

MISSOURI NOSOCOMIAL INFECTION REPORTING DATA

**Report to the Governor and
General Assembly
December 2011**



**Missouri Nosocomial Infection Reporting Data
Report to the Governor and General Assembly - 2011**

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Executive Summary

Background

In 2004, the Missouri legislature passed Senate Bill 1279, establishing the “Missouri Nosocomial Infection Reporting Act of 2004.” The law requires hospitals and ambulatory surgical centers (ASCs) to report specific categories of healthcare-associated infections (HAIs) to the Department of Health and Senior Services (DHSS). This report summarizes April 2010-March 2011 data on central line-associated bloodstream infections (CLABSIs), surgical site infections (SSIs) and head of bed (HOB) elevation.

Data Collection

The infections mandated for reporting include ventilator-associated pneumonias (VAPs), CLABSIs and SSIs. CLABSIs are reported by hospitals for six intensive care units (ICUs)--coronary, surgical, medical/surgical, medical, neonatal and pediatric. SSIs are reported by facility and not ICU. Hospitals report SSIs associated with abdominal hysterectomy, hip repair and coronary artery bypass surgery. ASCs report SSIs associated with hernia repair and breast surgery. In lieu of measuring the incidence of VAP, hospital ICUs report the percent of their ventilator patients with appropriate HOB elevation. HOB elevation of at least 30 degrees lowers the risk of developing VAP.

Reporting to the Public

The DHSS has developed a public website to report infection rates. The site provides the most current four quarters of data for viewing. At the time this report was prepared, SSI, CLABSI and HOB elevation data for April 2010-March 2011 were available on the website (http://health.mo.gov/data/hai/drive_noso.php). Data for the next reporting period, July 2010-June 2011, will be published on the website during December 2011. In October 2011, a table of historical data was added to the website. Data on the number of infections and procedures and the percent HOB compliance for 2006-2009 are currently displayed in that table.

Data Summary

Hospitals submit data for each ICU that meet DHSS reporting requirements. In all, 103 ICUs from 66 hospitals reported CLABSI data for April 2010-March 2011. Statewide infection rates were lowest in the coronary ICUs (0.5/1000 central line-days) and highest in the pediatric ICUs (1.9/1000). Statewide rates for all ICUs except pediatric ICUs were significantly lower than U.S. rates published by the Centers for Disease Control and Prevention (CDC). Missouri’s CLABSI rates for five of the six reporting ICUs have dropped 38 - 69 percent relative to the April 2007 – March 2008 reporting period.

Fifty-four hospitals and 24 ASCs reported SSI data. The lowest SSI rate for hospitals overall was for abdominal hysterectomy (0.8/100 surgeries). The highest rate was for coronary artery bypass surgery (1.9/100). The rates for abdominal hysterectomy and coronary artery bypass surgery were significantly lower than the rates published for 2006-2008 by the CDC. The ASCs reported infection rates for hernia repair and breast surgery. Infection rates for both of these surgery types were lower than 1.0/100 surgeries.

Forty-eight hospitals reported HOB elevation for ICUs with ventilator patients. The ideal is to have every hospital ICU comply with HOB standards (usually elevation of 30 degrees or more) for 100 percent of their ventilator patients. Generally, Missouri hospitals performed quite well in that regard. While none of the types of ICUs reached 100 percent compliance for every reporting hospital, the average compliance rate for each of the five types of reporting ICUs ranged from 97-98 percent. All but seven of the 74 hospital/ICU combinations had average compliance rates of 95 percent or better.

Cautions

Infection rates are affected by a facility's level of resources and commitment to infection control, the severity of the illnesses it treats, and the care with which it collects and reports data. A consumer who is choosing a facility for healthcare should consider the advice of their physician, the experience of facility staff, and all the other factors that are unique to his or her situation, in addition to the infection and HOB elevation data reported on the DHSS website.



Missouri Nosocomial Infection Reporting Data Report to the Governor and General Assembly - 2011

Background

Healthcare-associated infections (HAIs), also known as nosocomial infections, are infections that occur while patients are in a healthcare setting. Because of the seriousness of their conditions, patients treated in intensive care units (ICUs) have an especially high risk of HAIs. HAIs can severely aggravate an illness, lengthen hospital stays and spread to other individuals. HAIs continue to be a major public health problem in the United States. “The Guidance on Public Reporting of Healthcare-Associated Infections...,” published by the Healthcare Infection Control Practices Advisory Committee (HICPAC) in 2005¹, reported that in hospitals alone, HAIs accounted for an estimated 2 million infections, 90,000 deaths and \$4.5 billion dollars in excess healthcare costs annually. A recent study reported that adverse events cost Medicare an estimated \$324 million in October 2008.²

In 2004, the Missouri legislature passed Senate Bill 1279, establishing the “Missouri Nosocomial Infection Reporting Act of 2004.” The intent of the law is to establish conditions that lead to a decrease in HAIs in Missouri. The law requires hospitals and ambulatory surgical centers (ASCs) to report specific categories of HAIs to the Department of Health and Senior Services (DHSS).

The law also requires the DHSS to publish reports on the department’s internet website and to submit an annual report to the Governor and members of the General Assembly. Rather than including copies of every table from the website, this report summarizes the data and presents representative tables.

Data Collection

Procedures and HAIs are reported to the DHSS according to 19 CSR 10-33.050, which became effective July 30, 2005. The reporting rule was promulgated under the authority of the revised statute that mandates data reporting by hospitals and ASCs (Section 192.667, RSMo). The data that are collected follow the recommendations of the infection control advisory panel established by the law. This panel includes a statistician, a microbiologist and representatives of consumers, physicians, infection control professionals and regulators.

Infections and procedures of a more serious nature and that occur in a variety of hospitals and ASCs were considered for mandatory reporting. Hospitals and ASCs differ in what they report. Hospitals are required to report ventilator-associated pneumonia (VAP), central line-associated bloodstream infections (CLABSIs) and surgical site infections (SSIs). The SSIs reported are those associated with procedures for abdominal hysterectomy, hip repair and coronary artery bypass surgery. ASCs report only SSI data, and are limited to reporting infections associated with procedures for hernia repair and breast surgery. To provide denominators for the infection rates, hospitals and ASCs report every one of the selected procedures regardless of whether the procedure results in an infection. Because patients in intensive care units are particularly at risk for HAIs, hospital reporting of CLABSIs is done for six specific intensive care units (ICUs): medical, surgical, medical/surgical, coronary, neonatal and pediatric. SSIs are reported by

facility rather than ICU. For reasons discussed below, hospitals report HOB³ elevation but not VAP.

To ensure that the data being collected are reliable, the DHSS established reporting requirements for the facilities. Following the lead of the Centers for Disease Control and Prevention (CDC), DHSS required that only hospitals that had at least 50 central line-days in the prior year must report during the current year. Both hospitals and ASCs must report SSIs if they performed at least 20 of the specified surgeries in the prior year. Hospitals with at least 100 ventilator patients are asked to report the number of ventilator patients and the number who have HOB elevation of at least 30 degrees, a practice that reduces the risk of ventilator associated pneumonia (VAP). Reporting is done through the Missouri Healthcare-Associated Infection Reporting System (MHIRS), a web-based system developed by DHSS staff and the Information Technology Support Division of the Office of Administration. MHIRS allows facilities to enter HAI data directly into a DHSS database on a monthly basis.

Registration for reporting by hospitals and ASCs occurs annually in March and April. Facilities report the number of central line-days per ICU, the number of relevant surgeries, and the number of ventilator patients that they had during the previous year. This information determines which facilities will be required to report the selected indicators to the DHSS.

Hospitals have been reporting CLABSIs to the department since July 2005. Recording of SSI data by hospitals and ASCs began in January 2006. Reporting of VAPs has been postponed. Because hospitals do not use a standard method of diagnosing VAPs, an expert panel was convened to study the infection control issue. Based on their input, the advisory control panel recommended that a process measure, HOB elevation, be reported instead. The risk of contracting a VAP is substantially reduced for patients on ventilators if they have their heads elevated at least 30 degrees. This measure has been included in a group of VAP measures endorsed by the Joint Commission on Accreditation of Healthcare Organizations. At the request of DHSS, Missouri hospitals began voluntarily reporting HOB elevation in November 2007. Reporting is done for four ICUs--medical, surgical, medical/surgical and coronary--plus all other ICUs combined.

In October 2010, the DHSS added historical data to the website. After reaching the main page for Missouri Healthcare Associated Infection Reporting, visitors can link to a table where they can select either hospitals or ASCs. For the selected facility, users can view numerators, denominators and rates for CLABSIs, SSIs and HOB elevation. Currently displayed are data for 2006-2009. As each calendar year of data becomes complete, it is added to this table.

Reporting to the Public

Figure 1 depicts the main page of the public reporting site. This page introduces users to the site and presents a brief overview of HAIs. “Related Links” connects the user to other sites that have information on HAIs; “Healthcare-Associated Infections” provides expanded information on HAIs; “Instructions for Using this Site” helps the user interpret the selection page and data tables; “Definition of Terms” is a list of technical terms and their definitions; “Frequently Asked Questions” presents background information in an easy-to-read format; “Laws, Regulations and Manuals” links the user to Section 192.667, RSMo and related chapters and regulations, and allows the user to view the manuals and forms used by the facilities to report their data; “MRSA”

summarizes information on Methicillin-resistant Staphylococcus aureus (MRSA) infections; “Infection Reporting Data” brings up the main selection page for accessing HAI data.

Figure 1: Missouri Healthcare-Associated Infection Reporting

Health Care-Associated Infection Reporting | Health & Senior Services

Missouri Department of Health & Senior Services

Jay Nixon, Governor
Margaret T. Donnelly, Director

Healthy Living | Senior & Disability Services | Licensing & Regulations | Disaster & Emergency Planning | Data & Statistics | Online Services

Missouri Health Care-Associated Infection Reporting

Home » Data, Surveillance Systems & Statistical Reports » Missouri Health Care-Associated Infection Reporting

- **HAI Infections**
- **Instructions for Using this Site**
- **Infection Reporting Data**
- **Definition of Terms**
- **Frequently Asked Questions**
- **Laws, Regulations & Manuals**
- **Reports**
- **Information for Providers**
- **MRSA**
- **Related Links**

This site displays data on **Healthcare-Associated Infections (HAIs)** as reported to the Department of Health and Senior Services (DHSS) by hospitals and ambulatory surgery centers. These facilities are required by **state law and regulation** to report data on selected HAIs, also known as nosocomial infections. Currently, data are reported for central line-associated bloodstream (CLAB) infections and surgical site infections (SSIs). Data on head-of-bed elevation (HOB) is also displayed. HOB is a process measure related to care in preventing ventilator-associated pneumonia.

Such infections as methicillin-resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile*, vancomycin-resistant enterococcus (VRE), ventilator-associated pneumonia and others, are **not** included on this site. **Click here** for further information on these infections.

HAIs continue to be a major health problem in the United States. HAIs can be very serious, increasing the cost and length of hospital stays and even threatening lives. As a consumer, you should be proactive in your healthcare. The information on this site can help you to:

- Understand more about HAIs - what they are and why they occur.
- Be informed about hospital and ASC infection rates in Missouri.
- Learn what you, as a patient, can do to lower your risk of an HAI.

Keep in mind that a facility's experience with HAIs is only one thing to consider when choosing a facility. The advice of your physician, the experience of facility staff, and other factors unique to your situation should be considered as well. (Note: some facilities may not appear on this site because they did not perform enough procedures to make their infection rates meaningful.)

Please review the Instructions for Using this Site, Definition of Terms, Frequently Asked Questions, and other information listed on the left bar of this page for help in understanding the tables displayed on this site.

If you have been to this site previously, you may want to go directly to the Infection Reporting Data.

Stopping Infections Begins with the Hands

Data & Statistics

- Profiles
- MICA
- Priorities MICA
- Community Health Improvement Resources (CHIR)
- Intervention MICA
- Births
- Deaths
- Patient Abstract System (PAS)
- Behavioral Risk Factor Surveillance System (BRFSS)
- County-Level Study (CLS)
- Healthcare-Associated Infection Reporting (HAI)
- ESSENCE

Related Links

- Cancer Registry
- Communicable Disease Reporting & Surveillance
- Environmental Public Health Tracking

Bureau of Health Care Analysis & Data Dissemination
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<http://health.mo.gov/data/hai/index.php>[12/6/2011 4:12:45 PM]

In Figure 2, the main selection page is shown. Users can choose to compare hospitals (or ASCs) to selected comparison groups, or to view a facility profile that includes all data reported by the facility. To view comparison data, CLABSI, SSI or HOB can be selected. For CLABSI rates and HOB elevation percents, a specific type of ICU and a region of the state are selected. For SSIs, a facility type (hospital or ASC), a surgery type and a region are selected. Passing the computer mouse over a displayed map of Missouri produces a list of the reporting facilities by region. A link at the bottom of the page explains that facilities do not appear on the list if they had too few central line-days, surgeries or ventilator patients to meet the reporting requirements.

Figure 2: Main Selection Page

Healthcare-Associated Infection Reporting

Missouri Department of Health & Senior Services

Jay Nixon, Governor
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Healthy Living

Senior & Disability Services

Licensing & Regulations

Disaster & Emergency Planning

Data & Statistics

Online Services

Health Care-Associated Infection Reporting

Home » Data & Statistics » HAI Reporting » Facility Comparison

This interactive system will guide you through the steps to query HAI data. Follow the prompts below to view either profiles for individual facilities, or results from queries that allow you to compare similar facilities.

Step One: Select information type.

Comparison data for multiple hospitals or ASCs
 Profile for individual hospital or ASC

Step Two: Select a reporting category.

Central Line-Associated Bloodstream (CLAB) Infection - Hospitals only
 Surgical Site Infection (SSI) - Hospitals or ASCs
 Head-of-Bed Elevation (HOB) - Hospitals only

Step Three

Hospital
 ASC

Step Four

Select Surgery Type:

Step Five

To view a list of reporting facilities, place mouse over a region below.
To view performance of hospitals, click on a region.



Central MO/Northeast MO

St. Mary's Health Center-Jefferson City
Capital Region Medical Center
Boone Hospital Center
Lake Regional Health System
University of Missouri Health Care

Note: If your Hospital/ASC does not appear in any region, [Click here.](#)

NEW!

HAI Historical
Summary Data Now
Available

Data & Statistics

- Profiles
- MICA
- Priorities MICA
- Community Health Improvement Resources (CHIR)
- Intervention MICA
- Births
- Deaths
- Patient Abstract System (PAS)
- Behavioral Risk Factor Surveillance System (BRFSS)
- County-Level Study (CLS)
- Healthcare-Associated Infection Reporting (HAI)
- Cancer Registry
- Communicable Disease Reporting & Surveillance
- Environmental Public Health Tracking

Bureau of Health Care Analysis & Data Dissemination

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Table 1 shows the web display version of a Hospital Comparison table for SSIs related to coronary artery bypass graft (CABG) procedures. The symbols (● ○ ●) indicate whether the SSI rate was similar to, higher than, or lower than that of a comparison group. Hospitals can be compared to three different groups: 1) hospitals of a similar size (under 100 staffed beds, 100-299 staffed beds, or 300+ staffed beds), 2) all reporting hospitals, and 3) hospitals in the U.S. that report to the CDC.⁴ As shown in Table 1, Boone Hospital Center had lower coronary artery bypass-related infection rates than all three comparison groups.

Table 1

Healthcare-Associated Infection Reporting

Missouri Department of
Health & Senior Services

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Healthy Living
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Licensing & Regulations
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**Health Care-Associated Infection Reporting
Surgical Site Infection (SSI)**

Procedure: Cabg
Central MO - Northeast MO
Reporting Period: April 1, 2010 to March 31, 2011

[Main Page](#)

Facility Name	Hospital Performance Compared with Similar Size Facilities in Missouri	Hospital Performance Compared with All Missouri Facilities	Hospital Performance Compared with Facilities in U.S.	Hospital Specific Information
⊕ Boone Hospital Center	●	●	●	Data Comments
⊕ Capital Region Medical Center	●	●	●	Data Comments
⊕ Lake Regional Health System	●	○	●	Data Comments
⊕ St. Mary's Health Center-Jefferson City	●	●	●	Data Comments
⊕ University of Missouri Health Care	●	●	●	Data Comments

- = Infection rate lower than other facilities in the comparison group
- = Infection rate similar to other facilities in the comparison group
- = Infection rate higher than other facilities in the comparison group
- N/A = Too few facilities in the comparison group for reliable rate calculation.

Note: The above comparisons are based on [significance tests](#).

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Facilities vary according to the seriousness of the procedures they undertake and the kinds of illnesses they treat. To make SSI comparisons among hospitals fairer, infection rates are adjusted for the level of procedure risk and the underlying condition of the patient. Factors that are taken into account in adjusting the rates are 1) the degree of contamination of the wound at the time of the operation, 2) the duration of the procedure and 3) the American Society of Anesthesiologists' physical status classification system. When a user selects 'Data' in a Hospital Comparison table, infection rates are shown according to the risk factor group. This can be seen in Table 2 for Boone Hospital Center. The hospital reported 179 abdominal hysterectomy procedures and two infections in risk group 0, 115 procedures and no infections in risk group 1 and 15 procedures and no infections in risk group 2,3 (Groups 2 and 3 were combined because according to CDC data, they represented the same risk of infection.) The two infections in risk group 0 represent an infection rate of 1.1 per 100 procedures.

Table 2

Healthcare-Associated Infection Reporting

Missouri Department of Health & Senior Services
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Healthy Living | Senior & Disability Services | Licensing & Regulations | Disaster & Emergency Planning | Data & Statistics | Online Services

Health Care-Associated Infection Reporting
Surgical Site Infection (SSI)

Boone Hospital Center
Procedure: Abdominal Hysterectomy
Central MO - Northeast MO
Reporting Period: April 1, 2010 to March 31, 2011

Risk Group	Number of Procedures	Number of Infections	Infection Rate (per 100 procedures)	Rate for Similar Size Hospitals (per 100 procedures)	State Infection Rate (per 100 procedures)	National Infection Rate (per 100 procedures)
0	179	2	1.1	0.7	0.7	1.1
1	115	0	0.0	0.7	0.8	2.2
2,3	15	0	0.0	1.6	2.0	4.0

N/A => Too few hospitals for rate calculations.

Note: When the infection rate for a hospital is higher/lower than a comparison group rate, the difference may not be [statistically significant](#). [Return to previous page](#) to view performance of the hospital.

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A small number of infections resulting from a small number of procedures can result in a relatively large infection rate. For example, if by chance there had been just one infection for the 15 procedures in risk group “2, 3”, the rate would have been 6.7/100 procedures. This should caution the user of these data to focus on the results of the statistical tests (table of circles) rather than particular rates. Rates based on a small number of patient procedures will tend to be unreliable.

Users can also select a particular facility to profile. As illustrated in table 3, facility specific profiles display all of the applicable CLABSI, SSI and HOB indicators for a facility in one location.

Table 3

Healthcare-Associated Infections Reporting

Missouri Department of **Health & Senior Services** Jay Nixon, Governor
Margaret T. Donnelly, Director

Healthy Living | Senior & Disability Services | Licensing & Regulations | Disaster & Emergency Planning | Data & Statistics | Online Services

Health Care-Associated Infection Reporting

Boone Hospital Center
Central MO - Northeast MO
Reporting Period: April 1, 2010 to March 31, 2011

[Main Page](#)

Central Line-Associated Bloodstream (CLAB) Infections

Intensive Care Unit (ICU)	Hospital Performance Compared with Similar Size Hospitals in Missouri	Hospital Performance Compared with All Missouri Hospitals	Hospital Performance Compared with Hospitals in U.S.	Hospital-Specific Information
MEDICAL	N/A	●	●	Data Comments
SURGICAL	N/A	●	●	Data Comments
NEONATAL	N/A	●	●	Data Comments

Surgical Site Infections (SSI)

Surgery Type	Hospital Performance Compared with Similar Size Hospitals in Missouri	Hospital Performance Compared with All Missouri Hospitals	Hospital Performance Compared with Hospitals in U.S.	Hospital-Specific Information
ABDOMINAL HYSTERECTOMY	●	●	●	Data Comments
CORONARY ARTERY BYPASS SURGERY	●	●	●	Data Comments
HIP PROSTHESIS	●	●	●	Data Comments

Head of Bed (HOB) Elevation Process Measure*

Intensive Care Unit	Number of Patients on Ventilator	Number of Patients on Ventilator with Elevated HOB	Percent of * Patients with Elevated HOB	Hospital-Specific Information
SURGICAL	73	73	100%	Comments
MEDICAL	116	116	100%	Comments

* Elevating the head-of-bed (HOB) for ventilator patients helps to prevent ventilator-associated pneumonia. The HOB should be elevated at least 30 degrees for all qualifying patients. The goal is to have HOB [elevation for 100 percent](#) of a hospital's qualifying patients.

● = Infection rate lower than other facilities in the comparison group

http://health.mo.gov/data/hai/main_profile.php[12/6/2011 3:31:47 PM]

● = Infection rate similar to other facilities in the comparison group

○ = Infection rate higher than other facilities in the comparison group

N/A = Too few facilities in the comparison group for reliable rate calculation.

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Data Summary

Central Line-Associated Bloodstream Infections (CLABSIs)

Some hospitals have only one or two ICUs, while some may have all six that are required to report to the DHSS. Thus the total number of ICUs reporting will exceed the number of hospitals reporting. A total of 101 ICUs from 66 hospitals reported CLABSI data for April 2010-March 2011. Two of the 66 hospitals each had one ICU that had rates that were significantly higher than the state or national rate. Eight of the 66 hospitals had one or more ICUs whose rates were significantly lower than the state or national rate.

CLABSI data for all reporting hospital ICUs are summarized in Table 4. The statewide infection rates varied from 0.5/1000 central line-days for coronary ICUs to 1.9/1000 for pediatric ICUs. Compared to the most recent national rates reported by the CDC (2009 data),⁵ Missouri's rates were statistically significantly lower for all ICUs except the pediatric ICU; Missouri rates were lower, but not statistically significantly lower, in the latter ICUs. It should be noted that the CDC rates represent hospitals that voluntarily submitted data to the CDC's National Healthcare Safety Network infection surveillance system, and they are not for the same years displayed for Missouri. More current national rates or rates from a very similar mix of hospitals might well be different.

Table 4. Central Line-Associated Bloodstream Infection Summary Data by Intensive Care Unit

April 2010-March 2011 Reporting Period

Intensive Care Unit (ICU)	Number of ICUs	Statewide Infection Rate	U.S. Infection Rate¹
MEDICAL/SURGICAL	53	0.9*	1.4
CORONARY	7	0.5*	1.7
MEDICAL	12	1.0*	1.9
NEONATAL	14	0.8*	2.2
SURGICAL	9	0.8*	1.8
PEDIATRIC (U.S. rate is for pediatric/medical)	6	1.9	2.6

¹National Healthcare Safety Network (NHSN) Report, Data Summary for 2009, Device Associated Module. <http://www.cdc.gov/nhsn/PDFs/dataStat/2010NHSNReport.pdf>

* Significantly lower than the U.S. rate.

Note: The state and national infection rates are the number of infections per 1000 central line-days.

Table 5 compares the April 2010-March 2011 CLABSI rates to rates published in the three previous annual reports. Rates for the medical/surgical, neonatal and pediatric ICUs show steady declines over the four reporting periods: from the first period to the last, rates have dropped 47 percent for the medical/surgical ICUs, 69 percent for the neonatal, and 55 percent for the pediatric ICUs. Rates for the other three ICUs have not dropped every year, but are still lower in the current period compared to the first: the coronary ICU rates have dropped 58 percent, the surgical ICU rates have dropped 38 percent and the medical ICU rates 44 percent. These changes are in line with a national trend of declining CLABSIs that extends back to at least 1997, according to a report by CDC.⁶

Table 5. Comparison of Statewide Central Line-Associated Bloodstream Infection Rates by ICU and Reporting Period

Rates for Four Reporting Periods

Intensive Care Unit	April 2007- March 2008	April 2008- March 2009	April 2009- March 2010	April 2010- March 2011
CORONARY	1.2	1.6	1.0	0.5
SURGICAL	1.3	2.1	1.0	0.8
MEDICAL/SURGICAL	1.7	1.3	0.9	0.9
MEDICAL	1.8	1.7	1.8	1.0
NEONATAL	2.6	1.8	1.1	0.8
PEDIATRIC	4.2	2.4	2.3	1.9

Surgical Site Infections (SSIs)

Hospitals

A total of 54 hospitals of the 130 acute care hospitals in Missouri reported SSI data. By virtue of having performed at least 20 of the specific surgeries, 49 hospitals qualified to report on hip repair surgeries, 34 reported on abdominal hysterectomy surgeries, and 29 reported on coronary artery bypass graft (CABG) surgeries. For at least one of the three procedures, nine hospitals had infection rates that were significantly lower than either the rates for the state overall or the hospitals that report to CDC. Nine hospitals had rates that were significantly higher than at least one of the two comparison groups.

Additional SSI data for the hospitals are shown in Table 6. The statewide infection rates were 1.3/100 surgeries for hip repair, 0.8/100 for abdominal hysterectomy and 1.9/100 for CABG surgery. When adjusted for severity of surgery, the infection rates for CABG and abdominal hysterectomy surgeries were significantly lower than the U.S. infection rates published in CDC's last report.

Table 6. Hospitals: Surgical Site Infection Summary Data by Surgery Type

April 2010-March 2011 Reporting Period

Procedure	Number of Facilities	Adjusted* Statewide Infection Rate (per 100 Surgeries)	U.S. Infection Rate (per 100 Surgeries) ¹
HIP REPAIR	49	1.3	1.3
ABDOMINAL HYSTERECTOMY	34	0.8 **	1.6
CORONARY ARTERY BYPASS SURGERY	29	1.9**	2.9

¹National Healthcare Safety Network (NHSN) Report, Data Summary for 2006-2008, issued December 2009. <http://www.ast.org/legislation/documents/SURGPATIENTSAFETY/Natl>

*Adjusted for surgery severity level using the U.S. rate as a standard.

**Significantly lower than the U.S. infection rate.

In Table 7, hospital SSI trends for the last four reporting periods are shown. The rate for abdominal hysterectomy infections dropped substantially in the latest reporting period, from 1.6/100 surgeries to 0.8/100. Hip repair infection rates have not changed much over the four periods, whereas CABG infection rates have been up and down over the four periods.

Table 7. Hospitals: Trends for Statewide Surgical Site Infection Rates by Surgery Type and Reporting Period

Rates for Four Reporting Periods

Intensive Care Unit	April 2007-March 2008	April 2008-March 2009	April 2009-March 2010	April 2010-March 2011
HIP REPAIR	1.3	1.0	1.3	1.3
ABDOMINAL HYSTERECTOMY	1.3	1.2	1.6	0.8
CORONARY ARTERY BYPASS SURGERY	2.0	1.9	2.4	1.9

Ambulatory Surgery Centers (ASCs)

Twenty-four of the 109 Missouri ASCs that were open during the reporting period reported SSI data. Seventeen ASCs were qualified to report on hernia repair surgeries and 18 reported on breast surgeries. Table 8 shows that the statewide rate per 100 surgeries was less than 1.0/100 surgeries for both types of surgeries.

Table 8. Ambulatory Surgery Centers: Surgical Site Infection Rates by Surgery Type

Procedure	Number of Facilities Reporting 2010-2011	Statewide Infection Rates (per 100 Surgeries) 2010-2011
HERNIA REPAIR	17	0.19
BREAST SURGERY	18	0.18

Note: National data for ASCs are not available.

Table 9 indicates that infections related to hernia repair and breast surgery have been trending upward until the latest period, when they dropped from .26/100 surgeries to .19/100 for hernia repair and from .40/100 surgeries to .18/100 for breast surgery. The number of infections for hip repair and breast surgeries have been small for all four periods, so the rates are based on small numbers and will tend to fluctuate quite a bit.

Table 9. Ambulatory Surgical Centers: Trends for Statewide Surgical Site Infection Rates by Surgery Type and Reporting Period

Procedure	April 2007-March 2008	April 2008-March 2009	April 2009-March 2010	April 2010-March 2011
HERNIA REPAIR	0.10	0.14	0.26	.19
BREAST SURGERY	0.23	0.26	0.40	.18

ASCs tend to perform less serious surgeries and have generally healthier patient populations than inpatient facilities. The relatively brief lengths of stay in the ambulatory setting reduces a patient’s risk for infection; it also lessens the possibility of detecting post-surgical infections. Typically a patient does not stay very long in an ASC and may not discover an infection until days after the surgery. In this situation, the patient is likely to seek care in an emergency room or a physician’s office, and the ASC may never become aware of the infection.

Head- of- Bed (HOB) Elevation

Forty-eight hospitals reported HOB elevation for one or more ICUs. As shown in Table 10, the medical/surgical ICU was reported by the most number of hospitals, 37, while only seven hospitals reported on coronary ICUs and eight on surgery ICUs. The ideal is for every ICU to have appropriate HOB elevation for 100 percent of ventilator patients. Though a number of facilities reported 100 percent compliance, none of the ICU types reached 100 percent for every facility that reported for it. On the other hand, each category of ICU averaged 97 percent compliance or better. HOB elevation for individual facility/ICU combinations varied from 49

percent to 100 percent of ventilator patients. Twenty-two (46%) of the 48 hospitals reported 100 percent appropriate HOB elevation for at least one ICU. This is slightly higher than the 40 percent reported in the 2009-2010 time period.

**Table 10: Head of Bed Elevation Percentages
by Intensive Care Unit**

April 2010-March 2011 Reporting Period

ICU	Number of Facilities	Number of Ventilator Patients*	Average** Percent of Ventilated Patients with HOB Elevation
CORONARY	7	876	97
SURGICAL	8	1850	98
MEDICAL/SURGICAL	37	7215	97
MEDICAL	11	2395	98
OTHER	11	3402	97

* One ventilator patient is defined as a patient on a ventilator for one day. If a patient is on a ventilator two days, that would be two ventilator patients; two patients on ventilators for two days would be four ventilator patients, etc.

** The average was calculated as the average of the percents for the facility/ICU combinations. For example, the seven facilities reporting on coronary ICUs had HOB elevation percents of 89, 96, 97, 99, 100, 100 and 100; the average of these seven percents was 97, as shown in the above table.

Note: No national percentages are available for comparison.

Cautions

The infection rates reported by the DHSS are affected by a facility's level of resources and commitment to infection control, the severity of the illnesses it treats, and the care with which it collects and reports its data. Beyond checking for obvious errors, the DHSS is not able to verify the numbers that the facilities submit each month, and it is likely that some facilities do a better job of reporting than others. On the other hand, it is to each facility's advantage to accurately diagnose and monitor all infections. We believe most, if not all facilities, are guided by this philosophy.

A further consideration is that hospitals and ASCs vary in the types of patients they treat. A facility that treats severely ill patients will be at higher risk for HAIs. In order to mitigate this effect, CLABSIs are reported separately for each type of ICU and as a rate per 1000 central-line days. SSI comparisons are adjusted for the severity level of the surgery and the condition of the patient and reported as a rate per 100 surgeries. While these adjustments help to make the data between facilities more comparable, users of the data should understand that these adjustments are imperfect, and the rates on Missouri's website should not be the sole basis for choosing a healthcare facility. A consumer who is trying to select a facility for healthcare should also consider the experience of the staff, the advice of their physician, and all other factors that are unique to his or her situation.

Endnotes:

1. Guidance on public reporting of healthcare-associated infections: recommendations of the Healthcare Infection Control Practices Advisory Committee. McKibben L, Horan T, Tokars JI, Fowler G, Cardo DM, Pearson ML, Brennan PJ and the Healthcare Infection Control Practices Advisory Committee. *Am J Infect Control* 2005; 3(4):217-226.
2. Office of Inspector General, Adverse events in hospitals: national incidence among Medicare beneficiaries, OEI-06—09-00090, November 2010. Reported by Maggie Fox, Health and Science Editor, <http://blogs.reuters.com/maggie-fox/?st=article>
3. Hospitals currently are not required by statute or regulation to submit data related to head-of-bed (HOB) elevation. It is anticipated that the next legislative session will address an amendment to the statute to allow for mandatory reporting of process measures such as HOB elevation.
4. National Healthcare Safety Network (NHSN) Report, data summary for 2006 through 2008, issued December, 2009. *J Infect Control* 2009; 37:783-805.
5. National Healthcare Safety Network (NHSN) Report, data summary for 2009, Device Associated Module. <http://www.cdc.gov/nhsn/PDFs/dataStat/2010NHSNReport.pdf> .
6. Burton DC, Edwards JR, Horan TC, Fridkin SK. Trends in Central Line-associated Bloodstream Infections in Intensive Care Units-United States, 1997-2007. Abstract for SHEA 18th Annual Scientific Meeting, http://www.cdc.gov/ncidod/dhqp/SHEA_Abstract2.html.