	51	72	0		37	33.9	83.0	134	76	58
Vermont	16	0		1-4	<10.0	97.2	3	3	0	0		1-4	<10.0	100.0	3	3	0
Washington	103	0		27	26.2	87.1	49	37	12	0		39	37.9	80.0	83	51	32
Wisconsin	144	0		24	16.7	60.6	123	32	91	0	Yes	45	31.3	87.0	167	46	121
West Virginia	58	0		12	20.7	71.5	66	17	49	0		28	48.3	82.5	94	33	61
Wyoming	31	0		0	0.0	.	.	.	.	0		24	77.4	21.2	31	13	18

Table 1c. Characteristics of facilities reporting to NHSN by State[1], 2010 and 2011: Surgical Site Infections[9]

State	2010					2011				
			Healthcare Facilities Reporting to NHSN					Healthcare Facilities Reporting to NHSN		
	NHSN Mandate[4]	Any Validation[5]	No.	Data Submitted %[7]	No. of Procedures Reported[9]	NHSN Mandate[4]	Any Validation[5]	No.	Data Submitted %[7]	No. of Procedures Reported[9]
Alaska			0	.	.			1-4	38.9	82
Alabama			64	40.9	7,539	Yes	Yes	74	85.6	15,267
Arkansas			6	54.2	862			11	53.0	1,505
Arizona			6	70.8	3,789			14	56.6	4,824
California			63	62.8	23,487	M	Yes	332	73.8	136,576
Colorado	Yes	Yes[a]	61	91.5	29,813	Yes	Yes[a]	61	93.3	29,590
Connecticut			1-4	88.9	1,791			1-4	81.3	1,968
D.C.			1-4	55.6	1,250			1-4	80.6	832
Delaware	M		6	48.6	607	Yes		6	84.7	3,234
Florida			25	65.0	7,496			66	47.9	11,576
Georgia			20	66.3	8,704			32	58.9	10,208
Hawaii			0	.	.			1-4	12.5	12
Iowa			1-4	89.6	936			6	68.1	1,122
Idaho			1-4	72.2	647		Yes[a]	11	61.4	1,221
Illinois	M	Yes	131	71.6	30,762	Yes	Yes[a]	137	88.9	39,109
Indiana			6	75.0	3,324			22	42.4	4,807
Kansas			8	70.8	2,702		Yes	12	58.3	3,687
Kentucky			1-4	94.4	1,738			7	33.3	1,676
Louisiana			5	75.0	1,814			15	33.3	1,879
Massachusetts	Yes	Yes[a]	67	96.8	36,411	Yes	Yes	67	93.4	35,945
Maryland	M	Yes[a]	45	55.7	14,002	Yes	Yes	45	97.6	23,981
Maine			1-4	100.0	1,265			1-4	79.2	847
Michigan			25	81.0	14,410			28	86.9	15,938
Minnesota			6	48.6	2,849			5	90.0	3,582
Missouri			6	93.1	2,914			15	44.4	2,486
Mississippi			10	76.7	3,751			15	61.7	5,021
Montana			5	45.0	2,603			8	72.9	3,061
North Carolina			20	77.1	5,672			32	62.0	7,299
North Dakota			1-4	50.0	314			0	.	.
Nebraska			1-4	95.8	836			10	35.0	1,379
New Hampshire	Yes	Yes[a]	26	93.9	7,016	Yes	Yes	26	91.0	6,986
New Jersey	Yes	Yes	72	97.0	29,801	Yes	Yes	71	97.0	28,982
New Mexico			1-4	100.0	48			5	38.3	103
Nevada			8	44.8	1,906	Yes		11	72.7	4,553
New York	Yes	Yes[a]	179	97.4	61,383	Yes	Yes[a]	178	97.2	63,855
Ohio			8	89.6	4,900			12	77.1	5,253
Oklahoma			8	84.4	4,200			23	71.4	4,760
Oregon	Yes	Yes[a]	50	88.8	20,618	Yes		53	93.4	27,641
Pennsylvania	Yes	Yes[a]	166	94.3	97,244	Yes		171	93.2	99,001
Puerto Rico			0	.	.			0	.	.
Rhode Island			0	.	.			0	.	.
South Carolina	Yes	Yes[a]	59	92.1	26,596	Yes	Yes[a]	59	96.3	26,956
South Dakota			0	.	.			6	30.6	106
Tennessee	Yes	Yes	68	63.9	16,428	Yes	Yes	80	85.4	24,682
Texas			25	34.3	2,725	Yes		247	42.8	26,651
Utah			0	.	.			1-4	12.5	33
Virginia			18	57.9	3,661			24	44.4	3,570
Vermont	Yes		13	98.1	2,715		Yes	13	94.2	2,924
Washington			44	80.5	27,166			42	90.7	30,139
Wisconsin			32	63.8	14,137		Yes	47	84.0	21,318
West Virginia			5	58.3	579			10	60.0	1,783
Wyoming			1-4	66.7	218			1-4	41.7	182
All U.S.			1388	79.7	533,629			2,130	76.6	748,192

Table 1 Footnotes:

1. United States, Washington, D.C., and Puerto Rico
2. Data included in this report are from 2010 and 2011 from acute care facility ICUs (critical care units), NICUs (see footnote 8), and wards (for this report wards also include step-down and specialty care areas [hematology/oncology, bone marrow transplant]). Long term acute care facilities and locations, inpatient rehabilitation facilities and locations, dialysis facilities and locations, and long term care facilities (skilled nursing facilities) are not included in this report.
3. The number of acute care facilities in a state was obtained using a list of facilities with Centers for Medicare and Medicaid Services Certification Numbers (CCNs) which was last updated on June 1, 2012. Acute care facilities for which data is included in this report (children's, critical access, psychiatric, and acute short stay hospitals) were identified in the file and counted. Facilities sharing the same CCN in the NHSN database were identified and added to the count from the CCN file. Military and VA hospitals were identified using the 2009 American Hospital Association survey of healthcare facilities and added to the count from the CCN file. Long term acute care facilities, inpatient rehabilitation facilities, and long term care facilities (skilled nursing facilities) were excluded from the count. Because of this methodology, this count may differ slightly from counts provided by state regulatory authorities.
4. The number of acute care facilities eligible to report the HAI type under a state mandate, for states in which a mandate exists to report that HAI type to the state health department using NHSN at the beginning of each reporting period. This number is reported to CDC by the state health department. If no state mandate existed at the beginning of a reporting period, this number is zero. If no mandate existed at the beginning of the reporting period, but was implemented during the reporting period, the value of this column is "M" for midyear implementation. Since state mandates regarding surgical procedures vary greatly by procedure type, the presence or absence of a mandate involving any surgical procedure for acute care facilities is indicated by Yes/No.
5. Yes indicates that the state health department reported the completion of either or both of the following validation studies of NHSN data reported during the reporting period: data quality assessment of missing or implausible values along with state health department followup with identified facilities, and detection of outlier facilities along with state health department followup with identified facilities. Yes[a] indicates that the state completed one or both of these activities and also conducted an audit of medical records (although intensity of auditing activities [i.e., number of facilities audited and number of medical records reviewed] varies by state). Information on validation efforts was requested from all states, regardless of the presence of a legislative mandate for the particular HAI type. Some states without mandatory reporting of a given HAI to the state health department have performed validation on NHSN data that is voluntarily shared with them by facilities.
6. This measure is calculated using multiple data sets. It is calculated by dividing "No. of Healthcare Facilities Reporting to NHSN" by "No. of Facilities in State," and multiplying by 100. The denominator comes from the process described in footnote 3 above. The numerator comes from the NHSN system, and includes all facilities for which data were reported for at least one month during the 12 month reporting period. For CLABSI, this does not include facilities for which zero central line days were reported for all 12 months; for CAUTI this does not include facilities for which zero urinary catheter days were reported for all 12 months; for SSI, this does not include facilities for which zero of the selected procedures were performed for all 12 months. In states with a mandate to report HAI data using NHSN, some facilities in the count of facilities in the state might not be included in the mandate (e.g., facilities do not have the units or perform the procedures covered by the mandate; or the mandate covers only facilities above a certain bed size); or, some facilities included in the mandate might have reported zero central line days, zero urinary catheter days, or zero of the procedure types performed for the full 12-month period.
7. This metric is the rate at which facilities submitted data to NHSN during the reporting period. It is calculated by dividing the number of months of data submitted to NHSN by the total number of months of data eligible to be submitted, and multiplying by 100. For CLABSI or CAUTI, a month in which zero device days were reported is not counted in the numerator; for SSI, a month in which zero of the procedure types were performed is not counted in the numerator. For SSI, this is calculated by dividing the number of months that at least 1 procedure was reported to NHSN by the total number of months any procedure could have been reported, multiplied by 100. For example, if a state has two facilities reporting to NHSN, then 24 total months of data could have been submitted to NHSN in a 12-month period. If those two facilities sent in 24 total months of data, the state participation percent is 100%. If one facility submitted data for 8 months and the other for 4 months, then the state participation percent is 50% (data were reported for 12 of 24 total months). For states with a mandate, it is possible for this percentage to be less than 100 for several reasons, including that some facilities reporting might not be covered by the mandate, might only be submitting selected months of data, or might not have had any central line days, urinary catheter days or procedures in a given month to report.

8. NICU locations included are those classified by NHSN CDC location codes as Level II/III and Level III neonatal critical care areas. A Level II/III neonatal critical care area is defined by NHSN as a combined nursery housing both Level II and III newborns and infants. A Level III neonatal critical care area is defined by NHSN as a hospital NICU organized with personnel and equipment to provide continuous life support and comprehensive care for extremely high-risk newborn infants and those with complex and critical illness. Level III is subdivided into four levels differentiated by the capability to provide advanced medical and surgical care.

9. SSIs included are those following select surgical procedures approximating procedures covered by SCIP, using NHSN-defined SSIs that were classified as deep incisional or organ/space, and were detected during admission or upon readmission. The SCIP procedures are listed in Appendix A.

Table 2. National Standardized Infection Ratios (SIRs) and facility-specific summary SIRs using HAI data reported from all NHSN facilities reporting during 2011 by HAI and patient populations Central Line-associated Bloodstream Infections (CLABSIs), Catheter-associated Urinary Tract Infections (CAUTIs), and Surgical Site Infections (SSIs) following Surgical Care Improvement Project (SCIP) Procedures

HAI and Patient Population or Surgical Procedure	No. of Facilities Reporting		No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs[1]					Facility-specific SIRs at Key Percentiles[2]				
			Observed	Predicted		Lower	Upper	No. Facs with ≥1 Predicted Infection	No. Facs with SIR Significantly < 1.0		No. Facs with SIR Significantly > 1.0		Median				
									N	%[3]	N	%[3]	10%	25%	(50%)	75%	90%
CLABSI, all[4]	3,468		18,113	30,615.577	0.592	0.583	0.600	2,335	518	22%	54	2%	0.000	0.171	0.469	0.825	1.280
ICUs[5]	3,321		10,134	18,208.687	0.557	0.546	0.567	2,170	368	17%	41	2%	0.000	0.100	0.438	0.835	1.329
Wards[6]	1,252		5,781	8,998.281	0.642	0.626	0.659	793	151	19%	20	3%	0.000	0.156	0.484	0.863	1.372
NICUs[7]	928		2,198	3,408.609	0.645	0.618	0.672	594	61	10%	10	2%	0.000	0.178	0.564	0.999	1.539
CAUTIs, all[8]	1,802		14,315	15,398.109	0.930	0.914	0.945	1,307	172	13%	133	10%	0.000	0.228	0.675	1.237	1.892
ICUs[5]	1,536		8,925	9,021.342	0.989	0.969	1.010	1,051	82	8%	109	10%	0.000	0.239	0.726	1.360	2.053
Wards[6]	973		5,390	6,376.767	0.845	0.823	0.868	696	86	12%	60	9%	0.000	0.200	0.644	1.118	1.871
	No. of Procedures																
SSI, combined SCIP procedures[9]	2,130	748,192	6,357	7,682.638	0.827	0.807	0.848	1,221	141	12%	51	4%	0.000	0.327	0.715	1.156	1.716
SSI, Hip arthroplasty	1,355	181,758	1,456	1,624.199	0.896	0.851	0.944	497	18	4%	24	5%	0.000	0.234	0.709	1.316	1.920
SSI, Knee arthroplasty	1,505	264,115	1,426	1,663.435	0.857	0.813	0.903	540	21	4%	30	6%	0.000	0.000	0.659	1.325	1.971
SSI, Coronary artery bypass graft[10]	553	88,225	837	1,074.975	0.779	0.727	0.833	360	23	6%	15	4%	0.000	0.000	0.631	1.172	1.770
SSI, Cardiac surgery	317	29,175	154	220.605	0.698	0.592	0.817	62	2	3%	2	3%	0.000	0.000	0.635	1.276	1.735
SSI, Peripheral vascular bypass surgery	100	3,558	78	104.646	0.745	0.589	0.930	33	0	0%	1	3%	0.000	0.000	0.752	1.094	1.392
SSI, Abdominal aortic aneurysm repair	165	1,218	12	22.102	0.543	0.313	0.880	2	0	0%	0	0%	.	.	.	.	.
SSI, Colon surgery	1,150	69,872	1,679	2,108.745	0.796	0.759	0.835	553	39	7%	20	4%	0.000	0.127	0.647	1.138	1.746
SSI, Rectal surgery	260	3,643	77	103.555	0.744	0.587	0.929	22	4	18%	1	5%	0.000	0.000	0.386	0.854	1.516
SSI, Abdominal hysterectomy	1,223	83,540	531	636.954	0.834	0.764	0.908	193	1	1%	17	9%	0.000	0.000	0.695	1.246	2.220
SSI, Vaginal hysterectomy	528	23,088	107	123.422	0.867	0.710	1.048	29	0	0%	1	3%	0.000	0.000	0.727	1.412	1.714

Table 2 Footnotes

1. Facility-specific SIR data is only displayed for a location group or procedure category if ≥5 facilities reported during the reporting period.
2. Facility-specific key percentiles were only calculated if ≥20 facilities had ≥1.0 predicted HAI during the reporting period. If a single facility's predicted number of HAIs (e.g., CLABSI) was <1.0, a facility-specific SIR was neither calculated nor included in the determinations of the distribution of facility-specific SIRs.
3. Percent of facilities with at least one predicted infection who had an SIR significantly less than or greater than 1.0.
4. Data from all ICUs, wards (and other non-critical care locations), and NICUs. This excludes LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
5. Data from all ICUs; excludes wards (and other non-critical care locations), NICUs, LTAC locations (or facilities), and inpatient rehabilitation locations (or facilities).
6. Data from all wards (for this table wards also include stepdown and specialty care areas [including hematology/oncology, bone marrow transplant]. This excludes LTAC locations [or facilities] and inpatient rehabilitation locations [or facilities]).
7. Data from all NICU locations, including Level II/III and Level III nurseries. For purposes of this report, both umbilical-line and central-line associated bloodstream infections are considered CLABSIs.
8. Data from all ICUs and wards (and other non-critical care locations). This excludes NICUs, LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
9. SSIs included are those following select surgical procedures approximating procedures covered by SCIP, using NHSN surgical procedure categorizations that were classified as deep incisional or organ/space, and detected upon admission or readmission. (Specific NHSN procedures and the corresponding SCIP procedures are listed in Appendix A.)
10. Coronary artery bypass graft includes procedures with either chest only or chest and donor site incisions.

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011

3a. Central Line-associated Bloodstream Infections (CLABSI), All Locations[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting	No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs at Key Percentile[a][4]				
				Observed	Predicted		Lower	Upper	10%	25%	Median (50%)	75%	90%
Alaska			9	27	37.712	0.716	0.472	1.042					
Alabama	Yes	Yes	77	342	492.973	0.694	0.622	0.771	0.097	0.212	0.636	0.889	1.698
Arkansas	Yes	Yes	47	151	313.916	0.481	0.407	0.564	0.000	0.206	0.453	0.786	1.527
Arizona			58	270	469.599	0.575	0.508	0.648	0.000	0.000	0.395	0.679	0.965
California	Yes	Yes[a]	350	2,806	4,963.174	0.565	0.545	0.587	0.000	0.179	0.457	0.839	1.296
Colorado	Yes	Yes	51	213	363.025	0.587	0.511	0.671	0.000	0.206	0.404	0.783	0.963
Connecticut	Yes	Yes[a]	30	159	253.459	0.627	0.534	0.733	0.000	0.256	0.517	0.904	1.309
D.C.	Yes	Yes[a]	8	117	168.799	0.693	0.573	0.831					
Delaware	Yes	Yes[a]	8	50	93.553	0.534	0.397	0.705					
Florida			187	1,048	1,939.236	0.540	0.508	0.574	0.000	0.170	0.457	0.755	1.151
Georgia			104	693	848.860	0.816	0.757	0.880	0.000	0.359	0.603	0.939	1.299
Hawaii	Yes		15	21	81.440	0.258	0.160	0.394					
Iowa			40	71	128.037	0.555	0.433	0.699	0.000	0.000	0.000	0.258	0.800
Idaho			12	25	58.433	0.428	0.277	0.632					
Illinois	Yes	Yes[a]	149	623	1,050.639	0.593	0.547	0.641	0.000	0.000	0.451	0.896	1.384
Indiana			88	411	708.300	0.580	0.526	0.639	0.000	0.000	0.348	0.508	0.885
Kansas		Yes	43	94	216.413	0.434	0.351	0.532					
Kentucky			71	249	346.779	0.718	0.632	0.813	0.000	0.000	0.382	0.829	0.921
Louisiana			73	298	409.713	0.727	0.647	0.815	0.000	0.086	0.649	0.956	1.400
Massachusetts	Yes	Yes	68	320	569.091	0.562	0.502	0.627	0.000	0.000	0.503	0.792	1.100
Maryland	Yes	Yes[a]	47	297	443.061	0.670	0.596	0.751	0.000	0.144	0.462	0.944	1.489
Maine			22	96	97.054	0.989	0.801	1.208					
Michigan			94	317	875.392	0.362	0.323	0.404	0.000	0.029	0.221	0.495	0.777
Minnesota			50	104	257.782	0.403	0.330	0.489	0.000	0.160	0.300	0.436	0.655
Missouri			76	256	546.609	0.468	0.413	0.529	0.000	0.000	0.298	0.651	0.852
Mississippi			43	178	293.906	0.606	0.520	0.701	0.000	0.313	0.524	0.690	1.347
Montana			12	24	58.859	0.408	0.261	0.607					

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures NHSN facilities reporting during 2011
3a. Central Line-associated Bloodstream Infections (CLABSI), All Locations[1]

State	State NHSN Mandate[2]	Any Valid-ation[3]	No. of Facilities Reporting	No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs at Key Percentile[s4]				
				Observed	Predicted		Lower	Upper	10%	25%	Median (50%)	75%	90%
North Carolina		Yes[a]	93	511	894.276	0.571	0.523	0.623	0.000	0.000	0.394	0.716	0.899
North Dakota			6	21	56.270	0.373	0.231	0.571					
Nebraska			19	129	211.439	0.610	0.509	0.725					
New Hampshire	Yes	Yes	24	35	54.651	0.640	0.446	0.891					
New Jersey	Yes	Yes	72	422	579.844	0.728	0.660	0.801	0.000	0.337	0.632	1.122	1.697
New Mexico		Yes[a]	30	83	158.810	0.523	0.416	0.648					
Nevada	Yes	Yes[a]	23	299	518.123	0.577	0.514	0.646					
New York	Yes	Yes[a]	177	1,626	1,943.724	0.837	0.796	0.878	0.281	0.446	0.781	1.100	1.720
Ohio			134	542	1,147.145	0.472	0.434	0.514	0.000	0.134	0.353	0.667	0.981
Oklahoma	Yes	Yes[a]	54	194	377.196	0.514	0.444	0.592	0.000	0.000	0.227	0.546	1.230
Oregon	Yes	Yes	44	75	195.277	0.384	0.302	0.481	0.000	0.000	0.228	0.451	0.857
Pennsylvania	Yes	Yes	177	1,256	2,590.605	0.485	0.458	0.512	0.000	0.197	0.422	0.728	1.098
Puerto Rico			19	198	140.632	1.408	1.219	1.618					
Rhode Island			11	52	73.210	0.710	0.530	0.931					
South Carolina	Yes	Yes[a]	66	538	761.846	0.706	0.648	0.768	0.139	0.351	0.608	0.912	1.563
South Dakota			13	29	65.442	0.443	0.297	0.636					
Tennessee	Yes	Yes	96	652	932.237	0.699	0.647	0.755	0.000	0.317	0.546	1.026	1.389
Texas	Yes		266	1,073	1,919.930	0.559	0.526	0.593	0.000	0.000	0.427	0.808	1.187
Utah	Yes		25	113	167.951	0.673	0.554	0.809					
Virginia	Yes	Yes	81	447	638.340	0.700	0.637	0.768	0.000	0.223	0.495	1.008	1.398
Vermont			8	6	24.388	0.246	0.090	0.535					
Washington	Yes	Yes[a]	62	178	373.103	0.477	0.410	0.553	0.000	0.093	0.303	0.642	1.022
Wisconsin		Yes[a]	78	258	449.368	0.574	0.506	0.649	0.000	0.046	0.467	0.862	1.037
West Virginia	Yes		39	113	245.591	0.460	0.379	0.553	0.000	0.000	0.141	0.590	1.071
Wyoming			19	3	10.366	0.289	0.060	0.846					
All US			3,468	18,113	30,615.577	0.592	0.583	0.600	0.000	0.171	0.469	0.825	1.280

Footnotes for Table 3a

1. Data from all ICUs, wards (and other non-critical care locations), and NICUs. This excludes LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
2. Yes indicates the presence of a state mandate to report CLABSI data from any location to NHSN at the beginning of 2011.
3. Yes indicates that the state health department reported the completion of either or both of the following validation studies of NHSN CLABSI data reported from any location during the reporting period: data quality assessment of missing or implausible values along with state health department followup with identified facilities, and detection of outlier facilities along with state health department followup with identified facilities. Yes[a] indicates that the state completed one or both of these activities and also conducted an audit of medical records. Information on validation efforts was requested from all states, regardless of the presence of a legislative mandate for the particular HAI type and location. Some states without mandatory reporting of a given HAI to the state health department have performed validation on NHSN data that is voluntarily shared with them by facilities.
4. Facility-specific key percentiles were only calculated if ≥20 facilities had ≥1.0 predicted HAI during the reporting period. If a single facility's predicted number of HAIs (e.g., CLABSI) was <1.0, a facility-specific SIR was neither calculated nor included in the determinations of the distribution of facility-specific SIRs.

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011
3b. Central Line-associated Bloodstream Infections (CLABSI), Critical Care Locations[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting	No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs at Key Percentiles[4]				
				Observed	Predicted		Lower	Upper	10%	25%	Median (50%)	75%	90%
Alaska			8	10	14.787	0.676	0.324	1.244					
Alabama	Yes	Yes	74	208	359.328	0.579	0.503	0.663	0.045	0.216	0.472	1.120	2.001
Arkansas	Yes	Yes	43	100	207.440	0.482	0.392	0.586	0.000	0.000	0.408	0.786	1.674
Arizona			57	213	360.114	0.591	0.515	0.676	0.000	0.000	0.353	0.679	1.076
California	Yes	Yes[a]	317	1,051	1,944.915	0.540	0.508	0.574	0.000	0.074	0.453	0.829	1.414
Colorado	Yes	Yes	49	111	211.399	0.525	0.432	0.632	0.000	0.138	0.339	0.644	0.936
Connecticut	Yes	Yes[a]	30	113	208.046	0.543	0.448	0.653	0.000	0.264	0.529	0.892	1.309
D.C.	Yes	Yes[a]	8	87	114.812	0.758	0.607	0.935					
Delaware	Yes	Yes[a]	8	40	69.632	0.574	0.410	0.782					
Florida			183	752	1,421.509	0.529	0.492	0.568	0.000	0.088	0.423	0.769	1.155
Georgia			102	394	550.737	0.715	0.646	0.790	0.000	0.222	0.478	0.917	1.304
Hawaii	Yes		14	8	63.550	0.126	0.054	0.248					
Iowa			35	60	91.776	0.654	0.499	0.842					
Idaho			11	15	43.740	0.343	0.192	0.566					
Illinois	Yes	Yes[a]	146	391	639.980	0.611	0.552	0.675	0.000	0.000	0.506	0.934	1.517
Indiana			83	159	382.642	0.416	0.353	0.485	0.000	0.000	0.321	0.470	0.875
Kansas			42	52	150.337	0.346	0.258	0.454					
Kentucky			71	180	273.347	0.659	0.566	0.762	0.000	0.000	0.358	0.801	0.984
Louisiana			69	199	278.348	0.715	0.619	0.821	0.000	0.388	0.687	1.025	1.500
Massachusetts	Yes	Yes	67	203	402.526	0.504	0.437	0.579	0.000	0.000	0.476	0.802	1.107
Maryland	Yes	Yes[a]	47	226	302.475	0.747	0.653	0.851	0.000	0.000	0.478	0.957	1.534
Maine			22	45	44.331	1.015	0.740	1.358					
Michigan			91	215	666.756	0.322	0.281	0.369	0.000	0.000	0.224	0.466	0.584
Minnesota			48	93	230.664	0.403	0.325	0.494	0.000	0.155	0.300	0.485	0.655
Missouri			75	191	416.144	0.459	0.396	0.529	0.000	0.000	0.223	0.743	1.043
Mississippi			42	106	161.280	0.657	0.538	0.795	0.000	0.260	0.511	0.876	1.492
Montana			11	17	23.072	0.737	0.429	1.180					

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011
3b. Central Line-associated Bloodstream Infections (CLABSI), Critical Care Locations[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting	No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs at Key Percentiles[4]				
				Observed	Predicted		Lower	Upper	10%	25%	Median (50%)	75%	90%
North Carolina		Yes[a]	87	275	505.157	0.544	0.482	0.613	0.000	0.000	0.319	0.707	0.998
North Dakota			6	10	39.504	0.253	0.121	0.466					
Nebraska			19	48	79.909	0.601	0.443	0.796					
New Hampshire	Yes	Yes	24	25	45.169	0.553	0.358	0.817					
New Jersey	Yes	Yes	72	322	466.765	0.690	0.617	0.769	0.000	0.252	0.608	1.138	1.697
New Mexico		Yes[a]	27	43	82.254	0.523	0.378	0.704					
Nevada	Yes	Yes[a]	22	126	251.114	0.502	0.418	0.597					
New York	Yes	Yes[a]	177	802	1,148.246	0.698	0.651	0.749	0.233	0.381	0.682	1.024	1.591
Ohio			134	368	827.977	0.444	0.400	0.492	0.000	0.063	0.362	0.683	0.993
Oklahoma	Yes	Yes[a]	52	121	255.077	0.474	0.394	0.567	0.000	0.000	0.183	0.452	0.924
Oregon	Yes	Yes	43	63	156.767	0.402	0.309	0.514	0.000	0.000	0.295	0.402	0.855
Pennsylvania	Yes	Yes	157	483	1,073.668	0.450	0.411	0.492	0.000	0.062	0.424	0.722	1.165
Puerto Rico			19	113	83.865	1.347	1.110	1.620					
Rhode Island			10	43	60.013	0.717	0.518	0.965					
South Carolina	Yes	Yes[a]	55	177	269.510	0.657	0.564	0.761	0.000	0.000	0.582	1.059	1.704
South Dakota			12	11	30.711	0.358	0.179	0.641					
Tennessee	Yes	Yes	93	371	506.675	0.732	0.660	0.811	0.000	0.357	0.620	1.104	1.737
Texas	Yes		264	787	1,453.983	0.541	0.504	0.580	0.000	0.000	0.381	0.827	1.193
Utah	Yes		25	60	111.883	0.536	0.409	0.690					
Virginia	Yes	Yes	81	269	405.529	0.663	0.586	0.748	0.000	0.247	0.481	0.987	1.399
Vermont			8	6	19.784	0.303	0.111	0.660					
Washington	Yes	Yes[a]	62	113	260.523	0.434	0.357	0.521	0.000	0.000	0.334	0.597	1.086
Wisconsin		Yes[a]	69	164	275.599	0.595	0.507	0.693	0.000	0.224	0.462	0.930	1.169
West Virginia	Yes		38	92	157.339	0.585	0.471	0.717					
Wyoming			12	3	7.982	0.376	0.078	1.098					
All US			3,321	10,134	18,208.687	0.557	0.546	0.567	0.000	0.100	0.438	0.835	1.329

Footnotes for Table 3b

1. Data from all ICUs; excludes wards (and other non-critical care locations), NICUs, LTAC locations (or facilities), and inpatient rehabilitation locations (or facilities).
2. Yes indicates the presence of a state mandate to report CLABSI data from any ICU to NHSN at the beginning of 2011.
3. Yes indicates that the state health department reported the completion of either or both of the following validation studies of NHSN CLABSI data reported from any ICU during the reporting period: data quality assessment of missing or implausible values along with state health department followup with identified facilities, and detection of outlier facilities along with state health department followup with identified facilities. Yes[a] indicates that the state completed one or both of these activities and also conducted an audit of medical records. Information on validation efforts was requested from all states, regardless of the presence of a legislative mandate for the particular HAI type and location. Some states without mandatory reporting of a given HAI to the state health department have performed validation on NHSN data that is voluntarily shared with them by facilities.
4. Facility-specific key percentiles were only calculated if ≥20 facilities had ≥1.0 predicted HAI during the reporting period. If a single facility's predicted number of HAIs (e.g., CLABSI) was <1.0, a facility-specific SIR was neither calculated nor included in the determinations of the distribution of facility-specific SIRs.

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011
3c. Central Line-associated Bloodstream Infections (CLABSI), Ward (non-critical care) Locations[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting[4]	No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs at Key Percentiles[5]				
				Observed	Predicted		Lower	Upper	10%	25%	Median (50%)	75%	90%
Alaska			6	17	14.797	1.149	0.669	1.840					
Alabama			15	53	68.156	0.778	0.582	1.017					
Arkansas			10	32	54.307	0.589	0.403	0.832					
Arizona			8	31	70.557	0.439	0.298	0.624					
California	Yes	Yes[a]	342	1582	2642.387	0.599	0.570	0.629	0.000	0.153	0.510	0.846	1.378
Colorado	Yes	Yes	8	77	106.198	0.725	0.572	0.906					
Connecticut			1-4	.	.	.	.	.					
D.C.	Yes	Yes[a]	3	19	16.821	1.130	0.680	1.764					
Delaware			4	5	13.480	0.371	0.120	0.866					
Florida			44	160	332.285	0.482	0.410	0.562	0.000	0.128	0.332	0.571	0.874
Georgia			29	178	175.414	1.015	0.871	1.175					
Hawaii			5	10	14.491	0.690	0.331	1.269					
Iowa			12	0	6.499	0.000	.	0.568					
Idaho			1-4	.	.	.	.	.					
Illinois			30	153	244.011	0.627	0.532	0.735	0.004	0.231	0.481	0.898	1.682
Indiana			19	200	252.358	0.793	0.686	0.910					
Kansas			9	27	40.534	0.666	0.439	0.969					
Kentucky			9	31	38.316	0.809	0.550	1.148					
Louisiana			21	31	55.436	0.559	0.380	0.794					
Massachusetts			11	86	125.101	0.687	0.550	0.849					
Maryland			12	28	73.578	0.381	0.253	0.550					
Maine			1-4	.	.	.	.	.					
Michigan			28	43	116.789	0.368	0.266	0.496					
Minnesota			8	0	1.982	0.000	.	1.861					
Missouri			7	16	36.616	0.437	0.250	0.710					
Mississippi			10	38	106.612	0.356	0.252	0.489					
Montana			6	5	27.219	0.184	0.060	0.429					

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011
3c. Central Line-associated Bloodstream Infections (CLABSI), Ward (non-critical care) Locations[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting[4]	No. of Infections		SIR	95% CI for SIR		Facility-specific SIRs at Key Percentiles[5]				
				Observed	Predicted		Lower	Upper	10%	25%	Median (50%)	75%	90%
North Carolina		Yes[a]	32	187	261.337	0.716	0.617	0.826					
North Dakota			1-4	.	.	.	.	.					
Nebraska			9	70	117.154	0.598	0.466	0.755					
New Hampshire			1-4	.	.	.	.	.					
New Jersey			7	23	24.752	0.929	0.589	1.394					
New Mexico			16	29	59.899	0.484	0.324	0.695					
Nevada	Yes	Yes[a]	19	156	217.395	0.718	0.609	0.839					
New York			36	639	581.371	1.099	1.016	1.188	0.000	0.463	1.002	1.349	1.767
Ohio			25	102	186.569	0.547	0.446	0.664					
Oklahoma			12	34	63.909	0.532	0.368	0.743					
Oregon			11	3	16.911	0.177	0.037	0.518					
Pennsylvania	Yes	Yes	176	678	1374.314	0.493	0.457	0.532	0.000	0.189	0.400	0.716	1.264
Puerto Rico			13	79	51.438	1.536	1.216	1.914					
Rhode Island			1-4	.	.	.	.	.					
South Carolina	Yes	Yes[a]	66	306	440.312	0.695	0.619	0.777	0.000	0.299	0.545	0.921	1.833
South Dakota			9	14	21.330	0.656	0.359	1.101					
Tennessee	Yes	Yes	31	215	319.276	0.673	0.586	0.770	0.000	0.000	0.481	0.906	1.274
Texas			31	71	120.516	0.589	0.460	0.743	0.000	0.056	0.548	0.977	1.345
Utah			1-4	.	.	.	.	.					
Virginia			10	136	144.936	0.938	0.787	1.110					
Vermont			0	.	.	.	.	.					
Washington			11	37	59.505	0.622	0.438	0.857					
Wisconsin		Yes[a]	41	64	128.580	0.498	0.383	0.636	0.000	0.000	0.138	0.609	0.944
West Virginia			15	12	73.803	0.163	0.084	0.284					
Wyoming			13	0	2.383	0.000	.	1.548					
All US			1,252	5,781	8998.281	0.642	0.626	0.659	0.000	0.156	0.484	0.863	1.372

Footnotes for Table 3c

1. Data from all wards (for this table wards also include stepdown and specialty care areas [including hematology/oncology, bone marrow transplant]. This excludes LTAC locations [or facilities] and inpatient rehabilitation locations [or facilities]).
2. Yes indicates the presence of a state mandate to report CLABSI data from any ward to NHSN at the beginning of 2011.
3. Yes indicates that the state health department reported the completion of either or both of the following validation studies of NHSN CLABSI data reported from any ward location during the reporting period: data quality assessment of missing or implausible values along with state health department followup with identified facilities, and detection of outlier facilities along with state health department followup with identified facilities. Yes[a] indicates that the state completed one or both of these activities and also conducted an audit of medical records. Information on validation efforts was requested from all states, regardless of the presence of a legislative mandate for the particular HAI type and location. Some states without mandatory reporting of a given HAI to the state health department have performed validation on NHSN data that is voluntarily shared with them by facilities.
4. SIR data is only displayed for a state if ≥5 facilities reported during the reporting period.
5. Facility-specific key percentiles were only calculated if ≥20 facilities had ≥1.0 predicted HAI during the reporting period. If a single facility's predicted number of HAIs (e.g., CLABSI) was <1.0, a facility-specific SIR was neither calculated nor included in the determinations of the distribution of facility-specific SIRs.

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011
3d. Central Line-associated Bloodstream Infections (CLABSI), Neonatal Intensive Care Units (NICUs)[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting[4]	No. of Infections		95% CI for SIR			Facility-specific SIRs at Key Percentiles[5]				
				Observed	Predicted	SIR	Lower	Upper	10%	25%	Median (50%)	75%	90%
Alaska			1-4	.	.	.	.	.					
Alabama			13	81	65.490	1.237	0.982	1.537					
Arkansas	Yes		8	19	52.169	0.364	0.219	0.569					
Arizona			10	26	38.929	0.668	0.436	0.979					
California	Yes	Yes[a]	129	173	375.872	0.460	0.394	0.534	0.000	0.000	0.368	0.834	1.333
Colorado	Yes	Yes	17	25	45.428	0.550	0.356	0.812					
Connecticut			11	14	25.544	0.548	0.300	0.920					
D.C.	Yes	Yes[a]	6	11	37.167	0.296	0.148	0.530					
Delaware	Yes		1-4	.	.	.	.	.					
Florida			42	136	185.442	0.733	0.615	0.868	0.000	0.380	0.560	0.959	1.490
Georgia			32	121	122.708	0.986	0.818	1.178	0.213	0.586	0.975	1.242	1.798
Hawaii	Yes		1-4	.	.	.	.	.					
Iowa			9	11	29.761	0.370	0.185	0.661					
Idaho			8	8	11.543	0.693	0.299	1.366					
Illinois	Yes	Yes[a]	39	79	166.648	0.474	0.375	0.591	0.000	0.244	0.382	0.625	1.033
Indiana			25	52	73.299	0.709	0.530	0.930					
Kansas			10	15	25.542	0.587	0.328	0.969					
Kentucky			12	38	35.117	1.082	0.766	1.485					
Louisiana			26	68	75.929	0.896	0.695	1.135					
Massachusetts	Yes	Yes	10	31	41.464	0.748	0.508	1.061					
Maryland	Yes	Yes[a]	17	43	67.008	0.642	0.464	0.864					
Maine			1-4	.	.	.	.	.					
Michigan			18	59	91.847	0.642	0.489	0.829					
Minnesota			9	11	25.136	0.438	0.218	0.783					
Missouri	Yes		18	49	93.849	0.522	0.386	0.690					
Mississippi			14	34	26.014	1.307	0.905	1.826					
Montana			5	2	8.569	0.233	0.028	0.843					

Table 3. State-specific Standardized Infection Ratios (SIRs) and facility-specific SIR summary measures, NHSN facilities reporting during 2011
3d. Central Line-associated Bloodstream Infections (CLABSI), Neonatal Intensive Care Units (NICUs)[1]

State	State NHSN Mandate[2]	Any Validation[3]	No. of Facilities Reporting[4]	No. of Infections		95% CI for SIR			Facility-specific SIRs at Key Percentiles[5]				
				Observed	Predicted	SIR	Lower	Upper	10%	25%	Median (50%)	75%	90%
North Carolina		Yes[a]	24	49	127.782	0.383	0.284	0.507					
North Dakota			6	9	10.667	0.844	0.386	1.602					
Nebraska			6	11	14.376	0.765	0.382	1.369					
New Hampshire			1-4	.	.	.	.	.					
New Jersey	Yes	Yes	22	77	88.328	0.872	0.688	1.090					
New Mexico			1-4	.	.	.	.	.					
Nevada	Yes	Yes[a]	9	17	49.614	0.343	0.199	0.549					
New York	Yes	Yes[a]	53	185	214.107	0.864	0.744	0.998	0.000	0.406	0.839	1.305	2.524
Ohio			17	72	132.599	0.543	0.425	0.684					
Oklahoma			8	39	58.210	0.670	0.476	0.916					
Oregon	Yes		7	9	21.598	0.417	0.191	0.791					
Pennsylvania	Yes	Yes	43	95	142.623	0.666	0.539	0.814	0.000	0.230	0.494	1.033	1.210
Puerto Rico			5	6	5.329	1.126	0.413	2.451					
Rhode Island			1-4	.	.	.	.	.					
South Carolina	Yes	Yes[a]	10	55	52.023	1.057	0.796	1.376					
South Dakota			1-4	.	.	.	.	.					
Tennessee	Yes	Yes	24	66	106.285	0.621	0.480	0.790					
Texas	Yes		112	215	345.431	0.622	0.542	0.711	0.000	0.000	0.369	0.918	1.695
Utah	Yes		13	36	41.194	0.874	0.612	1.210					
Virginia			24	42	87.876	0.478	0.344	0.646					
Vermont			1-4	.	.	.	.	.					
Washington	Yes	Yes[a]	16	28	53.074	0.528	0.350	0.763					
Wisconsin		Yes[a]	16	30	45.189	0.664	0.448	0.948					
West Virginia			1-4	.	.	.	.	.					
Wyoming			1-4	.	.	.	.	.					
All US			928	2,198	3408.609	0.645	0.618	0.672	0.000	0.178	0.564	0.999	1.539

Footnotes for Table 3d

1. Data from all NICU locations, including Level II/III and Level III nurseries. For purposes of this report, both umbilical-line and central-line associated bloodstream infections are considered CLABSIs.
2. Yes indicates the presence of a state mandate to report CLABSI data from any NICU to NHSN at the beginning of 2011.
3. Yes indicates that the state health department reported the completion of either or both of the following validation studies of NHSN CLABSI data reported from any NICU during the reporting period: data quality assessment of missing or implausible values along with state health department followup with identified facilities, and detection of outlier facilities along with state health department followup with identified facilities. Yes[a] indicates that the state completed one or both of these activities and also conducted an audit of medical records. Information on validation efforts was requested from all states, regardless of the presence of a legislative mandate for the particular HAI type and location. Some states without mandatory reporting of a given HAI to the state health department have performed validation on NHSN data that is voluntarily shared with them by facilities.
4. SIR data is only displayed for a state if ≥5 facilities reported during the reporting period.
5. Facility-specific key percentiles were only calculated if ≥20 facilities had ≥1.0 predicted HAI during the reporting period. If a single facility's predicted number of HAIs (e.g., CLABSI) was <1.0, a facility-specific SIR was neither calculated nor included in the determinations of the distribution of facility-specific SIRs.

Table 4. Summary of State-specific Standardized Infection Ratios (SIRs) and confidence intervals, Central Line-associated Bloodstream Infections (CLABSI), by location grouping[1], 2011

	All locations[2]			ICU[3]			Ward (non-critical care)[4]			NICU[5]		
		95% CI for SIR			95% CI for SIR			95% CI for SIR			95% CI for SIR	
State	SIR	Lower	Upper	SIR	Lower	Upper	SIR	Lower	Upper	SIR	Lower	Upper
Alaska	0.716	0.472	1.042	0.676	0.324	1.244	1.149	0.669	1.840	.	.	.
Alabama	0.694	0.622	0.771	0.579	0.503	0.663	0.778	0.582	1.017	1.237	0.982	1.537
Arkansas	0.481	0.407	0.564	0.482	0.392	0.586	0.589	0.403	0.832	0.364	0.219	0.569
Arizona	0.575	0.508	0.648	0.591	0.515	0.676	0.439	0.298	0.624	0.668	0.436	0.979
California	0.565	0.545	0.587	0.540	0.508	0.574	0.599	0.570	0.629	0.460	0.394	0.534
Colorado	0.587	0.511	0.671	0.525	0.432	0.632	0.725	0.572	0.906	0.550	0.356	0.812
Connecticut	0.627	0.534	0.733	0.543	0.448	0.653	.	.	.	0.548	0.300	0.920
D.C.	0.693	0.573	0.831	0.758	0.607	0.935	1.130	0.680	1.764	0.296	0.148	0.530
Delaware	0.534	0.397	0.705	0.574	0.410	0.782	0.371	0.120	0.866	.	.	.
Florida	0.540	0.508	0.574	0.529	0.492	0.568	0.482	0.410	0.562	0.733	0.615	0.868
Georgia	0.816	0.757	0.880	0.715	0.646	0.790	1.015	0.871	1.175	0.986	0.818	1.178
Hawaii	0.258	0.160	0.394	0.126	0.054	0.248	0.690	0.331	1.269	.	.	.
Iowa	0.555	0.433	0.699	0.654	0.499	0.842	0.000	.	0.568	0.370	0.185	0.661
Idaho	0.428	0.277	0.632	0.343	0.192	0.566	.	.	.	0.693	0.299	1.366
Illinois	0.593	0.547	0.641	0.611	0.552	0.675	0.627	0.532	0.735	0.474	0.375	0.591
Indiana	0.580	0.526	0.639	0.416	0.353	0.485	0.793	0.686	0.910	0.709	0.530	0.930
Kansas	0.434	0.351	0.532	0.346	0.258	0.454	0.666	0.439	0.969	0.587	0.328	0.969
Kentucky	0.718	0.632	0.813	0.659	0.566	0.762	0.809	0.550	1.148	1.082	0.766	1.485
Louisiana	0.727	0.647	0.815	0.715	0.619	0.821	0.559	0.380	0.794	0.896	0.695	1.135
Massachusetts	0.562	0.502	0.627	0.504	0.437	0.579	0.687	0.550	0.849	0.748	0.508	1.061
Maryland	0.670	0.596	0.751	0.747	0.653	0.851	0.381	0.253	0.550	0.642	0.464	0.864
Maine	0.989	0.801	1.208	1.015	0.740	1.358	.	.	.	.	.	.
Michigan	0.362	0.323	0.404	0.322	0.281	0.369	0.368	0.266	0.496	0.642	0.489	0.829
Minnesota	0.403	0.330	0.489	0.403	0.325	0.494	0.000	.	1.861	0.438	0.218	0.783
Missouri	0.468	0.413	0.529	0.459	0.396	0.529	0.437	0.250	0.710	0.522	0.386	0.690
Mississippi	0.606	0.520	0.701	0.657	0.538	0.795	0.356	0.252	0.489	1.307	0.905	1.826
Montana	0.408	0.261	0.607	0.737	0.429	1.180	0.184	0.060	0.429	0.233	0.028	0.843
North Carolina	0.571	0.523	0.623	0.544	0.482	0.613	0.716	0.617	0.826	0.383	0.284	0.507
North Dakota	0.373	0.231	0.571	0.253	0.121	0.466	.	.	.	0.844	0.386	1.602
Nebraska	0.610	0.509	0.725	0.601	0.443	0.796	0.598	0.466	0.755	0.765	0.382	1.369
New Hampshire	0.640	0.446	0.891	0.553	0.358	0.817	.	.	.	.	.	.
New Jersey	0.728	0.660	0.801	0.690	0.617	0.769	0.929	0.589	1.394	0.872	0.688	1.090
New Mexico	0.523	0.416	0.648	0.523	0.378	0.704	0.484	0.324	0.695	.	.	.
Nevada	0.577	0.514	0.646	0.502	0.418	0.597	0.718	0.609	0.839	0.343	0.199	0.549
New York	0.837	0.796	0.878	0.698	0.651	0.749	1.099	1.016	1.188	0.864	0.744	0.998
Ohio	0.472	0.434	0.514	0.444	0.400	0.492	0.547	0.446	0.664	0.543	0.425	0.684
Oklahoma	0.514	0.444	0.592	0.474	0.394	0.567	0.532	0.368	0.743	0.670	0.476	0.916
Oregon	0.384	0.302	0.481	0.402	0.309	0.514	0.177	0.037	0.518	0.417	0.191	0.791
Pennsylvania	0.485	0.458	0.512	0.450	0.411	0.492	0.493	0.457	0.532	0.666	0.539	0.814
Puerto Rico	1.408	1.219	1.618	1.347	1.110	1.620	1.536	1.216	1.914	1.126	0.413	2.451
Rhode Island	0.710	0.530	0.931	0.717	0.518	0.965	.	.	.	.	.	.
South Carolina	0.706	0.648	0.768	0.657	0.564	0.761	0.695	0.619	0.777	1.057	0.796	1.376
South Dakota	0.443	0.297	0.636	0.358	0.179	0.641	0.656	0.359	1.101	.	.	.
Tennessee	0.699	0.647	0.755	0.732	0.660	0.811	0.673	0.586	0.770	0.621	0.480	0.790
Texas	0.559	0.526	0.593	0.541	0.504	0.580	0.589	0.460	0.743	0.622	0.542	0.711
Utah	0.673	0.554	0.809	0.536	0.409	0.690	.	.	.	0.874	0.612	1.210
Virginia	0.700	0.637	0.768	0.663	0.586	0.748	0.938	0.787	1.110	0.478	0.344	0.646
Vermont	0.246	0.090	0.535	0.303	0.111	0.660	0.000	.	.	.	.	.
Washington	0.477	0.410	0.553	0.434	0.357	0.521	0.622	0.438	0.857	0.528	0.350	0.763
Wisconsin	0.574	0.506	0.649	0.595	0.507	0.693	0.498	0.383	0.636	0.664	0.448	0.948
West Virginia	0.460	0.379	0.553	0.585	0.471	0.717	0.163	0.084	0.284	.	.	.
Wyoming	0.289	0.060	0.846	0.376	0.078	1.098	0.000	.	1.548	.	.	.
All US	0.592	0.583	0.600	0.557	0.546	0.567	0.642	0.626	0.659	0.645	0.618	0.672

Footnotes for Table 4

1. SIR data is only displayed for a state if ≥5 facilities reported during the reporting period.
2. Data from all ICUs, wards (and other non-critical care locations), and NICUs. This excludes LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
3. Data from all ICUs; excludes wards (and other non-critical care locations), NICUs, LTAC locations (or facilities), and inpatient rehabilitation locations (or facilities).
4. Data from all wards (for this table wards also include stepdown and specialty care areas [including hematology/oncology, bone marrow transplant]. This excludes LTAC locations [or facilities] and inpatient rehabilitation locations [or facilities]).
5. Data from all NICU locations, including Level II/III and Level III nurseries. For purposes of this report, both umbilical-line and central-line associated bloodstream infections are considered CLABSIs.

Table 5. Changes in State-specific Standardized Infection Ratios (SIRs), 2010 compared to 2011 Central Line-associated Bloodstream Infections (CLABSI), All Locations[1]

State	All Facilities Reporting[2]				Continuously Reporting Facilities		
	SIR 2010	SIR 2011	Change in SIR	p-value	No. of Continuous Reporters[3]	Change in SIR	p-value[4]
Alaska	0.589	0.716	No Change	0.723	3	No Change	0.840
Alabama	1.093	0.694	Decrease	0.000	67	Decrease	0.000
Arkansas	0.626	0.481	Decrease	0.047	21	No Change	0.204
Arizona	0.888	0.575	Decrease	0.000	21	Decrease	0.000
California	0.638	0.565	Decrease	0.000	335	Decrease	0.000
Colorado	0.658	0.587	No Change	0.286	50	No Change	0.286
Connecticut	0.677	0.627	No Change	0.562	30	No Change	0.562
D.C.	0.617	0.693	No Change	0.481	8	No Change	0.583
Delaware	0.863	0.534	Decrease	0.008	8	Decrease	0.008
Florida	0.679	0.540	Decrease	0.003	44	Decrease	0.038
Georgia	0.765	0.816	No Change	0.376	35	No Change	0.057
Hawaii	0.715	0.258	Decrease	0.003	7	Decrease	0.033
Iowa	0.440	0.555	No Change	0.433	24	No Change	0.202
Idaho	0.310	0.428	No Change	1.000	2	No Change	1.000
Illinois	0.684	0.593	Decrease	0.010	146	Decrease	0.010
Indiana	0.968	0.580	Decrease	0.000	32	Decrease	0.000
Kansas	0.595	0.434	No Change	0.060	13	No Change	0.068
Kentucky	0.656	0.718	No Change	0.481	21	Increase	0.032
Louisiana	0.819	0.727	No Change	0.340	30	No Change	0.840
Massachusetts	0.580	0.562	No Change	0.713	68	No Change	0.713
Maryland	0.931	0.670	Decrease	0.000	47	Decrease	0.000
Maine	0.958	0.989	No Change	0.869	5	No Change	0.405
Michigan	0.400	0.362	No Change	0.295	49	Decrease	0.023
Minnesota	0.532	0.403	No Change	0.353	3	No Change	0.287
Missouri	0.684	0.468	Decrease	0.002	10	No Change	0.097
Mississippi	0.783	0.606	Decrease	0.018	13	Decrease	0.008
Montana	0.481	0.408	No Change	0.636	10	No Change	0.876
North Carolina	0.655	0.571	No Change	0.086	36	No Change	0.204
North Dakota	0.203	0.373	No Change	0.340	2	No Change	0.752
Nebraska	0.870	0.610	Decrease	0.005	9	No Change	0.054
New Hampshire	0.539	0.640	No Change	0.527	24	No Change	0.527
New Jersey	0.803	0.728	No Change	0.154	72	No Change	0.154
New Mexico	0.456	0.523	No Change	0.469	18	No Change	0.415
Nevada	0.866	0.577	Decrease	0.000	17	Decrease	0.002
New York	0.865	0.837	No Change	0.362	177	No Change	0.401
Ohio	0.591	0.472	Decrease	0.010	26	Decrease	0.019
Oklahoma	0.544	0.514	No Change	0.630	49	No Change	0.554
Oregon	0.492	0.384	No Change	0.142	44	No Change	0.189
Pennsylvania	0.497	0.485	No Change	0.527	171	No Change	0.579
Puerto Rico	.	.	.	.	.	.	.
Rhode Island	1.171	0.710	No Change	0.093	4	No Change	0.194
South Carolina	0.857	0.706	Decrease	0.001	62	Decrease	0.001
South Dakota	.	.	.	.	.	.	.
Tennessee	0.870	0.699	Decrease	0.000	82	Decrease	0.000
Texas	0.609	0.559	No Change	0.238	80	No Change	0.061
Utah	.	.	.	.	.	.	.
Virginia	0.685	0.700	No Change	0.754	80	No Change	0.754
Vermont	0.782	0.246	Decrease	0.012	8	Decrease	0.012
Washington	0.464	0.477	No Change	0.829	62	No Change	0.829
Wisconsin	0.692	0.574	No Change	0.065	42	No Change	0.091
West Virginia	0.480	0.460	No Change	0.773	38	No Change	0.773
Wyoming	.	.	.	.	.	.	.
All US	0.677	0.592	Decrease	0.000	2210	Decrease	0.000

Footnotes for Table 5

1. SIRs are not reported for states with fewer than five facilities reporting CLABSI data to NHSN in 2010 or 2011.
2. Data from all ICUs, wards (and other non-critical care locations), and NICUs. This excludes LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
3. Continuous reporters include all facilities with at least one location that reported any data for CLABSI during both 2010 and 2011.
4. Adjusted by limiting analysis to only continuous reporters (e.g., facilities reporting for one month or more during 2010 that also reported during 2011).

Table 6. Changes in National Standardized Infection Ratios (SIRs), 2010 compared to 2011, Central Line-associated Bloodstream Infections (CLABSI), Catheter-associated Urinary Tract Infections (CAUTI), and Surgical Site Infections (SSI)[8]

	All Reporters				Continuous Reporters		
	SIR 2010	SIR 2011	Change in SIR	p-value	No. of Continuous Reporters[1]	Change in SIR[2]	p-value[2]
CLABSI, all locations[3]	0.677	0.592	Decrease	0.000	2,210	Decrease	0.000
CLABSI, ICU[4]	0.654	0.557	Decrease	0.000	2,117	Decrease	0.000
CLABSI, Ward[5]	0.711	0.642	Decrease	0.000	871	Decrease	0.000
CLABSI, NICU[6]	0.697	0.645	Decrease	0.023	500	Decrease	0.034
CAUTI, all locations[7]	0.937	0.930	No Change	0.568	923	Decrease	0.001
CAUTI, ICU[4]	0.972	0.989	No Change	0.286	760	No Change	0.127
CAUTI, Ward[5]	0.883	0.845	Decrease	0.046	550	Decrease	0.000
SSI, combined SCIP procedures[8]	0.927	0.827	Decrease	0.000	1,336	Decrease	0.001
SSI, Hip arthroplasty	0.970	0.896	Decrease	0.050	923	No change	0.244
SSI, Knee arthroplasty	0.941	0.857	Decrease	0.020	929	Decrease	0.046
SSI, Coronary artery bypass graft[9]	0.844	0.779	No change	0.105	412	No change	0.281
SSI, Cardiac surgery	0.847	0.698	No change	0.123	156	No change	0.650
SSI, Peripheral vascular bypass surgery	0.907	0.745	No change	0.271	42	No change	0.408
SSI, Abdominal aortic aneurysm repair	0.653	0.543	No change	0.796	29	No change	0.783
SSI, Colon surgery	0.903	0.796	Decrease	0.002	441	No change	1.000
SSI, Rectal surgery	1.044	0.744	No change	0.146	18	No change	1.000
SSI, Abdominal hysterectomy	1.011	0.834	Decrease	0.004	559	No change	0.052
SSI, Vaginal hysterectomy	1.158	0.867	Decrease	0.044	201	No change	0.758

Footnotes for Table 6

1. Continuous reporters include all facilities that reported any CLABSI or CAUTI data for any location during both 2010 and 2011 or SSI data for any of the 10 SCIP procedures during both 2010 and 2011.
2. Adjusted by limiting analysis to only continuous reporters, i.e., facilities reporting at least 1 location or procedure for 1 month or more during 2010 that also reported during 2011.
3. Data from all ICUs, wards (and other non-critical care locations), and NICUs. This excludes LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
4. Data from all ICUs; excludes wards (and other non-critical care locations), NICUs, LTAC locations (or facilities), and inpatient rehabilitation locations (or facilities).
5. Data from all wards (for this table wards also include stepdown and specialty care areas [including hematology/oncology, bone marrow transplant]. This excludes LTAC locations [or facilities] and inpatient rehabilitation locations [or facilities]).
6. Data from all NICU locations, including Level II/III and Level III nurseries. For purposes of this report, both umbilical-line and central-line associated bloodstream infections are considered CLABSIs.
7. Data from all ICUs and wards (and other non-critical care locations). This excludes NICUs, LTAC locations (or facilities) and inpatient rehabilitation locations (or facilities).
8. SSIs included are those following select surgical procedures approximating procedures covered by SCIP, using NHSN surgical procedure categorizations that were classified as deep incisional or organ/space, and were detected upon admission or readmission. (Specific NHSN procedures and the corresponding SCIP procedures are listed in Appendix A.)
9. Coronary artery bypass graft includes procedures with either chest only or chest and donor site incisions.

Appendix A.

Surgical Care Improvement Project (SCIP) Procedures, NHSN Procedure Categories Approximating SCIP Procedures, and Validated Parameters for Surgical Site Infection Risk Models in NHSN

SCIP Procedure	NHSN Procedure Category	Validated Parameters for Risk Model
Vascular	Abdominal aortic aneurysm repair	duration of procedure, wound class
	Peripheral vascular bypass surgery	age, ASA, duration of procedure, medical school affiliation
Coronary artery bypass graft	Coronary artery bypass graft with both chest and donor site incisions; Coronary artery bypass graft with chest incision only	age, ASA, duration of procedure, gender, medical school affiliation, age gender (interaction)
Other cardiac	Cardiac surgery	age, duration of procedure, emergency
Colon surgery	Colon surgery	age, ASA, duration, endoscope, medical school affiliation, hospital bed size, wound class
	Rectal surgery	duration of procedure, gender, hospital bed size
Hip arthroplasty	Hip arthroplasty (both primary and revision hip arthroplasties)	total/partial/revision, age, anesthesia, ASA, duration of procedure, medical school affiliation, hospital bed size, trauma
Abdominal hysterectomy	Abdominal hysterectomy	age, ASA, duration of procedure, hospital bed size
Knee arthroplasty	Knee arthroplasty	age, ASA, duration of procedure, gender, medical school affiliation, hospital bed size, trauma, revision
Vaginal hysterectomy	Vaginal hysterectomy	age, duration of procedure, medical school affiliation

Adapted from Mu Y, Edwards JR, Horan TC, Berrios-Torres SI, Fridkin SK. Improving risk-adjusted measures of surgical site infection for the National Healthcare Safety Network. Infect Control Hosp Epidemiol 2011 Oct; 32(10):970-86.