

## CUTTING SURGICAL INFECTIONS

*Hospitals Making Progress, but too many patients fail to get the right care*

[http://www.stophospitalinfections.org/infection\\_prevention/](http://www.stophospitalinfections.org/infection_prevention/)

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According to the Centers for Disease Control and Prevention (CDC) more than 290,000 surgical site infections (SSI) occur in U.S. hospitals each year,<sup>1</sup> in 2 out of every 100 surgeries, accounting for 20 percent of all hospital-acquired infections. A CDC review of data from 2002 found that 8,205 deaths were associated with surgical site infections.<sup>2</sup> An estimated 77 percent of deaths in patients with SSI are directly attributable to the infection.<sup>3</sup>

Patients who acquire infections from surgery spend, on average, an additional 6.5 days in the hospital, are five times more likely to be readmitted after discharge, and twice as likely to die.<sup>4</sup> Moreover, surgical patients who develop infections are 60 percent more likely to require admission to a hospital's intensive care unit.<sup>5</sup> Surgical infections are believed to account for up to ten billion dollars annually in health care expenditures.<sup>6</sup>

Surgery patients are at risk for infection because surgical incisions create a pathway for germs to enter the body. Maintaining a sterile environment in the operating room is therefore critical to protect patients from being contaminated with bacteria, which can lead to infection.

In addition, research shows that the risk of surgical site infections can be reduced if patients are given the appropriate antibiotic within one hour before the first surgical incision is made, depending on the type of surgery and patient characteristics. Another practice, discontinuing antibiotics within 24 hours after the surgery, is critical to reducing overuse of antibiotics and antibiotic resistance, a major problem in treating infections. These practices have been identified by the Centers for Medicare and Medicaid Services (CMS) as key to decreasing the incidence of surgical infections. CMS reports hospitals' compliance levels with these practices on its [Hospital Compare website](#).

An estimated 40 to 60 percent of all surgical site infections could be prevented by following these and other infection prevention measures.<sup>7</sup> Other measures found to reduce the incidence of surgical infections include appropriate hair removal for surgical patients (using clippers instead of razors to avoid creating cuts in the skin, which can allow bacteria to enter the body); keeping patients warm during surgery; and maintaining proper serum glucose levels after surgery.<sup>8</sup> These last two measures have recently been added to the Hospital Compare site but are not included in this report.

Since the 1960s surgeons have known that using “prophylactic” antibiotics – giving the patient antibiotics prior to surgery – can prevent infections.<sup>9</sup> But later studies found that the specific timing of giving the antibiotics (within one hour before the incision) provided significantly better results and eventually became the standard for these infection prevention methods.

A national strategy to get surgeons to use these proven techniques was launched after a group of 56 hospitals systematically implemented them under the Surgical Infection Prevention (SIP) Project with an overall reduction of infection rates by 27 percent - some of the participating hospitals had more dramatic reductions.<sup>10</sup> The SIP Project was a collaborative project of CMS, CDC and others<sup>11</sup>, launched in 2002. Further, research published in early 2005 (based on 2001 data) established a national baseline for these measures.<sup>12</sup> Although the study stated, “Antimicrobial prophylaxis to prevent SSI is one of the most widely accepted practices in surgery,” it found only 56% of Medicare patients were getting antibiotics within one hour of surgery. Ninety-three percent of the patients received the type of antibiotics in line with published guidelines and 41% had their antibiotics stopped within 24 hours of the end of their surgery.

CMS added these measures to its Hospital Compare website, where various other “process measures”<sup>13</sup> relating to optimal care were being reported. Initially this reporting was voluntary, and technically still is, but in July 2006 when the Medicare annual payment increase only went to hospitals that submitted this data, most hospitals began reporting.

The SIP Project evolved into the current Surgical Care Infection Prevention Project (SCIP), under which CMS and a host of partners operate an organized campaign to get hospitals to use these practices to prevent infections in surgical patients. See [About This Report](#) for more information.

This campaign has significantly increased compliance with these life-saving practices, but many hospitals still fall short of acceptable compliance, leaving tens of thousands of patients at a higher risk of developing a surgical site infection. The purpose of this Report is to more clearly identify for the public where these gaps in effective surgical care exist.

## **HOW OFTEN HOSPITALS FOLLOW SURGICAL INFECTION PREVENTION MEASURES**

To determine how well hospitals are following the three recommended surgical infection prevention measures, Consumers Union reviewed and analyzed data posted on the U.S. Department of Health & Human Services’ [Hospital Compare web site](#).

Hospital Compare posts data on how often hospitals follow the recommended surgical infection prevention measures as well as other measures related to heart attacks, heart failure, and pneumonia. The information displayed on the web site is based on data from medical records voluntarily submitted by hospitals for a sample of adult surgical inpatients. See “sampling” in [About this Report](#) for more details.

In this Report, Consumers Union analyzed the most recent data available, which covers surgeries conducted between July 1, 2007 and June 30, 2008 (these data were released by CMS on March 26, 2009). Our report includes historical data on how hospitals' compliance has changed over time and allows comparison of all hospitals in the state as well as state-to-state comparisons. Although CMS collects and makes available compliance levels by patient volume (i.e. number of surgical patients for whom data is submitted), this information is not available in the Hospital Compare comparison charts. Our report allows the viewer to see the percentage of surgical patients within each hospital who received this life-saving care. See "patient volume" in [About this Report](#) for more information.

For the purposes of this analysis, hospitals that followed the recommended infection prevention measures with 95 percent or more of the patients were considered to be in high compliance. Hospitals that followed these measures for 79 percent or fewer of sampled patients were considered to be in low compliance. Detailed information about the hospitals in each state can be found by clicking on the appropriate state on the map that appears on the report web site's [home page](#).

## ANALYSIS OF THE STATES<sup>14</sup>

For this section's analysis of state comparisons, we only included hospitals with data reported for at least 25 surgical patients<sup>15</sup>. Within each state, we calculated the weighted average<sup>16</sup> across all hospitals, where hospitals with a larger number of sampled surgical patients are given greater weight. Similarly, national figures are the weighted average of all hospitals nationally.<sup>17</sup>

In this report we also include the number of sampled surgery patients who did not receive correct care, but this is an under estimate.<sup>18</sup> CMS allows many hospitals to report on a sample of their surgeries, and only provides the sampled number of patients reported by each hospital, not the total number of surgery patients who should have received the correct care. Consequently, the actual number of surgery patients who did not receive appropriate care is likely much higher than what is reported here.

### **Antibiotic Given Within One Hour Before Surgery – SCIP 1 measure**

Giving a patient antibiotics right before surgery helps to boost the patient's ability to fight off contamination during surgery that could lead to infection. Studies show that patients given antibiotics either more than one hour before or after the first surgical incision is made experience higher rates of infection compared to those who are given antibiotics within one hour before surgery begins.<sup>19</sup>

Consumers Union's analysis found:

- An estimated 90.8 percent of surgical patients across the U.S. received antibiotics within one hour before surgery.

- A minimum of 96,750 patients nationwide did not receive this intervention; the actual number is likely much larger, since this is only the number of *sampled* patients in reporting hospitals who did not receive the correct care.
- For example, 8855 sampled surgical patients in California, and 7711 in Texas, did not receive the correct care in the reporting hospitals only.
- Forty-four percent of hospitals (1619 hospitals)<sup>20</sup> around the country performed worse than this national average. (90.8 percent)
- Every state had at least one hospital in high compliance. Only four states had no hospitals in low compliance: Vermont, Delaware, Connecticut, and New Hampshire.
- Nationwide, 445 hospitals (13.7 percent of all reporting hospitals) were low compliers (gave antibiotics within one hour before surgery to 79% or fewer of their patients).
- Approximately one-third of all reporting hospitals - 1099 hospitals – had high compliance on this measure (gave antibiotics within one hour before surgery to 95 percent or more of their patients).
- The remaining hospitals fall somewhere in between: 1701 hospitals (52%) gave antibiotics within one hour before surgery to 80%-94% percent of their patients.

There is substantial variation among states in the degree to which their hospitals comply with this process. The states with the largest percentage of hospitals in the low compliance category (that is, hospitals that provided the correct care to 79 percent or fewer of their surgical patients) are shown in the table below.

**States with the highest percentages of hospitals  
in Low Compliance with SCIP 1**

State	% of hospitals with low compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Washington, DC	43%	301
Alaska	38%	318
New Mexico	35%	771
Nevada	30%	1178
Oregon	27%	1711
Idaho	25%	581

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the low compliance hospitals, but for all reporting hospitals in the state.

The states with the largest percentage of hospitals in the *high* compliance category (that is, hospitals that provided the correct care to 95% or more of their surgical patients) and the smallest percentage of hospitals in the high compliance category are shown in the following tables:

**States with the highest percentages of hospitals  
in *High* Compliance – SCIP 1**

State	% of hospitals with high compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Vermont	69%	100
Maine	58%	327
Nebraska	57%	638
Massachusetts	53%	1548
Montana	50%	266
South Dakota	50%	328

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the high compliance hospitals, but for all reporting hospitals in the state.

**States with the lowest percentages of hospitals  
in *High* Compliance – SCIP 1**

State	% of hospitals with high compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Oregon	10%	1711
Alaska	13%	318
Washington, DC	14%	301
Mississippi	17%	1487
Nevada	17%	1178
Idaho	19%	581

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the high compliance hospitals, but for all reporting hospitals in the state.

Our analysis reveals substantial variations among hospitals within some states. The states with the widest gap between its hospitals with highest compliance rates and those with the lowest compliance rates are shown below:

**Widest Gaps Between High and Low Compliance Hospitals within states – SCIP 1**

State	Lowest Complying hospital	Highest Complying hospital	Percentage point difference
Pennsylvania	5%	100%	95%
Texas	7%	100%	93%
California	15%	100%	85%
Illinois	17%	100%	83%
Oklahoma	24%	100%	76%
Oregon	27%	100%	73%
Georgia	31%	100%	69%
Arizona	33%	97%	64%

[Complete list of all states’ compliance rates for SCIP-1](#)

**Appropriate Antibiotic Given to Surgical Patients – SCIP 2**

Choosing the appropriate antibiotic is critical because it must be effective in preventing infections caused by bacteria likely to be present around the surgical site. Antibiotic selection therefore varies depending on the type of surgery.<sup>21</sup> [Guidelines for appropriate antibiotic selection](#) have been developed by the CDC.

Of all three measures reported to CMS, hospitals did best when it came to providing the appropriate antibiotic to those surgical patients who received an antibiotic within one hour prior to surgery. Consumers Union’s analysis found:

- An estimated 95.4 percent of surgical patients across the U.S. who received an antibiotic within one hour prior to surgery received the appropriate antibiotic.
- Of the patients sampled by hospitals, 49,230 patients nationwide did not receive this intervention; the actual number is likely much larger, since this is only the number of *sampled* patients in the reporting hospitals who did not receive the correct care.
- In Florida, for example, 3520 of *sampled* surgical patients in the reporting hospitals did not receive the appropriate antibiotic.
- Every state had at least one hospital that administered the correct antibiotic to at least 95% of their surgical patients (high compliance). Twenty-two states had no low-compliance hospitals (administered the correct antibiotic to 79% or fewer of their surgical patients): Alaska, Alabama, Connecticut, Washington DC, Delaware, Hawaii, Idaho, Massachusetts, Maryland, Maine, Minnesota, Montana, North Dakota, Nebraska, New Hampshire, New Mexico, Rhode Island, South Carolina, South Dakota, Utah, Vermont, and Washington.
- Nationwide, only 97 hospitals (3% of all reporting hospitals) were low compliers (gave the appropriate antibiotic to 79 percent or fewer of their surgical patients).

- 2095 hospitals (65% of all reporting hospitals) were high compliers (gave the appropriate antibiotic to 95 percent or more of their surgical patients).
- The remaining 1,052 hospitals (32% percent of all reporting hospitals) provided the appropriate antibiotic to between 80% and 94% of their surgical patients.

The states with the largest percentage of hospitals in the low compliance category (that is, hospitals that provided the correct care to 79 percent or fewer of their surgical patients) are shown in the following table.

**States with the highest percentages of hospitals  
in Low Compliance with SCIP 2**

State	% of hospitals with low compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Louisiana	14%	1739
West Virginia	10%	527
Oregon	10%	745

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the low compliance hospitals, but for all reporting hospitals in the state.

The states with the largest percentage of hospitals in the *high* compliance category (that is, hospitals that provided the correct care to 95% or more of their surgical patients) and the smallest percentage of hospitals in the high compliance category are shown in the following tables:

**States with the highest percentages of hospitals  
in High Compliance – SCIP 2**

State	% of hospitals with high compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Delaware	100%	86
Vermont	100%	33
Utah	92%	252
Rhode Island	91%	108
South Dakota	89%	142
North Dakota	89%	133
Minnesota	86%	567

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the high compliance hospitals, but for all reporting hospitals in the state.

### States with the lowest rates of *High Compliance* – SCIP 2

State	% of hospitals with high compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Louisiana	38%	1739
Mississippi	43%	813
Georgia	45%	1732
Nevada	48%	526

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the high compliance hospitals, but for all reporting hospitals in the state.

When it came to giving surgical patients the appropriate antibiotic, the states with the widest gap between the hospitals with highest compliance rates and those with the lowest compliance rates are listed below:

### Widest Gaps Between High and Low Compliance Hospitals within states – SCIP 2

State	Lowest Complying hospital	Highest Complying hospital	Percentage point difference
Oklahoma	6%	100%	94%
Louisiana	21%	100%	79%
Wisconsin	32%	100%	68%
Virginia	33%	100%	67%
Florida	35%	100%	65%
Mississippi	36%	100%	64%
Ohio	36%	100%	64%
Kansas	42%	100%	58%
Texas	42%	100%	58%

[Complete list of all states' compliance rates for SCIP-2](#)

### Antibiotic Stopped Within 24 Hours After Surgery – SCIP-3

Continuing antibiotics beyond 24 hours after the end of surgery does not offer any additional protection when it comes to preventing surgical infections.<sup>22</sup> But the prolonged use of antibiotics can be associated with other complications and can contribute to antibiotic resistance.<sup>23</sup> Patients who receive antibiotics beyond 24 hours after surgery are at higher risk of developing serious infections caused by *C. difficile*, an antibiotic-resistant organism.<sup>24</sup>

Of all three surgical infection prevention measures, hospitals had the lowest compliance scores when it came to discontinuing antibiotics within 24 hours after surgery ended. Consumers Union's analysis found:

- Antibiotics were stopped within 24 hours of surgery for an estimated 87.1% of all surgical patients across the U.S.



- A minimum of 129,420 patients nationwide did not have antibiotics stopped within 24 hours after surgery; the actual number is likely much larger, since this is only the number of *sampled* patients in reporting hospitals who did not receive the correct care.
- For example, 13,668 *sampled* surgical patients in California and 11,764 in Texas did not receive the correct care in the reporting hospitals only.
- Nationwide, 629 hospitals (19% of all reporting hospitals) were high compliers (stopped administering antibiotics within 24 hours after the end of surgery with 95% or more of their patients).
- Three states had no high-compliance hospitals: Washington DC, Mississippi, and Nevada.
- Five states had no low-compliance hospitals: North Dakota, New Hampshire, Rhode Island, South Dakota, and Vermont.
- 720 hospitals (22% of all reporting hospitals) were low compliers (stopped administering antibiotics within 24 hours after the end of surgery for 79% or fewer of their surgical patients).
- 1,883 hospitals (58% of all reporting hospitals) stopped administering antibiotics within 24 hours after the end of surgery for between 80% and 94% of their patients.

When it came to stopping antibiotics within 24 hours after surgery, the states with the largest percentage of hospitals in the low compliance category (that is, hospitals that provided the correct care to 79 percent or fewer of their surgical patients) are shown in the table below.

**States with the highest percentages of hospitals  
in Low Compliance with SCIP 3**

State	% of hospitals with low compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Nevada	57%	1552
Louisiana	46%	4025
Idaho	44%	801
Wyoming	40%	424

\* This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the low compliance hospitals, but for all reporting hospitals in the state.

The states with the largest percentage of hospitals in the *high* compliance category (that is, hospitals that provided the correct care to 95% or more of their surgical patients) and the smallest percentage of hospitals in the high compliance category are shown in the following tables:

**States with the highest percentages of hospitals  
in *High* Compliance – SCIP 3**

State	% of hospitals with high compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Maine	60%	347
Vermont	54%	105
New Hampshire	46%	319
Montana	45%	434
Rhode Island	45%	251
South Dakota	44%	263
Massachusetts	42%	1884

\*This is an estimate of the numbers of sampled patients across the state who did not receive correct care, not only in the high compliance hospitals, but for all reporting hospitals in the state.

**States with the lowest rates of *High* Compliance – SCIP 3**

State	% of hospitals with high compliance	# of <i>sampled</i> patients statewide who did not receive correct care*
Nevada	0%	1552
Mississippi	0%	1769
Washington DC	0%	273
Louisiana	4%	4025
Utah	4%	1341
Tennessee	6%	3330
Georgia	7%	3823

\* This is an estimate of the sampled numbers of patients across the state who did not receive correct care, not only in the high compliance hospitals, but for all reporting hospitals.

When it came to stopping antibiotics within 24 hours after surgery, the states with the widest gap between the hospitals with highest compliance rates and those with the lowest compliance rates are shown in the table below:

**Widest Gaps Between High and Low Compliance Hospitals within states – SCIP-3**

State	Lowest Complying hospital	Highest Complying hospital	Percentage point difference
Alabama	3%	100%	97%
Oklahoma	3%	100%	97%
Kansas	3%	98%	95%
California	6%	100%	94%
Illinois	9%	100%	91%
Texas	13%	100%	87%
Pennsylvania	15%	100%	85%

[Complete list of all states' compliance rates for SCIP-3](#)

**CONCLUSIONS**

Our analysis and website, allowing a review of performance over time, clearly demonstrates improvement among U.S. hospitals in implementing proven prevention techniques since the beginning of the CMS public reporting program. Much work has been done over the past decade to encourage these safe practices. Yet still, too many hospitals are not offering all of their surgical patients the care they need to stay safe. And wide variations among hospitals mean that patient experiences could be radically different within a particular state.

Clearly, CMS has demonstrated that connecting payment to reporting is a powerful tool for changing behavior. And providing this data to the public enhances the pressure on hospitals to improve their infection control practices. But the payments are not connected to performance, they are merely connected to reporting. Thus, a hospital in low compliance that reports its data gets the same payments as a high complying hospital that reports its data. It is time for CMS to begin connecting the results with the money.

The Hospital Compare site is difficult to navigate and leaves out critical information – such as the total number of patients receiving care - and comparison tools are too limited, only allowing comparison of three hospitals at a time. It fails to reveal the complete picture of surgical safety. Without requiring hospitals to also report the number and rate of surgical-acquired infections, it is impossible to measure whether these practices actually translate into reducing infections.

Every year millions of Americans get infections while hospitalized and progress towards eliminating these infections is too slow. Voluntary programs have not served these patients. Consumers Union supports state and national laws to require all hospitals to make their infection rates public to inform consumers and to encourage hospitals to do a better job preventing infections. Disclosing infection rates will improve patient care, save lives and ultimately save

money. Twenty-five states now require public reporting of hospital infection rates. So far, only a handful of states have issued reports. More information on hospital infection reporting efforts can be found on the [Stop Hospital Infections website](#).

## RECOMMENDATIONS

### **Require hospitals to report surgical infections and publish infection rates along with SCIP measures.**

The Medicare data presented in this report tells how well hospitals try to prevent infection through these best practices. But hospitals' practices need to be paired with outcome measures that tell consumers whether these practices actually translate into reduced infections. The national goal of the SCIP project is to reduce preventable surgical injuries and deaths by 25 percent by 2010.<sup>25</sup> This deadline is close, yet there is no national documentation of surgical injuries and deaths, therefore, there will be no evidence available to determine whether or not the goal has been met. All hospitals should be required to report surgical infections to the Centers for Disease Control and Prevention's National Healthcare Safety Network. That information should be validated and used to calculate each hospital's surgical infection rate to be posted by CMS on the Hospital Compare website.

### **Tie Medicare payments to performance on SCIP within this year.**

All hospitals should work to achieve 95 percent or above compliance with the three recommended surgical infection prevention measures. Voluntary compliance has not led to all patients getting appropriate preventive care and Medicare should require these practices to become more widespread. The Medicare annual payment increases should be tied to more than simply reporting the data. Such payment policies worked well to get hospitals to submit data but it is now time to attach these payment adjustments to actual results.

**Require Hospital Compare to provide the total number of surgery patients for these measures.** In addition to providing the number of sampled patients, CMS should also provide the total number of surgery patients for whom these measures are appropriate. This would allow more accurate calculations and disclosure of the number of patients who did not receive the right preventive care.

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<sup>1</sup> Scott, R. Douglas II, "The Direct Medical Cost of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention," Division of Healthcare Quality Promotion, National Center for Preparedness, Detection, and Control of Infectious Diseases, Coordinating Center for Infectious Diseases Centers for Disease Control and Prevention, March 2009.

<sup>2</sup> Estimating Health Care Associated Infections and deaths in U.S. Hospitals," Public Health Reports, March-April 2007, p. 163-164. ([www.cdc.gov/ncidod/dhqp/pdf/hicpac/infections\\_deaths.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/hicpac/infections_deaths.pdf))

<sup>3</sup> "Strategies to Prevent Surgical Site Infections in Acute Care Hospitals, SHEA/IDSA Practice Recommendation," Infect Control & Hospital Epidemiology, October 2008;29:S51-S61; DOI: 10.1086/591064, citing Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for prevention of surgical site infection, 1999. Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol.* 1999;20(4):250-78; quiz 279-80 .

<sup>4</sup> Kirkland, K.B. et al "The Impact of Surgical-Site Infections in the 1990s: Attributable Mortality, Excess Length of Hospitalization, and Extra Costs," *Infection Control and Hospital Epidemiology*, 20 (11): 725-30.

<sup>5</sup> Griffin, Frances A., "Best Practice Protocols: Preventing Surgical Site Infection," *Nursing Management*, November 2005, p. 22.

<sup>6</sup> Scott, R. Douglas II, "The Direct Medical Cost of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention," Division of Healthcare Quality Promotion, National Center for Preparedness, Detection, and Control of Infectious Diseases, Coordinating Center for Infectious Diseases Centers for Disease Control and Prevention, March 2009.

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<sup>7</sup> OSF Surgical Safety Success Story; *This story originally appeared in IHI's e-newsletter, Continuous Improvement*, <http://www.ihl.org/IHI/Topics/PatientSafety/SurgicalSiteInfections/ImprovementStories/OSFSurgicalSafetySuccessStory.htm> (3/31/09); Odom-Forren, Jan, "Preventing Surgical Infections," *Nursing*, June 2006, p. 60.

<sup>8</sup> Griffin, p. 24-26.

<sup>9</sup> Bratzler, Dale W, et al, "Use of Antimicrobial Prophylaxis for Major Surgery," *Arch Sug/Vol*, 140, Feb 2005, p. 174.

<sup>10</sup> Cook, Rebecca, "Hospitals learn simple steps can help prevent infections," Associated Press, April 22, 2004.

<sup>11</sup> The SIP Project lead partners served on the steering committee: Agency for Healthcare Research and Quality, American College of Surgeons, American Hospital Association, American Society of Anesthesiologists, Association of periOperative Registered Nurses, Centers for Disease Control and Prevention, Centers for Medicare & Medicaid Services, Institute for Healthcare Improvement, The Joint Commission, Veterans Health Administration; <http://www.jointcommission.org/PerformanceMeasurement/PerformanceMeasurement/SCIP+Core+Measure+Set.htm>, accessed 1-20-09.

<sup>12</sup> Bratzler, Dale W, et al, "Use of Antimicrobial Prophylaxis for Major Surgery," *Arch Sug/Vol*, 140, Feb 2005, pp. 174-182.

<sup>13</sup> The activity being measured in this report is a "process measure." That is, rather than giving the outcomes of care (death, infection or a rate of these outcomes), process measures give the rate at which a health care provider gives recommended evidence-based care. Typically these process measures have been studied for years and are well-documented as a standard of care to improve health care outcomes.

<sup>14</sup> These state calculations used the total number of **reporting** hospitals; hospitals that did not report data to CMS ("N/A" on the individual state pages) were not include in the state comparison calculations. Hospitals reporting on fewer than 25 patients were also excluded in the state comparison calculations but were included in the calculations of the number of patients who did not receive the correct care. We also treat the District of Columbia as if it were a state.

<sup>15</sup> See hospitals with low patient volume in [About This Report](#).

<sup>16</sup> See "State Patient Average" in [About This Report](#).

<sup>17</sup> See "National Patient Average" in [About This Report](#).

<sup>18</sup> The calculations of sampled patients who did not receive the correct care includes those in hospitals with fewer than 25 patients.

<sup>19</sup> *Clinical Infectious Diseases* 2007; 44: 921-7

<sup>20</sup> This calculation includes hospitals with fewer than 25 patients.

<sup>21</sup> Griffin, p. 22.

<sup>22</sup> Bratzler, Dale W, et al, "Use of Antimicrobial Prophylaxis for Major Surgery," *Arch Sug/Vol*, 140, Feb 2005, p. 178.

<sup>23</sup> Jobe BA, et al. *American Journal of Surgery*. 1995; 169: 480-483; Privitera G, et al. *Antimicrobial Agents and Chemotherapy*. 1991; 35: 208-210.

<sup>24</sup> Bratzler, Dale, DO, MPH, "The Surgical Care Improvement Project, Where we started and where we're going," Slide 27.

<sup>25</sup> Bratzler, Dale, DO, MPH, "From SIPP to SCIP Presentation," <http://www.qualitynet.org/dcs/ContentServer?cid=1136495755695&pagename=Medqic%2FOtherResource%2FOtherResourcesTemplate&c=OtherResource>; accessed 1-20-09.