

## **KEY FINDINGS AND PUBLIC HEALTH ACTIONS**

### **Surgical Site Infections in California Hospitals, 2012**

#### **Introduction**

A surgical site infection (SSI) is an infection that occurs after surgery in the part of the body where the surgery took place due to contamination during the time of the operation. Some SSIs are superficial infections involving the skin layers only. Other surgical site infections are more serious and involve muscle and other tissues under the skin (“deep”) or organs or the space around organs (“organ/space”); these often result in longer hospitalization or readmission to the hospital. SSIs are the second most common type of healthcare associated infection in U.S. hospitals (290,000 per year) and account for the greatest additional healthcare cost, between \$3.5 and 10 billion per year. SSIs may be preventable by measures such as proper preparation of the skin and administration of an antibiotic just prior to surgery.

As of June 1, 2011, California hospitals are required to report data for 29 surgical procedure categories, including information on each surgery and any subsequent infections, to the California Department of Public Health (CDPH) via the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN). The current reporting period, January through December 2012, is the first full year of SSI reporting by California hospitals via NHSN.

California law requires that CDPH publicly report each hospital's rates of deep and organ/space SSI, and to adjust these rates using NHSN risk adjustment methods. The NHSN risk adjustment for SSIs is a standardized infection ratio (SIR). The SIR is a summary measure used to track and compare infections over time. It adjusts for the fact that hospitals perform surgery on different types of patients, and adjusts for individual patient risk factors for acquiring a SSI after surgery, such as age and underlying illness. The SIR compares the number of SSI that occurred after surgery in a hospital (observed SSI) to the number of SSI that were predicted to occur. The predicted number is based on the national average infection rate for the surgical procedure type and the mix of patients with different risk factors who had that surgery at the hospital. Some hospitals may have more high risk patients and others may have more low risk patients. Adjusting for surgical patient risk factors provides for a more fair comparison of SSI rates between hospitals and in the same hospital over time.

This report presents SIRs for each surgical procedure category by hospital for 2012. However, it's important to note that NHSN calculates a SIR only when at least 1 SSI is predicted, which is affected by the number of surgeries performed and the patient mix. Not every hospital will have a SIR for every surgical procedure category. To provide more comparison data, CDPH calculated a SIR if a hospital performed more than 100 procedures in a surgery category in 2012, but the predicted number of SSI was still less than 1. The CDPH-calculated SIRs are marked in the tables with an asterisk to indicate that they are not as reliable as the NHSN calculated SIRs.

Currently, NHSN does not have a risk adjustment process for 5 of the 29 California-mandated reportable surgical procedure categories. Therefore, SIRs cannot be reported for these categories: heart transplant, kidney surgery, ovarian surgery, pacemaker surgery and spleen surgery; only the number of procedures and the number of SSI are reported (Tables 25 through 29). We do not report data for any hospital that reported fewer than 20 procedures for a surgical procedure category because the numbers are too small to allow meaningful interpretation or comparison, and there is a need to protect confidential health information.

For the 24 risk-adjusted surgical procedure categories, for each SIR generated, we performed a statistical analysis to determine if the observed number of infections was significantly higher or lower than what was predicted from the national reference data. Based on our statistical analysis we labeled each SIR as indicating:

- N.D. - no difference between the number of observed and predicted SSI,
- High - more SSI occurred than were predicted, or
- Low - fewer SSI occurred than were predicted.

This statistical analysis allows comparison of the SIRs for each surgical procedure category.

It is important to keep in mind that the NHSN risk adjustment method may not take into account all of the differences in risk of infection for patients in hospitals. Furthermore, all statistics based on small numbers of procedures, including SIRs, are unstable; they can change dramatically with just one additional infection identified. Because many California hospitals perform small numbers of procedures, many hospitals do not have an SIR reported for many of their procedure categories.

In 2012, 43 hospitals reported none of the 29 surgical procedure categories were performed, indicating that they were not subject to SSI reporting requirements (Table 33). Thirteen hospitals reported fewer than 20 total procedures to CDPH (Table 34). SSI information for the 6 long term acute care (LTAC) hospitals and 1 rehabilitation hospital that reported SSI data are included in this report; however, NHSN does not currently provide an appropriately risk adjusted SIR for these hospitals.

For 2012, the Centers for Medicare and Medicaid (CMS) Services required hospitals to report SSI information to NHSN for colon surgery and abdominal hysterectomy. The SIR risk adjustment procedure used by CMS differs from the NHSN recommended method. Therefore the SIRs and the number of SSIs for each hospital in the CMS Hospital Compare website may be different than this California SSI public report.

### **Key Findings**

- For 2012, all 345 licensed California hospitals known to be subject to the SSI reporting requirements reported data on one or more of the 29 surgical procedure categories.
- Each hospital reported between 1 and 15,741 surgical procedures, a 68 percent increase in reported procedures (679,828) compared to the previous CDPH SSI report covering 7-9 months of 2011.
- There were 3,524 SSIs reported in 2012, a 73 percent increase over the number reported in 2011. This observed increase was most likely due to more thorough surveillance processes put into place by hospitals during the start up 7-9 month reporting period of 2011, resulting in better identification of SSI and more complete reporting in 2012.
- SSI SIRs could be calculated for 282 hospitals for one or more surgical categories, allowing comparison to national referent data.
  - 76 hospitals had one or more type of surgery with fewer SSIs than predicted (low SIR),

- 17 hospitals had at one or more type of surgery with more SSIs than predicted (high SIR), and
  - 14 hospital had surgery types with both low and high SIR.
  - The other 175 hospitals had SSI SIRs that showed no difference between the number of SSI reported and the number predicted.
- Recognizing that hospitals must monitor patients for 12 months following surgeries with implanted materials (such as joint replacements), SSI were reported in 2012 that were associated with surgeries performed in 2011. Statewide, 81 hospitals reported 128 SSIs detected in 2012 for surgeries performed in 2011 that had not been included in the 2011 SSI report. The addition of these SSIs to the already published 2011 data would not have changed the reported results or interpretations, except for one hospital where one interpretation would have changed from lower number of SSI than predicted to no different than predicted.

### **Public Health Actions**

In follow-up to this report, CDPH will:

- Identify and encourage hospitals with significantly higher numbers of SSI than predicted to report those findings to their surgical and operating room staff and examine adherence to surgical infection prevention practices.
- Continue to provide assistance to hospitals to improve surveillance and detection of SSI.
- Enhance efforts to evaluate the completeness and accuracy of SSI identification and reporting.
- Evaluate the risk-adjustment procedures and definitions used by NHSN and provide recommendations for refinement.

All hospitals should review these data and consider:

- Reporting to their surgical services and operating room staff the surgery-specific SSI findings and comparisons, focusing on those surgical categories with significantly higher and lower SSI than were predicted.
- Monitoring adherence to evidence-based SSI prevention practices
- Continuing efforts to ensure complete identification and accurate reporting of all SSIs for the 29 required surgical procedure categories.
- Reviewing CDPH's quarterly quality control reports to confirm that CDPH has correct and complete data and to identify additional data errors.

The public should consider:

- Asking your healthcare providers about SSI rates and the measures being taken to prevent these infections.
- Reviewing the CDPH Healthcare-Associated Infections Program website for further information on SSI rates and SSI prevention.