

# **MISSOURI NOSOCOMIAL INFECTION REPORTING DATA**

**Report to the Governor and  
General Assembly  
December 2013**



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Report to the Governor and General Assembly - 2013**

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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). Beginning with January 2012, certain hospitals that were deemed to be “critical access” started reporting data to the Center for Disease Control (CDC) National Healthcare Safety Network (NHSN). In September, DHSS started to transfer certain required pieces of information to the Missouri Healthcare-Associated Infection Reporting System (MHIRS). This report summarizes January 1, 2012-December 31, 2012 data on central line-associated bloodstream infections (CLABSI), surgical site infections (SSIs) and head of bed (HOB) elevation.

## Data Collection

The infections mandated for reporting include ventilator-associated pneumonias (VAPs), CLABSI and SSIs. CLABSI 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, hospitals 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 January 1, 2012-December 31, 2012 were available on the website ([http://health.mo.gov/data/hai/drive\\_noso.php](http://health.mo.gov/data/hai/drive_noso.php)). Data for the next reporting period, April 1, 2012 to March 31, 2013, will be published on the website during December 2013. 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 2006-2010 are currently displayed in that table.

## Data Summary

Hospitals submit data for each ICU that meets DHSS reporting requirements. In all, 94 ICUs from 65 hospitals reported CLABSI data for January 1, 2012-December 31, 2012. Statewide infection rates were lowest in the Surgical ICUs (0.5/1000 central line-days) and highest in the medical/surgical ICUs (2.5/1000 central line-days). Missouri’s CLABSI rates for three of the six reporting ICUs have dropped between 11 and 38 percent relative to the January 1, 2011 to December 31, 2011 reporting period. Fifty-four hospitals and 23 ASCs reported SSI data. The lowest SSI rate for hospitals overall was for abdominal hysterectomy (.9/100 surgeries). The highest rate was for coronary artery bypass surgery (1.9/100). 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-five 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 statewide compliance rate for each of the five types of reporting ICUs was 98 percent. All but nine of the 45 hospital/ICU combinations had average compliance rates of 95 percent or better. In fact 31 of the 45 hospital ICU combinations had 100 percent compliance.

### **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 - 2013**

### **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. “Guidance on Public Reporting of Healthcare-Associated Infections...,” published by the Healthcare Infection Control Practices Advisory Committee (HICPAC) in 2005<sup>1</sup>, 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 2010 study reported that adverse events cost Medicare an estimated \$324 million in October 2008.<sup>2</sup>

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 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 HOB<sup>3</sup> 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 the data for CLABSIs, SSIs and HOB elevation. Currently displayed are data for 2006-2010. 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**

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

Search

Healthy Living
Senior & Disability Services
Licensing & Regulations
Disaster & Emergency Planning
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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

Wash 'Em - Hand Hygiene



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

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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**

**Health & Senior Services** Margaret T. Donnelly, Director

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

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Table 1 shows the web display version of a Hospital Comparison table for SSIs related to abdominal hysterectomies 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 two different groups: 1) hospitals of a similar size (under 100 staffed beds, 100-299 staffed beds, or 300+ staffed beds) and 2) all reporting hospitals. As shown in Table 1, Missouri Baptist Medical Center had lower abdominal hysterectomy-related infection rates than compared with both similar sized facilities and statewide (Table 1 is a partial listing of 17 hospitals in the St. Louis Metro – Southeast Missouri area).

**Table 1.  
Surgical Site Infection (SSI), Hospital Comparison**

Missouri Department of Health & Senior Services					
Healthy Living	Senior & Disability Services	Licensing & Regulations	Disaster & Emergency Planning	Data & Statistics	Online Services
Jay Nixon, Governor Gail Vasterling, Acting Director					
<b>Health Care-Associated Infection Reporting            Surgical Site Infection (SSI)</b>					
Procedure: Abdominal Hysterectomy St. Louis Metro - Southeast MO Reporting Period: January 1, 2012 to December 31, 2012					
<a href="#">Main Page</a>					
Facility Name	Hospital Performance Compared with Similar Size Facilities in Missouri	Hospital Performance Compared with All Missouri Facilities	Hospital Specific Information		
<input type="checkbox"/> Barnes-Jewish Hospital	○	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Barnes-Jewish St. Peters Hospital	○	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Christian Hospital Northeast-Northwest	○	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Mercy Hospital Jefferson	○	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Mercy Hospital St. Louis	○	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Missouri Baptist Hospital-Sullivan	○	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Missouri Baptist Medical Center	●	●	<a href="#">Data Comments</a>		
<input type="checkbox"/> Parkland Health Center-Farmington	○	●	<a href="#">Data Comments</a>		

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 Missouri Baptist Medical Center. The hospital reported 215 abdominal hysterectomies and 0 infections in risk group 0, 176 procedures and 0 infection in risk group 1, and 43 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).

**Table 2.**  
**Surgical Site Infection (SSI), Hospital Infection Rates**

Missouri Department of  
**Health & Senior Services**
Jay Nixon, Governor  
Gail Vasterling, Acting Director

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

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

Missouri Baptist Medical Center  
Procedure: Abdominal Hysterectomy  
St. Louis Metro - Southeast MO  
Reporting Period: January 1, 2012 to December 31, 2012

[Previous Page](#) | [Main Page](#)

Risk Group	Number of Procedures	Number of Infections	Infection Rate (per 100 procedures)	Rate for Similar Size Hospitals (per 100 procedures)	Statewide Infection Rate (per 100 procedures)
0	215	0	0.0	0.6	0.6
1	176	0	0.0	0.9	1.2
2,3	43	0	0.0	2.9	2.8

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 43 procedures in risk group “2, 3”, the rate would have been 2.32/100 procedures. This should caution the user of the 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.  
Capital Region Medical Center Profile**

Missouri Department of Health & Senior Services						Jay Nixon, Governor Gail Vasterling, Acting Director	
Healthy Living	Senior & Disability Services	Licensing & Regulations	Disaster & Emergency Planning	Data & Statistics	Online Services		
<b>Health Care-Associated Infection Reporting</b> Capital Region Medical Center Central MO - Northeast MO Reporting Period: January 1, 2012 to December 31, 2012							
<a href="#">Main Page</a>							
<b>Central Line-Associated Bloodstream (CLAB) Infections</b>							
Intensive Care Unit (ICU)	Hospital Performance Compared with Similar Size Hospitals in Missouri	Hospital Performance Compared with All Missouri Hospitals	Hospital-Specific Information				
MEDICAL/SURGICAL	●	●	<a href="#">Data</a> <a href="#">Comments</a>				
<b>Surgical Site Infections (SSI)</b>							
Surgery Type	Hospital Performance Compared with Similar Size Hospitals in Missouri	Hospital Performance Compared with All Missouri Hospitals	Hospital-Specific Information				
ABDOMINAL HYSTERECTOMY	●	●	<a href="#">Data</a> <a href="#">Comments</a>				
CORONARY ARTERY BYPASS SURGERY	●	●	<a href="#">Data</a> <a href="#">Comments</a>				
HIP PROSTHESIS	●	●	<a href="#">Data</a> <a href="#">Comments</a>				
<b>Head of Bed (HOB) Elevation Process Measure*</b>							
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			
MEDICAL/SURGICAL	100	99	99%	<a href="#">Comments</a>			
<small>* 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 400 percent of hospitals qualifying patients.</small>							

**National Health Safety Network (NHSN)**

This past year has been one of challenges in terms of education and training. The Center for Medicare and Medicaid Services (CMS) has required that all critical access hospitals submit certain reports to them through NHSN. The reports that are to be submitted are on CLABSIs and SSIs (abdominal hysterectomies and colon). DHSS collects data on CLABSIs and abdominal hysterectomies, but not colon surgeries.

Beginning in September 2012, the goal of DHSS has been to establish a way to download infection data for facilities who participate in the CMS program. During the summer of 2012, with the assistance of four facilities, DHSS developed a method by which we could query the NHSN system and download that data for inclusion in the MHIRS data tables for the quarterly public reports. The four facilities acted in a “beta” role to ensure that the query of data was both accurate and reliable. Unfortunately, when we received the download file for all 41 critical access facilities, it was discovered that much more work was needed to ensure accurate and reliable data. As a result, DHSS could not adhere to the quarterly reporting requirement. To correct the errors, additional programming code was written to ensure that the data accepted from NHSN met our stringent requirements of acceptability. This in turn required many hours of

testing to make sure that our code was sound. Table 4 shows an example of the query results for CLABSIs.

**Table 4.**  
**NHSN CLABSI Analysis**

orgID	summaryYM	locCDC	numCLDays	CLABCount	CLABRate
11486	01/01/2012	IN:ACUTE:CC:MS	50	0	0
11486	02/01/2012	IN:ACUTE:CC:MS	60	0	0
11486	03/01/2012	IN:ACUTE:CC:MS	58	0	0
11486	04/01/2012	IN:ACUTE:CC:MS	79	0	0
11486	05/01/2012	IN:ACUTE:CC:MS	78	0	0
11486	06/01/2012	IN:ACUTE:CC:MS	61	0	0
11486	07/01/2012	IN:ACUTE:CC:MS	56	0	0
11486	08/01/2012	IN:ACUTE:CC:MS	74	0	0
11486	09/01/2012	IN:ACUTE:CC:MS	55	0	0
11486	10/01/2012	IN:ACUTE:CC:MS	74	0	0
11486	11/01/2012	IN:ACUTE:CC:MS	79	0	0
11486	12/01/2012	IN:ACUTE:CC:MS	39	0	0
11486	01/01/2013	IN:ACUTE:CC:MS	68	0	0
11486	02/01/2013	IN:ACUTE:CC:MS	29	0	0
11486	03/01/2013	IN:ACUTE:CC:MS	117	0	0
11486	04/01/2013	IN:ACUTE:CC:MS	73	1	13.699
11486	05/01/2013	IN:ACUTE:CC:MS	63	0	0

There has been a large learning curve for all parties involved including the infection practitioners in the hospitals. The new requirements from CMS and a relatively complicated NHSN data entry system caused some growing pains and anxiety among some of the facilities. In addition, there has been a considerable amount of turnover in infection reporting staff at hospitals. However, this did create some opportunities to reach out, assist, and train hospital staff. One area in particular where training proved useful was making sure all facilities have their ICU mapped correctly to the master CDC locations and descriptions portion of NHSN so that DHSS can effectively query (location CDC [locCDC]) and obtain the correct results as in Table 4 above.

### **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 94 ICUs from 65 hospitals reported CLABSI data for January 1, 2012-December 31, 2012. Two of the 65 hospitals had one ICU that had rates that were significantly higher than the state rate. Ten of the 65 hospitals had one or more ICUs whose rates were significantly lower than the state rate.

CLABSI data for all reporting hospital ICUs are summarized in Table 5. The statewide infection rates varied from 0.5/1000 central line-days for surgical ICUs to 2.5/1000 for medical/surgical ICUs.

**Table 5.  
Central Line-Associated Bloodstream Infection Summary Data by Intensive  
Care Unit**

**January 1, 2012-December 31, 2012 Reporting Period**

Intensive Care Unit (ICU)	Number of ICUs	Statewide Infection Rate
MEDICAL/SURGICAL	54	2.5
CORONARY	5	0.8
MEDICAL	7	0.8
NEONATAL	15	1.3
SURGICAL	6	0.5
PEDIATRIC	7	2.1

Note: The state infection rate is the number of infections per 1000 central line-days.

Table 6 compares the January 1, 2012-December 31, 2012 CLABSI rates to rates published in the three previous annual reports for trend analysis. The Surgical ICU rate has consistently decreased across the 4 reporting periods and has dropped by 50% compared to the April 2009 – March 2010 reporting period. The rate for medical ICUs has also seen a decline (-55 percent) over the same time period. Coronary ICU infection rates are down 20 percent over the 4 year period. Neonatal and pediatric ICU infection rates have fluctuated up and down over the 4 years but the 2012 rate for both are similar to the April 2009 – March 2010 rates. The medical/surgical ICU rate did see a large increase between 2011 and 2012, from a rate of 0.9 in 2011 to a rate of 2.5 in 2012.

**Table 6.**  
**Comparison of Statewide Central Line-Associated Bloodstream Infection Rates by ICU and Reporting Period**

**Rates for Four Reporting Periods**

<b>Intensive Care Unit</b>	<b>April 2009- March 2010</b>	<b>April 2010- March 2011</b>	<b>January 2011- December 2011</b>	<b>January 2012- December 2012</b>
CORONARY	1.0	0.5	0.9	0.8
SURGICAL	1.0	0.8	0.6	0.5
MEDICAL/SURGICAL	0.9	0.9	0.9	2.5
MEDICAL	1.8	1.0	1.3	0.8
NEONATAL	1.1	0.8	1.1	1.3
PEDIATRIC	2.3	1.9	3.2	2.1

*Surgical Site Infections (SSIs)*

Hospitals

A total of 54 hospitals of the 137 acute care hospitals in Missouri reported SSI data. By virtue of having performed at least 20 of the specific surgeries, 51 hospitals qualified to report on hip repair surgeries, 34 reported on abdominal hysterectomy surgeries, and 28 reported on coronary artery bypass graft (CABG) surgeries. When comparing hospital rates to overall state rates, one hospital had an infection rate that was significantly lower than the overall state rate for abdominal hysterectomy surgeries. Four hospitals had rates that were significantly higher than the state rate.

Additional SSI data for the hospitals are shown in Table 7. The statewide infection rates were 1.3/100 surgeries for hip repair, 0.9/100 for abdominal hysterectomy and 1.9/100 for CABG surgery.

**Table 7.**  
**Hospitals: Surgical Site Infection Summary Data by Surgery Type**  
**January 1, 2012-December 31, 2012 Reporting Period**

Procedure	Number of Facilities	Adjusted* Statewide Infection Rate (per 100 Surgeries)
HIP REPAIR	51	1.3
ABDOMINAL HYSTERECTOMY	34	0.9
CORONARY ARTERY BYPASS SURGERY	28	1.9

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

In Table 8, hospital SSI trends for the last four reporting periods are shown. The rate for abdominal hysterectomy infections has decreased since the last reporting period, from 1.4/100 surgeries to 0.9/100. Hip repair infection rates have remained consistent over the four periods. The CABG rate declined between 2009/2010 and 2010/2011 but has since remained consistent.

**Table 8.**  
**Hospitals: Trends for Statewide Surgical Site Infection Rates**  
**by Surgery Type and Reporting Period**

**Rates for Four Reporting Periods**

Procedure	April 2009-March 2010	April 2010-March 2011	January 2011-December 2011	January 2012-December 2012
HIP REPAIR	1.3	1.3	1.5	1.3
ABDOMINAL HYSTERECTOMY	1.6	0.8	1.4	0.9
CORONARY ARTERY BYPASS SURGERY	2.4	1.9	1.7	1.9

Ambulatory Surgery Centers (ASCs)

Twenty-three of the 108 Missouri ASCs that were open during the reporting period reported SSI data. Seventeen ASCs were qualified to report on hernia repair surgeries and 14 reported on breast surgeries. Table 9 shows that the statewide rate per 100 surgeries was less than 1.0/100 surgeries for both types of surgeries.



**Table 9.**  
**Ambulatory Surgery Centers: Surgical Site Infection Rates**  
**By Surgery Type**

**January 1, 2012 – December 31, 2012 Reporting Period**

Procedure	Number of Facilities Reporting	Statewide Infection Rates (per 100 Surgeries)
HERNIA REPAIR	17	0.14
BREAST SURGERY	14	0.36

Table 10 indicates that infection rates related to hernia repair and breast surgery have fluctuated over the past four periods, yet have consistently remained well under a rate of 1.0/100. The total number of infections for hernia repair and breast surgeries has been small for all four periods. Because of the small number of infections, fluctuations in the trend lines for these indicators are to be expected.

**Table 10.**  
**Ambulatory Surgical Centers:**  
**Trends for Statewide Surgical Site Infection Rates**  
**by Surgery Type and Reporting Period**

**Rates for Four Reporting Periods**

Procedure	April 2009- March 2010	April 2010- March 2011	January 2011- December 2011	January 2012- December 2012
HERNIA REPAIR	0.26	0.19	0.30	0.14
BREAST SURGERY	0.40	0.18	0.05	0.36

ASCs tend to perform less serious surgeries and have generally healthier patient populations than inpatient facilities. The relatively brief stays in the ambulatory setting reduces a patient's risk for infection; it also lessens the possibility of detecting post-surgical infections. A typical patient does not stay very long in an ASC (less than 24 hours) so an infection may not be discovered until days after the surgery. In this situation, the patient is more 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-five hospitals reported HOB elevation for one or more ICUs. As shown in Table 11, the medical/surgical ICU was reported by the most number of hospitals, 38, while only five hospitals

reported on surgical ICUs, seven on their medical ICUs, six on coronary ICUs and ten on “other” 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, for all categories of ICUs they averaged 98 percent compliance or better. HOB elevation for individual facility/ICU combinations varied from 91 percent to 100 percent of ventilator patients. Thirty-one (69%) of the 45 hospitals reported 100 percent appropriate HOB elevation for at least one ICU. This is slightly higher than the 60 percent reported in the January – December 2011 time period.

**Table 11.**  
**Head of Bed Elevation Percentages**  
**by Intensive Care Unit**

**January 1, 2012-December 31, 2012 Reporting Period**

ICU	Number of Facilities	Number of Ventilator Patients*	Average** Percent of Ventilated Patients with HOB Elevation
CORONARY	6	747	98
SURGICAL	5	1230	99
MEDICAL/SURGICAL	38	7287	98
MEDICAL	7	1962	98
OTHER	10	3626	99

\* 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 percent’s for the facility/ICU combinations. For example, the six facilities reporting on coronary ICUs had HOB elevation percent’s of 91, 96, 100, 100, 100 and 100; the average of these seven percent’s was 98, as shown in the above table.

### **National Data**

Beginning with the calendar year 2012 Public Report the Department of Health and Senior Services no longer publishes the national rates in comparison to that of the Missouri facilities. The national rates over the past several years have not kept pace with that of our public report. In most cases the reports published by NHSN were a year to two years behind Missouri rates. Since Missouri publishes on a quarterly basis, the DHSS believes it is a disservice to try to compare rates from different time periods.

### **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.