Dirigo Health Agency/ Maine Quality Forum

Annual Report on Health care Associated Infections in Maine

Presented To:

Joint Standing Committee on Health and Human Services

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EXECUTIVE SUMMARY – ANNUAL REPORT ON HEALTH CARE ASSOCIATED INFECTIONS IN MAINE

MAINE QUALITY FORUM/DIRIGO HEALTH AGENCY

Purpose of this Report

The Maine Quality Forum of the Dirigo Health Agency is required to submit an annual report to the Maine Legislature on statewide efforts with health care infection control professionals to control and prevent health care associated infections (HAI).[1] This is the third such report to be issued.

Maine health care providers are required to submit certain data related to the prevention and occurrence of health care associated infection to the Maine Health Data Organization. As the law directs, this report presents provider-specific performance data related to HAI, abstracted from the Maine Health Data Organization's database.

In early 2009, the Legislature passed Resolve, Chapter 82, which focused on developing hospital reporting requirements related to methicillin-resistant *Staphylococcus aureus* (commonly referred to as MRSA) and *Clostridium difficile* (sometimes called C-diff), which are both infections that are particularly problematic. This Resolve charged the Maine Health Data Organization and the Maine Quality Forum with the development and implementation of rules governing hospital reporting on the programs in place for controlling the spread of multiple drug-resistant organisms, the numbers of patients at high risk for MRSA colonization and of the numbers of high-risk patients that hospitals surveilled for MRSA.

The Resolve also directed the Maine Quality Forum, working in conjunction with infection control specialists, nurses and consumers, to develop performance measures related to hospital programs and to publish assessments of those efforts. This report is also intended to satisfy these requirements.

What are health care associated infections and why should we care about them?

A health care associated infection is an infection that is not present when a patient is admitted to a hospital or other health care facility (e.g. nursing homes, ambulatory care centers or emergency departments). These infections are sometimes also referred to as hospital/health care facility acquired infections or nosocomial infections. By definition, this type of infection develops after a patient's admission and which does not appear to be present at the time of admission; if an infection develops earlier, it is reasonably assumed to be what is called a community acquired infection, or an infection that was picked up before the patient entered the health care facility.

[1] 24-A MRSA §6951.

Health care associated infections are usually caused by bacteria, but can be caused by a virus or a fungus. Oftentimes, these germs are carried on a patient's body without causing any harm. Other times, these germs can be picked up from contaminated surfaces or objects, including health care workers' hands or from a visitor carrying the germ, or by contact with an infected person.

Hospital patients are especially susceptible to infection. Their immunity may be compromised by the disease that brought them there, or by surgery or other medical procedures they receive. Health care associated infections can be devastating to patients' health and present a significant cost to the health care system. The US Department of Health and Human Services puts HAI as one of the leading causes of death in the United States, estimating the human cost of HAI in 2002 at 99,000 deaths.[2] A 2009 analysis by the federal CDC estimates the cost of HAIs per hospital patient ranges from $16,000 - $19,000, for a total national cost of $28.4 billion - $33.8 billion.[3]

HAI Data as an Indicator of Health Care Quality

The Maine Quality Forum and the MIPC use a defined set of health care associated infection measures to assess how well hospitals prevent infections in their facilities. Maine hospitals submit data for two types of quality: process measures and outcomes measures. Process measures use data to calculate how often hospitals comply with different types of research-proven, infection prevention methods. These prevention methods are sometimes called "bundles" when they require a combination of a number of steps. Outcomes measures calculate actual rates of infection. The hospitals report the measurement data to the Maine Health Data Organization, which provides them to the Maine Quality Forum.

The occurrence of health care associated infections is influenced by a complex variety of process and structural features of the health care delivery. HAIs can be transmitted by patient interactions with health care workers, with other patients, with visitors or by contact with contaminated surfaces or implements. HAI transmission can be influenced by a combination of environmental factors within the health care setting, factors related to the treatment and provision of care and factors related to the running of a health care facility such as staffing levels, funding for infection control programs, staff attitudes toward infection control and adherence to infection control protocols, to name a few.

Because so many different factors influence HAI and because there are so many complex interactions that may influence its occurrence, *it is important to approach comparisons of HAI data across health care organizations very cautiously*. While process measures such as data related to the administration of appropriate antibiotics prior to a surgical procedure or the use of checklists for the cleaning of patient rooms might provide a good point of comparison, outcome measures – such as infection rates – may not. This is not meant to excuse high rates of HAI; instead, it is offered as a reminder to consider all of the factors that interact to exert influence on HAI.

[2] HHS Action Plan to Prevent Healthcare-Associated Infections. Department of Health and Human Services. June 2009.
[3] Scott Rd. The Direct Medical Costs of Healthcare-Associated Infections in US Hospitals and the Benefits of Prevention, 2009. Centers for Disease Control and Prevention. February 2009.

This report has three sections. The first centers on HAI quality indicators related to surgical care. The second focuses more broadly health care associated infection not related specifically to surgical care. The third specifically addresses the issue of Methycillin Resistant Staphylococcus aureus, or MRSA.

Findings

The surgical and HAI quality indicators tracked by the MQF indicate Maine hospitals are, on average, doing a good job addressing the risks associated with health care associated infections. While the national benchmark presents room for improvement, performance on most indicators is trending in the right direction.

MRSA prevalence has been documented for important high risk populations on a hospital by hospital basis. The prevalence study serves as an indicator for each facility of the population that is most likely to pose risk for the transmission of MRSA to other patients and to health care workers within the hospital. It is incumbent upon each hospital to take the steps it deems necessary and appropriate to minimize that risk. Each Maine hospital is now submitting data regarding the incidence of MRSA infection to the National Health Services which may be used over time to assess the impact of MRSA infection control measures.

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Background

This report focuses on hospital performance in the realm of HAI control and prevention. Because this subject matter and the data used to assess performance can be clinical and difficult to understand, this year's report strives to make the information more accessible to a general audience than it has been in the past. This means the report is less technically-oriented than it has been historically.

Any discussion about health care associated infections will unavoidably involve the use of a long list of terms and acronyms. A list of common abbreviations and terms that may be useful in reading this report: may be found in Appendix 1 of this report.

[4] 24-A MRSA §6951.

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Fighting HAI – Strategies and Partners

It is important to recognize that many healthcare associated infections are preventable. The key to combating HAI is to break the cycle of disease transmission, interrupting how the disease germs are passed from one person to the next. The most successful prevention efforts include both systematic as well as disease-specific strategies. Systematic strategies are designed to address the prevention of all types of HAI whereas disease-specific efforts are targeted at preventing or containing the spread of particular diseases. Systemic efforts include strategies to protect patients from exposure to the disease from a healthcare worker, through direct exposure to other patients who carry the disease or through indirect exposure through contact with a contaminated surface or medical device.

Designing, implementing and administering HAI prevention programs are complex undertakings and demand the cooperation of a wide range of partners including hospitals and other healthcare facilities, healthcare professionals, patients and their families, laboratories and government, to name a few.

[5] HHS Action Plan to Prevent Healthcare-Associated Infections. Department of Health and Human Services. June 2009.
[6] Scott Rd. The Direct Medical Costs of Healthcare-Associated Infections in US Hospitals and the Benefits of Prevention, 2009. Centers for Disease Control and Prevention. February 2009.

The **Maine Center for Disease Control and Prevention**, a Bureau of the Maine Department of Health and Human Services, is a significant partner in the effort to address HAI. In October 2009, the Maine CDC established the Healthcare Associated Infections program within its Division of Infectious Disease and has received federal funding to support the program; the federal government is a major funder of similar efforts across the nation. In December 2009, the program released the first State of Maine State Healthcare Associated Infection Prevention Plan,[7] which is intended to lay out the state's strategy for preventing health care associated infections. The plan describes the infrastructure, surveillance efforts, prevention measures, communication strategies and evaluation approaches to be employed under the Plan. The Plan also identifies key prevention targets on which the state will focus surveillance and prevention activity for 2010-2011. The first set of targets includes central line associated blood stream infections (CLABSI), MRSA infection and surgical site infection. A more comprehensive description of this initiative, including highlights of accomplishments to date, may be found in Appendix 2 of this report.

With the Maine CDC providing leadership, the program relies on collaboration with the Maine Infection Prevention Collaborative and other key players described here.

In 2008, Maine took an important step was taken toward addressing the challenge of HAI. Maine hospitals formed the **Maine Infection Prevention Collaborative** (MIPC) in partnership with the Maine Hospital Association, the Maine Center for Disease Control and Prevention, the Maine Quality Forum and the Northeast Health Care Quality Improvement Organization, which oversees quality of care for Maine Medicare patients. The MIPC's goal is to review, develop and share experiences and expertise in the prevention of health care associated infections. The MIPC works to continuously improve the health and safety of both patients and providers by encouraging the consistent use of best practices for infection control. To achieve this goal, the MIPC fosters collaborative development and implementation of evidence-based protocols and guidelines for HAI prevention and advocates for the standardization of data collection and the analysis and sharing of infection control performance indicators.

Infection prevention professionals from all Maine hospitals participate in the MIPC and every hospital CEO has signed a pledge of support for the work of the collaborative.

With the assistance of the work of several subcommittees, the MIPC realized a long list of considerable accomplishments during 2010, including collaboration with the Maine CDC on the implementation of the Maine State Healthcare Associated Infection Prevention Plan and successful application for federal funds to support the surveillance and prevention efforts focused on HAI in Maine. The MIPC played a key role in the implementation of the active surveillance testing and prevalence pilot for the MRSA study described later in this report and surveyed each hospital to compile a database on infection prevention plans and policies for preventing health care associated infections.

The MIPC was also instrumental in encouraging expansion of participation by Maine hospitals in the federal CDC's National Healthcare Safety Network (NHSN), the standardized national database for reporting and benchmarking of HAI prevention and incidence, realizing commitments from all acute care facilities to enroll and enter MRSA HAI incidence data facility-wide by January 1, 2011.

[7] http://www.maine.gov/dhhs/boh/ddc/hai/documents/maine-hai-state-plan.pdf

A copy of the MIPC Annual Report for 2010 is included in Appendix 3 to this report.

The **Maine Quality Forum** convened an **MDRO Metrics Work Group** to specifically address the issues related to health care associated infections. This group includes representatives of the Maine State Nurses Association, the Maine Hospital Association, the Maine Quality Forum Advisory Council, the Maine Infection Prevention Collaborative, and consumers. All of these stakeholders share the goal of eradicating the transmission of MRSA in Maine hospitals and have worked diligently on the MRSA prevalence study assigned to the MQF in Resolve 2009, Chapter 82.

The **Maine Health Data Organization** (MHDO) is the independent state agency responsible for collecting health care data and is an important partner in efforts to address issues related to HAI prevention and control. The MHDO processes data and provides the Maine Quality Forum and others, with much of the data needed to carry out its work.

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Surgical Quality of Care Indicators - The Surgical Care Improvement Project

The Surgical Care Improvement Project (SCIP), sponsored by the federal Centers for Medicare and Medicaid Services (CMS) is a partnership of national quality organizations interested in improving surgical care by significantly reducing surgical complications. SCIP Partners include the Steering Committee of 10 national organizations who have pledged their commitment and full support for SCIP.

SCIP measures are part of the "core measures" required by CMS for its hospital quality data set. Several SCIP measures relate to the prevention of surgical site infections and are included as part of the Maine Quality Forum's HAI measures.

SCIP Measure One – Percent of Patients Receiving an Antibiotic within One Hour Prior to Surgery

The first SCIP measure looks at the percent of surgical patients in Maine hospitals who received an antibiotic within one hour prior to surgery – more specifically, within one hour prior to the first incision. This measure reports on how well each hospital adheres to a specific process of care that is considered to be the best, evidence-based care. Antibiotics are drugs that kill bacteria that can cause infection. Medical research has shown that antibiotics are most effective in reducing the risk of infection when they are given to the patient as close to the time surgery begins as possible and not more than one hour prior to surgery.[8]

Patients should ask their doctor whether they will need to be given an antibiotic at the time of their surgery. If the answer is no, ask for an explanation. If the answer is yes, ask when the antibiotic will be given, keeping in mind that the closer to the time of incision the drug is given, the lower the risk of infection. Unless the doctor is using a drug that must be administered very slowly, the antibiotic should be given no more than one hour before the first incision is made.

The graphs that appear below are presented by hospital peer grouping. The Maine Hospital Association has divided Maine hospitals into five peer groups. The hospitals listed within each peer group are considered to be comparable and share similar characteristics. The graph for each peer group shows three years of results for each individual hospital, with the third column showing results for the most recent year. The height of each column shows the percent of surgery patients who received the proper antibiotic care; a higher column means better results. The horizontal black line near to top of each graph represents the Maine statewide hospital average for the twelve months from July 2009 through June 2010. If no data show for a particular hospital, there were not enough patients to report on the measure.

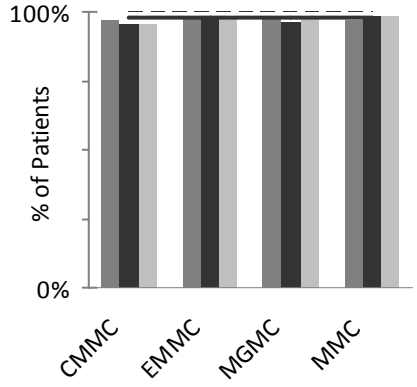
[8] Note that there are some prophylactic antibiotics used that require a slow infusion of the drug; when such drugs are used or that may take longer to act than others. These drugs will be appropriately administered more than one hour prior to surgery, to allow time for proper infusion. Not all patients will receive an antibiotic before surgery as some types of operations do not require pre-surgical antibiotics.

SCIP Measure One: Percent of All Patients Receiving an Antibiotic Within One Hour Prior to Surgery, by Maine Hospital, 2007-2010

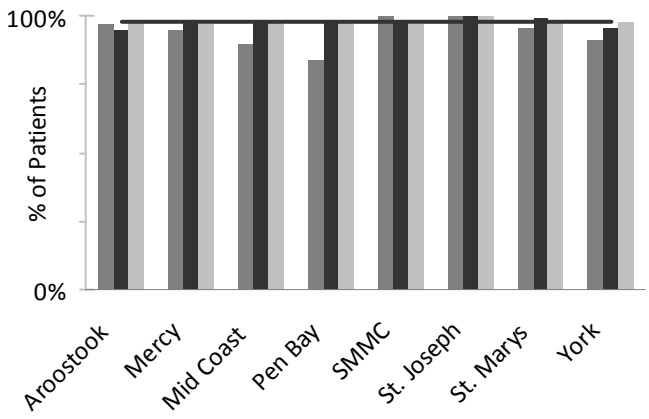
[Maine Average, 2009-2010 = 98%; National Benchmark, 2009-2010 = 99.8%]

July 2007-June 2008 July 2008-June 2009 July 2009- June 2010

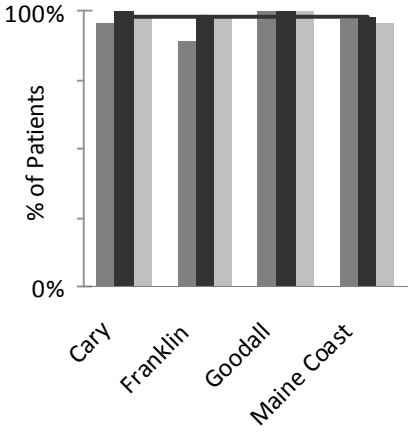
Hospital Peer Group A



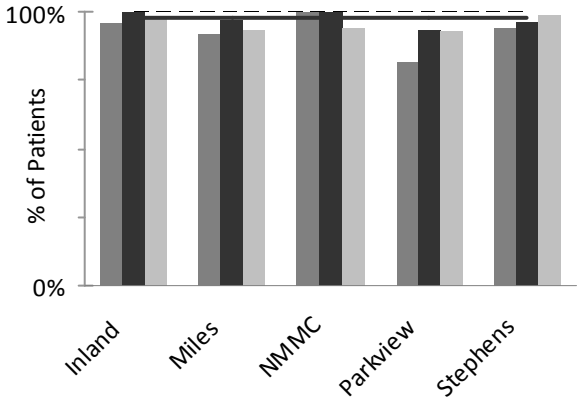
Hospital Peer Group B

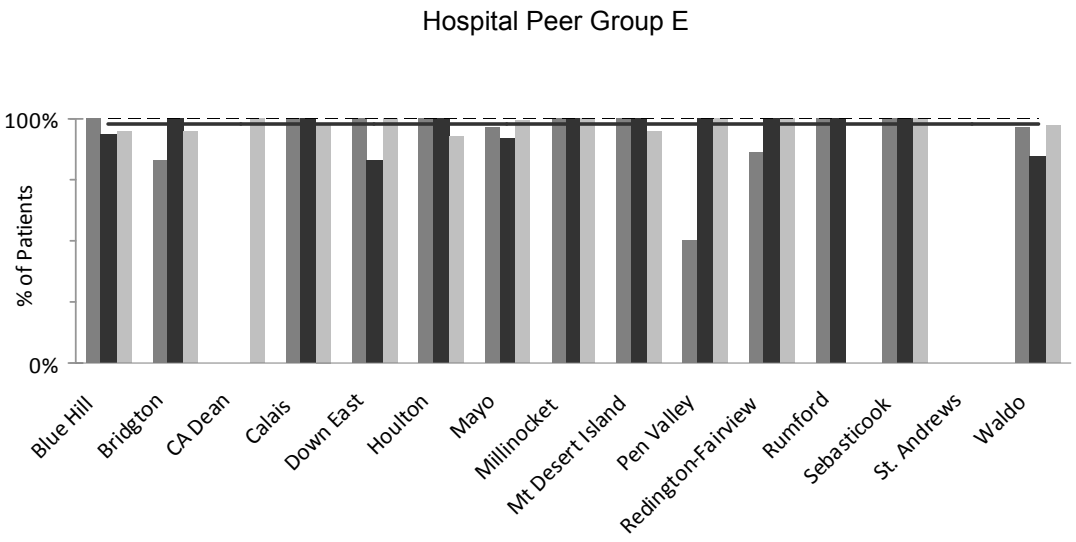


Hospital Peer Group C

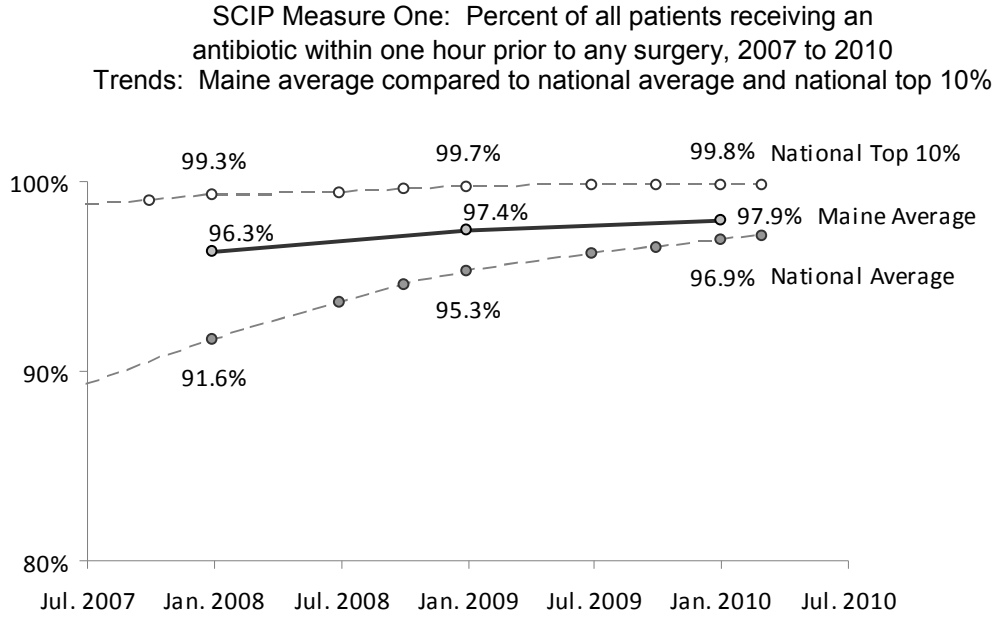


Hospital Peer Group D





The next chart shows the trend over time in the Maine statewide hospital average for the percent of patients receiving a prophylactic antibiotic within one hour prior to surgery, for all Maine hospitals taken as a whole. The chart compares Maine's average with the national average at several points over time. It also compares the Maine to the national benchmark – the results for the top 10% of U.S. hospitals that scored best on this measure. Maine hospitals have outperformed the national average at each point in time shown and have demonstrated improvement since mid-2008. The Maine average, though, is about two percentage points below the national benchmark, so there is still room for improvement.



SCIP Measure Two – Percent of All Surgery Patients Receiving the Recommended Antibiotic for Their Procedure

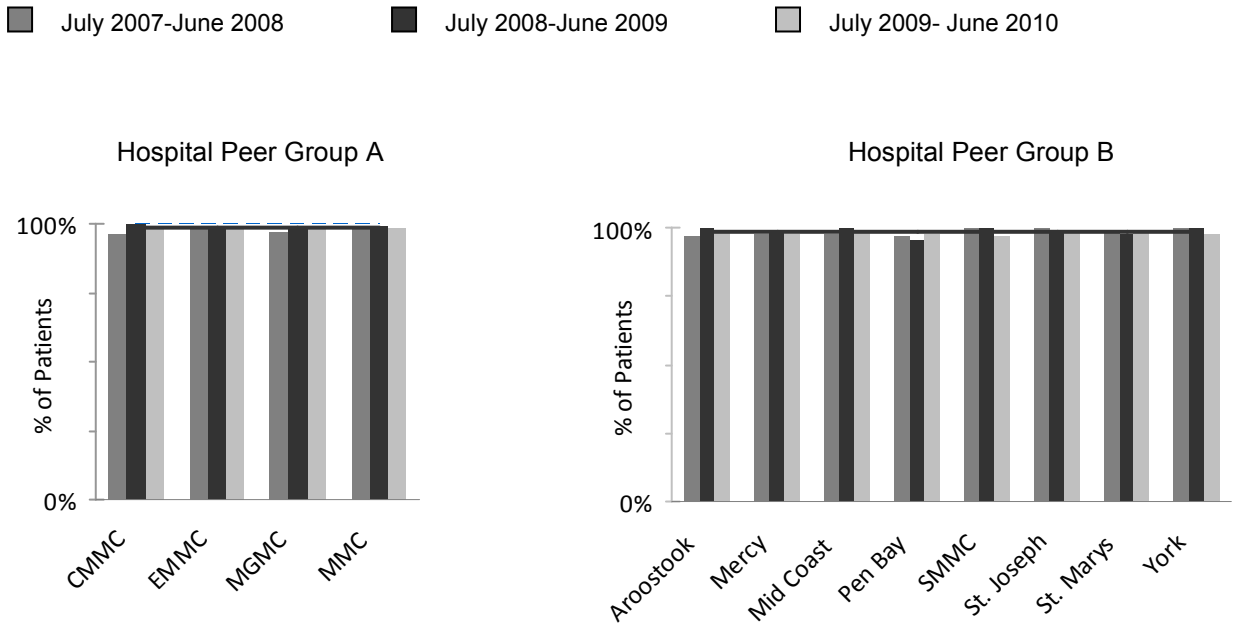
While the first SCIP measure looks whether a pre-surgical antibiotic was given at the right time, the second measure looks at how often an appropriate prophylactic antibiotic was chosen – it is important to give the right drug at the right time. When preparing the patient for surgery, doctors should choose an antibiotic that medical evidence has shown to be effective at preventing infection in similar patients under similar conditions. Patients who are going to be having surgery can ask their doctor if they are going to have a pre-operative antibiotic and, if so, what drug they will be given and why that particular drug was chosen.

It is important for surgical patients to receive prophylactic antibiotics that are consistent with current clinical guidelines specific to each particular type of surgical procedure. While one drug might be best for patients about to undergo a hip replacement, a different drug may be indicated for use in patients about to have heart surgery. The goal here is to use an antibiotic that is both safe for the patient and cost effective. At the same time, the drug chosen needs to be able to fight off the infections the patient is most likely to face.

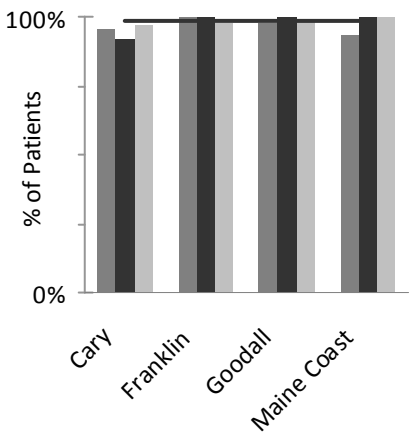
The charts below show, for each hospital peer group, the percent of surgical patients who received the recommended antibiotic for their procedure. Once again, the higher columns represent better results.

SCHIP Measure Two: Percent of All Surgery Patients Receiving the Recommended Antibiotic for Their Procedure, by Maine Hospital, 2007-2010

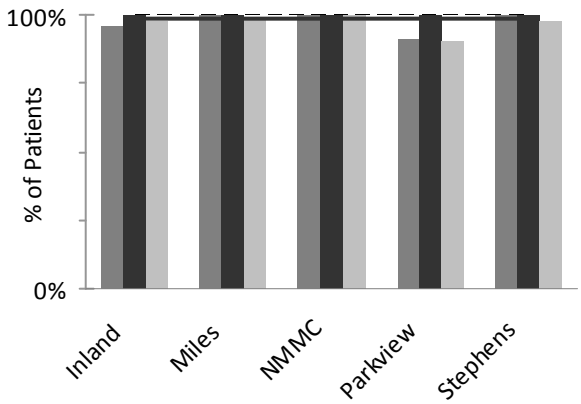
[Maine Average, 2009- 2010 = 98.7%; National Benchmark, 2009-2010 = 99.9%]



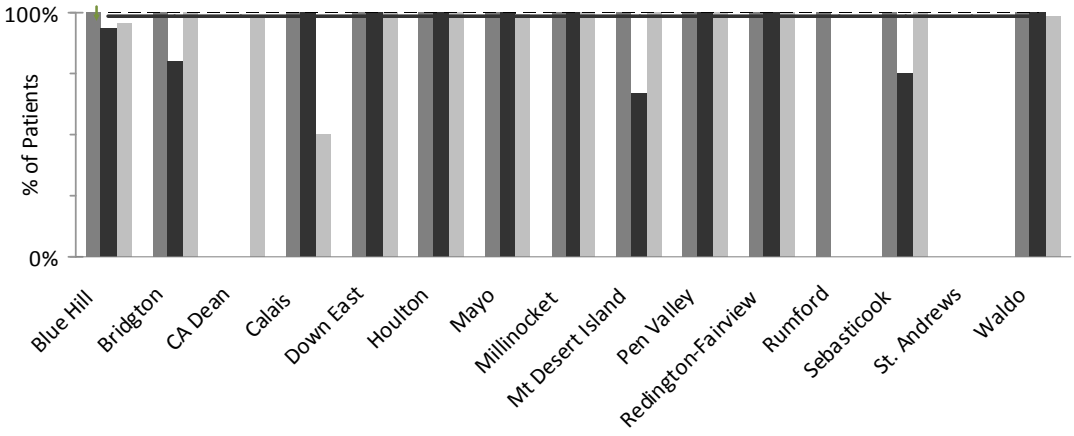
Hospital Peer Group C



Hospital Peer Group D

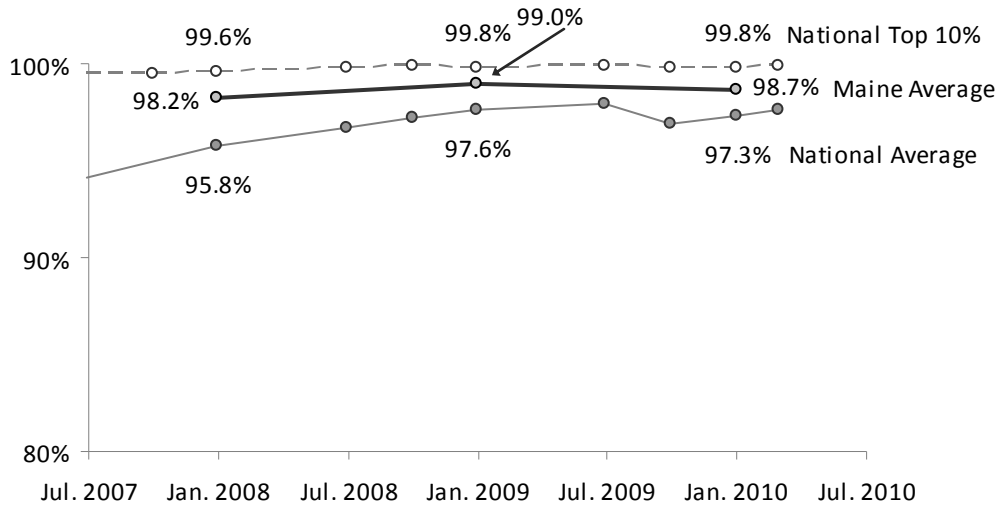


Hospital Peer Group E



The next chart shows the trend over time in Maine's performance with regard to ensuring surgical patients with an antibiotic appropriate for their condition and procedure. It compares the Maine average to both the national average and a national benchmark. Maine's performance on this measure has remained relatively steady between 2007 and 2010 and our hospitals outperform the national average, but remain slightly below the top performers in the country.

SCIP Measure Two: Percent of all surgery patients receiving the recommended antibiotic for their procedure, 2007 to 2010
Trends: Maine average compared to national average and national top 10%



SCIP Measure Three – Percent of Surgical Patients Who's Preventive Antibiotics Were Discontinued Within 24 Hours After Anesthesia Was Ended

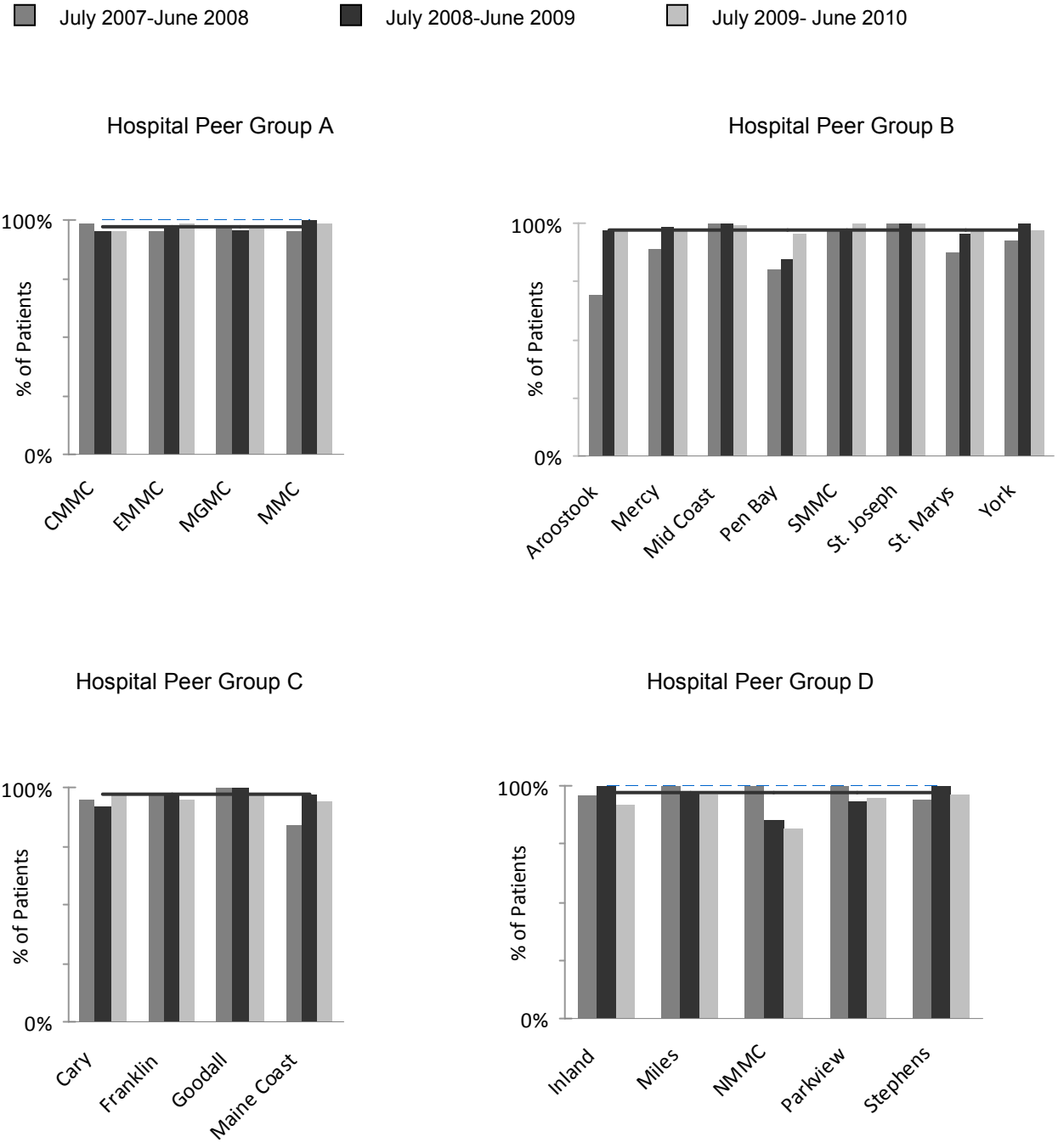
Just as it is important to give the right antibiotic to the right patient at the right time, it is also important to stop that antibiotic when it will no longer provide a meaningful benefit to the patient. Continuing prophylactic antibiotics for more than 24 hours surgery ends does not provide any added benefit. In fact, prolonged administration of the antibiotic can sometimes even heighten the risk of a patient getting certain infections, just as it can contribute to the development of bacteria with greater resistance to antibiotics.

Sometimes the doctor may prescribe an antibiotic for a post-surgical patient for a number of reasons, including the treatment of signs of infection. Patients can ask their provider what medications they are on and why they are being prescribed, including any antibiotics they may be given.

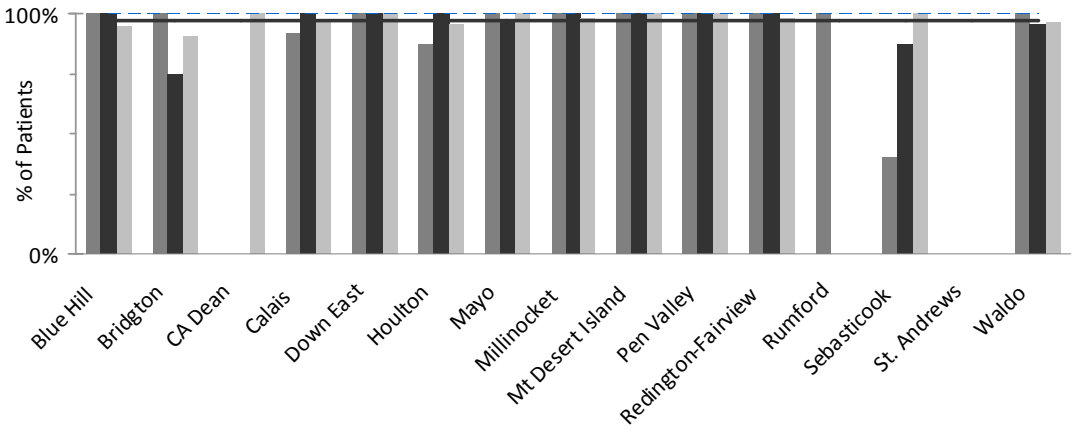
For hospitals in each peer group, the charts below show the percent of surgical patients whose prophylactic antibiotics were stopped within the 24 hour period following surgery. A taller column means better performance and the horizontal line near the top of each graph shows the Maine hospital statewide average for July 2009 through June 2010. The peer group graphs are followed by the trend chart. The trend over time shows improvement in Maine's performance, which continues to be better than the national average, but still falls short of the nation's top performers.

SCIP Measure Three – Percent of Surgery Patients Whose Preventive Antibiotics Were Discontinued Within 24 Hours After Anesthesia Ended, by Maine Hospital, 2007-2010

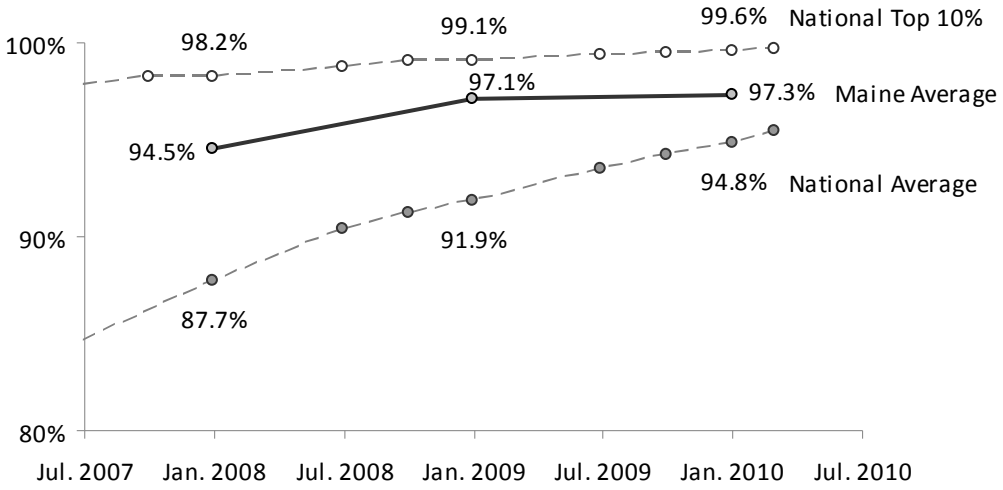
[Maine Average, 2009- 2010 = 97.3%; National Benchmark, 2009-2010 = 99.7%]



Hospital Peer Group E



SCIP Measure Three: Percent of all surgery patients whose preventive antibiotics were discontinued within 24 hours after anesthesia ended, 2007-2010
Trends: Maine average compared to national average and national top 10%



SCIP Measure Four – Percent of Cardiac Surgical Patients with Controlled 6 am Post-Operative Serum Glucose

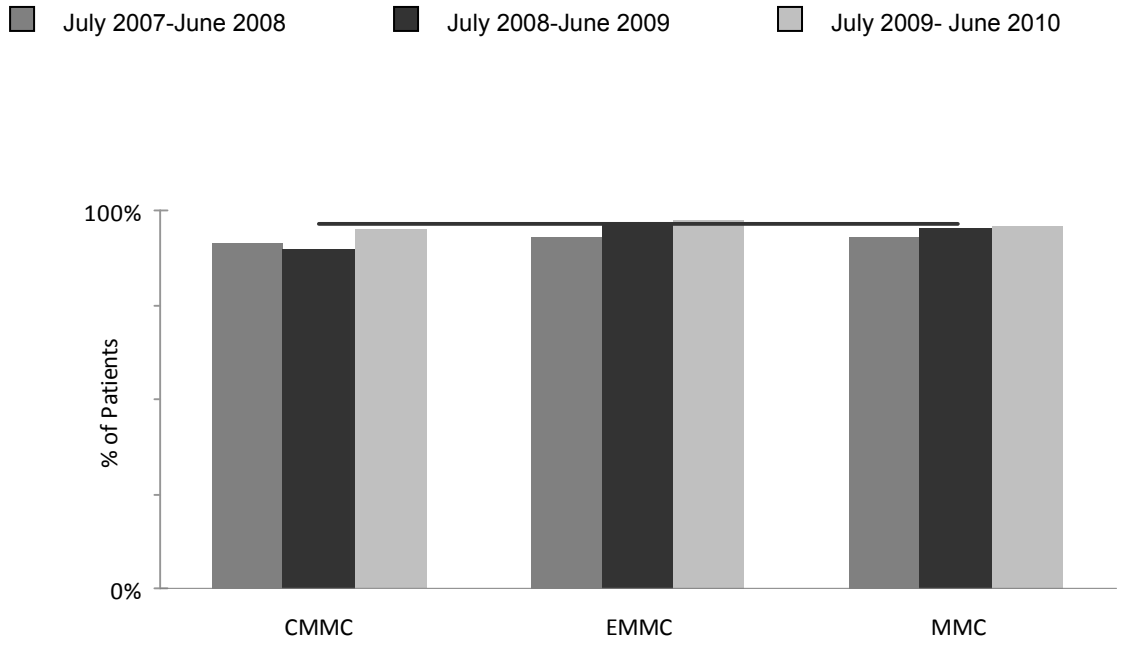
Hyperglycemia – high blood sugar – has been associated with increases in both morbidity and mortality in surgical patients, especially for patients undergoing heart surgery. This occurs in both diabetic and non-diabetic patients. As the level of hyperglycemia increases, so does a patient's risk of infection. It is important to identify hyperglycemia so that steps can be taken to minimize the risk of infection and the risk of a poor outcome for heart surgery patients.

Following heart surgery, patients or their advocate may ask the doctor if their blood sugar levels have been checked and whether or not they were elevated. If they are elevated, it is appropriate to ask is being done to control their hyperglycemia.

The charts below show how well Maine hospitals are doing with regard to checking and controlling levels of blood sugar in patients after heart surgery. There are only three hospitals in Maine that perform heart surgery and each hospital's performance is shown over three years. A taller column means better performance and the horizontal line near the top of the graph represents the combined hospital statewide average for July 2009 through June 2010.

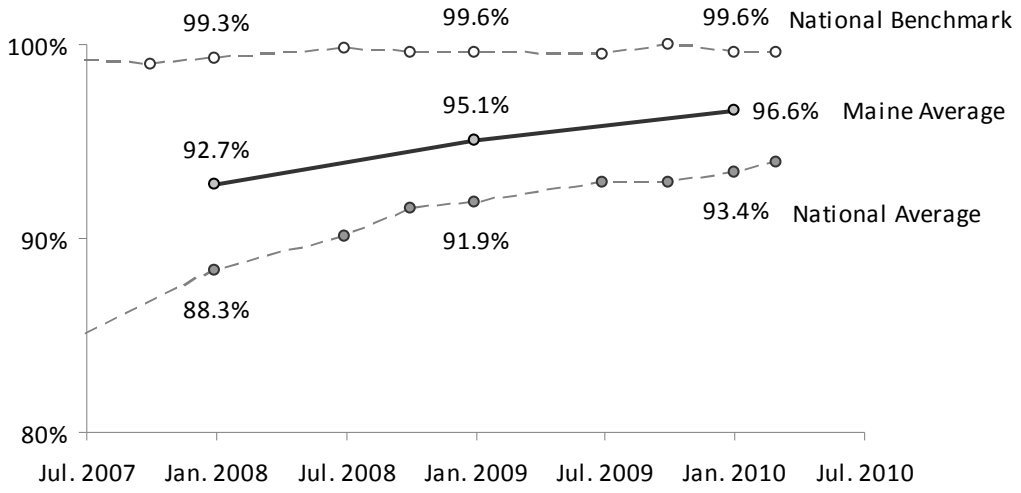
SCIP Measure Four – Percent of Cardiac Surgery Patients with Controlled 6 am Post-Operative Serum Glucose, by Maine Hospital, 2007-2010

[Maine Average, 2009- 2010 = 96.6%; National Benchmark, 2009-2010 = 99.6%]



The second chart shows the average rate for this measure at all three hospitals together and how performance has improved over time. The Maine average exceeds the national average and is trending toward the national benchmark for top performers.

SCIP Measure 4: Percent of cardiac surgery patients with
controlled 6 AM post-operative serum glucose, 2007 to 2010
Trends: Maine average compared to national average and national benchmark



SCIP Measure Six[9] *– Percent of Surgery Patients with Appropriate Hair Removal*

Some types of surgery require that a patient's hair be removed near the area of the incision before the operation begins. The clinical research has found that shaving the hair with a razor increases a patient's risk by causing nicks or scratches that may become infected. Instead, hair is best removed right before surgery with electric clippers or a depilatory cream.

Patients scheduled for surgery can ask if any of their hair will need to be removed prior to their operation and, if so, how it will be removed. It is appropriate to ask for electric clippers or a depilatory cream to be used instead of a razor.

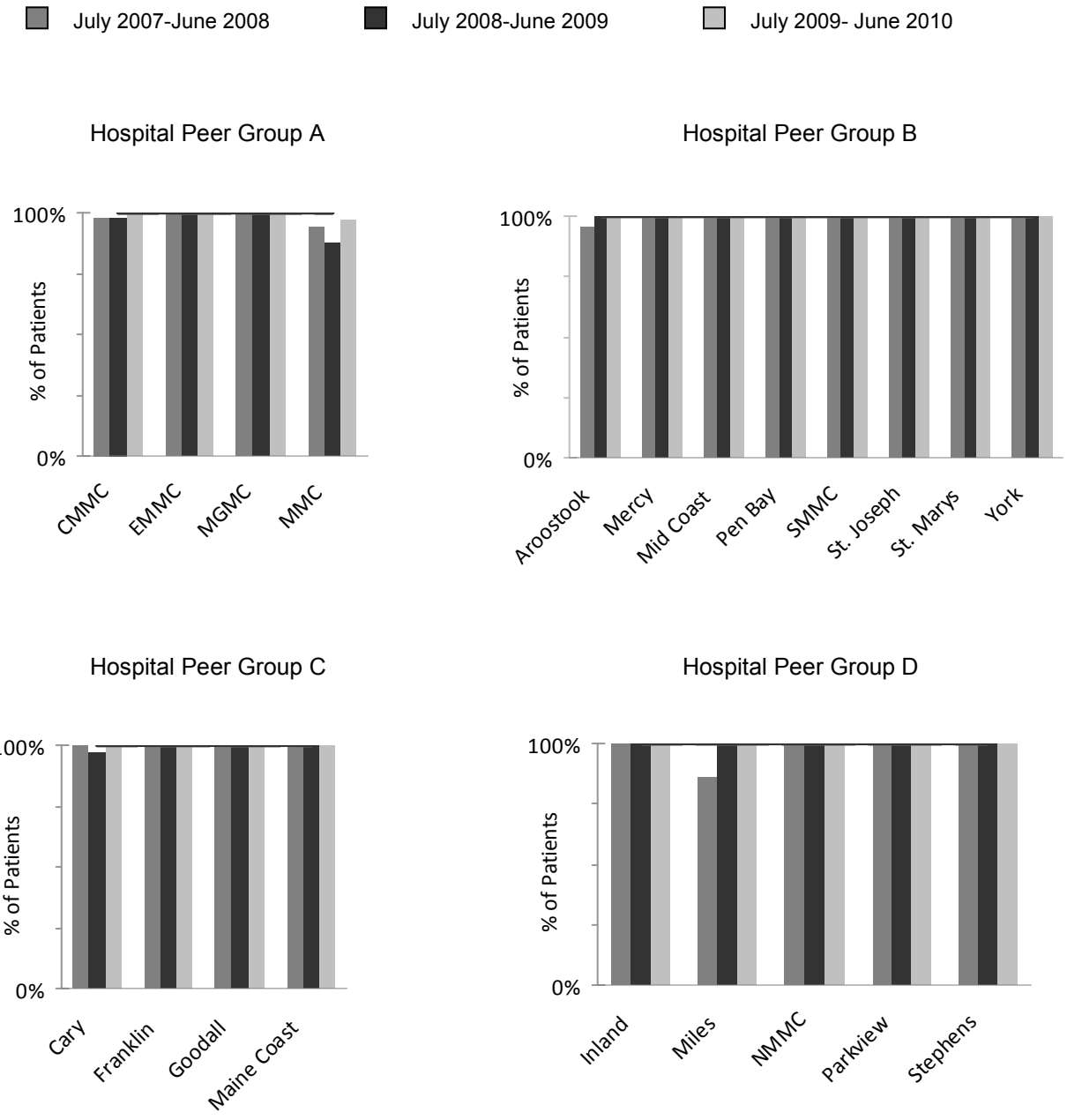
The charts below show how Maine hospitals have performed over each of three years on the measure of appropriate hair removal, as compared to their peers; almost every

[9] SCHIP assigns each of its measures a number. The original SCHIP Measure 5 has been "retired" by the project, which is why we skip from Measure 4 to Measure 6.

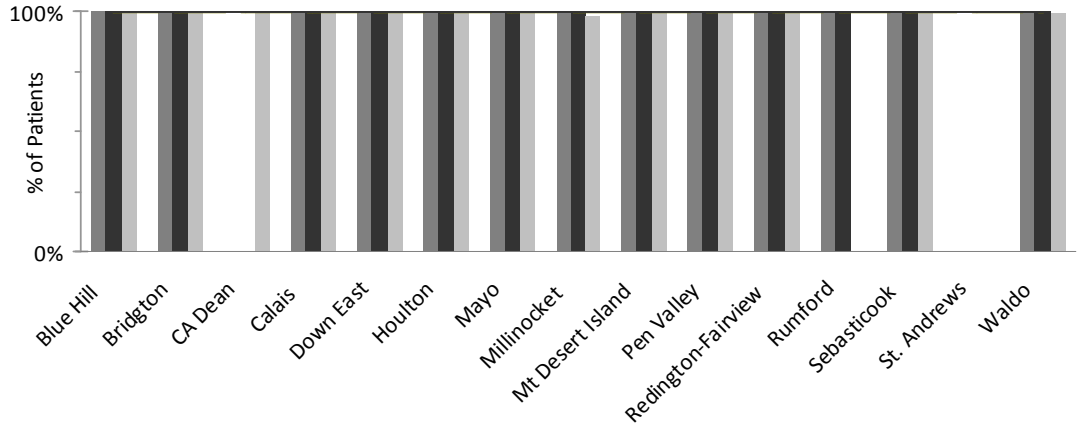
hospital in each year reported 100% compliance with this quality measure. The trend chart shows the change over time, for the Maine hospital statewide average with regard to this SCIP measure. That chart shows Maine hospital improvement for this measure, which tracks the national average in movement towards the national benchmark.

SCIP Measure Six – Percent of All Surgery Patients with Appropriate Hair Removal, by Maine Hospital, 2007-2010

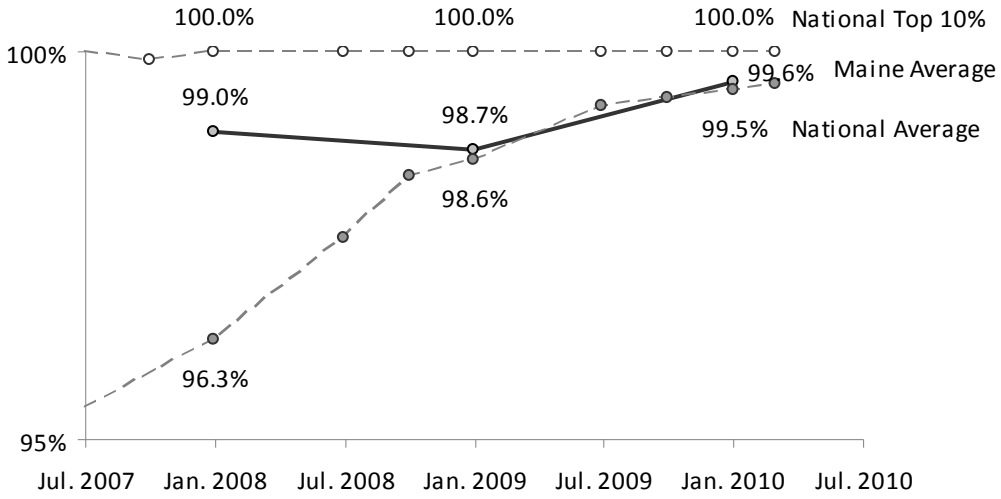
[Maine Average, 2009- 2010 = 99.6%; National Benchmark, 2009-2010 = 100%]



Hospital Peer Group E



SCIP-6: Percent of all surgery patients
with appropriate hair removal, 2007-2010
Trends: Maine average compared to national average and national benchmark



Quality Indicators Related to Health Care Associated Infection

The rules of the Maine Health Data Organization require providers to submit data for a set of five specified health care associated infection (HAI) quality indicators. These five measures are included in the MHDO database.

HAI Measures One & Two – Central Line Associated Bloodstream Infections (CLABSI)

Some patients need to have a large intravenous (IV) catheter – sometimes called a "central line" – which is inserted into the body to either deliver concentrated solutions of drugs, to monitor special types of pressures, or to measure certain aspects of cardiac performance. For adults, central line catheters are ordinarily inserted into the large veins of the chest or into the heart itself. Newborns can also have central lines, but these lines usually enter the body through the umbilical cord.

A central line associated bloodstream infection (a "CLABSI") is defined as a bloodstream infection that develops after a central line has been placed, and that is not related to an infection in any other part of the patient's body. These infections lead to longer hospital stays, increase the costs of care, and even increase the risk of patient death. Hospitals can prevent CLABSI by ensuring the proper insertion and care of the central line; which makes tracking the occurrence of CLABSI is an important indicator of quality of care

All acute care, non-critical access hospitals are required to report the incidence of a CLABSI infection to the Maine Health Data Organization. Maine hospitals have been voluntarily reporting this data to NHSN, which is a voluntary surveillance system that is administered by the federal CDC. It integrates patient and health care personnel safety surveillance systems and is open to all types of facilities and is intended to allow for valid estimates of the magnitude of adverse events in health care settings. Beginning in 2011, CMS now includes submission of this data to NHSN as a condition of Medicare payment.

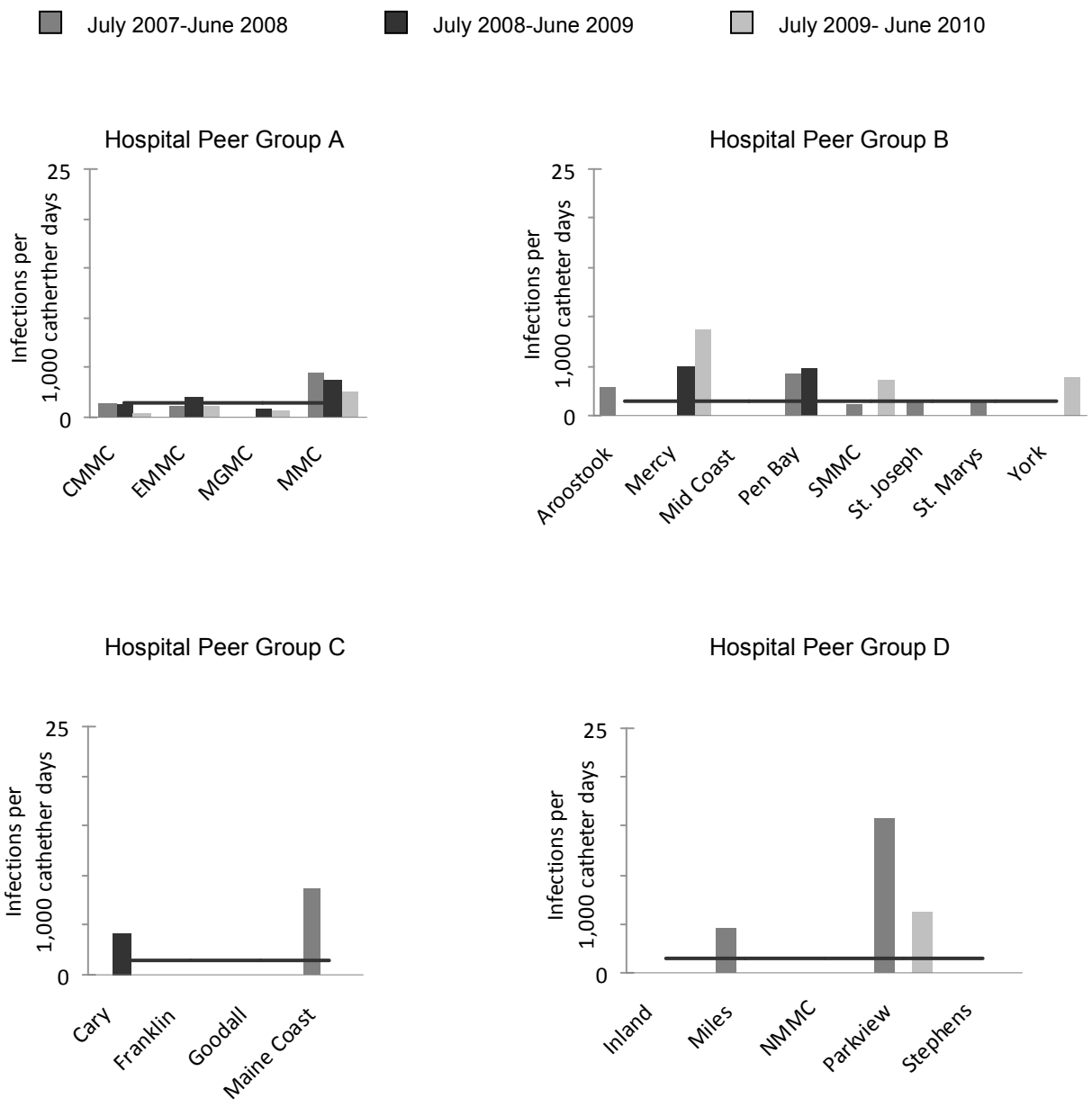
The term "central line days" is used in the charts that show Maine's performance with regard to the incidence of CLABSI in our hospitals. "Central line days" refers to the total number of days a central line is in place for patients in any unit of a hospital. Each day at the same time, hospitals are supposed to count the number of patients with at least one central line in place; each patient with one or more central lines in place at the time the census is taken is counted as one central line day.

The graphs that follow show the CLABSI infection rates in patients in adult intensive care units in each Maine hospital, with peer group comparisons, followed by a set of charts showing the rate of CLABSI in Maine neonatal intensive care units. Many Maine hospitals did not have sufficient data to allow valid CLABSI measures to be reported; in such instances, no bars appear on the graph for the hospital. CLABSI is a relatively rare event. There were fewer than 100 instances among adults in ICUs for the years reported, although there were roughly 30,000 "catheter days" among adults in Maine ICUs in each of those years. Of the approximately 3,000 neonatal catheter days in each of the years shown, there were fewer than 12 infections in each year. Looking at rates of incidence can mask the fact that there are actually few infections.

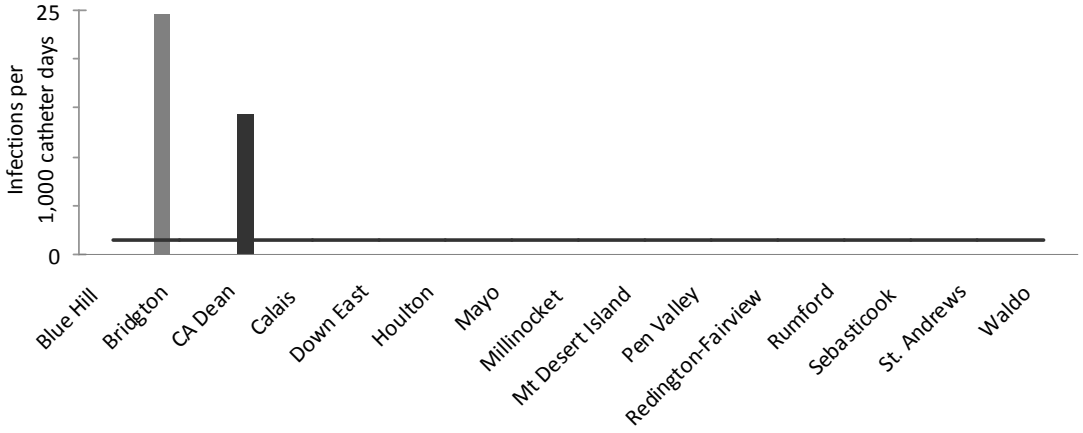
In these charts, shorter bars – indicating fewer infections – are better. Maine's performance with regard to the adult ICU measure is trending in the right direction and is now well below the national average. The neonatal data is more difficult to interpret, as there are relatively few observations to consider; only three Maine hospitals have neonatal intensive care units. Even small changes in small numbers of observations can appear as large swings. Maine's performance on this indicator is also below the national average, although has moved upwards in the most recent year.

HAI One – Number of Catheter-Related Blood Stream Infections Among ICU Patients per 1,000 Central Line Catheter Days, by Maine Hospital, 2007-2010

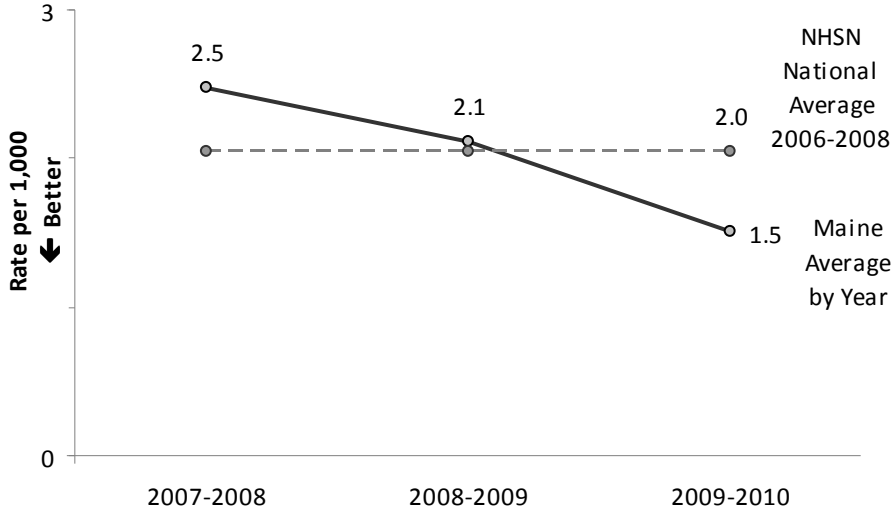
[Maine Average, 2009- 2010 = 1.5]



Hospital Peer Group E



HAI One: Number of catheter-related blood stream infections
among ICU patients per 1,000 central-line catheter days, 2007-2010
Trend: Maine average compared to NHSN national average for 2006-2008



HAI Two – Number of Catheter-Related Blood Stream Infections Among Neonatal ICU Patients Per 1,000 Central Line Catheter or Umbilical Days, by Maine Hospital for 2007-2010, Compared to National Healthcare Safety Network data for 2006-2008

NOTE: These graphs are presented by patient weight. The Maine and NHSN averages for each grouping are as follows:

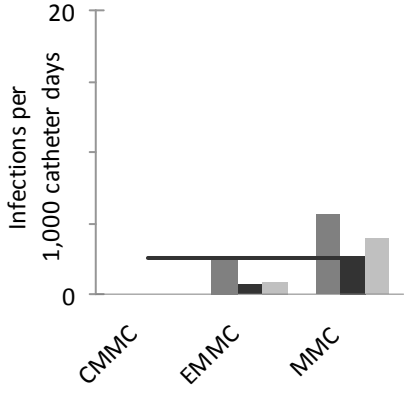
Weight	Maine Average	NHSN Average
All weights	2.5	3.9
< 750 grams	4.4	3.4
751 – 1000 grams	2.3	2.4
1001 – 1500 grams	4.7	2.4

July 2007-June 2008 July 2008-June 2009 July 2009- June 2010

All Maine averages shown are for the 2009 – 2010 time period
All NHSN averages shown are for the 2006 – 2008 time period

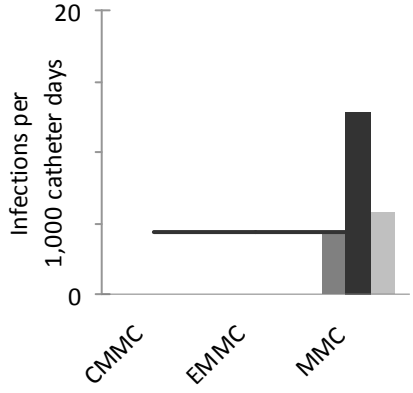
All Neonates

Maine Avg = 2.5, NHSN Avg = 3.9



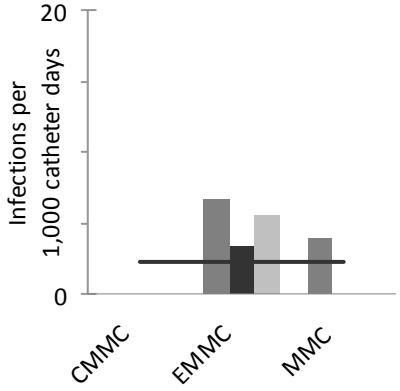
Neonates Weighing Less Than 750 Grams

Maine Avg = 4.4, NHSN Avg = 3.4



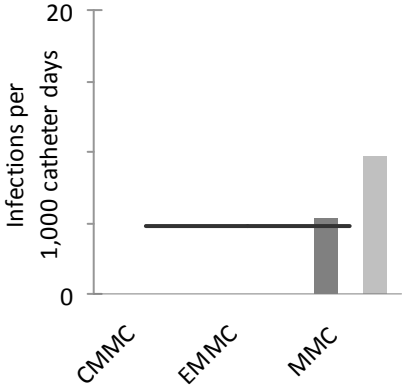
Neonates Weighing 751 – 1,000 Grams

Maine Avg = 2.3, NHSN Avg = 2.4



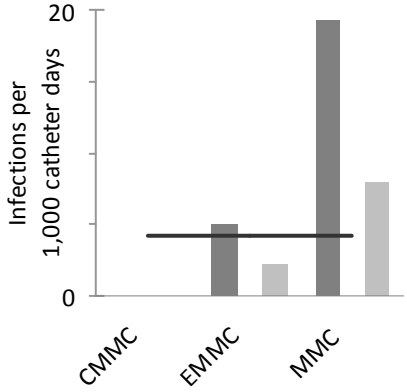
Neonates Weighing 1,001 – 1,500 Grams

Maine Avg = 4.7, NHSN Avg = 2.4



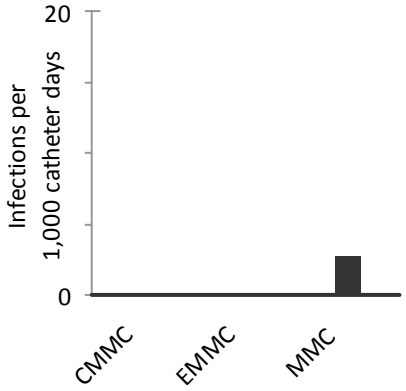
Neonates Weighing 751 – 1,000 Grams

Maine Avg = 2.3, NHSN Avg = 2.4

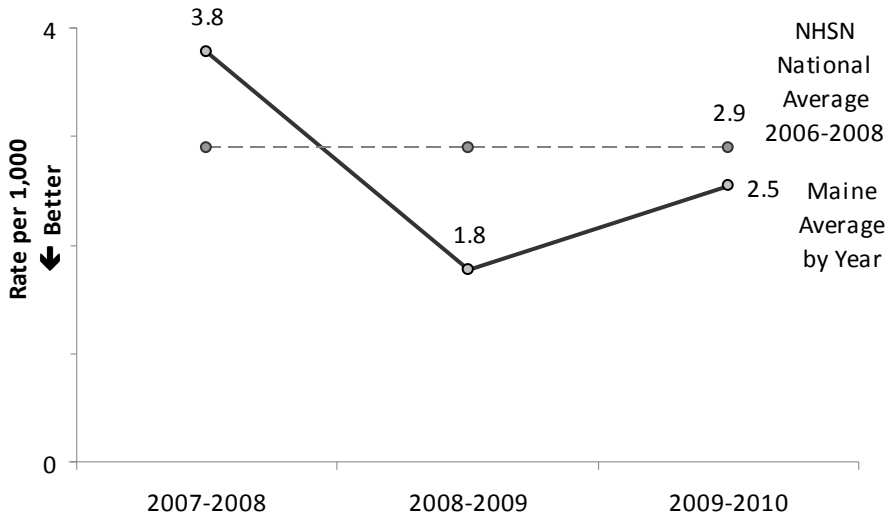


Neonates Weighing 1,001 – 1,500 Grams

Maine Avg = 4.7, NHSN Avg = 2.4



HAI Two: Number of catheter-related blood stream infections among all neo-natal ICU patients per 1,000 central-line catheter or umbilical days, 2007-2010
Trend: Maine average compared to NHSN national average for 2006-2008



HAI Three & Four: Preventing Central Line Bloodstream Infection – the "Prevention Bundles"

The use of central lines to deliver medications and to monitor how well a patient's body is functioning is an important tool available to health care providers. But because central line bloodstream infections result in risk of morbidity and mortality to patients and because they result in longer and more costly hospital stays, it is important to take steps to effectively and efficiently reduce their incidence.

Clinicians and researchers have studied CLABSI carefully and have developed strategies designed to lower the risk of infection that goes along with the placement of a central line. These strategies have been grouped into "bundles" of best practices – practices that will reduce the risk of infection before insertion of the central line, the strategies to reduce risk at the time of insertion, and strategies to minimize the risk of infection after insertion.[10] There are standard definitions for these bundles of best practices, which include the use of appropriate sterile barrier precautions, using chlorhexidine to cleanse the patient's skin prior to inserting the catheter, avoiding insertion of the central line in a femoral site, dressing the insertion site appropriately and removal of the catheter at the earliest possible point in time. It is important that hospital personnel responsible for caring for patients who need a central line use these best practices to help reduce those patients' risk of bloodstream infection.

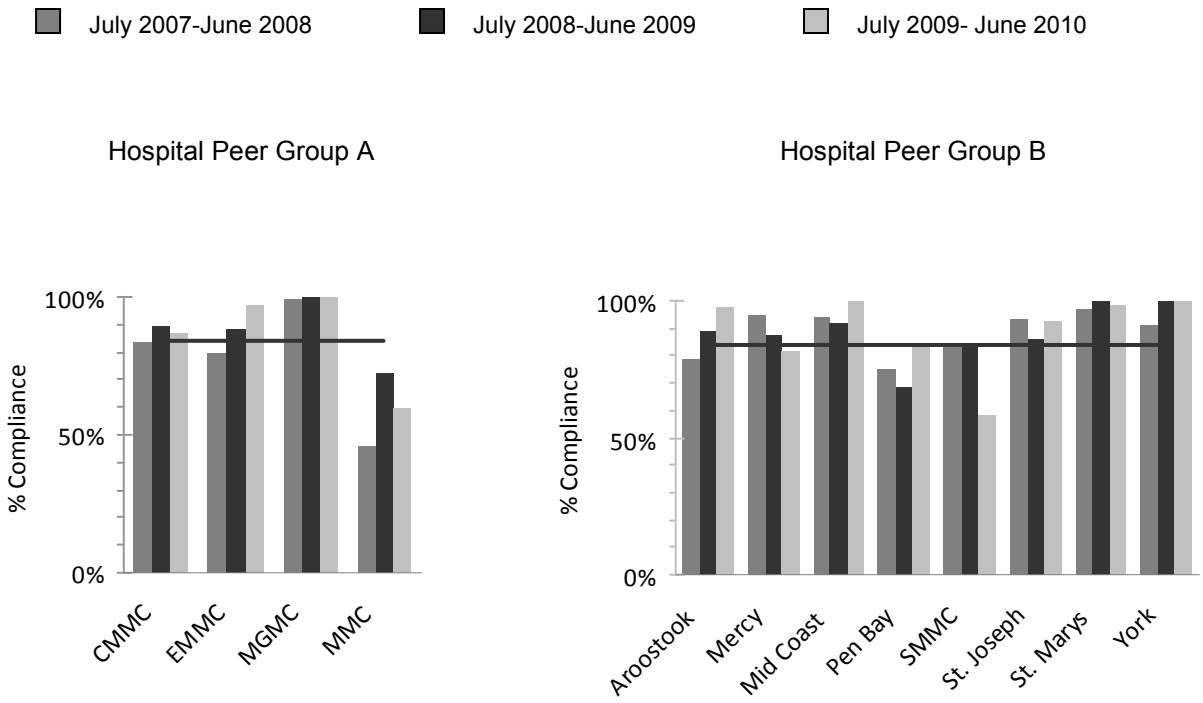
[10] Strategies to prevent central line-associated bloodstream infections in acute care hospitals. National Guideline Clearing House. Agency for Healthcare Research & Quality, US Department of Health and Human Services. http://www.guideline.gov/content.aspx?id=13395

The following charts show how frequently the CLABSI prevention bundles are used in intensive care units (HAI Three) and in surgical suites (HAI Four) in Maine hospitals.[11] Once again, the data is presented for each hospital, by hospital peer group. A higher bar indicates better performance; the horizontal black line on each graph indicates the Maine hospital statewide average for the period of July 2009 through June 2010.

The trend data for compliance with the prevention bundles in the ICU document a dip in compliance rates between the year ending June 2008 and the year ending June 2009; the rate, however, "recovers" in the most recent year, bouncing back to its 2007-08 level. The trend data for compliance with use of prevention bundles with surgical patients shows steady improvement.

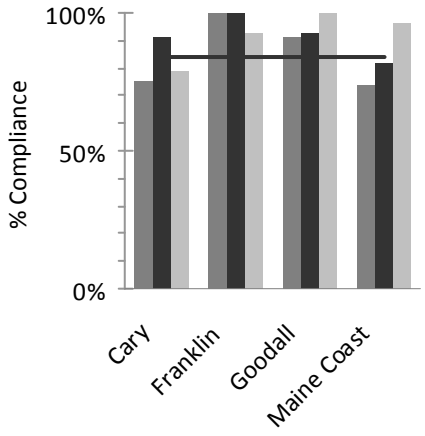
HAI Three – Documented Compliance with Infection Prevention Measures for ICU Patients with Central Line Catheters, by Maine Hospital, 2007 – 2010

[Maine Average, 2009- 2010 = 84%]

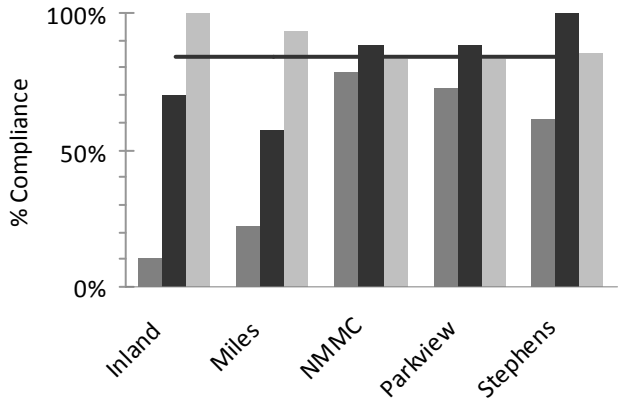


[11] There are standard definitions for CLABSI bundles; reported compliance should reflect compliance with those standardized best practices.

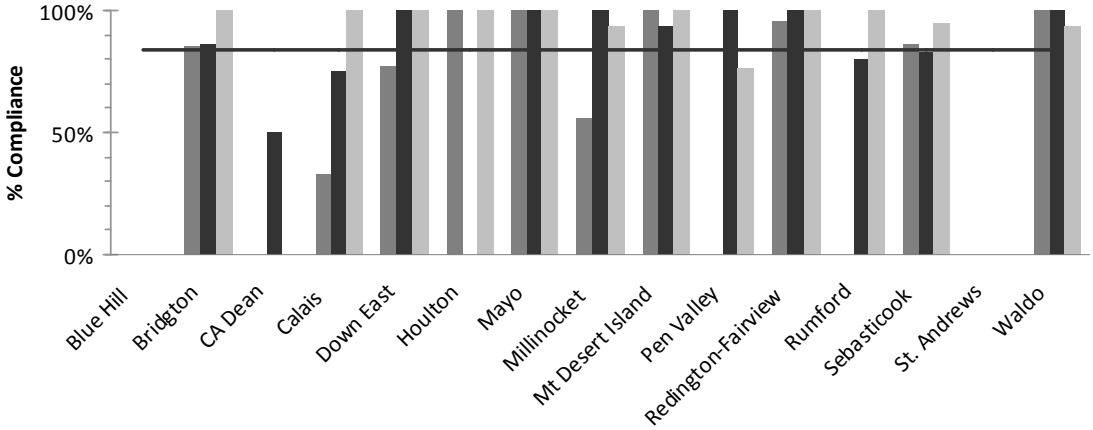
Hospital Peer Group C



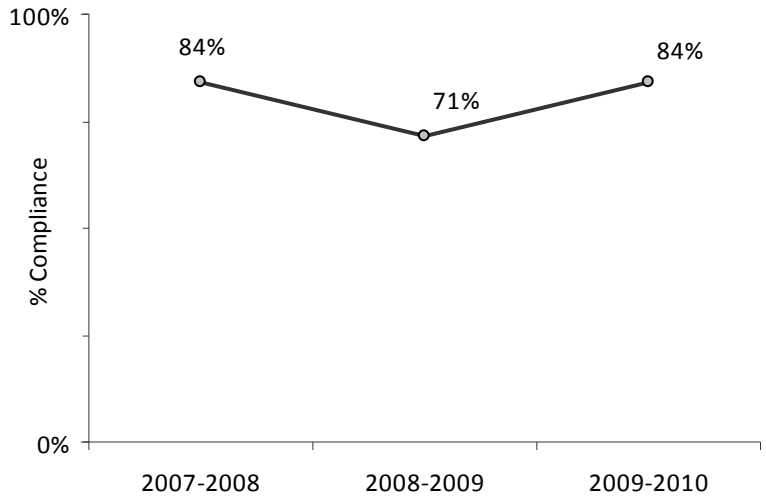
Hospital Peer Group D



Hospital Peer Group E

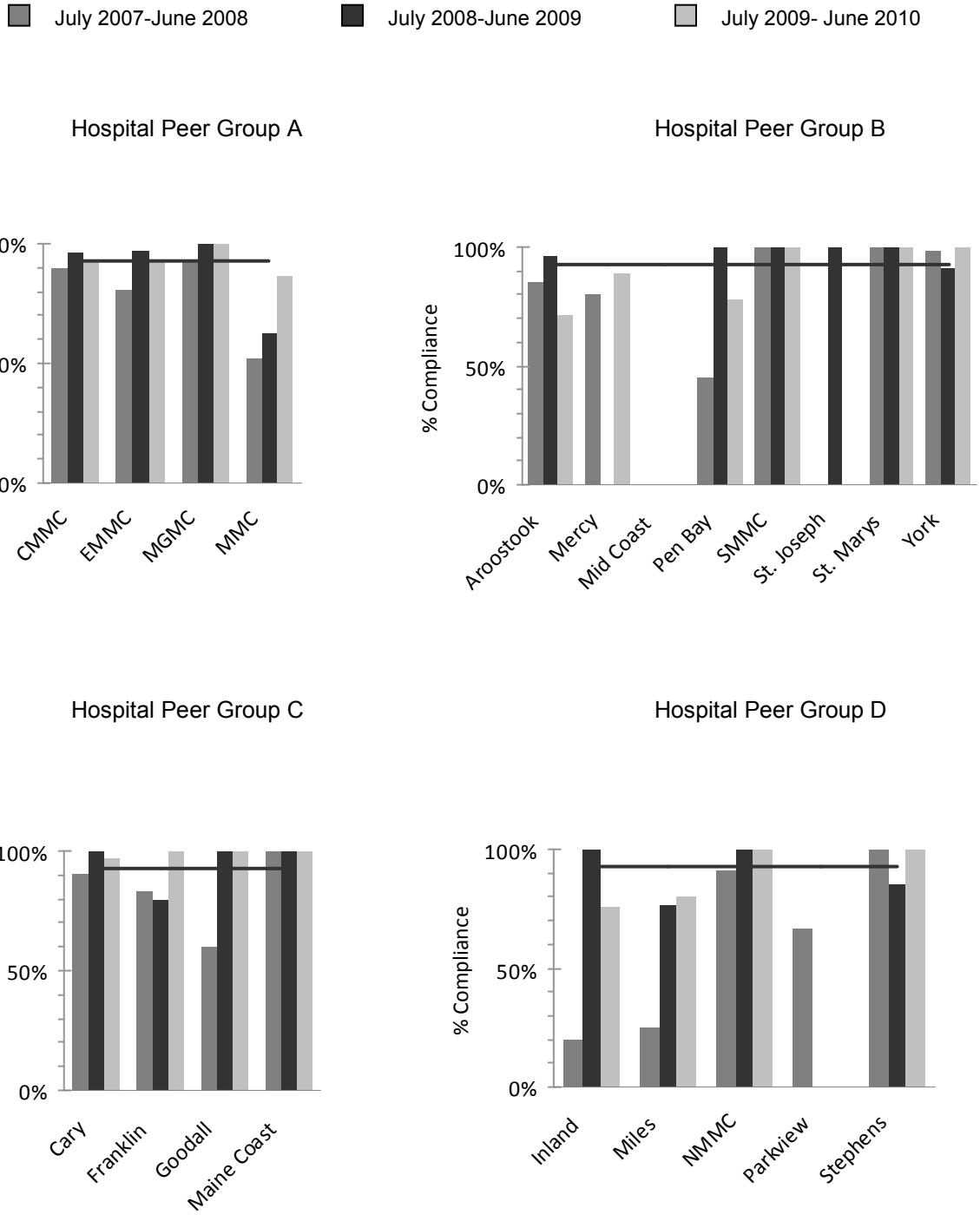


HAI Three: Percent compliance with all five evidence-based interventions for patients with intravascular central catheters (central line bundle compliance) in intensive care units; Trend: Maine hospital averages for 2007-2010

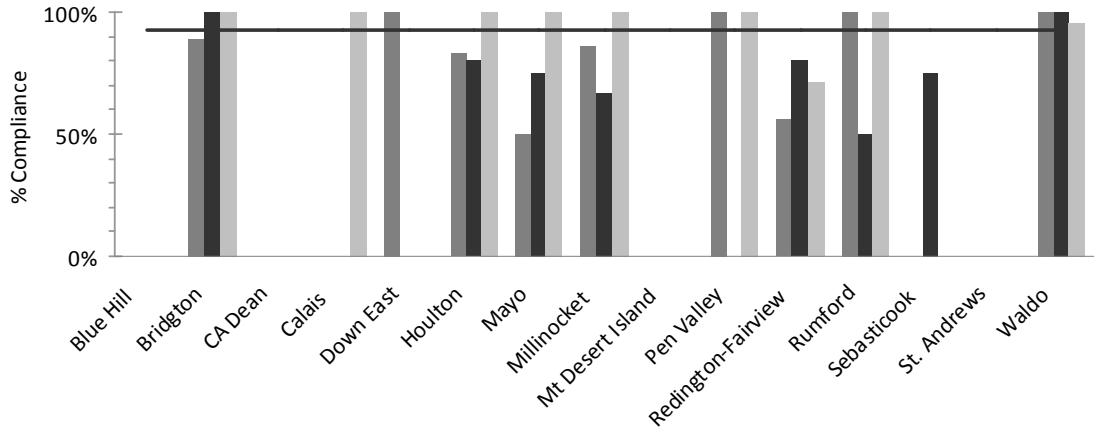


HAI Four – Documented Compliance with Infection Prevention Measures for Patients with Central Line Catheter Insertions Before, During or After Surgery, by Maine Hospital, 2007 – 2010

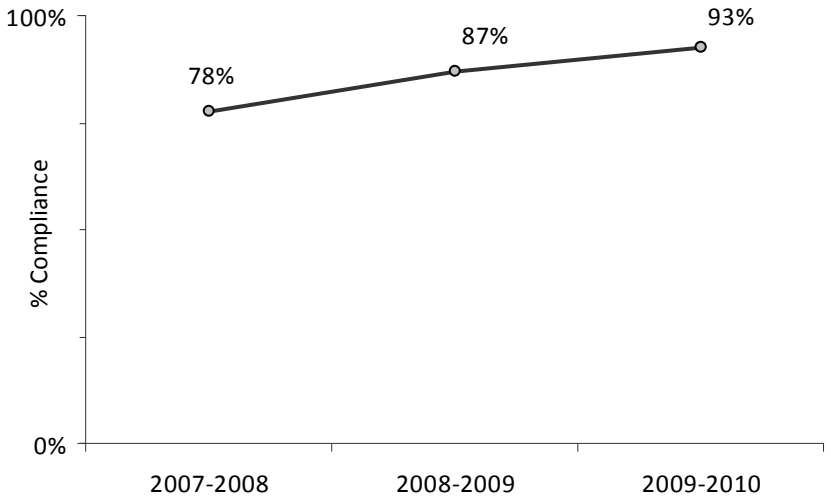
[Maine Average, 2009- 2010 = 93%]



Hospital Peer Group E



HAI-4: Percent compliance with the four insertion related evidence-based interventions for patients with intravascular central catheters (central line bundle compliance) placed preoperatively, in pre-operative areas, operating rooms, and recovery areas
Trend: Maine hospital averages for 2007-2010



At times, it is necessary for a doctor to take steps to open a patient's airway, to allow air to flow freely to the lungs. An endotracheal tube can be used for this purpose; inserted into the trachea, it acts as a passage through a patient's upper airway – this is sometimes called "intubation." During surgery, intubation is used to ensure that a patient is able to breathe properly while under anesthesia. In the case of some critically ill patients, the tube is connected to a mechanical ventilator that ensures respiration in patients who cannot breathe on their own. Sometimes, though, patients who are intubated get pneumonia; when the pneumonia occurs after the patient has been on mechanical ventilation it is referred to as "VAP" or ventilator associated pneumonia. VAP occurs about 20% of the time in patients on mechanical ventilation and can lead to increased severity of illness and, often, an increased risk of death, as well as longer and more expensive hospital stays.[12]

The risk for VAP can be related to a patient's pre-existing condition – they may have a suppressed immune system or chronic obstructive lung disease or other acute respiratory distress syndrome. Any of these conditions can make a patient vulnerable to pneumonia. If a patient is heavily sedated while on a ventilator they may be at increased risk of pneumonia, which can also be influenced by the position the patient is lying in (whether they are flat on their back or with head raised).

There are device-related risk factors for VAP, particularly with regard to how a specific device might influence secretions or lead to aspiration of bacteria into a patient's lungs. Poor hand hygiene in care workers is the most significant personnel-related factor in the risk of VAP.

Research has found that there are practices that can reduce the risk of VAP; as in the case of CLABSI, there are practices that have been shown to be effective in realizing the best outcomes for patients. When these practices are bundled and used together, they produce even better outcomes than if any one of them were used alone. The VAP bundle includes elevating the head of the patient's bed, deep vein thrombosis prevention, peptic ulcer disease prevention strategies, daily sedation "vacations" (moderating the level of sedation) and daily assessment of a patient's readiness for removal of mechanical ventilation.

The charts below show, by peer group for each Maine hospital, the degree of adherence to the use of VAP preventive protocols. If the chart has no bars for a particular hospital it means that there were either no data or insufficient data to report on the indicator. Taller bars indicate better performance. The horizontal black line on each graph shows the Maine hospital statewide average for this measure for the period July 2009 through June 2010.

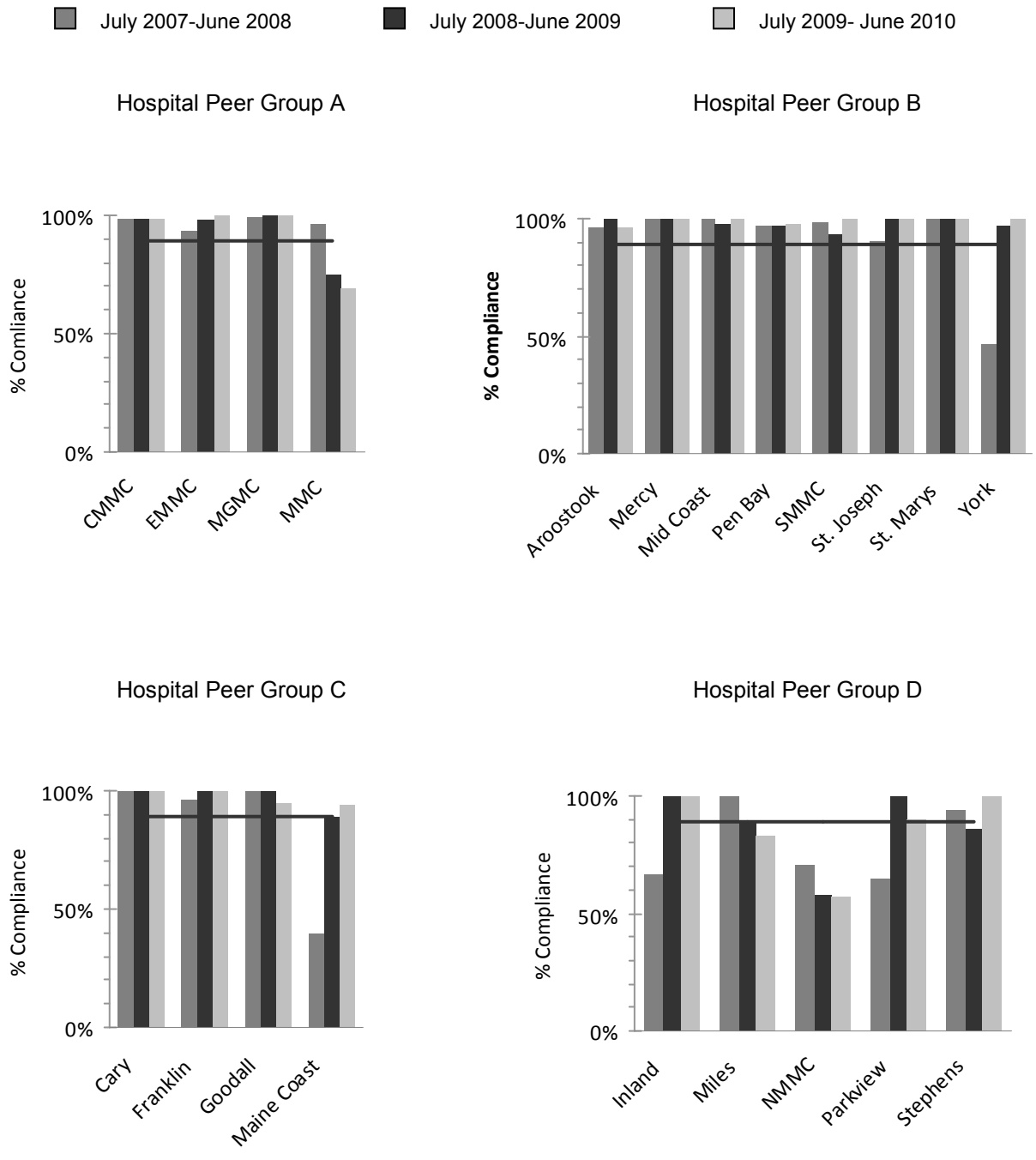
The trend data shows a decline in compliance with recommended VAP prevention measures over the three reporting periods, falling from 96% statewide in 2007-08 to 89% in 2009-10. This may be a function of the fact that there are relatively few patients on ventilators in ICUs over the course of a year; even relatively small changes in

[12] Koenig SM and Truwit JD. Ventilator-associated Pneumonia: Diagnosis, Treatment and Prevention. Clin Microbiol Rev. 2006 October; 19(4): 637–657. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592694/

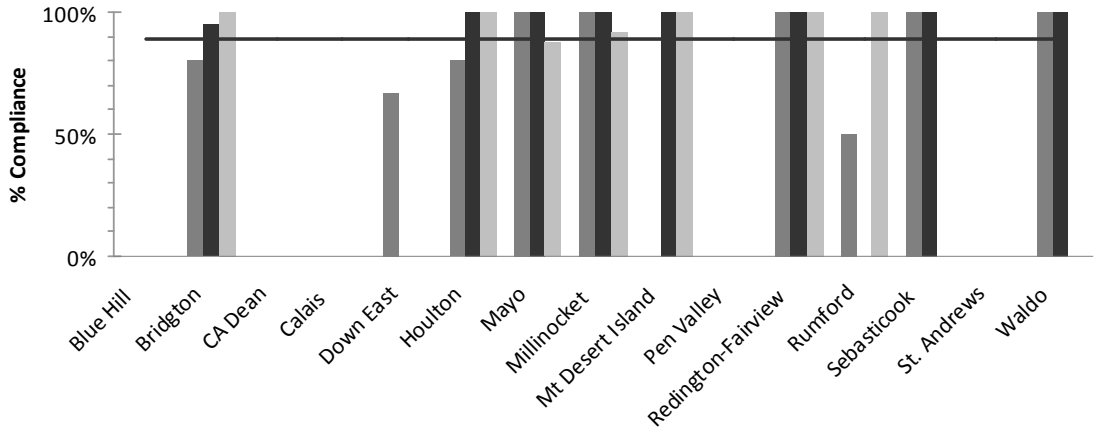
observations when the total number of observations is small, can result in very large swings in rates.

HAI Five – Documented Compliance with Pneumonia Prevention Measures Among ICU Patients on Ventilators, by Maine Hospital, 2007 – 2010

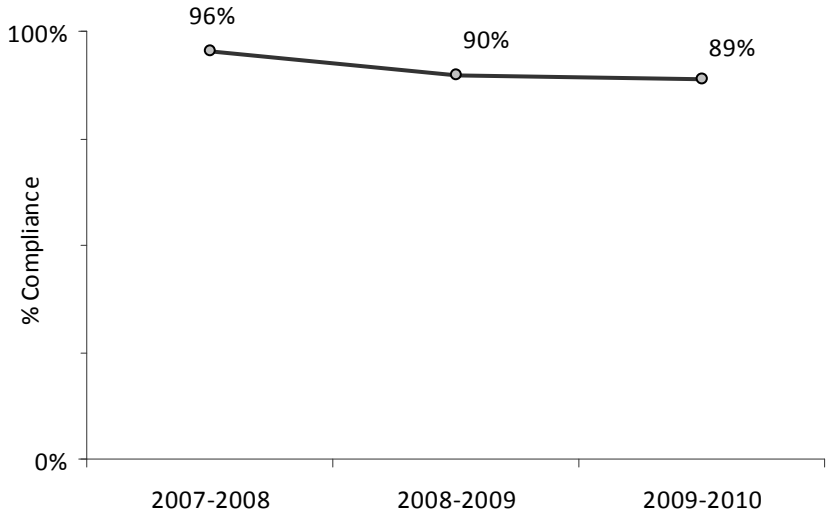
[Maine Average, 2009- 2010 = 89%]



Hospital Peer Group E



HAI-5: Documented pneumonia prevention measures among ICU patients on ventilators, 2007-2010
Trend: Maine hospital averages for 2007-2010



The MRSA Study

Methicillin **R**esistant **S**taphylococcus **a**ureus – or MRSA, as it is commonly called – is a type of bacteria that can cause infection in human beings. "Regular" strains of staphylococcus aureus bacteria are often resistant to the effect of penicillin and other related drugs, but the antibiotic methicillin is usually able to address a staph infection.

However, over time, some strains of staph have developed that also resist the effect of methicillin and similar drugs; these bacteria are referred to as MRSA. Because this type of bacterial infection is able to resist so many antibiotics, it is difficult to treat.

MRSA can be found both in the general community and in health care. A person can carry MRSA without having an infection; this is called being "colonized" by the bacteria. MRSA infections are often seen in the form of relatively mild skin infections that cause sores or boils. It can cause more serious skin infections; it can infect wounds and surgical incisions and can infect the bloodstream, the urinary tract and even the lungs.

Much of the time, MRSA infections are not life threatening, but when a person is already weakened by illness or surgery – such as people in hospitals or nursing facilities – they can be very serious, causing more complicated illness, an increased risk of mortality, longer hospital stays and higher health care spending. As this bacterium becomes more and more difficult to treat, concern among health care workers, public health officials and lawmakers about the rising prevalence of MRSA and the increasing rate of MRSA infection is growing.

In early 2009, the Maine Legislature became very concerned about the potential spread of MRSA in our state. In an effort to better understand the magnitude of the problem in Maine, the Legislature directed the Maine Quality Forum to coordinate a study of the prevalence of MRSA[13] among persons considered to be at high risk for MRSA.[14] The Legislature also enacted language requiring hospitals to submit quarterly reports of the following data to the Maine Health Data Organization:

- Percent of patients at high risk for MRSA colonization who were tested using the hospital's targeted MRSA colonization surveillance program and who tested positive for the bacteria;
- Percent of patients at high risk for MRSA colonization who were screened and cultured, but who tested negative for the bacteria; and
- Percent of patients at high risk for MRSA colonization who were not tested as part of the hospital's targeted surveillance program (these data will begin to be reported in March 2011).

In the spring of 2009, the Maine Quality Forum convened a work group to assist the MQF in the task of developing a working definition of which patients coming into the inpatient hospital setting should be considered "high risk" for MRSA colonization. This population would conceivably pose the greatest risk of carrying MRSA into the hospital

[13] "Prevalence" is a measure of how common a disease or condition is within a community at a given point in time. In this study, people being admitted to the hospital were screened and cultured for MRSA colonization at the time they entered the hospital. In contrast, "incidence" is the rate at which new cases of a disease or condition – like MRSA infection – occurs.
[14] 2009 Resolve, Chapter 82, First Regular Session, Maine State Legislature.

setting from the community, placing patients and health care workers at heightened risk for MRSA infection.

As a result of that process and after consultation with the federal CDC and other experts, the MQF adopted a working definition of "high risk" that includes five groups.[15] These include:

- Patients who have had a recent hospitalization;
- Patients having a recent nursing facility stay;
- Patients undergoing hemodialysis;
- People admitted to a health care facility from a prison or jail;
- Patients admitted to hospital intensive care units.

In order to test the validity of this definition of high risk, hospitals were required to screen and culture patients in any one of these for MRSA to see if they were colonized – or were carrying – the bacteria over a six-month time period. The protocol for the surveillance or screening process was developed by the Multi-Drug Resistant Organism – MDRO – working group of the Maine Quality Forum. This initial screening study was conducted at all Maine hospitals between January and June of 2010.

The study was intended to define a hospital-specific high risk population that must be screened and cultured for MRSA colonization. This means that the types of patients that must be tested will vary from one hospital to the next. The study results define which of the five groups of patients which specific hospitals have to screen and culture on an on-going basis.

The data collected by the hospitals during the study was submitted to the Maine Health Data Organization; the MHDO's staff epidemiologist analyzed the data to calculate the colonization rate for each of the five high risk population groups at each hospital to find how many people in each of the groups were found to be positive for MRSA. If any one of the five population groups had at least 50% of its members tested[16] and if 7% or more of the group's members tested positive for MRSA at the time of admission, the group was confirmed as meeting the definition of high risk. On the other hand, if less than 7% of a group's members tested positive for MRSA, it would be considered to have <u>not</u> met the definition of high risk. At the end of the study, the data collected would be used to refine the working definition of high risk for MRSA. This is important because, at a minimum, hospitals have to screen and culture people falling into a high risk category.

It is important to point out a weakness in the study methodology. Hospitals were given a choice between re-testing patients who had previously been clinically documented as being positive for MRSA colonization or not retesting them. Hospitals choosing not to retest based that decision on the assumption that patients who were positive for MRSA previously would remain positive.

In contrast, some hospitals did retest previously positive patients. The literature shows that it is not uncommon for people to test positive for MRSA colonization at one point in

[15] The definition of "high risk" that was adopted for use in the validation study was not a consensus definition. Instead, it represents the input of the work group, as well as guidance from experts in the field. There were members of the work group who advocated for a much broader definition of the high risk population.
[16] Note that patients had the right to refuse to be tested for MRSA.

time and later test negative for the bacteria. The culturing test is not perfect – the test can sometimes result in “false positive” or “false negative” results – but it is possible for a person who had previously been known to carry the bacteria to later become decolonized.
Some hospitals that retested previously positive patients categorized patients who subsequently retested negative, as negative patients. Retesting previously positive patients did not affect the level of precautions taken by the hospital when the patient was admitted; it is only a variation in how different hospitals implemented the pilot study.

This approach highlights an inconsistency in how hospitals implemented the study, making it hard to compare the testing data across hospitals. As many as 35% of previously positive patients who were retested for MRSA colonization were found to be negative for the bacteria at the time of retesting. The way in which these patients were accounted for in the study tended to undercount the number of high risk patients and may have contributed to some of the five groupings not meeting the 7% threshold for validating the definition of “high risk.”

When analyzing the data, steps were taken to try to adjust for the inconsistencies in approaches to screening. There were two possible ways to calculate rates: to count all previously positive patients as positive regardless of their most recent test results, or to count them as positive or negative as indicated by their most recent test result. Since only a few hospitals rescreened patients who had previously tested positive for MRSA colonization, using the second calculation method would result in inconsistent measurements across all hospitals.

So rates were calculated both ways. Rates that were calculated using the most recent test results were used to define which of the five population groupings met the 7% threshold at each hospital; patients in these groups will continue to be screened and cultured for MRSA colonization. Some argue that this approach undercounts the number of high risk patients and may have contributed to some of the five population groupings to fail meeting the 7% threshold for validating the definition of “high risk.”

However, rates were also calculated assuming a patient who once tested positive, remains positive. These are the rates that are being publicly reported because it is the only method where each hospital can be compared using the same yardstick. While not a perfect approach, this is a practical solution. Still, people interested in comparing the study results at one hospital to another and wishing to draw hard and fast conclusions from the data, need to do so with caution.

In future, hospitals choosing to retest previously positive patients may continue to do so, and retested patients showing a negative screen for MRSA will be included in the data analysis. If all hospitals understand that retesting is allowed, it will likely become an approach that will be adopted across the board.

Study Findings

The analysis of the data collected during the six-month pilot identified, for each of Maine’s acute care and critical access hospitals, which types of patients are to be considered at high risk for either community acquired or health care acquired MRSA. For some hospitals, all five groups of patients met the 7% screen-positive threshold

described above; in such cases, the hospital would continue to screen, culture and submit data for patients in each of those five groups. Other hospitals' experience shows that only a subset of the five groups is high risk at those particular facilities and, in the case of two hospitals, none of the five groups met the 7% threshold.

Hospitals are only required to screen and report findings for their own particular high risk populations. Only one hospital reported positive screens for MRSA that were at least 7% in each of the five groups; that hospital (Maine Medical Center) will continue to screen and culture all patients falling into any of the five groups. Two hospitals will continue to screen patients in four of the five groups; most will continue to screen patients in three of the five groups.

The table below shows which of the five groups is defined as high risk for each hospital. Shaded areas indicate high risk. A box marked with a dash indicates where there were insufficient data to come to a conclusion regarding whether the group qualified as high risk for that hospital; the numbers of patients falling into those groups at those hospitals were simply too small to allow any conclusions to be drawn. In those situations, the hospitals will not be required to continue to screen patients falling into those groups.

For those wishing to see hospital-specific data for the outcomes of screening patients in each of the five potential high risk groups included in the pilot study, please see Appendix 4.

Methicillin-Resistant Staphylococcus Aureus **Prevalence Study Results (Hospital-Specific High-Risk Patient Groups for on-Going Culturing Upon Admission)**

	Patient Categories				
Hospital Name	**Admitted to ICU**	**Hemodialysis**	**With prior hospitalization (overnight) in past 6 months (including transfers)**	**With an overnight stay in a SNF or NF in past 6 months**	**Transferred from prison or jail**
Blue Hill Memorial Hospital					
Bridgton Hospital					-
CA Dean Memorial Hospital					
Calais Regional Hospital				-	
Cary Medical Center					
Central Maine Medical Center					-
Down East Community Hospital					
Eastern Maine Medical Center					
Franklin Memorial Hospital		-			-
Goodall Hospital					-
Houlton Regional Hospital		-			

Inland Hospital					
Maine Coast Memorial Hospital					
Maine Medical Center					
MaineGeneral Medical Center					-
Mayo Regional Hospital					
Mercy Hospital		-			-
Mid Coast Hospital					
Miles Memorial Hospital					-
Millinocket Regional Hospital	-			-	
Mount Desert Island Hospital					
New England Rehab Hospital					
Northern Maine Medical Center					
Parkview Medical Center					
Penobscot Bay Medical Center					
Penobscot Valley Hospital	-				
Red-Fairview General Hospital					-
Rumford Hospital					
Sebasticook Valley Hospital	-				
Southern Maine Medical Center					
St Andrews Hospital					
St Joseph Hospital					
St Mary's Regional Medical Ctr					-
Stephens Memorial Hospital					-
The Aroostook Medical Center		-			
Waldo County General		-			
York Hospital		-			

SNF/NF = skilled nursing facility/nursing facility

[x]Category tested ≥ 7% positive carriage rates upon admission during prevalence study (Jan. 4, 2010 - June 30, 2010); hospital will continue culturing and reporting MRSA carriage rates

Next Steps – MRSA

Maine hospitals continue to screen and culture high risk patients for MRSA colonization and are submitting the data to the Maine Health Data Organization, building a MRSA prevalence database for future use. Importantly, hospitals are also reporting any incidents of hospital acquired MRSA infection to the National Health Safety Network (NHSN), which becomes part of an incidence database that may be used to examine the frequency of hospital acquired MRSA infection.

Recall that there is a difference between the prevalence of MRSA carriage and the incidence of MRSA infection. A person can be colonized with MRSA, carrying the bacteria and able to transmit the bacteria to another person, without actually having an

infection. It can be important to screen and identify people colonized with MRSA as they come into a hospital or other health care facility, so steps may be taken to reduce the risk of the bacteria causing that patient to develop an infection or the risk of the bacteria being transmitted to another patient who might develop an infection as a result.

Studies of the prevalence of MRSA such as this pilot project, provide an indication of how widely present the MRSA organism is in a particular population in a given geographic area at any point in time. The information drawn from such a study can be helpful in determining what strategies might be taken to minimize the risk of infection from MRSA among particularly vulnerable people, such as very sick patients in the hospital. The MQF pilot study identified for each hospital in the state, which populations likely pose a risk for spreading MRSA to others.

The incidence of hospital acquired MRSA infections – which is what is being reported to NHSN – is a quality indicator that can help show how well infection control efforts are working at a health care facility. [17]The prevalence study does not provide that type of information. The Maine Quality Forum now plans to consult with its MDRO Work Group and develop next steps with regard to the MRSA surveillance initiative. The group will consider the option of on-going surveillance with or without a period of revalidation. The group may also consider the advisability of securing access to the NHSN data reported on the incidence of MRSA infection, which would allow an assessment of the success of measures undertaken by hospitals to control the spread of MRSA infection.[18]

Conclusion

The surgical and HAI quality indicators tracked by the MQF indicate Maine hospitals are, on average, doing a good job addressing the risks associated with health care associated infections. While the national benchmark presents room for improvement, performance on most indicators is trending in the right direction.

MRSA prevalence has been documented for important high risk populations on a hospital by hospital basis. The prevalence study serves as an indicator for each facility of the population that is most likely to pose risk for the transmission of MRSA to other patients and to health care workers within the hospital. It is incumbent upon each hospital to take the steps it deems necessary and appropriate to minimize that risk. Each Maine hospital is now submitting data regarding the incidence of MRSA infection to the National Health Services which may be used over time to assess the impact of MRSA infection control measures.

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[17] The incidence data, though, will not differentiate between MRSA infections that develop in individuals known to have previously been colonized with MRSA, from those whose MRSA is the result of new acquisition leading to infection. Many infections are caused by germs already carried by the individual, although there are steps that can be taken to reduce the risk of infection in patients known to be colonized with the bacteria.

[18] Hospitals have to explicitly authorize release of NHSN data to third parties.

APPENDIX 1 – COMMON TERMS USED IN DISCUSSIONS ABOUT HEALTH CARE ASSOCIATED INFECTIONS

CAUTI	Catheter-associated urinary tract infection
CDC	Centers for Disease Control & Prevention (federal)
CLABSI	Central line-associated bloodstream infection
Colonized	A person carrying a disease but without symptomatic infection is said to be colonized with the disease, and may pass the disease on to others without being sick themselves
HAI	Health care associated infection
MCDC	Maine Center for Disease Control & Prevention (state)
MDRO	Multidrug resistant organism
MIPC	Maine Infection Prevention Collaborative
MQF	Maine Quality Forum, Dirigo Health Agency
MRSA	Methicillin-resistant *Staphlycoccus aureus*
NHSN	National Healthcare Safety Network
Nosocomial infection	An infection acquired while being treated in a hospital, but unrelated to the patient's primary condition
SCIP	Surgical Care Improvement Project
SSI	Surgical site infection
VAP	Ventilator associated pneumonia

APPENDIX 2 - Overview of the Maine State Healthcare Associated Prevention Plan

The Healthcare Associated Infection Prevention Plan was funded in 2010 by the American Recovery and Rehabilitation Act (ARRA). The prevention of health care associated infections is a new initiative for the Maine Center for Disease Control and Prevention. The Maine CDC works closely with an advisory group, the Maine Infection Prevention Collaborative (MIPC) and their Coordinating Committee. Currently, the MIPC represents all hospitals in Maine. The focus of the plan is ultimately to reduce health care acquired infections in Maine. In order to measure the progress made, it is necessary that all hospitals report health care associated infections using uniform definitions through the National Health care Safety Network (NHSN). In particular, the plan hopes to reduce:

1. central lines infections,
2. Methicillin Resistant Staphylococcus aureus infections, and
3. surgical site infections.

The plan consists of four sections: infrastructure, surveillance, HAI prevention, and communication as well as evaluation. Below are some of the accomplishments to date:

- The infrastructure has been built, consisting of the advisory group, a full-time HAI Prevention Coordinator, and a full-time epidemiologist/data analyst.
- Maine CDC has participated in monthly meetings with both the MIPC and the Coordinating Committee.
- The HAI coordinator is working with the Maine Health Data Organization and the Maine Quality Forum to streamline reporting by hospitals.
- A gap analysis of central line prevention bundle compliance has been done.
- Hand hygiene data has been collected and a pilot validation study has been done.
- A MRSA prevention gap analysis has been done.
- Every Maine hospital will be enrolled in NHSN and reporting HAI-MRSA hospital-wide by January of 2011.
- Maine CDC has offered increased training on hospital outbreak investigations.
- Maine CDC is working with the state lab (HETL)to increased lab capacity to identify organisms likely to cause health care outbreaks.

The HAI plan includes these objectives for 2011:

- Build relationships with hospitals so Maine CDC can provide needed assistance in the event of an outbreak. Continue to expand lab capacity for genotyping Clostridium difficile and MRSA for outbreak investigations.
- Facilitate peer-to-peer learning of best practices among hospital infection preventionists.
- Support and encourage the use of electronic communication of data to NHSN.
- Develop metrics to measure baseline in order to measure progress in the reduction of HAIs. Develop a means of validating HAI data to ensure the quality of the data.
- Develop statewide and regional surveillance of health care associated infections.

- Promulgate a rule change of notifiable diseases that allows Maine CDC to collect and analyze surveillance data for C. difficile, MRSA, Central line infections, and carbapenem resistant gram negative rods.

Viewing health care associated infections as a public health issue represents a paradigm shift. In the past, hospitals have not publicly reported infection rates. Maine CDC, as administrator of the HAI Plan, is now responsible for surveillance of health care acquired infections statewide. The focus for Maine CDC is primarily on outcomes, i.e. health care associated infections. However, to accomplish surveillance and determine improvements requires data. This data must be validated and collected in a uniform manner using standard definitions, such as those used by CDC's National Healthcare Safety Network (NHSN). Hence, much of the work of Maine CDC is to build a surveillance system whereby hospital data is collected, analyzed, and validated. That way, unusual microbial activity can be detected in a timely fashion and controlled more effectively. Maine CDC realizes that current mandates have increased the burden on hospitals, and the state agencies are working together to streamline the reporting process.

APPENDIX 3 - Maine Infection Prevention Collaborative, Annual Report 2010

EXECUTIVE SUMMARY

The Maine Infection Prevention Collaborative (MIPC) was established in 2008 and consists of hospital Infection Preventionists and their key partners. The mission of the MIPC is to improve the health of the people of Maine by preventing and controlling healthcare-associated infections and the burden of drug resistant organisms.
Major Accomplishments of the group in 2010 included:

- Collaborated with the Maine Center for Disease Control and Prevention (CDC) to implement the *State Plan for the Surveillance and Prevention of Healthcare-Associated Infections* and access the federal funding for the surveillance and prevention of healthcare-associated infections (HAI) as provided for in the American Recovery and Reinvestment Act;
- Served as the state's Healthcare-Associated Infection Prevention Advisory Council for implementation of the state plan;
- Implemented the legislatively mandated prevalence study of active surveillance testing for MRSA colonization upon admission for five potential high risk groups;
- Surveyed each hospital's infection prevention plans/policies for preventing health care-associated MRSA infections;
- Collated and encouraged adoption of evidenced-based infection prevention protocols for preventing MRSA infections;
- Continued expansion of the number of Maine hospitals participating in the federal Centers for Disease Control and Prevention's national Healthcare Safety Network NHSN), a standardized national database for reporting and benchmarking prevention and incidence of HAI data;
- Obtained commitments from all Maine hospitals to enroll and enter NHSN MDRO Module Metric 1 (MRSA HAIs) in at least one inpatient unit by July 1, 2010;
- Obtained agreement from all Maine hospitals to expand NHSN MDRO Module Metric 1 (MRSA HAIs) to house-wide surveillance by January 1, 2011;
- Assisted each hospital to evaluate their own infection prevention plans/policies for optimal hand hygiene practices;
- Continued work toward developing valid accurate comparable hand hygiene data as well as evaluation of that data;
- Collated and encouraged adoption of "best practice" tools for improving and monitoring hand hygiene;
- Assisted each hospital to evaluate their own infection prevention plans/policies for preventing central line-associated infections;
- Surveyed current practice in all hospitals in Maine regarding evidenced-based infection prevention protocols for preventing central line associated blood stream infections;
- Convened the first annual MIPC Summit Meeting, including presentations from partners from New Hampshire and Vermont; and
- Received a prestigious award from the Maine CDC, in recognition of the MIPC's effective work to reduce infectious diseases in Maine.

The MIPC's major goals for 2011 include:

- Develop standardized metrics of both process and outcome data to measure progress in the reduction of healthcare associated infections specifically as outlined in the state HAI plan.
- Continue to serve as the state's multidisciplinary advisory group to guide and support the prevention and surveillance activities outlined in the state HAI plan;
- Continue to provide leadership and commitment to the goals outlined in the state plan for the surveillance and prevention of healthcare-associated infections;
- Advocate for the utilization of NHSN as the vehicle for any public reporting efforts around HAI;
- Continue collaboration with HAI stakeholders in Vermont and New Hampshire;
- Develop a process for evaluation of evidence-based standards to determine the applicability/appropriateness of measures for public reporting; and
- Develop recommendations around the public reporting of HAI metrics, and effectively communicate those recommendations, to assure that the MIPC is proactively involved in the state's HAI public reporting programs.
- Support the development of a statewide "dashboard" of currently available Infection Prevention Data
- Begin to assess statewide Catheter Associated Urinary Tract Infection Prevention Initiatives

FULL REPORT

In 2008, Maine's hospitals formed the MIPC in partnership with the Maine Quality Forum, the Maine Hospital Association, and the Maine Centers for Disease Control and the Northeast Health Care Quality Foundation. The function of this group is to review, develop and share experience and expertise in the prevention of healthcare associated infections and to continuously improve the health and safety of patients and providers by seeking to uniformly employ the best evidence based practices of infection prevention. Current strategies to achieve these goals include:

- Collaborative development and implementation of evidence-based protocols and guidelines
- Standardization of data collection and the analysis and sharing of infection prevention performance indicators

Infection Prevention professionals from all Maine hospitals as well as representatives from other key organizations are invited to participate in the Collaborative. Every hospital CEO has signed a Pledge of Support for the work of the Collaborative. Several subcommittees within the Collaborative are charged with the detailed work on identified initiatives for the Collaborative. Those subcommittees focus on the areas of Hand

Hygiene, Multi-Drug Resistant Organisms, Data Management, Resource, and Central Line Associated Central Line Infections. An annual report was given by each subcommittee at the first annual MIPC Summit. A summary of each committee report is highlighted below:

Hand Hygiene Subcommittee
Goal of subcommittee: To consistently monitor and report hand hygiene compliance rates and to use the data to improve hand hygiene compliance among participating hospitals. In 2009 a gap analysis of hand hygiene performance improvement activities in the state revealed that all Maine Hospitals had established hand hygiene data indicators and performance improvement monitors. However, there was considerable variance in the data collection methodology which did not allow effective comparison of data.
Work of the subcommittee in 2010 focused on moving all hospitals to the same methodology of measurement of hand hygiene observations. This has been a huge endeavor.

- Early spring 2010, a survey tool was used to poll all IPs in Maine to look for variance in HH observation methodology
- Late spring 2010, the subcommittee developed concise instructions for conducting observations and utilizing the monitor tool.
- The MIPC voted to adopt this methodology for consistency
- By July 1 all hospitals were to have trained their hand hygiene observers to this methodology
- Summer 2010 the Minimum Expectations to Promote and Support Hand Hygiene Compliance were developed. This document outlines the current evidence based practices that Maine hospitals should implement to improve their performance

Goals for 2011

- Development of hand Hygiene Resources such as posters, competencies, training scenarios, policies, staff handouts, public education, etc. for all hospitals to utilize
- Develop a methodology for Hand Hygiene Data Verification of Compliance data.
- Support hospitals to implement the Minimum Expectations to Promote and Support Hand Hygiene Compliance

MDRO Subcommittee
Goals of subcommittee:

- Assist IP in implementing Active surveillance testing in their institutions and provide ongoing support
- Standardization of the MRSA HAI inpatient surveillance using NHSN definitions
- Assessment of Maine hospitals: MDRO Prevention Strategies

The MDRO subcommittee was critical to the implementation of the statewide MDRO Metrics Workgroup prevalence study for active surveillance testing of five designated possible high risk groups for MRSA colonization.

- An active surveillance algorithm was developed and distributed to members to facilitate training and implementation of the prevalence study
- A Frequently Asked Question list was developed and maintained to support accurate data collection and reporting

The MDRO subcommittee also took the leadership role to facilitate agreement from all thirty six Maine acute care hospitals to agree to participate in NHSN MDRO Module Metric 1 (MRSA HAIs). This outcome metric specifically targets MRSA healthcare acquired infections. The following goals were proposed by the committee and agreed to by the entire MIPC.

- By July 1, 2010 all acute care hospitals will begin entering MRSA HAI data in NHSN for one inpatient unit
- By January 2011 all acute care hospitals, state wide will begin entering house-wide MRSA HAI data

As of the writing of this document all 36 hospitals have made the commitment to these goals and have completed training in NHSN. There are three hospitals that have not yet completed the process of enrolling in NHSN but have collected the appropriate data and will enter the data retrospectively to comply with the intent of the goals above. The MIPC will continue to support their efforts to ensure compliance.
To support the efforts of the MIPC to enroll in the NHSN, the Northeast Health Care Quality Foundation has been instrumental in providing training and consultation to the membership. Their efforts have been incredibly valuable to our membership and have been a huge part of our success.
The MDRO subcommittee has also presented a challenging case scenario to the MIPC membership to provide an opportunity for discussion regarding rationale and clarity in the use of the NHSN surveillance definitions. More training and opportunities for competency assessment will be offered to the MIPC in 2011.

A gap analysis survey was distributed to the MIPC membership to assess MDRO prevention strategies across Maine hospitals. This survey was completed by 23 hospitals. The MDRO subcommittee will analyze the data collected for this survey and develop evidence based tools and strategies for attainment of MDRO prevention goals.

Goals for FY11

- Continue to support hospitals in their efforts to report NHSN MDRO Module Metric 1 (MRSA HAIs) via education and challenging case scenarios.
- Complete gap analysis of MDRO prevention strategies in Maine
- Develop Evidence based tools and strategies for MIPC membership to utilize

Central Line Associated Bloodstream Infection (CLABSI) Subcommittee
Goals for the subcommittee:

- Identify minimum evidence based best practices for prevention of CLABSI
- Develop strategies to support implementation and sustainment of best practice in all membership organizations
- Sharing successful practices and outcome data in the future

This is the MIPC's newest subcommittee in the collaborative. They have just begun their work regarding CLABSI. The subcommittee has focused on the following efforts:

- Developing a crosswalk of all published evidence based guidelines to identify minimum standards
- Developed a survey tool to perform a gap analysis between current practice in the state of Maine and minimum evidence based guidelines

Goals for FY11

- Compete analysis of gap analysis to identify potential areas for improvement across the state
- Build a tool kit to assist members in developing and implementing best (minimum) practice

Data Management Subcommittee

Goals for the subcommittee:

- Ensure high quality MIPC data
- Ensure MIPC members have a comprehensive understanding of quality data dimensions and metrics
- Ensure all MIPC data is meaningful, validated, and standardized

This subcommittee has focused on the basics in data management for the MIPC for 2010. Their work will continue in depth and breadth in 2011. The areas of focus of the subcommittee for 2010 are as follows:

- Completed a needs assessment regarding data dimensions and metrics for the MIPC membership
- Developed and delivered an educational program for the membership in April 2010
- Developed a process and tool for subcommittees to utilize to submit requests to the Data Subcommittee evaluation of proposed projects and processes for data collection, analysis and validation

- Designed and conducted a pilot validation survey of Hand Hygiene Observation Practices in a sampling of MIPC hospitals.

Goals for 2011

- Continue to assist subcommittees with data collection, analysis and validation issues
- Develop a process for evaluation of evidenced based standards to determine the applicability/appropriateness of measures for public reporting
- Provide recommendations to the MIPC regarding measures so that the MIPC may be proactively involved in the development of publically reported infection prevention measures

Resource Subcommittee
Goals of subcommittee:

- To evaluate resources available to each Maine hospitals to better utilize talents and insure minimum standards within the MIPC.
- Develop a "hard figure" for staffing ratios for IP professionals

This subcommittee actually began as a work group for the MaineHealth consortium and evolved with enrollment into the MIPC into a collaborative wide subcommittee. This was modeled after the Barnes Jewish consortium. Areas of focus for the subcommittee were:

- Administering the Barnes Jewish Consortium Assessment Tool to the MIPC membership
- Analysis of data collected
- Development of a list of essential functions with an Infection Prevention Program with estimated time commitments for each
- Develop an estimate of time requirements for a Infection Prevention Program

A plethora of descriptive data was collected that was challenging to synthesize and analyze. A literature search was conducted seeking a national benchmark for minimum staffing levels for Infection Prevention. No such benchmark was available and continues not to be available. A descriptive analysis was completed and distributed to the MIPC but little conclusions or comparisons were able to be drawn at that time. Based on the current information available locally and nationally, the subcommittee was unable to provide hard and fast recommendations on staffing or resources and felt it would be imprudent to at this point. This remains an unresolved issue at the national level that many IP experts are still struggling with.

The subcommittee has concluded its work at this time and has moved onto other priorities within the MIPC.

In addition to the Maine Infection Prevention Collaborative, the Maine Pine Tree Chapter of the Association for Professionals in Infection Control and Epidemiology (APIC) continues to be very active and supports the efforts of the MIPC. APIC has representation

from all Maine acute care hospitals and behavioral health facilities as well as representation from long term care, home health, and public health professionals. As of December 2010 there were 60 active members many of which are MIPC members. A focus of the chapter is supporting members to obtain certification in Infection Control. The APIC chapter meets quarterly and offers educational opportunities for members and is open to all healthcare professionals. APIC has worked collaboratively with the MIPC to provide a venue for identified educational needs for the MIPC membership as well as some hardware support for the monthly meetings.

The MIPC is a dynamic and knowledgeable group of impassioned Infection Preventionists. Their work is essential to the health of the population of the state of Maine. They do not function alone in this endeavor and must rely on the dedicated work of many stakeholders and healthcare professionals across the continuum of our healthcare system. Though these combined efforts, the health of the people of Maine is improving by preventing and controlling healthcare-associated infections and the burden of drug resistant organisms in our hospitals and communities. The MIPC looks forward to continued collaboration with their key stakeholders and welcome making new connections to stakeholders who have yet to be identified in our continued efforts to accomplish our mission.

Respectively submitted by

The Maine Infection Prevention Collaborative

APPENDIX 4 – Prevalence Rates of MRSA Colonization Among High Risk Population Subgroups, by Hospital

Methicillin-Resistant Staphylococcus Aureus Carriage Rates[1] As Determined by Active Surveillance Culturing Upon Admission (1/4/10 - 6/30/10)					
	Patient Categories				
Hospital Name	Admitted to ICU / CICU	Hemodialysis	With prior hospitalization (overnight) in past 6 months (including transfers)	With overnight stay in a SNF or NF in past 6 months	Transferred from prison or jail
Blue Hill Memorial Hospital	0/0 (n/d)	0/0 (n/d)	27/130 (20.8%)	6/19 (31.6%)	0/0 (n/d)
Bridgton Hospital	7/79 (9%)	0/1 (0%)	38/225 (16.9%)	10/44 (22.7%)	2/4 (*)
CA Dean Memorial Hospital	0/0 (n/d)	0/0 (n/d)	2/51 (*)	0/7 (0%)	0/0 (n/d)
Calais Regional Hospital	0/18 (0%)	0/18 (0%)	9/96 (9.4%)	1/21 (*)	0/0 (n/d)
Cary Medical Center	5/63 (7.9%)	0/0 (n/d)	25/176 (14.2%)	6/23 (26.1%)	0/2 (0%)
Central Maine Medical Center	100/839 (11.9%)	44/109 (40.4%)	366/1750 (20.9%)	155/501 (30.9%)	2/19 (*)
Down East Community Hospital	0/0 (n/d)	0/0 (n/d)	13/178 (7.3%)	14/64 (21.9%)	0/6 (0%)
Eastern Maine Medical Center	116/1692 (6.9%)	28/141 (19.9%)	278/3044 (9.1%†)	68/397 (17.1%)	4/13 (30.8%†)
Franklin Memorial Hospital	20/123 (11.6%)	3/7 (42.9%*†)	70/520 (13.5%)	29/148 (19.6%)	1/9 (*)
Goodall Hospital	40/290 (13.8%)	0/0 (n/d)	51/319 (16%)	22/79 (27.8%)	1/2 (*)
Houlton Regional Hospital	0/1 (0%)	1/3 (*)	43/171 (25.1%)	22/54 (40.7%)	0/0 (n/d)
Inland Hospital	8/92 (8.7%)	0/0 (n/d)	19/174 (10.9%)	11/58 (19%)	0/0 (n/d)
Maine Coast Memorial Hospital	25/345 (7.2%†)	0/7 (n/d)	81/551 (14.7%)	28/106 (26.4%)	0/0 (n/d)
Maine Medical Center[2]	81/1021 (7.9%)	25/158 (15.8%)	457/4195 (10.9%)	140/721 (19.4%)	5/32 (15.6%)
MaineGeneral Medical Center	62/610 (10.2%)	9/47 (19.1%)	229/1751 (13.1%)	70/372 (18.8%)	2/15 (*)
Mayo Regional Hospital	8/111 (7.2%)	0/2 (0%)	15/149 (10.1%)	8/46 (17.4%)	0/1 (0%)
Mercy Hospital	27/228 (11.8%)	2/5 (*)	60/512 (11.7%)	29/163 (17.8%)	1/10 (*)
Mid Coast Hospital	35/441 (7.9%)	0/0 (n/d)	47/402 (11.7%)	14/206 (6.8%)	0/0 (n/d)
Miles Memorial Hospital	27/307 (8.8%)	0/2 (0%)	11/48 (16.3%)	11/48 (22.9%)	1/4 (*)

Millinocket Regional Hospital	2/80 (*)	0/0 (n/d)	9/194 (4.6%)	2/9 (*)	0/0 (n/d)
Mount Desert Island Hospital	9/76 (11.8%)	0/0 (n/d)	18/88 (20.5%)	9/32 (28.1%)	0/0 (n/d)
New England Rehab Hospital	6/52 (11.5%)	6/19 (31.6%)	125/877 (14.3%)	0/6 (0%)	0/1 (0%)
Northern Maine Medical Center	16/141 (11.3%)	0/0 (0%)	67/268 (25%)	25/78 (32.1%)	0/2 (0%)
Parkview Medical Center	10/224 (4.5%)	0/0 (n/d)	21/198 (10.6%†)	5/39 (12.8%)	0/0 (n/d)
Penobscot Bay Medical Center	20/382 (5.2%)	0/7 (0%)	43/730 (5.9%)	26/219 (11.9%)	0/29 (0%)
Penobscot Valley Hospital	1/26 (*)	0/0 (n/d)	12/196 (6.1%)	7/59 (11.9%)	0/0 (n/d)
Red-Fairview General Hospital	10/117 (8.5%)	0/1 (0%)	48/249 (19.3%)	35/134 (16.1%)	1/6 (*)
Rumford Hospital	9/74 (12.2%†)	0/3 (0%)	54/279 (19.4%)	15/61 (24.6%)	0/0 (n/d)
Sebasticook Valley Hospital	2/37 (*)	0/0 (n/d)	8/144 (5.6%)	13/50 (26%)	0/0 (n/d)
Southern Maine Medical Center	22/151 (14.6%)	5/17 (29.4%)	135/725 (18.6%)	84/295 (28.5%)	0/3 (0%)
St Andrews Hospital	0/0 (n/d)	0/0 (n/d)	24/130 (18.5%)	5/16 (31.3%)	0/0 (n/d)
St Joseph Hospital	18/142 (12.7%†)	0/0 (n/d)	84/682 (12.3%†)	30/150 (20%)	0/6 (0%)
St Mary's Regional Medical Ctr	17/230 (7.4%†)	6/21 (28.6%)	94/1031 (9.1%)	47/299 (15.7%)	1/16 (*)
Stephens Memorial Hospital	15/81 (18.5%)	0/6 (0%)	64/296 (21.6%)	50/150 (33.3%)	1/4 (*)
The Aroostook Medical Center	43/280 (15.4%)	1/7 (*)	75/463 (16.2%)	18/50 (36%)	0/0 (0%)
Waldo County General	14/122 (11.5%)	1/9 (*)	32/209 (15.3%)	18/84 (21.4%)	0/2 (0%)
York Hospital	28/130 (21.5%)	1/11 (*)	93/566 (16.4%)	32/160 (20%)	0/0 (n/d)

[1]If greater than 7%, hospital continues culturing and reporting

[2]Due to changes in data collection methods results have not captured all admissions but do not impact the outcome

*Insufficient data

"n/d" = no data / no patients

†Although exceeding 7%, this hospital has rescreened previously positive patients and found that, in fact, many were negative and determined it is unnecessary to continue screening this patient category.