

# What the Experts Say

## Prevalence, Mortality and Attributable Costs of Surgical Site Infections

In 2003, 30.8 million inpatient surgical procedures were performed in the U.S., and 9.7 million of them were performed on patients 65 years and older.

DeFrances CJ, Hall MJ, Podgornik MN, 2003 National hospital discharge survey. CDC, National Center for Health Statistics, Div of Health Care Statistics, Advance Data from Vital and Health Statistics. No. 359;8 July 2005:14. (accessed 10 Jan 2006 at <http://www.cdc.gov/nchs/data/ad/ad359.pdf>).

In 1996, 28.4 million ambulatory surgery procedures were performed in the U.S.

Hall MJ, Lawrence L, Ambulatory surgery in the United States, 1996. CDC, National Center for Health Statistics, Div of Health Care Statistics, Advance Data from Vital and Health Statistics. No. 300;12 Aug 1998:7. (accessed 10 Jan 2006 at <http://www.cdc.gov/nchs/data/ad/ad300.pdf>).

According to NNIS system reports (1986-1996), SSIs occur after 2.6% of surgeries. [This rate translates to over 1.5 million SSIs annually—over 800,000 SSIs for inpatient surgeries and over 738,000 for outpatient surgeries—based on additional data (see above) from CDC and National Center for Health Statistics].

“Based on NNIS System reports, SSIs are the third most frequently reported nosocomial infection, accounting for 14% to 16% of all nosocomial infections among hospitalized patients... Among surgical patients, SSIs were the most common nosocomial infection, accounting for 38% of all such infections.” Surgical site infections increase length of stay by 7 to 10 days.

“For most SSIs, the source of pathogens is the endogenous flora of the patient’s skin, mucous membranes or hollow viscera. When mucous membranes or skin is incised, the exposed tissues are at risk for contamination with endogenous flora.”

Mangram AJ, et al., *Guideline for prevention of surgical site infection, 1999*. Centers for Disease Control and Prevention, Hospital Infection Control Practices Advisory Committee, Atlanta GA (accessed 10 Jan 2006 at: [http://www.cdc.gov/ncidod/dhqp/gl\\_surgicalsites.html](http://www.cdc.gov/ncidod/dhqp/gl_surgicalsites.html)).

Patients who develop SSIs “are twice as likely to die, 60% more likely to spend time in an ICU, and more than five times more likely to be readmitted to the hospital.”

Kirkland KB, et al., *The impact of surgical-site infections in the 1990s: attributable mortality, excess length of hospitalization, and extra costs*. *Infect Control Hosp Epidemiol*. Nov 1999;20(11):722-4.

The mean attributable cost of each surgical site infection is \$25,546 (ranging from \$1,783 to \$134,602), based on a review of studies published from 2001 to 2004, each examining the simple cost of hospital-acquired infections (HAIs) or evaluating

the economics of an intervention to prevent or reduce HAI. “Surgical and BSI are the most frequently studied infections and the most expensive.”

Stone PW, et al., *Systematic review of economic analyses of health care-associated infections*. *Am J Infect Control*. Nov 2005;33(9):501-9.

For elderly patients, SSI due to *S. aureus* was responsible for a more than 5-fold increase in mortality, more than 12 additional hospital days, and excess costs of more than \$40,000.

McGarry SA, et al., *Surgical-site infection due to Staphylococcus aureus among elderly patients: mortality, duration of hospitalization, and cost*. *Infect Control Hosp Epidemiol*. Jun 2004;25(6):461-7.

One facility found that cardiac surgery deep-sternal and deep-leg surgical site infections “...added approximately \$85,000 and \$55,000, respectively, to the overall cost of the patient’s hospital stay. The deep-sternal SSIs extended the patients’ hospital stay an average of 33 days...”

Stone PW, et al., *The economic impact of infection control: making the business case for increased infection control resources*. *Am J Infect Control*. Nov 2005;33(9):542-7.

**Mortality:** In a 7-year, 479-patient cohort study, SSI—caused by methicillin-resistant *Staphylococcus aureus* (MRSA) and methicillin-susceptible *S. aureus* (MSSA)—significantly increased risk for mortality. “Among patients with SSI, 25 (20.7%) of the 121 patients with MRSA SSI died during the 90-day postoperative period, compared with 11 (6.7%) of the 165 patients with MSSA SSI...” Just four (2.1%) of 193 uninfected patients died.

**Hospital Days:** “Uninfected patients had significantly fewer total hospital days after surgery (median 5 days) than did patients with SSI due to MSSA (median, 14 days;  $P < .001$ ) and patients with MRSA SSI (median, 23 days;  $P < .001$ ...)”

**Hospital Costs:** Total mean hospital charges for patients with a MSSA SSI were \$38,770 higher than the charges for patients without infection. For patients with a MRSA SSI, mean hospital charges were \$84,020 higher than those for uninfected patients.

Engemann JJ, et al., *Adverse clinical and economic outcomes attributable to methicillin resistance among patients with Staphylococcus aureus surgical site infection*. *Clin Infect Dis*. 1 Mar 2003;36(5):592-8.