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

Submitted by:

Karynlee Harrington
Executive Director
Dirigo Health Agency
211 Water Street
53 State House Station
Augusta, ME 04333-0053
207-287-9900
Karynlee.Harrington@Maine.gov

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

Purpose of this Report

This is the fourth Annual report on Healthcare Associated Infections (HAI) prepared by the Dirigo Health Agency's Maine Quality Forum. This report summarizes measurable and qualitative indicators of statewide efforts with health care infection control professionals to control and prevent HAI.[1]

A limited set of data related to the prevention and occurrence of HAI is reported by Maine hospitals to the Maine Health Data Organization (MHDO). This report presents hospital performance data related to HAI, abstracted from the MHDO's database.

Healthcare Associated Infections

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.

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.

[1] 24-A MRSA §6951.

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 Indicators of Health Care Quality

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. Outcome measures calculate actual rates of infection. Maine hospitals report these measurement data to the MHDO, 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 health care facilities.

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 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 on HAI; and
- the third addresses Methicillin-resistant Staphylococcus aureus (MRSA).

Findings

HAI quality indicators summarized in this report demonstrate that Maine hospitals continue to show progress in addressing the risks associated with health care associated infections. While there is room for improvement on some of the indicators, progress has been documented on others and the trend seems to point in a positive direction overall.

Furthermore, the partnership in the Maine Infection Prevention Collaborative (MIPC) between hospitals, the quality improvement organization and State government agencies seems to have resulted in new opportunities for training, improvement and meaningful reporting. One direct result of this partnership is the immediacy with which partners have taken-up enrolling, reporting and analyzing incidence data through National Healthcare Safety Network (NHSN), a voluntary surveillance system, administered by federal CDC.

NHSN is a secure internet-based disease surveillance system that allows healthcare facilities to share data in a timely manner with other healthcare facilities (e.g., a multihospital system) or with other governmental or non governmental entities such as Maine CDC or Northeast Healthcare Quality Foundation quality improvement organizations). As such, it is a unique tool that allows for reporting and valid estimation of the magnitude of adverse events among patients and healthcare personnel. Furthermore, as a surveillance system it also allows for reporting of healthcare associated infection outbreaks and for the evaluation of adherence to practices known to be associated with prevention of these adverse events and the detection of trends.

PL 2011, c.316 facilitates the reporting of healthcare associated MRSA and *C. difficile* through NHSN. This law now permits the use of HAI incidence data as a quality indicator through public reporting. Since before the beginning of 2012, all Hospitals have started reporting *MRSA* and *C. difficile* hospital acquired incidence data to NHSN, and future reports should be able to present summaries of this data.

Purpose of this Report

Dirigo Health Agency's Maine Quality Forum is required to submit an annual report to the Maine Legislature on statewide efforts to control and prevent health care associated infections (HAI).[4] This is the fourth such report to be issued.

Maine acute care hospitals are required to submit certain data related to the prevention and occurrence of HAI to the Maine Health Data Organization. As the law directs, this report presents 2011 hospital-specific performance data related to HAI, abstracted from the Maine Health Data Organization's database.

In 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 controlling the spread of multiple drug-resistant organisms, the numbers of patients at high risk for MRSA colonization and the numbers of high-risk patients that hospitals surveilled for MRSA.

The Resolve directs 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.

PL 2011 c. 316 requires acute care hospitals to report MRSA and C. difficile data monthly to the national CDC via the National Healthcare Safety Network (NHSN) and allows the Maine Health Data Organization access to this data for purposes of future public reporting of hospital acquired MRSA rates for quality and other purposes.

Background

This report focuses on hospital performance in the realm of HAI control and prevention. We continue to strive to make information accessible to a general audience. Similar to last year, the report will attempt to be less technically-oriented than other comparable reports.

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: can be found in Appendix 1.

[4] 24-A MRSA §6951.

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.

Health care associated infections are usually caused by bacteria, viruses or fungi. 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.[5] 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.[6]

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 by 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 and costly 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 Infection Prevention Collaborative (MIPC)

The Maine Center for Disease Control and Prevention (Maine CDC)

Maine CDC is 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 laid out the state's strategy for preventing health care associated infections. The plan described the infrastructure, surveillance efforts, prevention measures, communication strategies and evaluation approaches to be employed under the Plan. The Plan also identified key prevention targets on which the state would focus surveillance and prevention activity for 2010-2011. The first set of targets included 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, can be found in Appendix 2.

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

Maine Health Data Organization (MHDO)

MHDO is the state agency responsible for collecting health care data and administrating Maine's All Payer claims database. MHDO is an important partner in efforts to address issues related to HAI prevention and control. The MHDO provides the Maine Quality Forum with the data and data processing needed to carry out the analyses that form the basis of this report.

Maine Hospital Association

The Maine Hospital Association represents 39 community-governed hospitals in Maine. Formed in 1937, the Augusta-based non-profit Association is the primary advocate for hospitals in the Maine State Legislature, the U.S. Congress and state and federal regulatory agencies. It also provides educational services and serves as a clearinghouse for comprehensive information for its hospital members, lawmakers and the public. MHA is a leader in developing health care policy and works to stimulate public debate on important health care issues that affect all of Maine's citizens.

Northeast Health Care Quality Foundation

The Northeast Health Care Quality Foundation is a non-profit educational healthcare organization that monitors appropriateness, effectiveness and quality of healthcare services as the Medicare Quality Improvement Organization (QIO) for Maine through a contract with the Centers for Medicare and Medicaid Services (CMS).

---

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

The Collaborative

In 2008, an important step was taken toward addressing the challenge of HAI. Maine hospitals formed 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, 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 several subcommittees, the MIPC realized considerable accomplishments during 2011, including completion of the federally required training and enrollment of all Maine hospitals in the federal CDC's National Healthcare Safety Network (NHSN), continued participation in the MRSA prevalence study and the development of best practice tools for improving and monitoring hand hygiene in the hospital setting following a collaborative study with Maine CDC to observe hand hygiene in all Maine hospitals. .

A copy of the MIPC Annual Report for 2011 is included in Appendix 3.

HAI Data as an Indicator of Health Care Quality

The Maine Quality Forum and the MIPC use a defined set of HAI 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 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 facility characteristics 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 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.

This report has three sections:

- the first centers on HAI quality indicators related to surgical care.
- the second focuses more broadly on health care associated infections.
- the third specifically addresses the issue of Methicillin resistant Staphylococcus aureus, or MRSA.

Section 1 – Quality Indicators

Surgical Quality of Care Indicators - The Surgical Care Improvement Project

The Surgical Care Improvement Project (SCIP), sponsored by the federal Centers for Medicare & 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 ten 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]

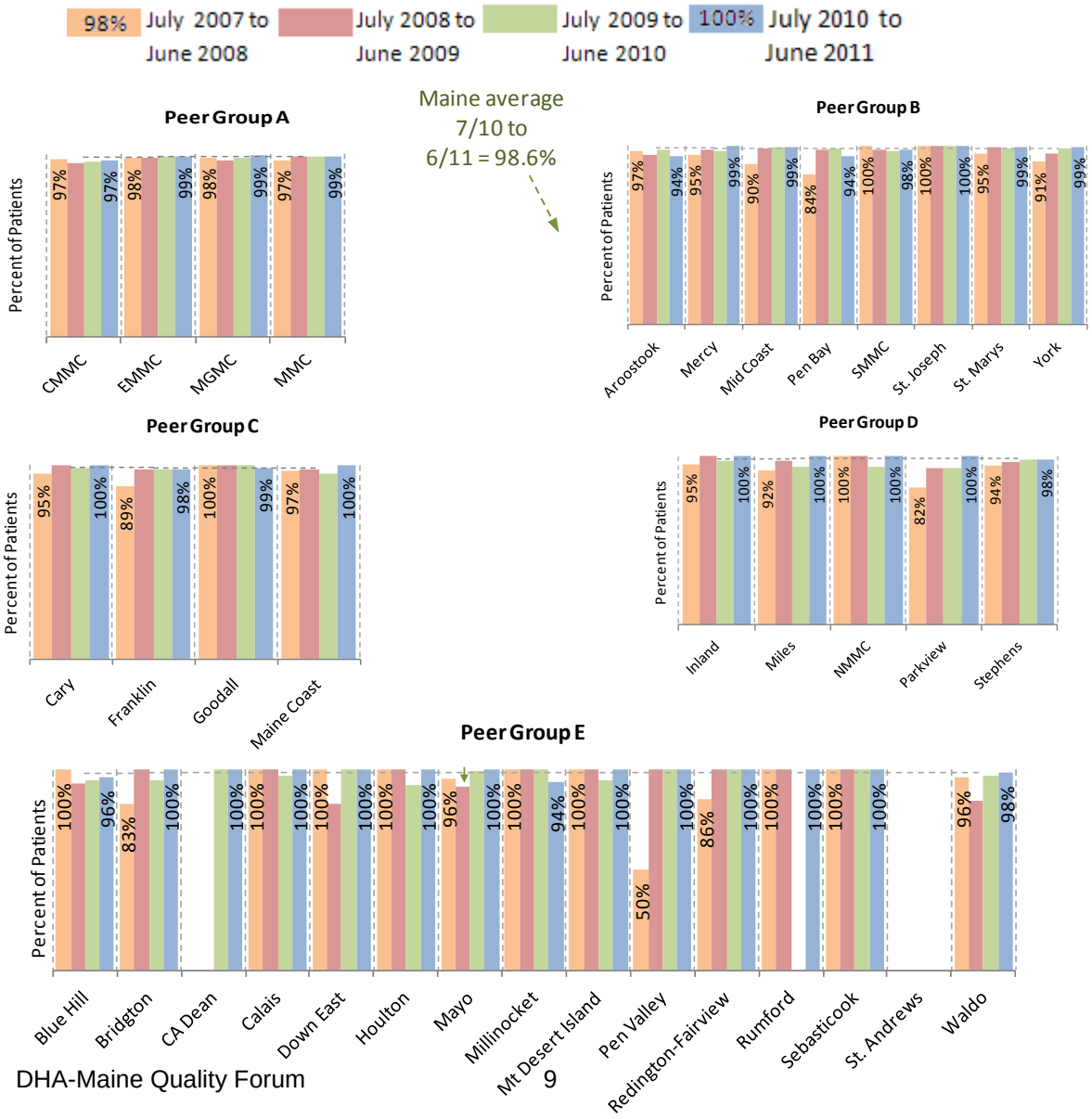
Patients should ask their doctor whether they will need to be given an antibiotic at the time of their surgery. If the answer is no, ask for an explanation. If the answer is yes, ask

[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.

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.

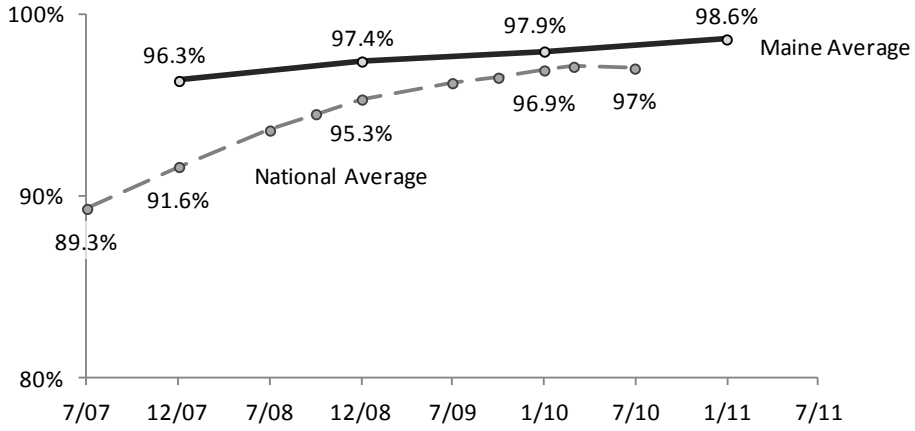
The graphs that appear below are presented by hospital peer grouping. The Maine Hospital Association has divided Maine hospitals into five peer groups. The hospitals listed within each peer group are considered to be comparable in size, bed count, and scope of services. The graph for each peer group shows four years of results for each individual hospital, with the fourth 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 2011 through June 2011. If no data show for a particular hospital, there were an insufficient number of patients to report on the measure.

SCIP Measure One: Percent of All Patients Receiving an Antibiotic Within One Hour Prior to Surgery, by Maine Hospital, 2007-2011



The next chart shows the trend over time in the Maine statewide average for the percent of patients receiving a prophylactic antibiotic within one hour prior to surgery. The chart compares Maine's average with the national average at several points over time. Maine hospitals have outperformed the national average at each point in time shown and have demonstrated improvement since mid-2008.

SCIP-1A: Percent of all patients receiving an antibiotic within one hour prior to any surgery, 2007- 2011
Trends: Maine average compared to national average



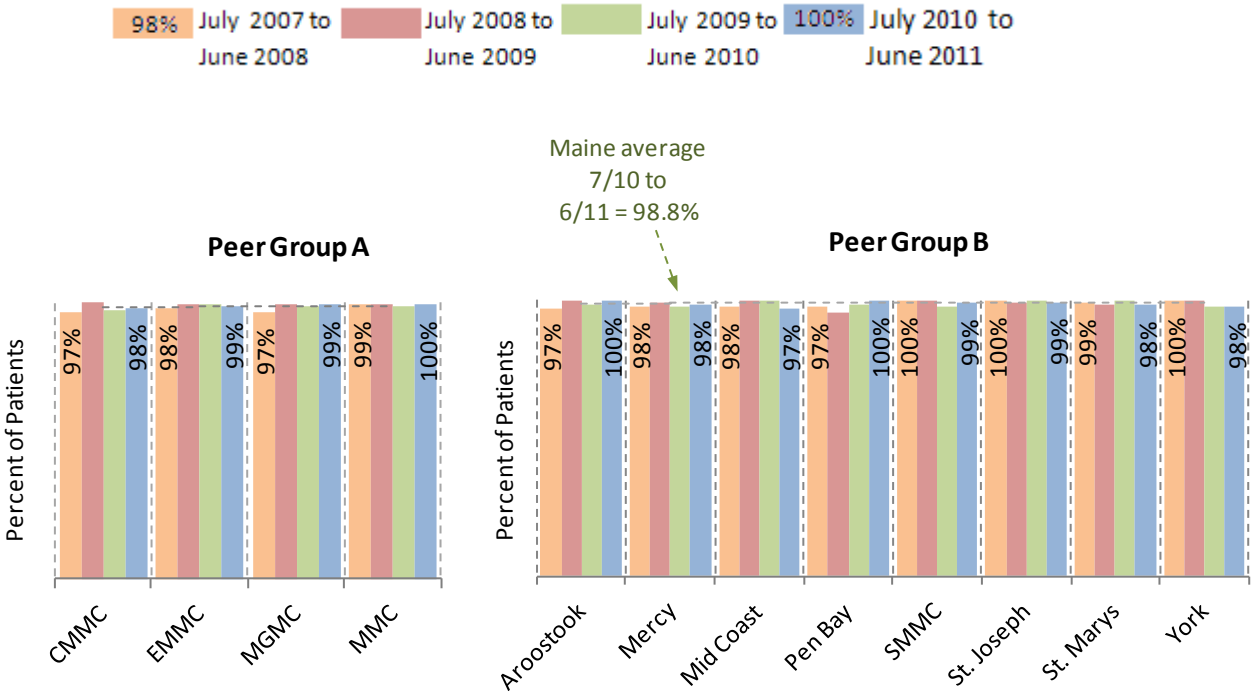
SCIP Measure Two – Percent of All Surgery Patients Receiving the Recommended Antibiotic for Their Procedure

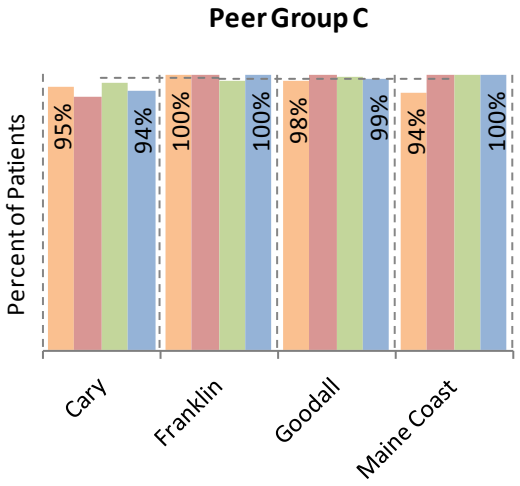
While the first SCIP measure looks at whether a pre-surgical antibiotic was given at the right time, the second measure looks at how often an appropriate prophylactic antibiotic was chosen. It is important to give the right drug at the right time. When preparing the patient for surgery, doctors should 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.

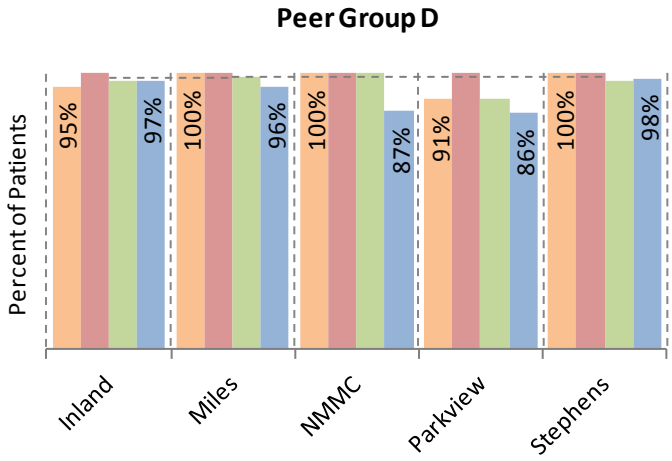
It is important for surgical patients to receive prophylactic antibiotics that are consistent with current clinical guidelines specific to each particular type of surgical procedure. While one drug might be best for patients about to undergo a hip replacement, a different drug may be indicated for use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

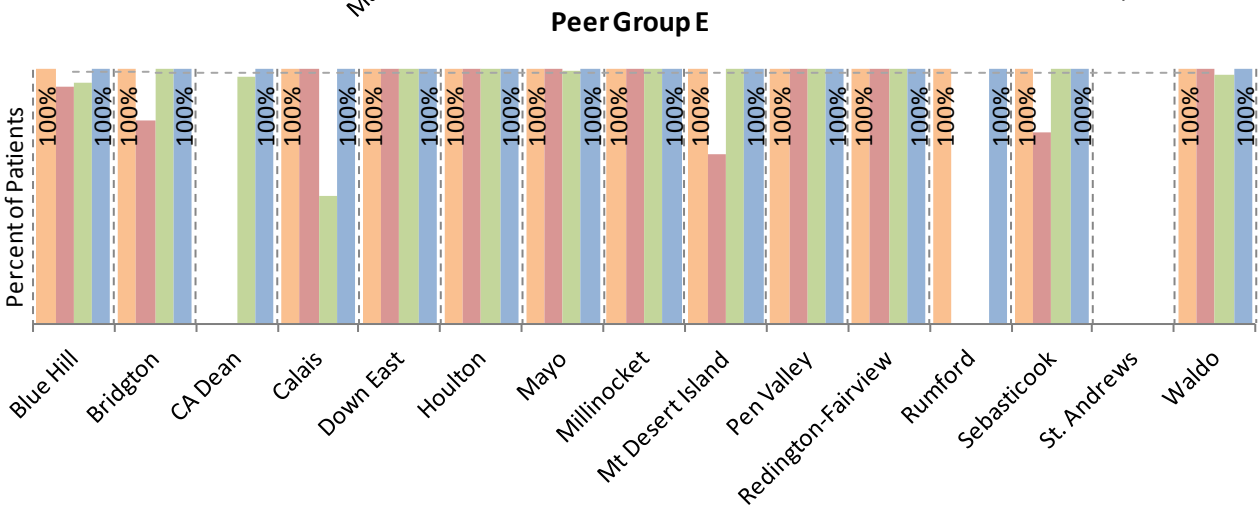
The charts below show, for each hospital peer group, the percent of surgical patients who received the recommended antibiotic for their procedure. Once again, the higher columns represent better results.

SCIP Measure Two: Percent of All Surgery Patients Receiving the Recommended Antibiotic for Their Procedure, by Maine Hospital, 2007-2011



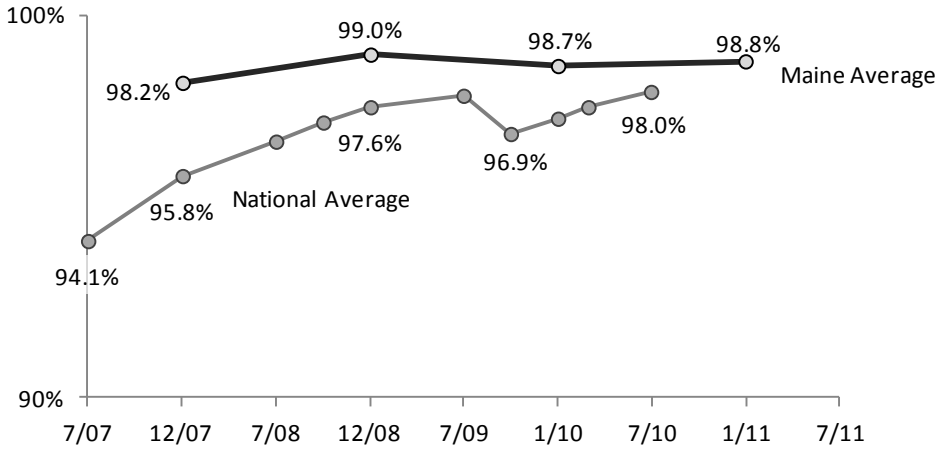






The next chart shows the trend over time in Maine's performance with regard to ensuring surgical patients with an antibiotic appropriate for their condition and procedure. It compares the Maine average to the national average. Maine's performance on this measure has remained relatively steady between 2007 and 2011 and our hospitals outperform the national average over time.

SCIP-2A: Percent of all surgery patients receiving the recommended antibiotic for their procedure, 2007 - 2011
Trends: Maine weighted average compared to national average



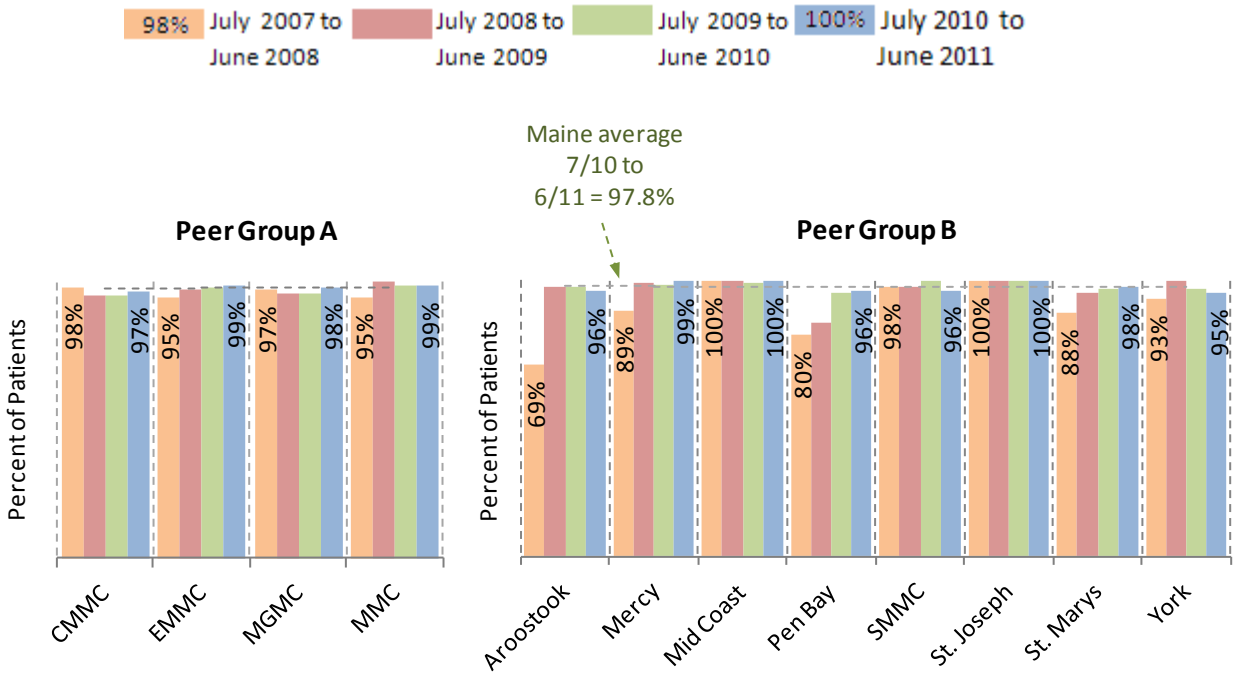
SCIP Measure Three – Percent of Surgical Patients Whose Preventive Antibiotics Were Discontinued Within 24 Hours After Anesthesia Was Ended

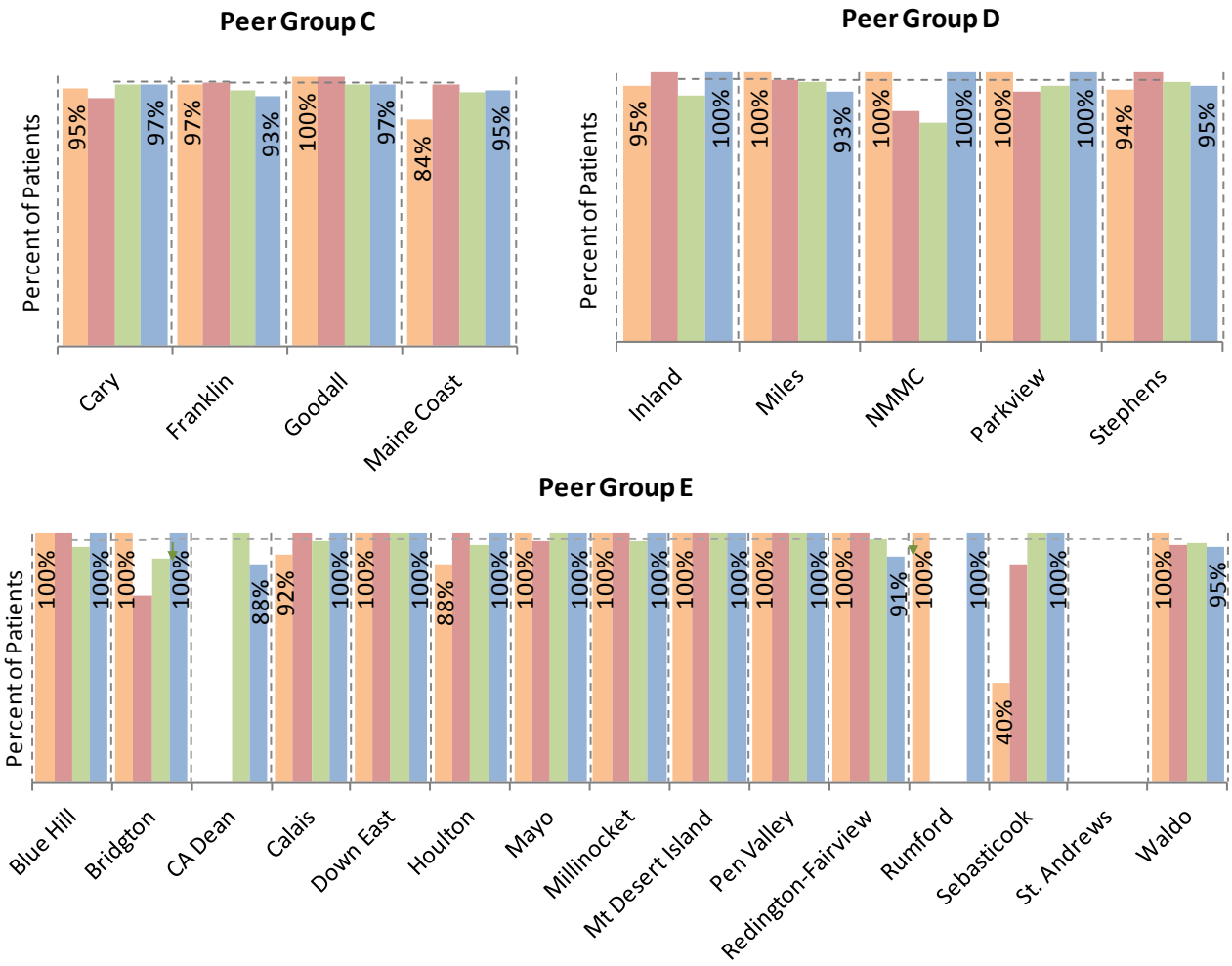
Just as it is important to give the right antibiotic to the right patient at the right time, it is also important to stop that antibiotic when it will no longer provide a meaningful benefit to the patient. Continuing prophylactic antibiotics for more than 24 hours after surgery ends does not provide 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 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 aggregate trend over time shows improvement in Maine's performance, which continues to be better than the national average.

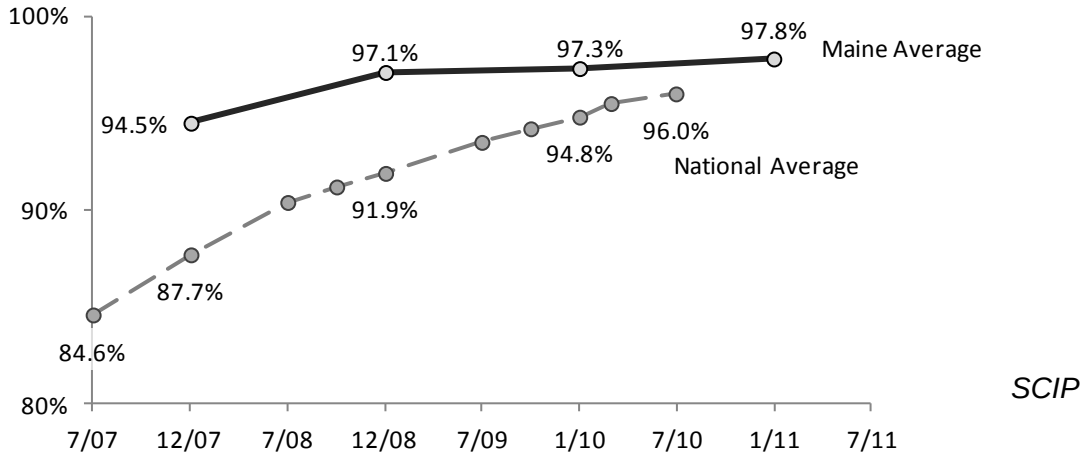
SCIP Measure Three – Percent of Surgery Patients Whose Preventive Antibiotics Were Discontinued Within 24 Hours After Anesthesia Ended, by Maine Hospital, 2007-2011





SCIP- 3A: Percent of all surgery patients whose preventive antibiotics were discontinued within 24 hours after anesthesia ended, 2007-2011

Trends: Maine weighted average compared to national average



SCIP

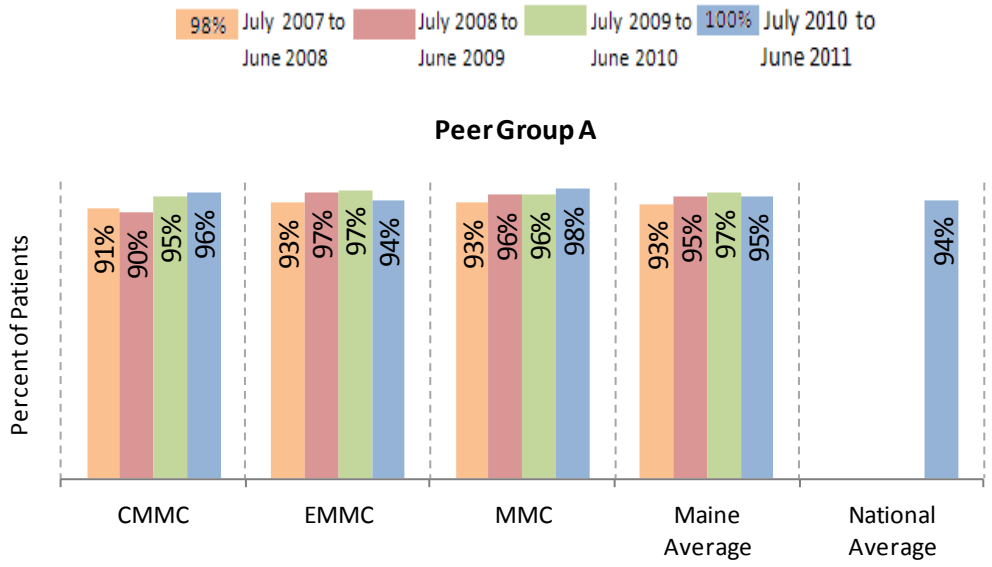
Measure Four – Percent of Cardiac Surgical Patients with Controlled 6 am Post-Operative Serum Glucose

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 what 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 2010 through June 2011.

SCIP-4: Percent of cardiac surgery patients with controlled 6 AM post-operative serum glucose, by Maine Hospital, 2007-2011



The fourth column shows the average rate for this measure at all three hospitals together and how performance has changed over time. Although slightly declined since last year, the Maine average still exceeds the national average.

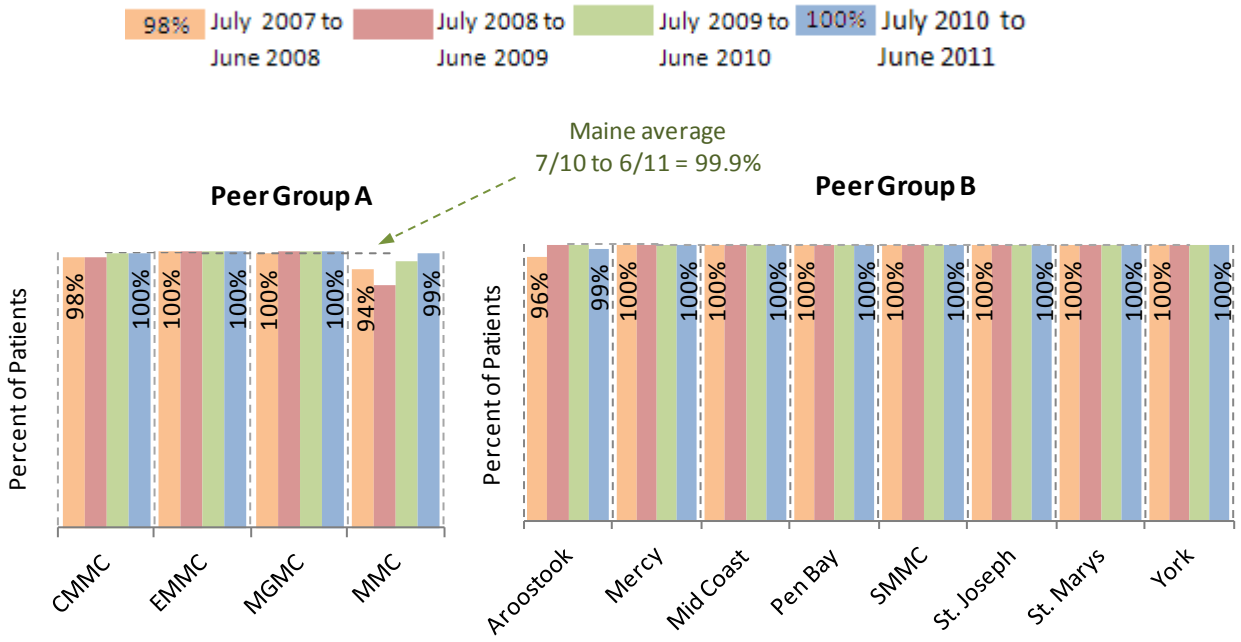
SCIP Measure Six[9] – Percent of Surgery Patients with Appropriate Hair Removal

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.

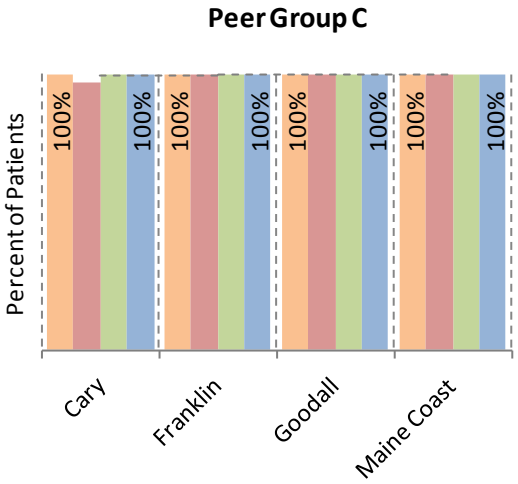
Patients scheduled for surgery can ask if any of their hair will need to be removed prior to their operation and, if so, how it will be removed. It is appropriate to ask for electric clippers or a depilatory cream to be used instead of a razor.

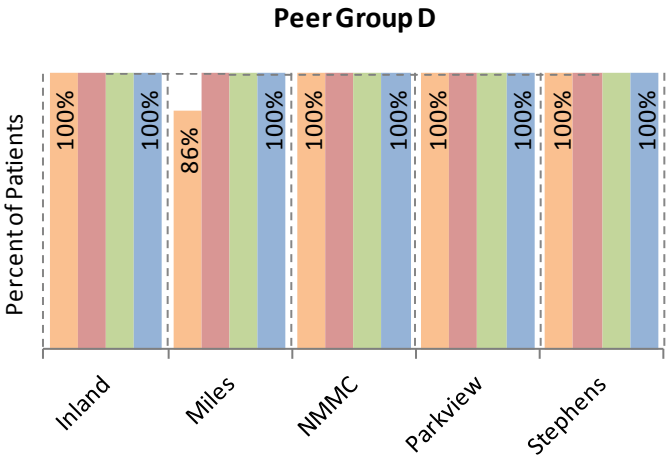
The charts below show how Maine hospitals performed over each of three years on the measure of appropriate hair removal, as compared to their peers. Almost every hospital in each year reported 100% compliance with this quality measure. The trend chart also compares performance to the Maine average.

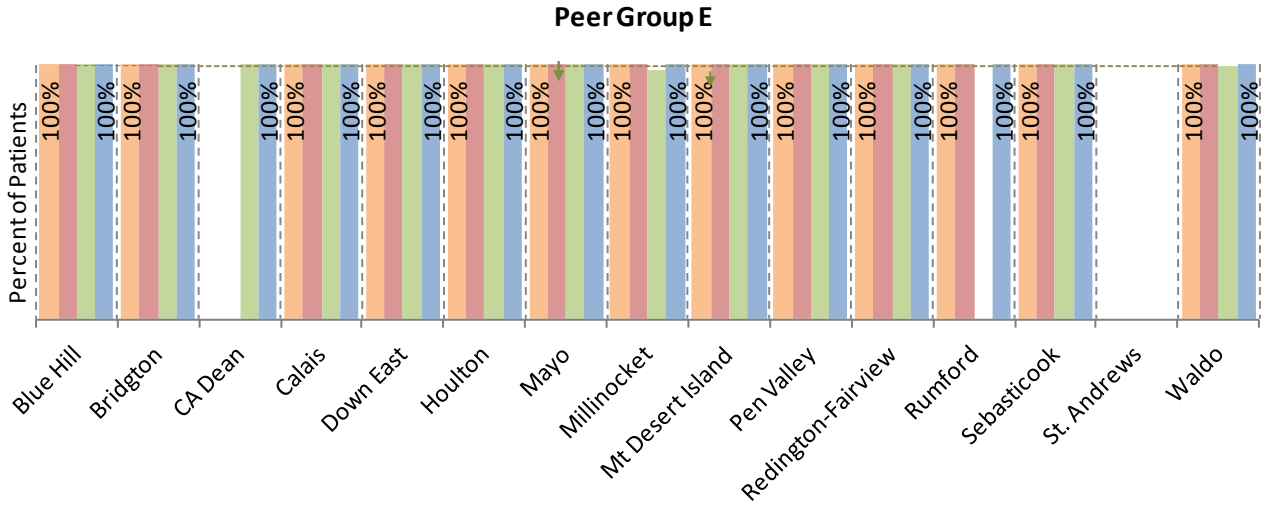
SCIP Measure Six – Percent of All Surgery Patients with Appropriate Hair Removal, by Maine Hospital, 2007-2011



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







Section 2 – Health Care Associated Infections

The rules of the Maine Health Data Organization require acute care hospitals to submit data for a set of five specified health care associated infection (HAI) quality indicators. These five measures are described below.

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 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 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. Many hospitals have been voluntarily reporting this data to NHSN. NHSN integrates patient and health care personnel safety surveillance systems for all types of facilities and allows 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 following tables and charts to 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.

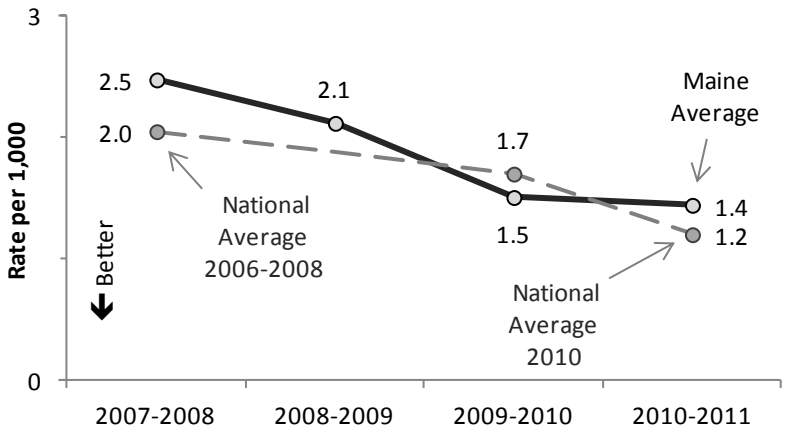
The charts that follow show the CLABSI infection rates in patients in adult intensive care units in each Maine hospital, with peer group comparisons. Many Maine hospitals did not have sufficient data to allow valid CLABSI measures to be reported; in such instances, no bars appear on the graph for the 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.

HAI-1: Number of catheter-related blood stream infections among ICU patients per 1,000 central-line catheter days, by Maine hospital, 2007-2011

Hospital	July '07 to June '08			July '08 to June '09			July '09 to June '10			July '10 to June '11		
	Num.	Denom.	Rate /1,000	Num.	Denom.	Rate /1,000	Num.	Denom.	Rate /1,000	Num.	Denom.	Rate /1,000
Peer Group A												
CMMC	6	4,224	1.4	6	4,710	1.3	2	5,078	0.4	3	4,029	0.7
EMMC	9	8,253	1.1	14	7,345	1.9	8	7,150	1.1	9	7,160	1.3
MGMC	0	1,493	0.0	1	1,221	0.8	1	1,388	0.7	2	1,818	1.1
MMC	48	10,507	4.6	35	9,362	3.7	23	9,082	2.5	18	9,205	2.0
Peer Group B												
TAMC	1	348	2.9	0	247	0.0	0	371	0.0	1	412	2.4
Mercy	0	602	0.0	3	611	4.9	4	572	7.0	1	854	1.2
Mid Coast	0	476	0.0	0	488	0.0	0	696	0.0	0	621	0.0
Pen Bay	1	235	4.3	1	209	4.8	0	164	0.0	2	184	10.9
SMMC	1	921	1.1	0	654	0.0	2	559	3.6	1	368	2.7
St. Joseph	1	662	1.5	0	568	0.0	0	462	0.0	1	623	1.6
St. Marys	2	1,316	1.5	0	1,230	0.0	0	1,008	0.0	1	994	1.0
York	0	315	0.0	0	329	0.0	1	265	3.8	0	232	0.0
Peer Group C												
Cary	0	396	0.0	1	240	4.2	0	134	0.0	0	168	0.0
Franklin	0	266	0.0	0	186	0.0	0	123	0.0	0	121	0.0
Goodall	0	102	0.0	0	150	0.0	0	72	0.0	0	145	0.0
Maine Coast	1	116	8.6	0	198	0.0	0	123	0.0	0	226	0.0

Hospital	July '07 to June '08			July '08 to June '09			July '09 to June '10			July '10 to June '11		
	Num.	Denom.	Rate /1,000	Num.	Denom.	Rate /1,000	Num.	Denom.	Rate /1,000	Num.	Denom.	Rate /1,000
Peer Group D												
Inland	0	127	0.0	0	53	0.0	0	62	0.0	0	78	0.0
Miles	1	220	4.5	0	174	0.0	0	132	0.0	0	126	0.0
NMMC	0	96	0.0	0	55	0.0	0	55	0.0	0	122	0.0
Parkview	6	378	15.9	0	225	0.0	1	161	6.2	0	237	0.0
Stephens	0	121	0.0	0	71	0.0	0	76	0.0	0	83	0.0
Peer Group E												
Blue Hill	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
Bridgton	2	81	24.7	0	83	0.0	0	12	0.0	2	195	10.3
CA Dean	0	0	0.0	1	70	14.3	0	0	0.0	0	0	0.0
Calais	0	3	0.0	0	0	0.0	0	39	0.0	0	177	0.0
Down East	0	59	0.0	0	36	0.0	0	16	0.0	0	24	0.0
Houlton	0	13	0.0	0	0	0.0	0	38	0.0	0	82	0.0
Mayo	0	42	0.0	0	37	0.0	0	26	0.0	0	18	0.0
Millinocket	0	58	0.0	0	81	0.0	0	144	0.0	0	59	0.0
Mt Desert Island	0	19	0.0	0	123	0.0	0	35	0.0	0	31	0.0
Pen Valley	0	0	0.0	0	86	0.0	0	48	0.0	0	59	0.0
Redington-Fairview	0	121	0.0	0	58	0.0	0	81	0.0	0	132	0.0
Rumford	0	7	0.0	0	31	0.0	0	60	0.0	0	17	0.0
Sebasticook	0	35	0.0	0	23	0.0	0	36	0.0	0	79	0.0
St. Andrews	0	254	0.0	0	236	0.0	0	237	0.0	0	343	0.0
Waldo	0	30	0.0	0	73	0.0	0	33	0.0	1	93	10.8
Maine State Average	79	31,896	2.5	62	29,263	2.1	42	28,538	1.5	42	29,115	1.4
NHSN National Average			2.0			1.9			1.7			1.2

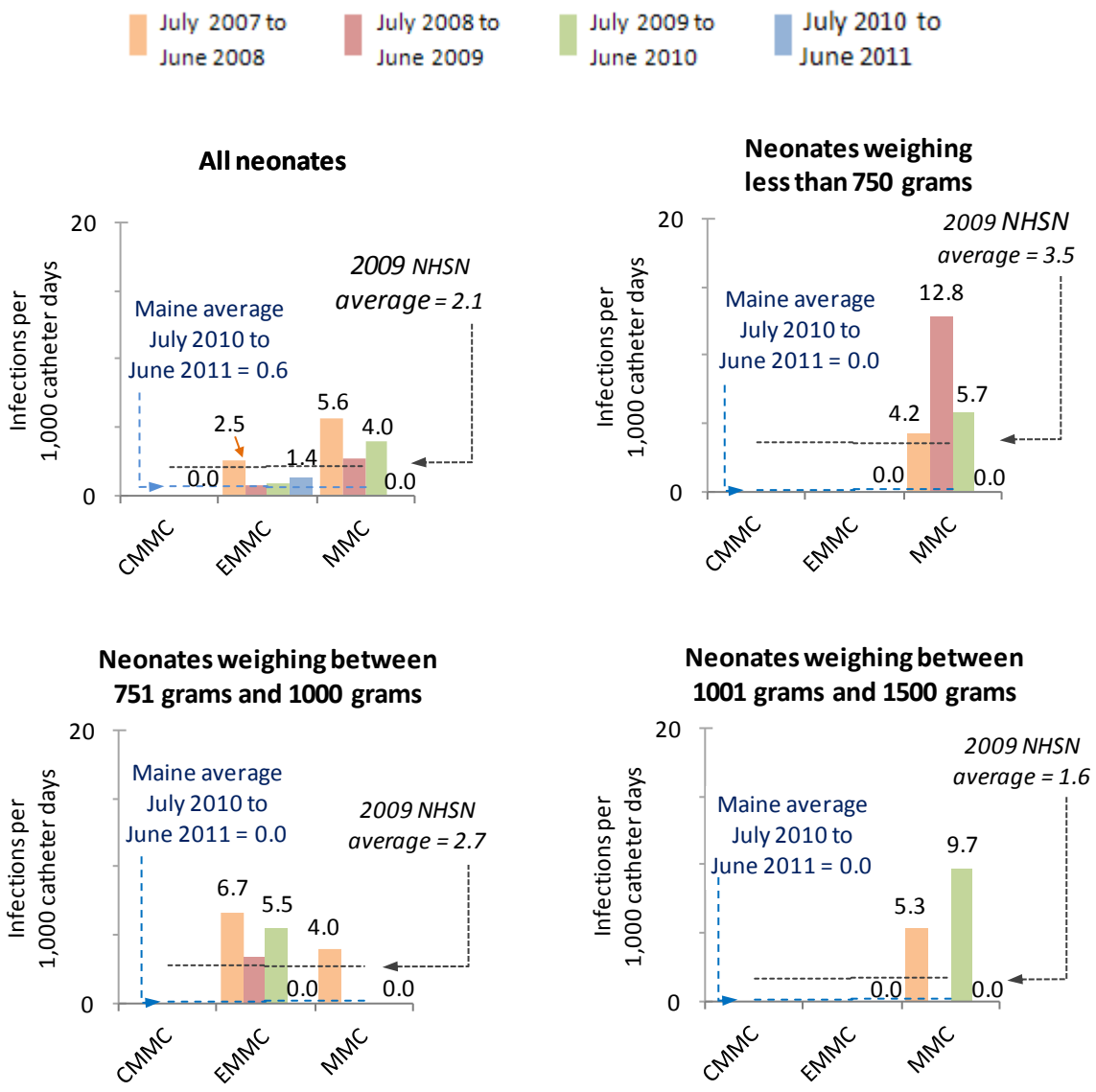
HAI One: Number of catheter-related blood stream infections among ICU patients per 1,000 central-line catheter days, 2007-2011
Trend: Maine average compared to NHSN national average for 2006-2008

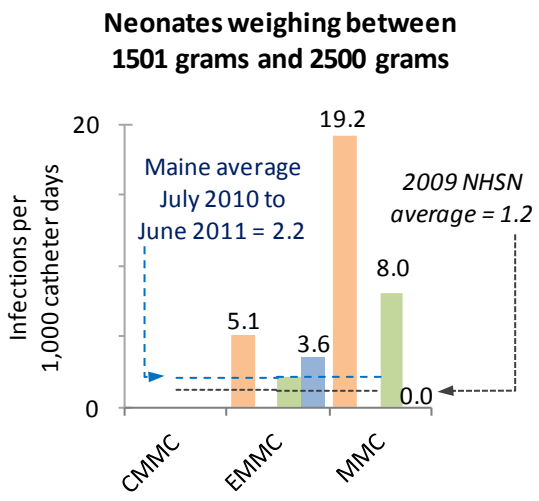


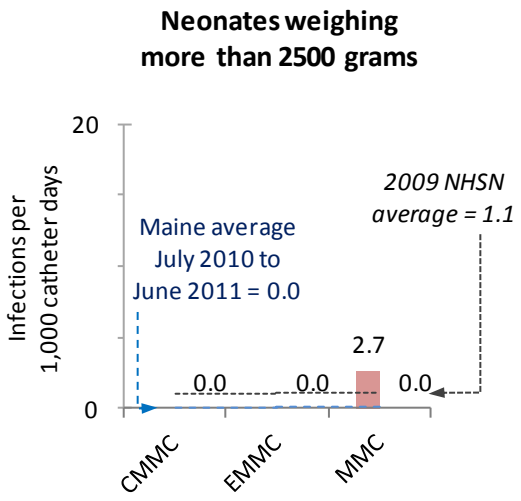
In the charts that follow, shorter bars – indicating fewer infections – are reports of better results, also lower rates in the tables are better. Maine's performance with regard to the adult ICU measure is trending in the right direction. The neonatal data is more difficult to interpret, as there are 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 has improved in the most recent year but is currently above the national average.

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.







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.

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] The data are presented for each hospital, by hospital peer group. A higher bar indicates

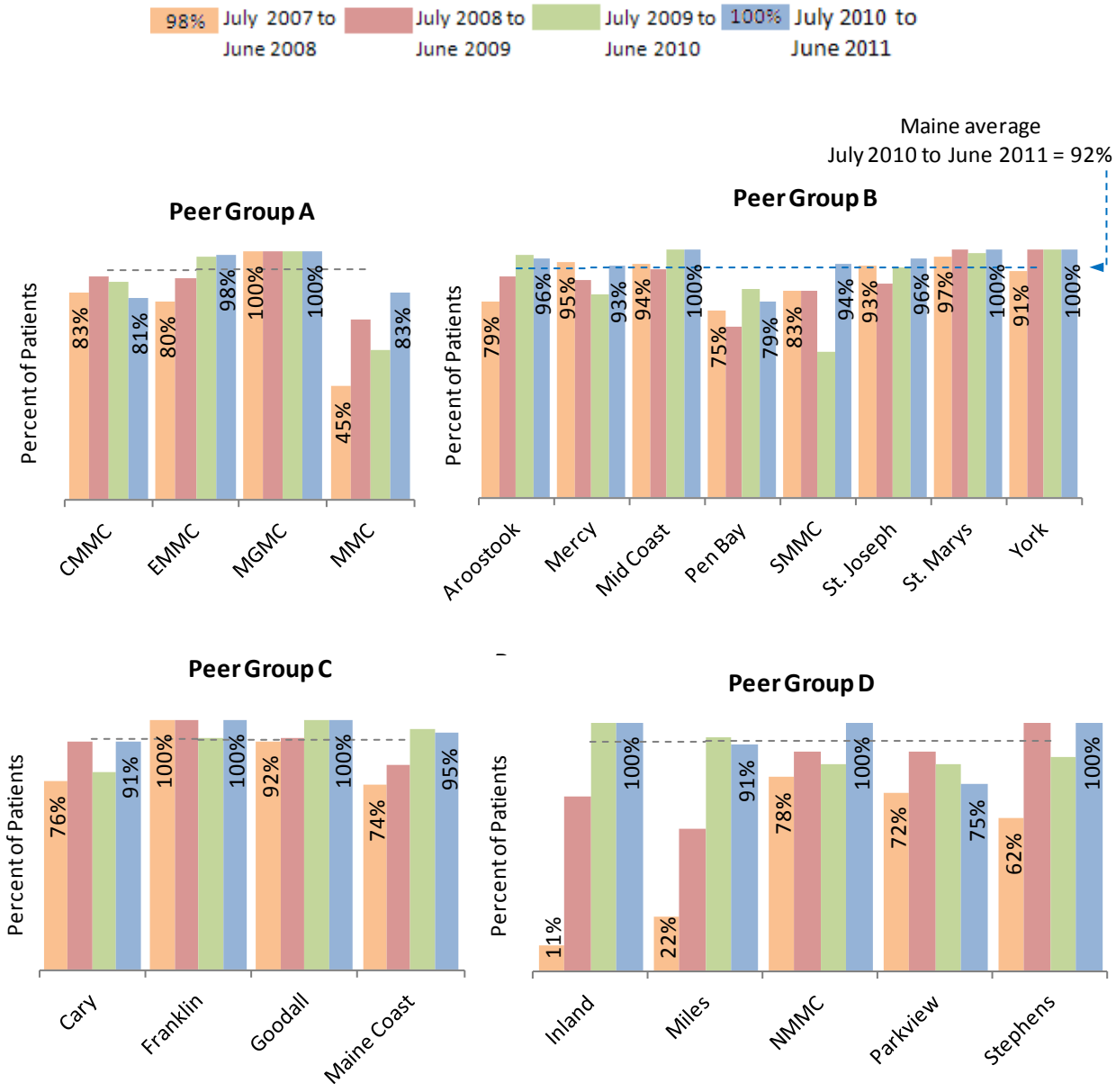
[10] Strategies to prevent central line-associated bloodstream infections in acute care hospitals. National Guideline Clearing House. Agency for Healthcare Research & Quality, US Department of Health and Human Services. http://www.guideline.gov/content.aspx?id=13395

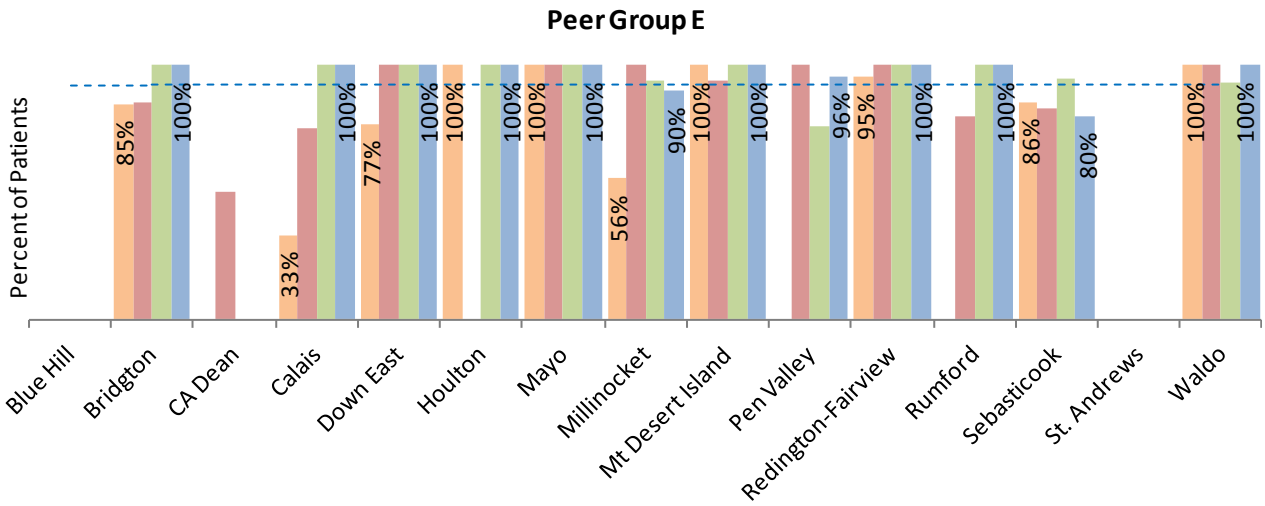
[11] There are standard definitions for CLABSI bundles; reported compliance should reflect compliance with those standardized best practices.

better performance; the horizontal black line on each graph indicates the Maine hospital statewide average for the period of July 2010 through June 2011.

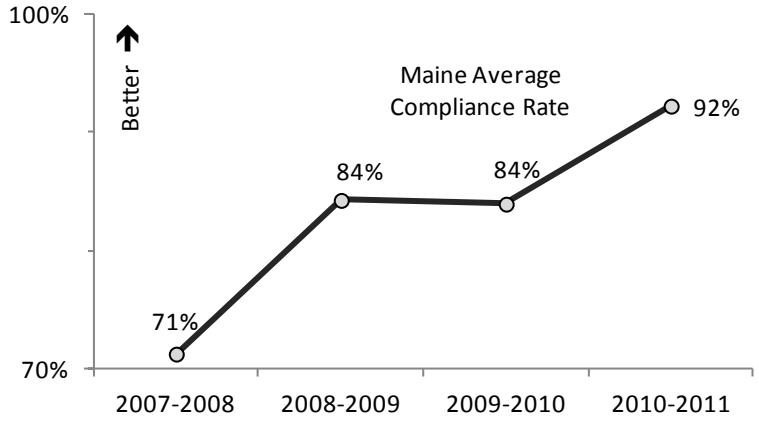
Aggregate trend data for compliance with the prevention bundles in the ICU show improvement in compliance rates between the year ending June 2008 and the year ending June 2011.The trend data for compliance with use of prevention bundles with surgical patients shows steady improvement.

HAI Three – Documented Compliance with Infection Prevention Measures for ICU Patients with Central Line Catheters, by Maine Hospital, 2007 – 2011

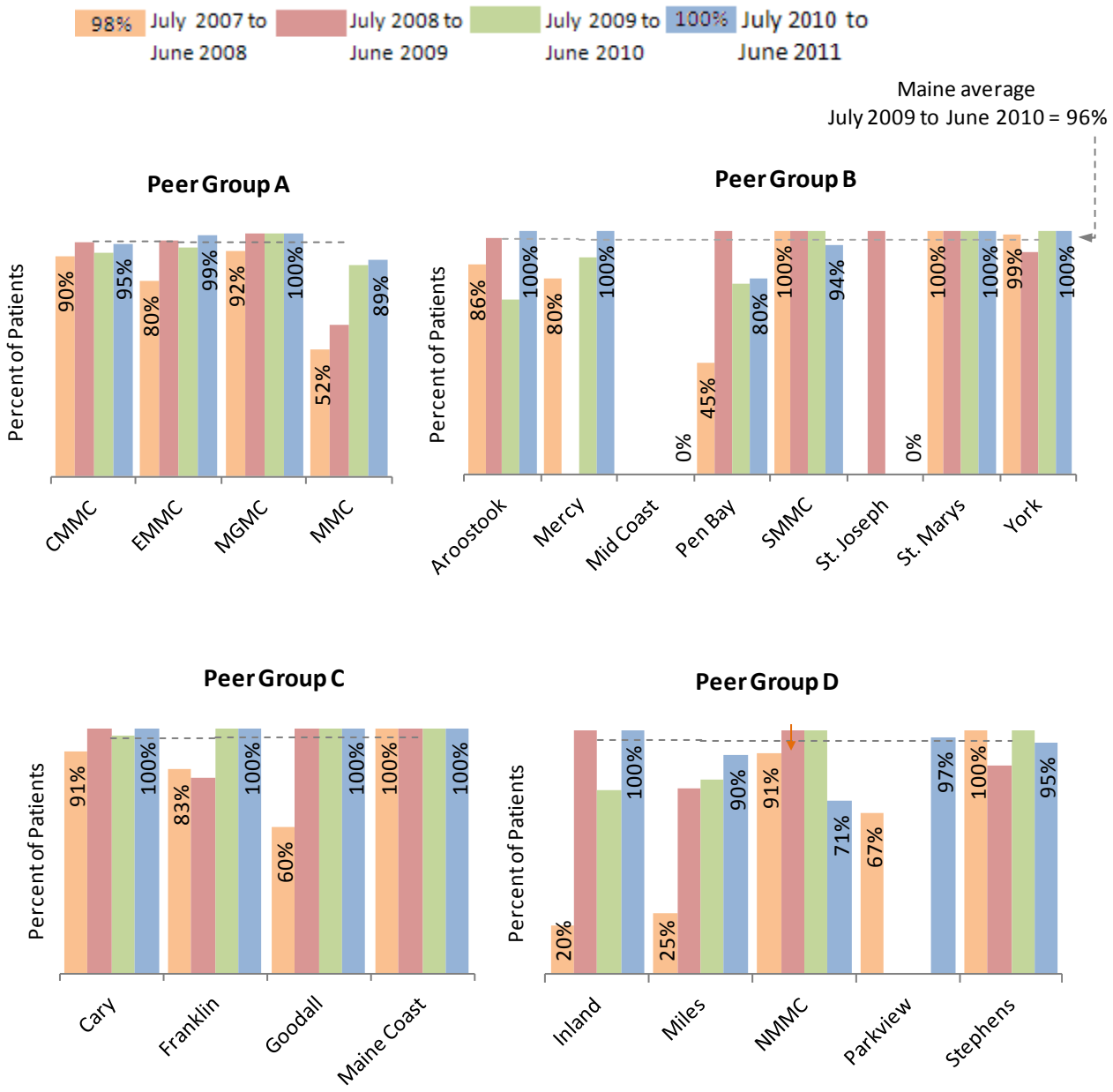


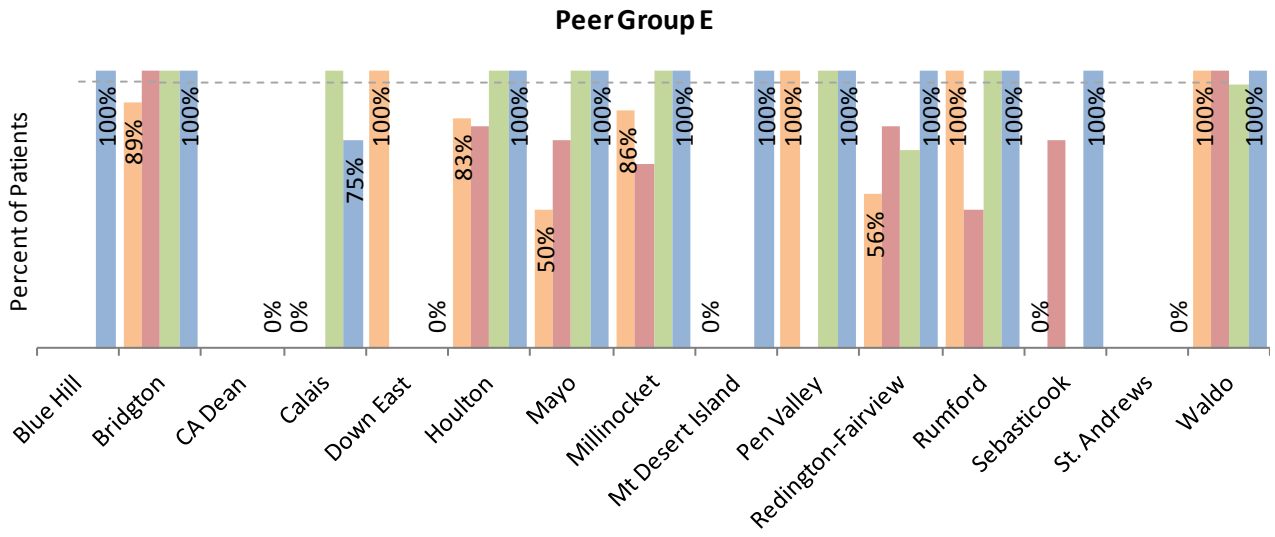


HAI Three: Percent compliance with
Infection Prevention Measures for ICU Patients with Central Line Catheters
Trend: Maine hospital averages for 2007-2011

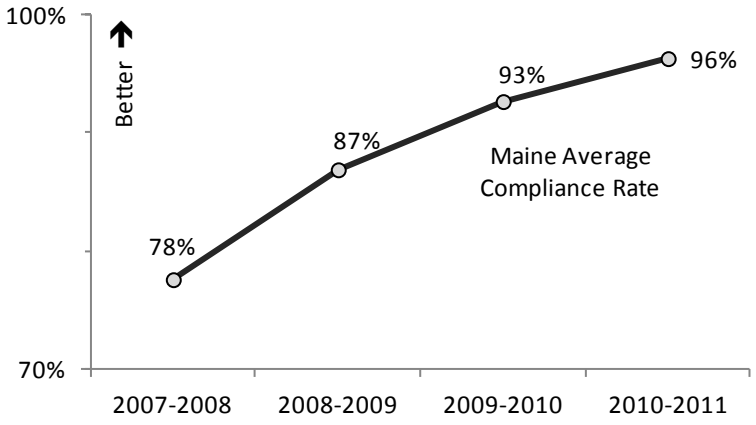


HAI Four – **Percent compliance with the four insertion related, evidence based Interventions for patients with intravascular central catheters (central line bundle compliance) placed preoperatively, in pre-operative areas, operating rooms, and recovery areas, 2007-11**





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 2007-2011



HAI Five – Preventing Ventilator Associated Pneumonia

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 commonly 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 to ensure 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. 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.

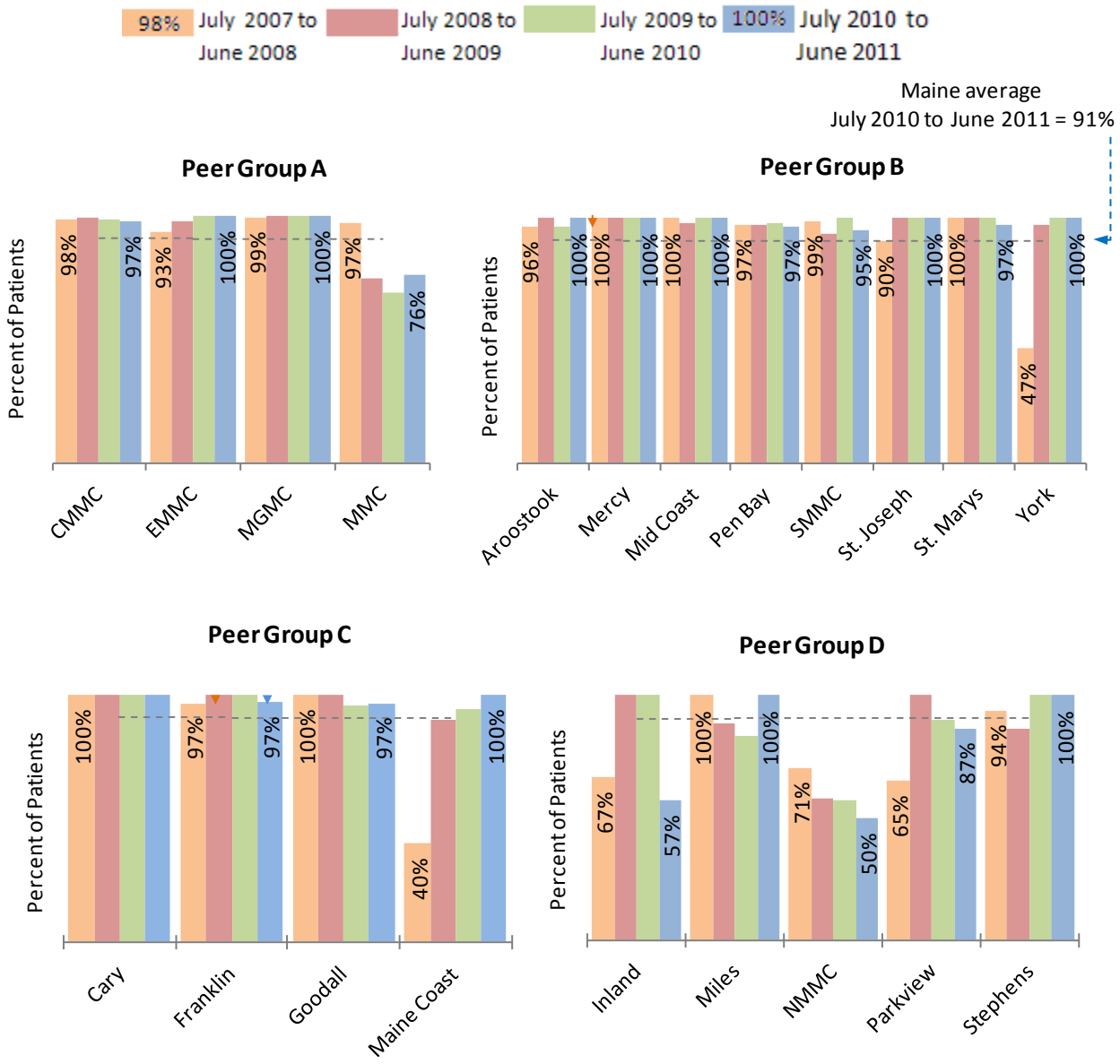
The charts below show, by peer group for each Maine hospital, the degree of adherence to the use of VAP preventive protocols. If the chart has no bars for a particular hospital it means that there were either no data or insufficient data to report on the indicator. Taller bars indicate better performance. The horizontal black line on each graph shows the Maine hospital statewide average for this measure for the period July 2009 through June 2011.

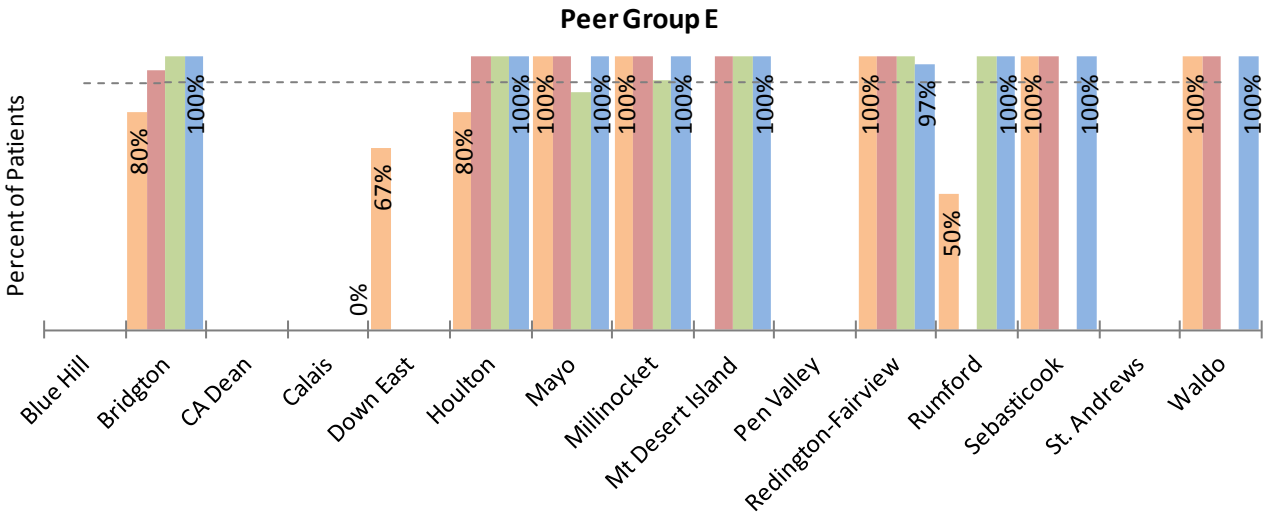
The trend data shows a decline in compliance with recommended VAP prevention measures over the three reporting periods preceding 2010, falling from 96% statewide in 2007-08 to 89% in 2009-10. Although wide swing changes might be a function of the fact that there are relatively few patients on ventilators in ICUs over the course of a year; the trend for the most recent year seems to show some "recovery" to 91%.

---

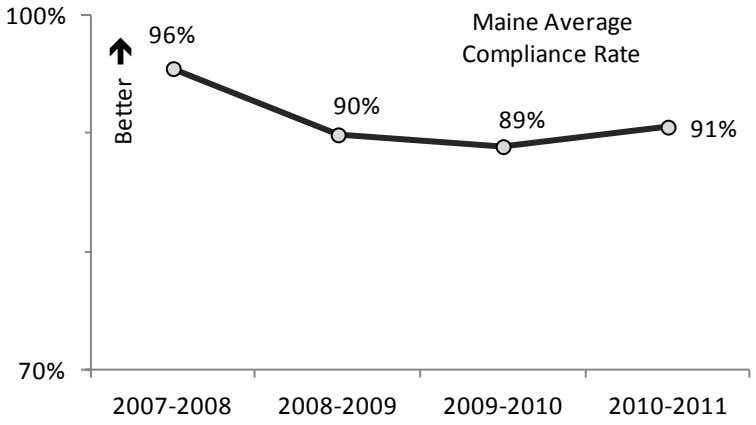
[12] Koenig SM and Truwit JD. Ventilator-associated Pneumonia: Diagnosis, Treatment and Prevention. Clin Microbiol Rev. 2006 October; 19(4): 637–657. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1592694/

HAI Five – Documented Compliance with Pneumonia Prevention Measures Among ICU Patients on Ventilators, by Maine Hospital, 2007 – 2011





HAI Five – Documented Compliance with Pneumonia Prevention Measures Among ICU Patients on Ventilators
Trend: Maine hospital averages for 2007-2011



Section 3 - MRSA

Methicillin resistant **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 in the task of developing a working definition of patients coming into the inpatient hospital setting who should be considered "high risk" for MRSA colonization. This population would conceivably pose the greatest risk of carrying MRSA into the hospital 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.

---

[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.

[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.

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 categories 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 specific hospitals have to screen and culture on an on-going basis.

The table below shows which of the five groups are 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 within those groups at those hospitals were simply too small to allow any conclusions to be drawn. In those situations, the hospitals were not required to continue to screen patients falling into those groups. For those wishing to see hospital-specific data for this year's screening rates for patients in each of the five potential high risk groups included in the pilot study, please see Appendix 4.

In reviewing this data one must take into account 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.

Data on the prevalence of MRSA such as is presented in the Appendix 4 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 this data 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 incidence of hospital acquired MRSA infections – which is not presented here but 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. [16]

---

[16] 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.

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

Hospital Name	Patient Categories:				
	Admitted to ICU	Hemo-dialysis	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			High Risk	High Risk	
Bridgton Hospital	High Risk		High Risk	High Risk	
C.A. Dean Memorial Hospital					
Calais Regional Hospital			High Risk		
Cary Medical Center	High Risk		High Risk	High Risk	
Central Maine Medical Center	High Risk	High Risk	High Risk	High Risk	
Down East Community Hospital			High Risk	High Risk	
Eastern Maine Medical Center		High Risk		High Risk	
Franklin Memorial Hospital	High Risk		High Risk	High Risk	
Goodall Hospital	High Risk		High Risk	High Risk	
Houlton Regional Hospital			High Risk	High Risk	
Inland Hospital	High Risk		High Risk	High Risk	
Maine Coast Memorial Hospital			High Risk	High Risk	
Maine Medical Center	High Risk	High Risk	High Risk	High Risk	High Risk
MaineGeneral Medical Center	High Risk	High Risk	High Risk	High Risk	
Mayo Regional Hospital	High Risk		High Risk	High Risk	
Mercy Hospital	High Risk		High Risk	High Risk	
Mid Coast Hospital	High Risk		High Risk		
Miles Memorial Hospital	High Risk		High Risk	High Risk	
Millinocket Regional Hospital					
Mount Desert Island Hospital	High Risk		High Risk	High Risk	
New England Rehab Hospital	High Risk	High Risk	High Risk		

Hospital Name	Patient Categories:				
	Admitted to ICU	Hemo-dialysis	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
Northern Maine Medical Center	High Risk		High Risk	High Risk	
Parkview Medical Center				High Risk	
Penobscot Bay Medical Center				High Risk	
Penobscot Valley Hospital				High Risk	
Red-Fairview General Hospital	High Risk		High Risk	High Risk	
Rumford Hospital			High Risk	High Risk	
Sebasticook Valley Hospital				High Risk	
Southern Maine Medical Center	High Risk	High Risk	High Risk	High Risk	
St Andrews Hospital			High Risk	High Risk	
St Joseph Hospital				High Risk	
St Mary's Regional Medical Ctr		High Risk	High Risk	High Risk	
Stephens Memorial Hospital	High Risk		High Risk	High Risk	
The Aroostook Medical Center	High Risk		High Risk	High Risk	
Waldo County General	High Risk		High Risk	High Risk	
York Hospital	High Risk		High Risk	High Risk	

† 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

The next table lists the percentage of patients identified to be high risk who were tested in each hospital between July, 2010 and June 2011. Shaded areas indicate that no high risk groups were identified for that hospital.

Methicillin-Resistant Staphylococcus Aureus Active Surveillance Compliance Rate (percent of patients cultured upon admission within the high-risk groups that should have been cultured), July 2010 to June 2011

Hospital Name	Jul.-Sept. 2010	Oct.-Dec. 2010	Jan.-Mar. 2011	Apr.-Jun. 2011
Blue Hill Memorial Hospital	95.7%	93.2%	95.8%	90.1%
Bridgton Hospital	95.2%	100.0%	100.0%	100.0%
CA Dean Memorial Hospital				
Calais Regional Hospital	95.7%	100.0%	94.9%	100.0%
Cary Medical Center	97.6%	96.2%	98.9%	100.0%
Central Maine Medical Center	95.5%	95.8%	96.4%	96.6%
Down East Community Hospital	100.0%	85.3%	80.6%	86.3%
Eastern Maine Medical Center	98.8%	96.9%	98.5%	99.4%
Franklin Memorial Hospital	91.1%	93.4%	91.9%	91.8%
Goodall Hospital	95.0%	95.8%	93.6%	96.3%
Houlton Regional Hospital	99.5%	100.0%	100.0%	100.0%
Inland Hospital	100.0%	99.5%	100.0%	98.9%
Maine Coast Memorial Hospital	98.9%	99.1%	99.2%	98.8%
Maine Medical Center	81.9%	83.4%	71.9%	83.0%
MaineGeneral Medical Center	97.6%	96.5%	96.7%	97.8%
Mayo Regional Hospital	99.6%	97.5%	99.4%	99.0%
Mercy Hospital	91.4%	100.0%	89.8%	91.4%
Mid Coast Hospital	91.2%	84.2%	97.9%	98.6%
Miles Memorial Hospital	95.6%	99.1%	98.4%	97.4%
Millinocket Regional Hospital				
Mount Desert Island Hospital	100.0%	95.2%	100.0%	100.0%
New England Rehab Hospital	99.7%	99.4%	99.8%	99.4%
Northern Maine Medical Ctr.	96.4%	98.0%	99.3%	97.8%
Parkview Medical Center	100.0%	100.0%	94.4%	97.9%
Penobscot Bay Medical Ctr.	94.4%	90.3%	95.2%	90.6%
Penobscot Valley Hospital	95.3%	81.1%	78.7%	84.4%
Red-Fairview General Hospital	98.8%	99.1%	98.4%	98.6%
Rumford Hospital	98.6%	97.8%	98.4%	96.2%
Sebasticook Valley Hospital	100.0%	100.0%	93.3%	100.0%
Southern Maine Medical Ctr.	92.4%	93.3%	94.8%	96.2%
St Andrews Hospital	98.1%	98.4%	100.0%	98.7%
St Joseph Hospital	90.8%	88.5%	85.3%	88.2%
St Mary's Regional Medical Ctr	96.6%	96.6%	95.3%	93.1%
Stephens Memorial Hospital	95.7%	94.3%	96.6%	94.6%
The Aroostook Medical Center	97.7%	98.9%	98.3%	99.4%
Waldo County General	98.3%	97.6%	98.7%	100.0%
York Hospital	96.7%	98.1%	99.2%	98.7%

Conclusion

This report provides an insight into the efforts currently underway for the prevention of Healthcare Associated Infections. It summarizes compliance rates with well established indicators for the prevention of HAIs.

The HAI quality indicators summarized in this report demonstrate that Maine hospitals continue to show progress in addressing the risks associated with health care associated infections. While there is room for improvement on some of the indicators, the trend seems to point in a positive direction overall.

The partnership among the Maine Infection Prevention Collaborative (MIPC) between hospitals, the quality improvement organization and State governmental agencies has resulted in new opportunities for training, improvement and meaningful reporting. One direct result of this partnership is the immediacy with which partners have taken-up enrolling, reporting and analyzing incidence data through National Health Safety Network (NHSN).

PL 2011, c.316 requires Maine acute care hospitals to report healthcare associated MRSA and *C. difficile* to NHSN. Additionally the law allows the MDHO and CDC to access this data. As such, future reports will be able to incorporate NHSN infection rates into any analysis. It is out this marriage of process and outcome measures that a more complete picture of the status of Healthcare Associated Infections in Maine hospitals will emerge.

NHSN is a secure internet-based disease surveillance system that allows healthcare facilities to share data in a timely manner with other healthcare facilities (e.g., a multihospital system) or with other governmental and non governmental entities such as Maine CDC or Northeast Healthcare Quality Foundation quality improvement organizations). As such, it is a unique tool that allows for reporting and valid estimation of the magnitude of adverse events among patients and healthcare personnel. Furthermore, as a surveillance system it also allows for reporting of healthcare associated infection outbreaks and for the evaluation of adherence to practices known to be associated with prevention of these adverse events and the detection of trends.

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 Maine Healthcare Associated Infection (HAI) Prevention Program is the result of a federal CDC initiative to provide healthcare surveillance within a state public health department. The program was initiated with American Recovery and Rehabilitation Act (ARRA) funds. To accomplish the objectives, 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 to reduce healthcare acquired infections in Maine. In order to measure the progress made, it is necessary that all hospitals report healthcare associated infections using uniform definitions through the National Healthcare Safety Network (NHSN). In the spring of 2011, the Legislature passed a bill which required hospitals to report healthcare associated infections of Methicillin Resistant Staphylococcus aureus (HAI-MRSA) and HAI-Clostridium difficile. The statute states that this data must be validated by Maine CDC prior to public reporting. As of October, 2011, Maine CDC is able to view MRSA and C. difficile HAI data from hospitals via NHSN.

The priorities in the original HAI plan (2009) were to reduce:

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

Since infections are often the result of non-acute care stays, the HAI program at Maine CDC has expanded its efforts into long term care. Maine CDC is offering basic infection control education and resources to long term care facilities (nursing facilities and assisted living), home health, and emergency medical services.

The HAI plan consists of three sections: **infrastructure, HAI surveillance and prevention, and communication/evaluation**. Below are some of the accomplishments to date:

Infrastructure:

- The infrastructure has been built, consisting of the advisory group, a full-time HAI Prevention Coordinator, and a full-time epidemiologist/data analyst. However, due to funding insecurities, the epidemiologist resigned, and due to a hiring freeze, the position remains unfilled.
- Maine CDC has participated in monthly meetings with both the MIPC and the MIPC-Coordinating Committee. The HAI program has offered support to the MIPC by hiring a professional facilitator for the meetings, and providing facilitator training to MIPC members to improve meeting efficiency.

HAI surveillance and prevention:

- Through ***new legislation***, the Maine CDC is now collecting and analyzing HAI data through NHSN for MRSA, C. difficile, and central line infections.
- The Maine CDC has piloted a ***validation protocol*** for central line infections reported to NHSN. We have yet to develop protocol for MRSA and C. difficile-HAIs.
- The HAI coordinator is working with the Maine Health Data Organization and the Maine Quality Forum to ***streamline reporting*** by hospitals.

- Maine CDC has offered increased training on hospital ***outbreak*** investigations. Maine CDC has also supported the education and professional ***certification*** of hospital infection preventionists.
- Maine CDC is working with the state lab (HETL) to ***increased lab capacity*** to identify C. difficile subtypes involved in healthcare outbreaks. This allows insight to the mode of transmission and can be helpful in preventing new outbreaks. Maine CDC continues to build relationships with hospitals and long term care facilities to provide assistance in the event of an outbreak.
- Maine CDC is also working to ***enhance electronic lab reporting*** of common HAI organisms.
- Maine CDC has done two days of external observations for ***hand hygiene*** compliance at all 36 acute care hospitals.

Communication and Evaluation:

- To reduce multidrug resistant organisms, Maine CDC offered a 2 day certification course in ***antibiotic stewardship*** which was attended by almost all hospitals in Maine. Maine CDC is doing a follow-up survey to assess if hospitals have made progress, and what barriers they are experiencing. Maine CDC is collaborating with the Muskie Institute and the University of New England to provide additional education to assist with these efforts.
- Maine CDC, in collaboration with the Northeast Health Care Quality Foundation, has offered three day-long ***infection control seminars for long term care*** staff. The seminars have been attended by staff from 22-25 institutions. The seminars provide infection control education, as well as published resources for the infection preventionist at each facility. The long term care staff are encouraged to network with their local hospital infection preventionist. Maine CDC will offer six more seminars throughout the state prior to September 30, 2012.
- Maine CDC is distributing ***patient education materials***, including “Living with MRSA” and “Moving to a Hospital or Skilled Nursing Facility: What to Expect When You Have MRSA”.

The HAI plan includes these objectives for 2012:

- Facilitate peer-to-peer learning of best practices among hospital infection preventionists through the MIPC.
- Support and encourage the use of electronic data to NHSN.
- Develop baselines 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, regional, and hospital specific surveillance data of healthcare associated infections.
- Support hospitals in reporting catheter associated urinary tract infections and surgical site infections on NHSN, a CMS requirement beginning in January 2012.
- Work collaboratively with academia to educate healthcare professionals to enhance antibiotic stewardship programs in hospitals.
- Work collaboratively with the Northeast Health Care Quality Foundation to improve infection control practices in long term care and to enhance accurate reporting of healthcare associated infections through NHSN by hospitals.
- Continue to develop and distribute information on organisms commonly associated with HAIs.

Viewing healthcare 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 healthcare acquired infections statewide. 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, and then shared with the hospital. 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. Maine CDC is working with other state agencies to streamline the reporting process.

The priorities for 2012 will be to support reporting of mandated data, validate reported data, identify problem areas within facilities and offer intervention, and dovetail national HAI goals with Maine's HAI program.

APPENDIX 3 - Maine Infection Prevention Collaborative, Annual Report 2011

EXECUTIVE SUMMARY

The Maine Infection Prevention Collaborative (MIPC) was established in 2008 and consists of Maine hospital Infection Preventionists, Infectious Disease Specialists and key partners including the Maine Centers for Disease Control and Prevention (Maine CDC), the Maine Hospital Association, the Maine Quality Forum, the Northeast Health Care Quality Foundation, and the Maine Health Data Organization. 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 MIPC in 2011 included:

- All Maine hospitals completed the federally required training and enrolled in the U.S. Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN), which is a national database of health care associated infection and prevention practice adherence data.
- All Maine acute care hospitals joined the Maine CDC NHSN group, which allows Maine CDC access to statewide hospital data.
- All Maine hospitals collected and entered a full year's hospital -wide surveillance data into the NHSN Multiple Drug Resistant Organism (MDRO) Module Metric 1 (Methicillin-Resistant *Staphylococcus* or "MRSA").
- All Maine hospitals continued the legislatively mandated prevalence study of active surveillance testing for MRSA colonization upon admission for five potential high risk groups.
- The MIPC developed and distributed a Summary of a Gap Analysis of MRSA Evidence-Based Practices for hospitals.
- Beginning October 1, 2011, all Maine hospitals collected and entered hospital-wide surveillance data into the NHSN MDRO/CDI Module (Clostridium Difficile infections).
- The majority of Maine hospitals collected and entered a full year's intensive care unit data into the NHSN CLABSI Module (Central Line Associated Blood Stream Infections).
- Maine hospitals realized a 38% reduction in CLABSI infections in intensive care units statewide from 2008 to 2010 with an additional 21% reduction in CLABSI from 2009 to 2010.
- The MIPC developed a Hand Hygiene Compliance Report reviewing hospital specific and state wide averages for hand hygiene for every hospital in the state.
- The MIPC collaborated with the Maine CDC to have independent hand hygiene observers perform monitoring on two separate occasions in all Maine hospitals.
- The MIPC collated, distributed and encouraged adoption of "best practice" tools for improving and monitoring hand hygiene.
- The MIPC developed and distributed Mandatory Influenza Vaccination of Healthcare Workers "Talking Points" along with a summary of current evidence-based practices for sharing with all hospitals.
- The MIPC collaborated with the Maine CDC to implement the *State Plan for the Surveillance and Prevention of Healthcare-Associated Infections* ("State Plan") 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.

- The MIPC served as the state's Healthcare-Associated Infection Prevention Advisory Council for implementation of the State Plan.
- The MIPC presented "Maine's Journey to Prevent Healthcare Acquired Infections" at the Maine Quality Counts Annual Conference in April 2011.
- The MIPC convened the second annual MIPC Summit which provided the opportunity for all members of the MIPC and our peers on the MIPC-Coordinating Committee to share successes and evaluate the progress made in 2011.

The MIPC's major goals for 2012 include:

- Hospitals will collect and enter data into the NHSN Surgical Site Infection (SSI) Module for colon surgeries and hysterectomies beginning January 1, 2012.
- Hospitals will collect and enter NHSN Catheter-associated Urinary Tract Infection (CAUTI) Module in critical care units beginning January 1, 2012.
- The MIPC will develop standardized metrics of both process and outcome data to measure progress in the reduction of the healthcare associated infections specified in the State Plan.
- The MIPC will continue to serve as the state's multidisciplinary advisory group to guide and support the prevention and surveillance activities outlined in the State Plan.
- The MIPC will continue to provide leadership and commitment to the goals outlined in the State Plan for the surveillance and prevention of HAIs.
- The MIPC will advocate for the utilization of NHSN data as the vehicle for any public reporting efforts around HAIs.
- The MIPC will continue collaboration with HAI stakeholders in Vermont and New Hampshire to reduce HAIs.
- The MIPC will 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.
- The MIPC will support the development of a statewide "dashboard" of currently available infection prevention data with hospital-specific information included for each hospital.
- The MIPC will perform a formal risk assessment of its current initiatives to assist the collaborative to prioritize efforts and maximize its limited resources.
- The MIPC will assist the Maine CDC to formulate a process for validation of MRSA and C.difficile HAI data.
- The MIPC will continue to monitor and develop strategies to improve hand hygiene compliance including patient education initiatives and strategies to address staff non-compliance.

FULL REPORT

In 2008, Maine's hospital infection prevention professionals formed the Maine Infection Prevention Collaborative (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. Its mission is to improve the health of the people of Maine by preventing and controlling healthcare-associated infections and the burden of drug resistant organisms. The two major current strategies to achieve these goals are:

- Collaborative development and implementation of evidence-based protocols and guidelines; and
- 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 MIPC. Every hospital CEO has signed a Pledge of Support for the work of the MIPC. Several priority areas have been a focus for the collaborative to date: hand hygiene, multi-drug resistant organisms, central line-associated blood stream infections (CLABSI), surgical site infections (SSI), influenza vaccination of healthcare workers and supporting its members with enrollment and data entry into the U.S. Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN) national database. Much of this work has been accomplished through a subcommittee structure which has become cumbersome and inefficient. As a result, the MIPC is redesigning its workflow to maximize the time spent with the infection control preventionists (IPs) and to be considerate of time requirements outside of the MIPC regularly scheduled meetings.

Hand Hygiene Maine is the only state in the United States that has a consistent methodology for training hand hygiene observers and collecting hand hygiene data. This is a major accomplishment for the MIPC that facilitates identification of best practices for the critically important infection prevention strategy of hand hygiene.

This past year, all Maine hospitals agreed to have 5 quarters of data (January 2010 to March 2011) shared with the Maine CDC for analysis and exploration of performance improvement opportunities for the MIPC. Of note, a total of 193,613 observations were included in the data base. The Maine CDC developed a Hand Hygiene Compliance Report that was shared with each hospital ICP and our partners. The data was presented in several formats to be better utilized by the MIPC and individual hospitals. Each hospital's average observed compliance was graphed and provided in table format. Hospitals were grouped into peer groups by size. Steady improvement of compliance rates were observed over the 15 month time span. The average observed compliance for the first quarter of 2010 was 89%. The average observed compliance for the first quarter of 2011 was 92%.

The limitation of hand hygiene data collection is always validation. Unfortunately, there is no accepted methodology in the literature for validation of hand hygiene observations. Therefore, the data cannot be utilized for hospital-to-hospital comparison. Despite this,

the MIPC members agreed that ANY compliance rate less than 100% requires continued work and support.

The MIPC collaborated with the Maine CDC to implement an independent outside hand hygiene audit program in 2011. Each Maine hospital participated in two audits by outside independent contractors who had been trained by the Maine CDC. However, the audit methodology was slightly different from the MIPC data collection methodology so the audit process cannot be utilized as validation of hand hygiene data. These data provided opportunities for hospitals and the MIPC to discuss the data and explore performance improvement opportunities.

The MIPC Hand Hygiene Subcommittee developed a Minimum Expectations to Promote and Support Hand Hygiene Compliance which was shared with each hospital and IP. These minimum expectations highlight evidence- based practices that hospitals can adopt that will support hand hygiene performance improvement. The Hand Hygiene Subcommittee conducted a survey of Maine hospitals' hand hygiene programs in relation to the minimum expectations. The results were shared with the MIPC. The members of the MIPC voted to focus on three top areas for 2012 as performance improvement opportunities. Those areas are:

1. Implementing patient education strategies i.e. Speak Up Campaigns;
2. Providing positive reinforcement for compliant staff; and
3. Identifying methodologies for managing non-compliant staff.

The MIPC has developed and shared a listing of available hand hygiene resources including posters, competencies, training tools, policies, handouts, and public education handouts.

Multiple Drug-resistant Organisms (MDROs)

The goals established by the MDRO Subcommittee for 2011, along with a brief summary of the related work, are:

- Continue to support hospitals in their efforts to report NHSN MDRO Module Metric 1 (MRSA HAIs) via education and challenging case scenarios.

The MDRO Subcommittee worked to provide case scenarios for study by MIPC members. The discussion rising from these scenarios helped to provide MIPC members with insight and clarity around surveillance definitions for MRSA HAI reporting to NHSN. The collaborative nature of the discussions helped to evenly distribute understanding of surveillance definitions, leading to standardized reporting and improved data quality.

- Complete gap analysis of MDRO prevention strategies in Maine.

Through the concerted effort of the MDRO Subcommittee, thirty-three hospitals in Maine completed a MDRO Gap Analysis that exposed opportunities for improvement. The results of this survey were compiled and shared with MIPC members and the additional members of the MIPC-Coordinating Committee.

- Develop evidence based tools and strategies for MIPC membership to utilize.

After a review of potential areas for improvement based on the MDRO Gap analysis, the MIPC collaboratively determined which strategies would address the areas of improvement that needed more immediate focus. The group decided on the following:

Just in time feedback; improved patient education; and progressive enforcement for lapses in infection control practices. Evidence- based practices were collected via literature search and shared. Examples of policies and how to best implement those policies were obtained and shared with MIPC members. Resources for culture change were proposed for use by IP's.

As Clostridium difficile (C. diff) Infection reporting to NHSN became a goal of Maine Hospitals, the MDRO Subcommittee began to collect real life stories to help share the impact of C diff on patients. Work on antibiotic stewardship, a key strategy to reduce MDROs, was revisited, and talking points for antibiotic stewardship were developed and shared with MIPC members. The Maine CDC is working on enhancing antibiotic stewardship across the state.

Central Line Associated Bloodstream Infection (CLABSI)

The MIPC membership hospitals have decreased CLABSI infections in their intensive care units (ICUs) by 38% from 2008 to 2010 and dropped an additional 21% from 2009 to 2010. This is based on actual outcome data rather than projected data. This was a major accomplishment, and the MIPC will continue to drive the rate down in 2011. A compilation of all the current recommendation was completed and shared with the MIPC membership. Those recommendations were prioritized and baseline compliance information was collected for the MIPC. Several opportunities for performance improvement were identified:

1. Need for development of consistent educational tools for staff responsible for insertion of central line catheters;
2. Increase opportunities for IP attendance at national APIC trainings; and
3. Expanding focus for performance improvement of CLABSI from critical care settings to other areas of the hospitals.

A tool kit for the prevention of CLABSI was developed for MIPC members and shared with all IPs. Several resources that are available on the web were shared with all MIPC members.

The Maine CDC supported several IPs to attend APIC Epi 101 and Epi 201 training this year. This specialized education from experienced national leaders in APIC promotes knowledge and excellence in the practice of infection surveillance, prevention, and control. That assures Maine State IPs have the basic knowledge and skills in Infection Prevention and Control. At least three sessions across New England were open to Maine IPs at little cost. Twenty-five members took advantage of these trainings.

A goal for 2012 is to focus on performance improvement opportunities in non-ICU settings to decrease CLABSI infections in this population of patients.

Surgical Site Infection (SSI)

Work began on preparing hospitals for data submission in NHSN in January of 2012 for all colon surgeries and hysterectomies. NHSN SSI data submission presents some very challenging issues for Maine as many hospitals still utilize paper records for some or all parts of surgical documentation. The data submission has some very significant IT (Information Technology) implications for data submission of the denominator data to allow for accurate risk adjusted infection rate computations.

Several hospitals in Maine are currently submitting data and were very helpful to share processes and lessons learned with the rest of the membership. A presentation was given to the MIPC and key IT professionals in member organizations to help outline the requirements that would be necessary for accurate data submission.

Work to focus on for 2012 will include sharing of evidence based practices and performance improvement tools for reducing surgical site infections in all Maine hospitals.

Mandatory Influenza Vaccination of Healthcare Workers

A hot topic across the United States is whether influenza vaccination should be mandatory for healthcare workers. This was a topic of discussion and a focus for the MIPC. Although the MIPC chose not to develop a statewide policy for hospitals regarding mandatory vaccination, MIPC members agreed that influenza vaccination of staff must be a priority in all Maine healthcare settings. The Maine CDC provided hospitals with a report of healthcare worker vaccination rates for each individual hospital as well as a state average. The statewide average for vaccination for 2010 was near 65%. This represented a modest increase from 2005 rates which were near 40%. Unfortunately, the data had a number of limitations which may have significantly affected the accuracy of the data. The Maine CDC has worked with the Maine Immunization Program and the MIPC to standardize data collection and data definitions for 2011 to improve the data accuracy. Regardless, the report did generate a lot of discussion and the MIPC agreed that vaccination compliance should improve statewide and should be a focus of the MIPC.

Talking points with evidence based practices and helpful tools were developed by the MIPC and shared with the members for use in their own settings. These talking points contained helpful position statements from many national health care organizations such as the American Hospital Association and the Association for the Professionals in Infection Prevention and Epidemiology which supported efforts to improve vaccination of healthcare workers. Several hospitals across the country have made polices, practices, and performance improvement tools available on the web. These websites were included in the talking points.

Association for Professionals in Infection Control and Epidemiology (APIC) - Pine Tree Chapter

The Maine Pine Tree Chapter of the Association for Professionals in Infection Control and Epidemiology (APIC) - Pine Tree Chapter 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 2011, there were 60 active members many of which are MIPC members. A focus of the chapter is providing education to its members. APIC has provided time for several presentations this year by our partners in the Northeast Healthcare Quality Foundation regarding NHSN and specific difficult case

studies. APIC also supports its members to obtain certification in Infection Control. A certification review class was held in October for nineteen members. Several members have taken or have scheduled a time to take their certification test. Currently 44% of Maine hospitals have a certified IP and approximately 55% of current Maine APIC members have achieved certification. This far surpasses the national average of 17% of APIC members who have certification. Funding for this education was provided by the Maine CDC via the federal HAI grant monies.

Conclusion

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

Maine Hospital MRSA-ASC Data Jan 2010-June 2011 as Collected by the Maine Health Data Organization

	Admitted to ICU			Hemodialysis			Prior hospitalization			Overnight stay SNF			Transferred from jail		
Hospital	N	D	%	N	D	%	N	D	%	N	D	%	N	D	%
Blue Hill							63	408	15.44%	21	100	21.00%			
Bridgton	11	176	6.25%	0	1	0.00%	59	585	10.09%	22	146	15.07%	2	4	50.00%
Calais	0	18	0.00%	0	1	0.00%	31	301	10.30%	1	21	4.76%			
Cary	42	216	19.44%				97	563	17.23%	14	78	17.95%	0	2	0.00%
CMMC	290	2807	10.33%	120	328	36.59%	987	5412	18.24%	433	1523	28.43%	2	19	10.53%
CA Dean*							0	51	0.00%	0	7	0.00%			
Down East							41	467	8.78%	26	127	20.47%			
EMMC	66	1692	3.90%	30	348	8.62%	156	3044	5.12%	155	1508	10.28%	0	13	0.00%
Franklin	45	533	8.44%	2	7	28.57%	152	1488	10.22%	74	424	17.45%	1	9	11.11%
Goodall	78	785	9.94%				153	818	18.70%	55	201	27.36%	1	2	50.00%
Houlton	0	1	0.00%	1	3	33.33%	126	630	20.00%	57	195	29.23%			
Inland	43	341	12.61%				66	554	11.91%	40	199	20.10%			
Maine Coast	14	349	4.01%	0	7	0.00%	125	1697	7.37%	71	353	20.11%	0	8	0.00%
MMC	195	3073	6.35%	65	388	16.75%	1298	11648	11.14%	431	2108	20.45%	10	73	13.70%
MGMC	231	1846	12.51%	24	167	14.37%	788	5900	13.36%	258	1183	21.81%	2	15	13.33%
Mayo	30	354	8.47%	0	2	0.00%	55	497	11.07%	29	144	20.14%	0	1	0.00%
Mercy	97	673	14.41%	1	5	20.00%	148	1322	11.20%	84	486	17.28%	1	10	10.00%
Mid Coast	72	930	7.74%				95	701	13.55%	14	206	6.80%			
Miles	51	1066	4.78%	0	2	0.00%	97	787	12.33%	14	118	11.86%	1	4	25.00%
Millinocket*	2	80	2.50%				9	194	4.64%	2	9	22.22%			
MDI	13	184	7.07%				26	232	11.21%	15	78	19.23%			
NE Rehab	14	71	19.72%	18	54	33.33%	355	2734	12.98%	0	6	0.00%	0	1	0.00%
NMMC	42	444	9.46%				136	905	15.03%	52	205	25.37%	0	2	0.00%
Parkview	4	224	1.79%				10	198	5.05%	18	158	11.39%			
Pen Bay	15	382	3.93%	0	7	0.00%	33	730	4.52%	74	735	10.07%	0	29	0.00%
Pen Valley	1	26	3.85%				10	196	5.10%	34	231	14.72%			
Red-Fairview	33	362	9.12%	0	1	0.00%	131	784	16.71%	81	348	23.28%	1	6	16.67%
Rumford	2	74	2.70%	0	3	0.00%	138	886	15.58%	52	211	24.64%			
Sebasticook	2	37	5.41%				8	144	5.56%	22	109	20.18%			
SMMC	90	639	14.08%	16	79	20.25%	510	2663	19.15%	285	979	29.11%	0	3	0.00%
St. Andrews							40	375	10.67%	7	31	22.58%			
St. Joseph	8	142	5.63%				43	682	6.30%	102	637	16.01%	0	6	0.00%
St. Mary's	15	230	6.52%	11	55	20.00%	242	3204	7.55%	114	788	14.47%	1	16	6.25%
Stephens	44	281	15.66%	0	6	0.00%	143	868	16.47%	112	402	27.86%	1	4	25.00%
TAMC	124	864	14.35%	1	7	14.29%	253	1448	17.47%	55	169	32.54%			
Waldo	29	296	9.80%	1	9	11.11%	65	623	10.43%	38	253	15.02%	0	2	0.00%
York	81	449	18.04%	1	11	9.09%	238	1624	14.66%	59	377	15.65%			
Range	0.0 % - 19.7%			0.0% - 36.6%			0.0% - 20.0%			0.0-32.5			0.0% - 50.0%		

* No risk groups exceed 7% (with at least 3 positive results) in original Prevalence Study, so no Active Surveillance Culture data submitted.