MAINE STATE LEGISLATURE

Health Care Associated Infection

Annual Report to the Joint Committee on Health and Human Services

January 30, 2009

Dirigo Health Agency's
Maine Quality Forum

EXECUTIVE SUMMARY

During the first special session of the 123rd Legislature in 2008, hearings and discussion over proposed legislation regarding reporting of healthcare associated diseases led to Chapter 594 of the Session Laws. This directs the Dirigo Health Agency's Maine Quality Forum to submit a report on hospital performance in this area based on performance indicators currently submitted, a summary of current collaborative infection control efforts in Maine, and a summary of additional reporting requirements being considered by the Maine Quality Forum Advisory Council.

Part I of this report contains tables describing and comparing hospital performance in three areas related to infection prevention and outcomes. For many measures of care of patients with pneumonia and measures of surgical care, Maine's hospitals' performance is above or near that of top-performing hospitals in the country. For indicators of performance on prevention of hospital-acquired bloodstream infections and prevention of pneumonia in patients on artificial ventilation, there is more variation in performance, although overall Maine's averages compare favorably with national benchmarks.

However, as expressed in the description of collaborative prevention and control activities in Part II of the report, a public attitude of zero-tolerance attitude for healthcare associated infection is becoming prevalent. The infection control and epidemiology community in Maine is working hard to reduce infection rates. The data in the charts in this report represents a baseline, and it is recognized that opportunities for improvement exist. Part II describes extensive collaborative efforts in this regard. As directed in the 2008-2009 State Health Plan, the Maine Quality Forum helped facilitate the formation of the Maine Infection Prevention Collaborative. There is vigorous, ongoing work by professional groups such as the Pine Tree Chapter of APIC (Association for Professionals in Infection Control and Epidemiology, and the Maine Center for Disease Control and Prevention's Infectious Disease Public Health Workgroup.

Part III of this report describes the current framework used by the Maine Quality Forum Advisory Council in choosing indicators. Although no immediate additions to the list of required reported measures are planned, the Advisory Council will convene a workgroup to assess the current set of indicators in light of new evidence and recommendations.

Full Report

Chapter 594 of the Session Laws of the 123rd Maine Legislature, now incorporated into the statute governing the Dirigo Health Agency's Maine Quality Forum, directs the Forum to

- *"Submit a health care provider-specific performance report ... including health care-associated infection quality data that is submitted by providers to the Maine Health Data Organization."*
- *"Report to the joint standing committee of the Legislature having jurisdiction over health and human services matters on statewide collaborative efforts with healthcare infection control professionals in the State to control or prevent health care-associated infections."*
- *"report to the joint standing committee of the Legislature having jurisdiction over health and human services matters no later than January 30, 2009, with any recommendations from the Maine Quality Forum Advisory Council regarding additional health care-associated infection quality data to be collected from health care providers."*

This report addresses these elements.

I. Health Care Provider-Specific Performance Data

Maine's hospitals must report to the Maine Health Data Organization, directly or through Northeast Health Care Quality Foundation (under contract with the Centers for Medicare and Medicaid Services (CMS) to be the Quality Improvement Organization (QIO) for Maine, New Hampshire, and Vermont), performance on several indicators of quality on health care associated infections. These include:

- Surgical Care Improvement Project indicators (CMS Core Indicators)
    - SCIP-inf-1 (a-h): Per cent of patients who receive antibiotic prophylaxis less than 1 hour prior to 7 types of surgeries and roll-up
    - SCIP-inf-2 (a-h): Per cent of patients who received the correct prophylactic antibiotic for the procedure being done
    - SCIP-inf-3 (a-h): Per cent of patients whose prophylactic antibiotics were discontinued within 24 hours following surgery
    - SCIP-inf-4: Per cent cardiac patients whose serum glucose is controlled at 6 a.m. following surgery
    - SCIP-inf-6: Per cent of surgical patients with appropriate hair removal prior to surgery
    - SCIP-inf-7: Per cent colorectal surgery patients with normal temperature immediately after surgery

- Pneumonia Care indicators (CMS Core Indicators)
    - PN-5b: Per cent of patients receiving antibiotics for pneumonia within 4 hours of hospital arrival (Note: Metric has been changed to within 6 hours of arrival)
    - PN-6: Per cent of patients receiving antibiotics for pneumonia within 24 hours of hospital arrival

Hospitals also must report the following healthcare associated infection (HAI) indicators to the Maine Health Data Organization:

- HAI-1: Central line associated bloodstream infection (CLABSI) rate for intensive care unit (ICU) patients
- HAI-2: CLABSI rates for neonatal (ICU) patients (by birth weight)
- HAI-3: Per cent of (ICU) patients for whom all elements of the CLABSI "prevention bundle" are observed at the time of insertion
- HAI-4: Per cent of perioperative patients for whom all elements of the CLABSI "prevention bundle" are observed at the time of insertion
- HAI-5: Per cent of ventilator patients for whom all elements of the ventilator associated pneumonia "prevention bundle" are observed on a daily basis

Hospital performance on these measures is reported on the Maine Quality Forum website (www.mainequalityforum.gov). Printed tables are included below. Most graphs are sorted by hospital peer group, a Maine Hospital Association designation on the basis of hospital size and other descriptors. Peer Group E contains all of Maine's fifteen critical access hospitals.

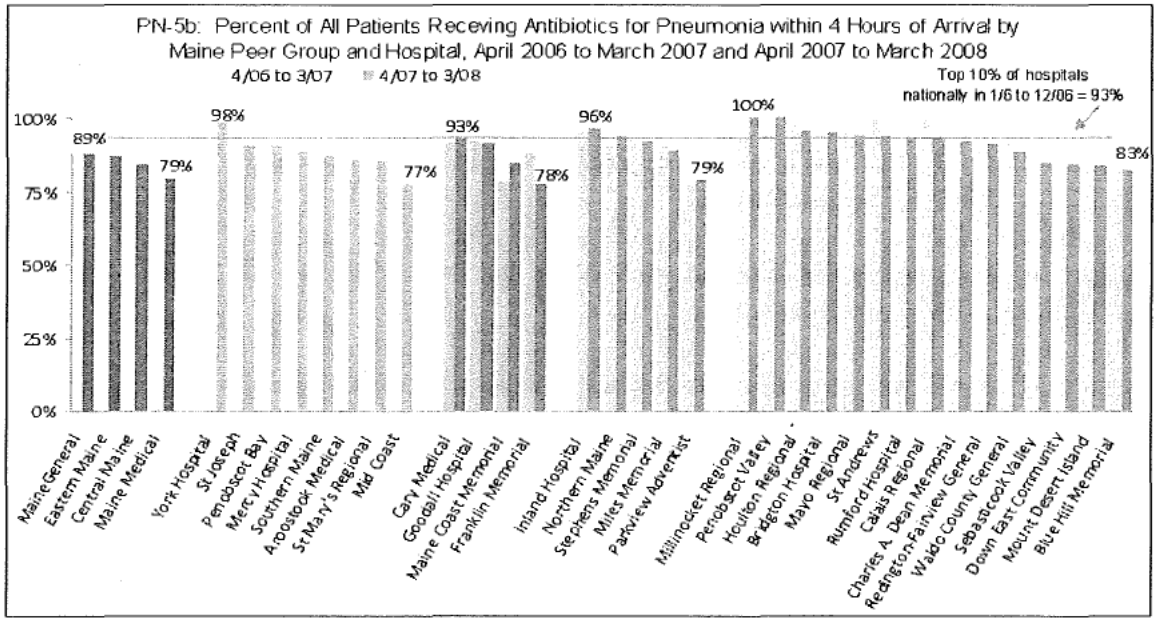


Table 1: Percent of patients receiving timely antibiotics for pneumonia

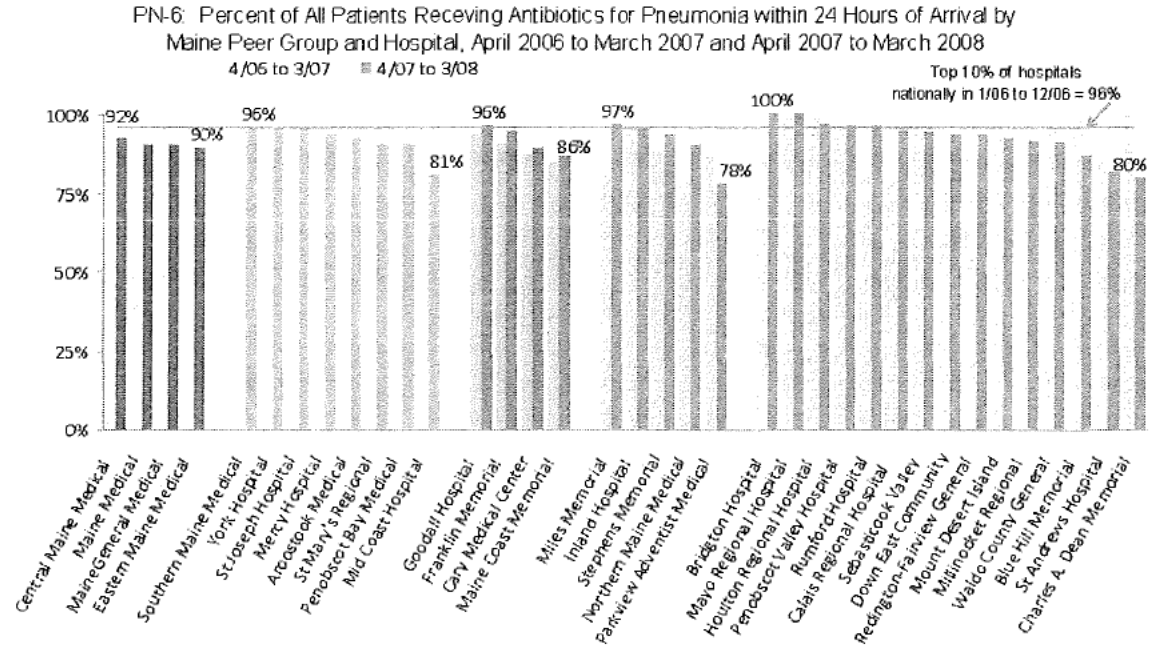


Table 2, PN 6: Per cent of patients receiving the <u>appropriate</u> antibiotic for pneumonia within 24 hours of admission

Tables 1 and 2 show hospital performance during two time intervals for timely administration of antibiotics to patients with pneumonia. Higher performance is associated with better patient outcomes. Performance is compared with the top-performing 10% of all hospitals nationwide reporting to the Center for Medicare and Medicaid Services (CMS). Most hospitals show improving performance.

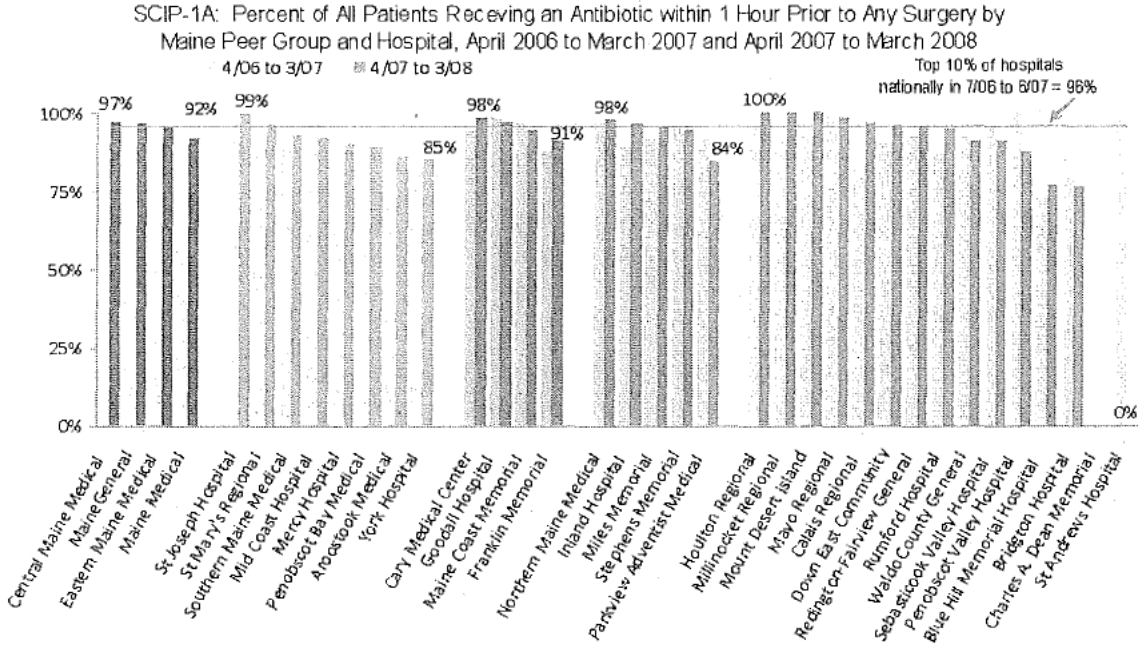


Table 3: Rate of administration of prophylactic antibiotics at the right time prior to surgery

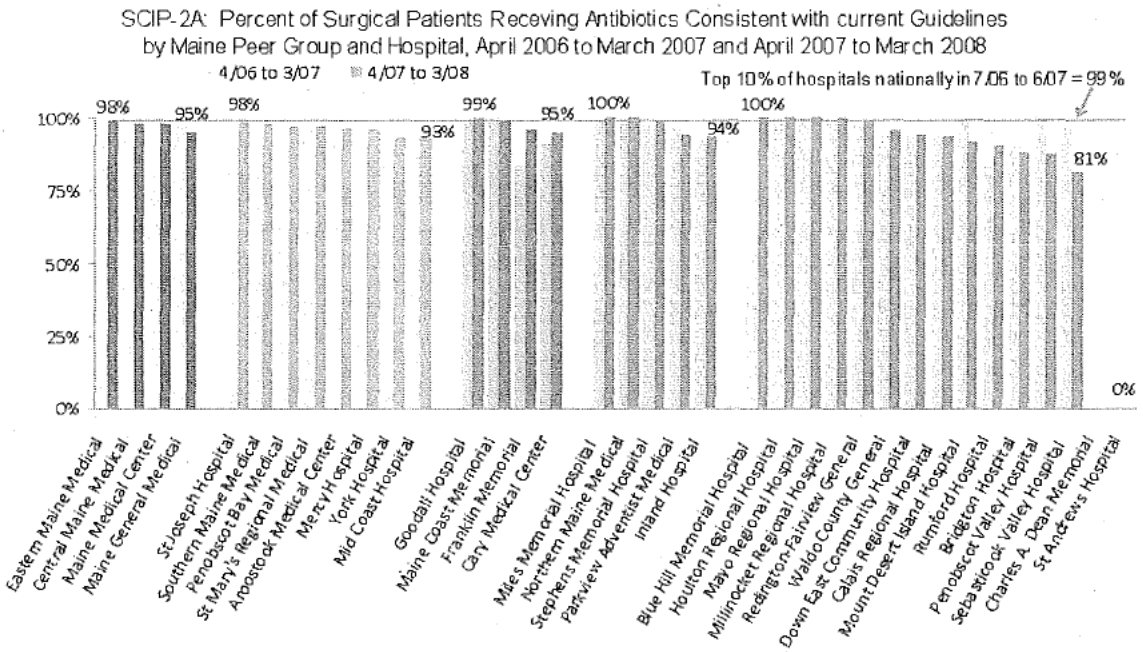


Table 4: Rate of use of correct prophylactic antibiotics prior to surgery (note: national average for 1st quarter 2008 = 95.8%)

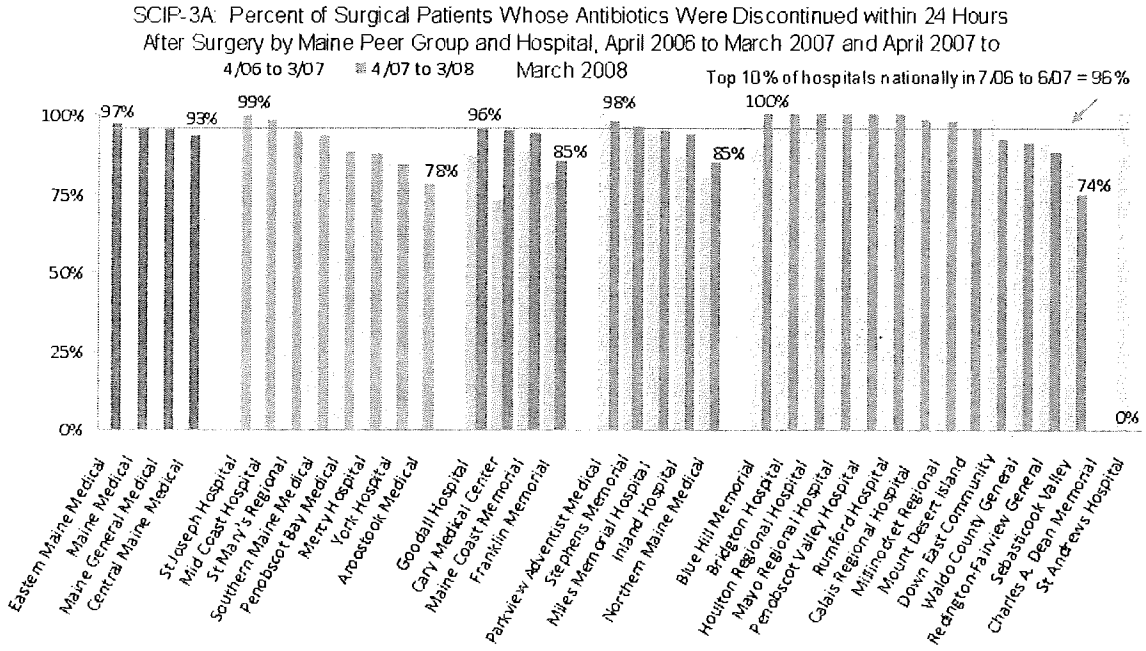


Table 5: Appropriate discontinuation of prophylactic antibiotics following surgery (note: national average for 1st quarter 2008 = 87.7%)

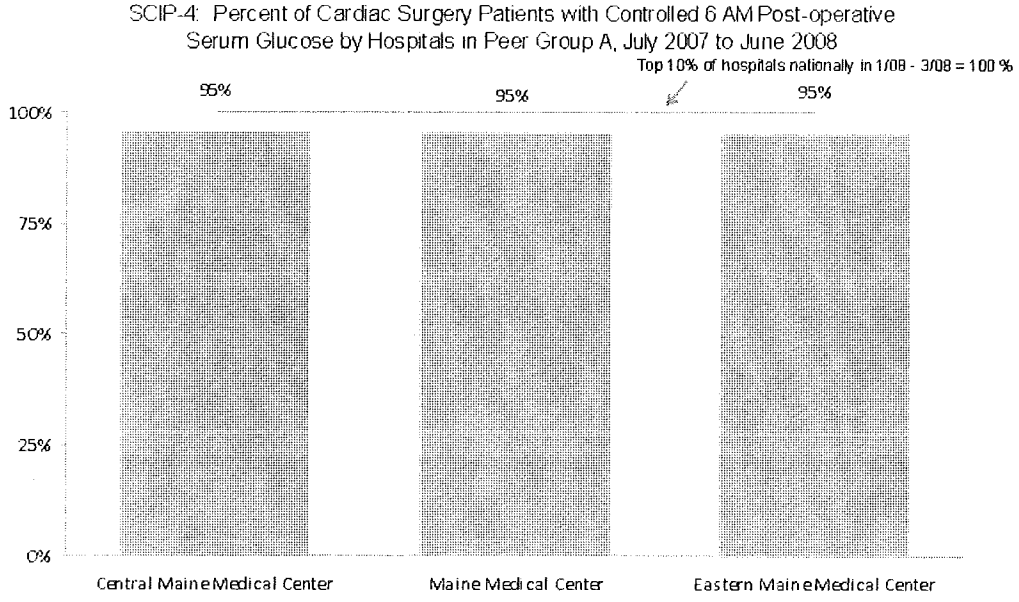


Table 6: Rate of blood sugar control in patients after cardiac surgery (associated with lower infection rates) (note: national average for 1st quarter 2008 = 88.3%)

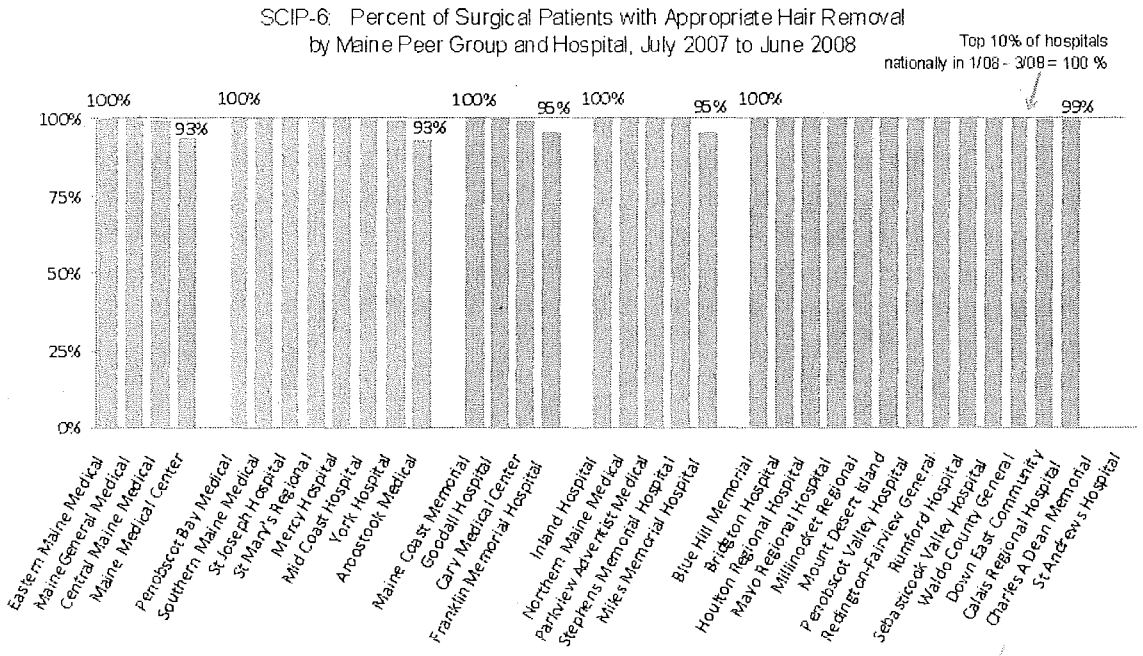


Table 7: Rate of appropriate hair removal prior to surgery (clipped not shaved) (note: national average for 1st quarter 2008 = 96.3%)

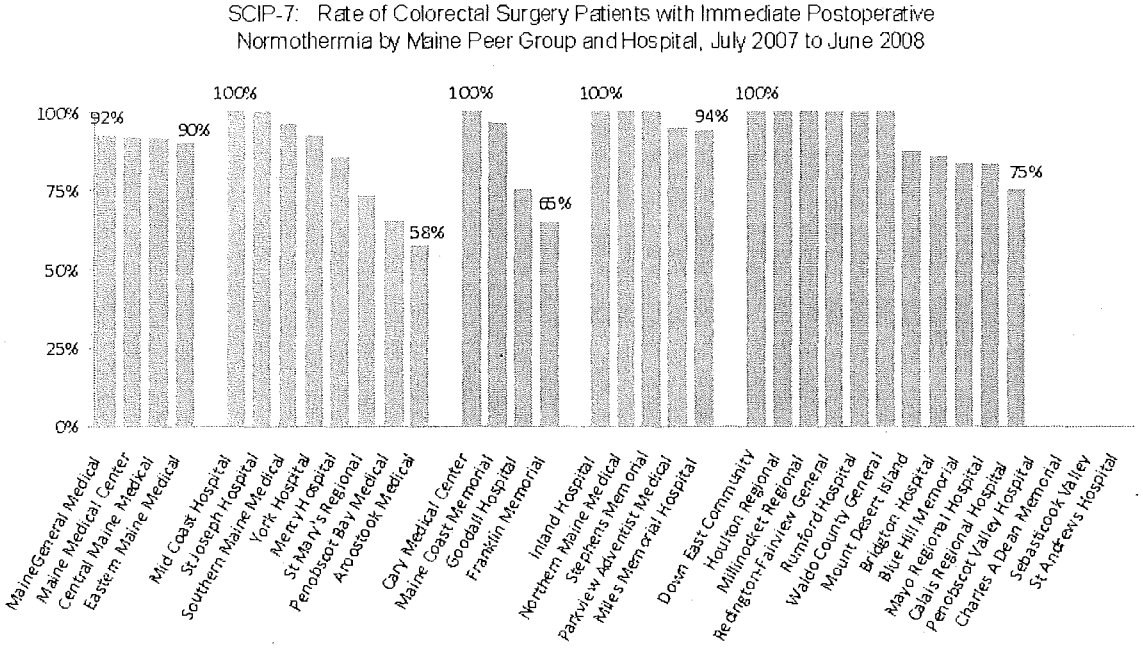


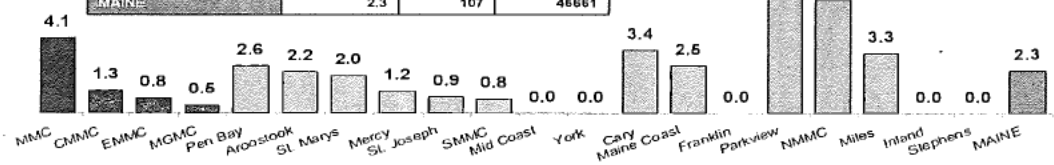
Table 8: Rate of colorectal surgery patients with normal body temperature after surgery (note: national average for 1st quarter 2008 = 84.4%)

Tables 3-8 above show hospital performance on surgical care improvement processes. These processes are associated with reduced surgical site infections and fewer complications. Maine hospital performance in each is compared to the performance of the top-performing 10% of hospitals nationwide who report these measures to CMS. National averages, when applicable, are shown in caption. For more information on these two groups of measures, see the Maine Quality Forum website (www.mainequalityforum.gov) or the CMS "Hospital Compare" website (www.hospitalcompare.hhs.gov).

The following tables show data compiled from hospital reports on infection outcomes (central line associated bloodstream infection) and prevention processes (prevention of central line associated bloodstream infections and ventilator associated pneumonia) in various care settings within hospitals.

HAI-1: Central-Line-Associated Blood Stream Infection Rate per 1,000 Central Line Catheter Days for ICU* Patients, Maine 2007 Q1 to 2008 Q2

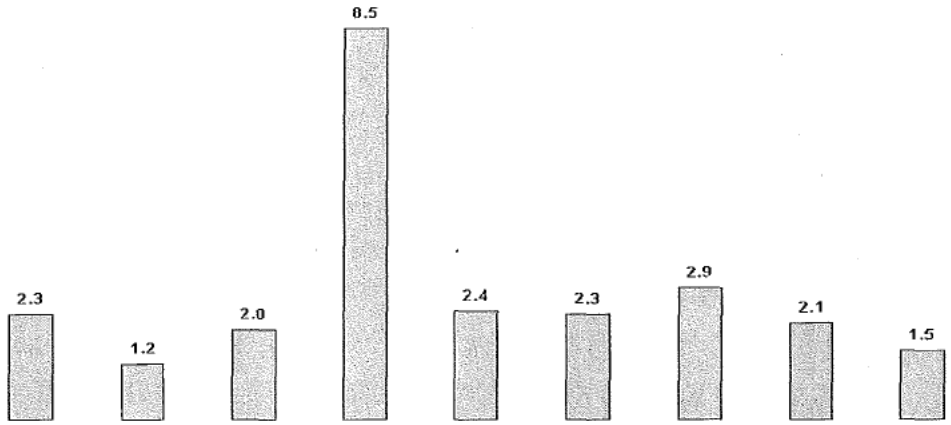
	Rate per 1000	Numerator	Denominator
Bridgton	23.3	2	86
Calais	0.0	0	3
Down East	0.0	0	59
Houlton	0.0	0	31
Mayo	0.0	0	50
Millinocket	0.0	0	69
Mt Desert Island	0.0	0	19
Red-Fairview	0.0	0	192
Rumford	0.0	0	17
Sebasticook	0.0	0	38
St. Andrews	0.0	0	254
Waldo	0.0	0	31
MAINE	2.3	107	46661



	MMC	CMMC	EMMC	MGMC	Pen Bay	Aroostook	St. Marys	Mercy	St. Joseph	SMMC	Mid Coast	York	Cary	Maine Coast	Franklin	Goodall	Parkview	NMMC	Miles	Inland	Stephens	MAINE
	Peer Group A				Peer Group B								Peer Group C				Peer Group D					
Numerator	62	8	10	1	1	1	4	1	1	1	0	0	2	1	0	0	10	1	1	0	0	107
Denominator	15279	6270	11835	2127	388	446	1976	843	1138	1242	860	458	590	393	436	117	583	163	307	160	201	46661

Table 9: CLABSI rate in intensive care unit patients. Critical access hospital (Group E) data tabulated but not graphed because of small numbers

HAI-1: Central-Line-Associated Blood Stream Infection Rate per 1,000 Central-Line Catheter Days for ICU* Patients, Maine Jan 2007 - July 2008 Compared to National Healthcare Safety Network Data for 2006 (from American Journal of Infection Control June 07)



	Peer Group A	Peer Group B	Peer Group C	Peer Group D	Peer Group E	MAINE	NHSN Medical ICU	NHSN Medical Ward	NHSN Med/Surg Ward
Numerator	81	9	3	12	2	107	489	51	58
Denominator	35511	7351	1536	1414	849	46661	170719	24218	38340

Table 10: CLABSI rates in intensive care unit patients, in combined hospital peer groups, compared to NHSN benchmark

Tables 9 and 10 show that the overall central line associated bloodstream infection rate for the 18 months of available data is 2.3 infections per 1000 central line days. This compares favorably with the CDC's National Healthcare Safety Network (NHSN) data base average for medical ICUs of 2.9 infections per 1000 central line days.

Central line associated bloodstream infection rates are also reported for infants in neonatal intensive care settings. These reports are grouped by patient weight and compared to the CDC's National Healthcare Safety Network benchmark rates for similar patients. These reports are demonstrated in the graphs below.

HAI-2: CLABSI Rate per 1,000 Central-Line Catheter or Umbilical Days for NICU Patients Weighing <750 grams, Maine Jan 2007 - July 2008 Compared to National Healthcare Safety Network Data for 2006 (from American Journal of Infection Control June 07)

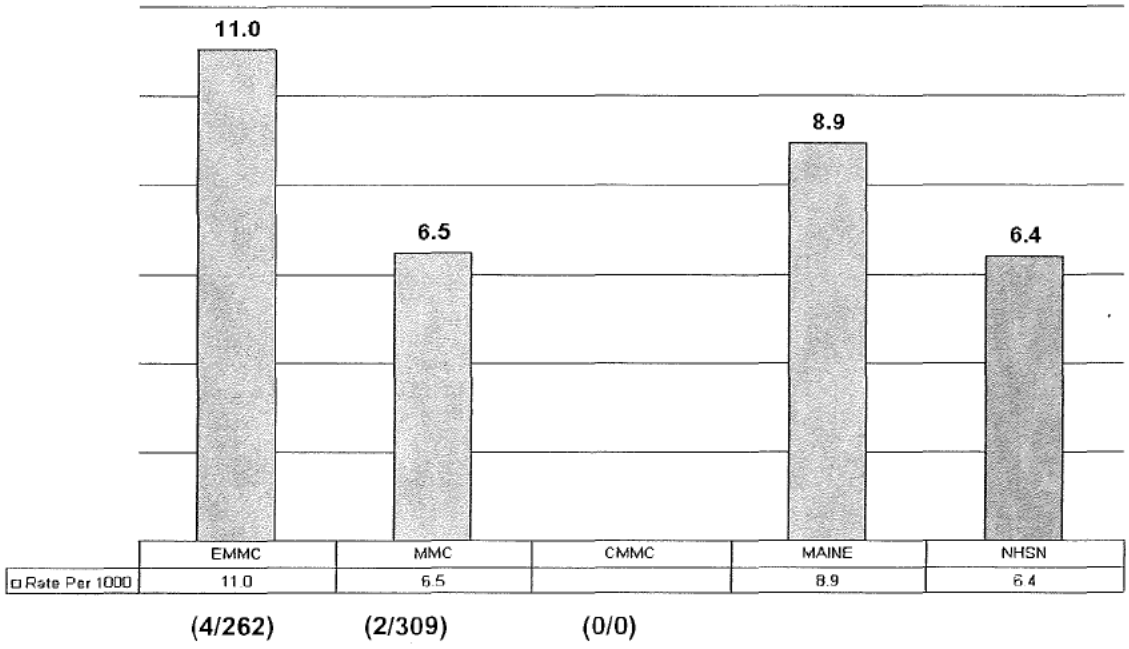


Table 11: CLABSI rates for newborns weighing less than 750 grams (under 26.4 ounces) compared to NHSN benchmark

HAI-2: CLABSI Rate per 1,000 Central-Line or Umbilical Catheter Days for NICU Patients Weighing 751-1000 grams, Maine Jan 2007 - July 2008 Compared to National Healthcare Safety Network Data for 2006 (from Amer Journal of Infect Control, June 07)

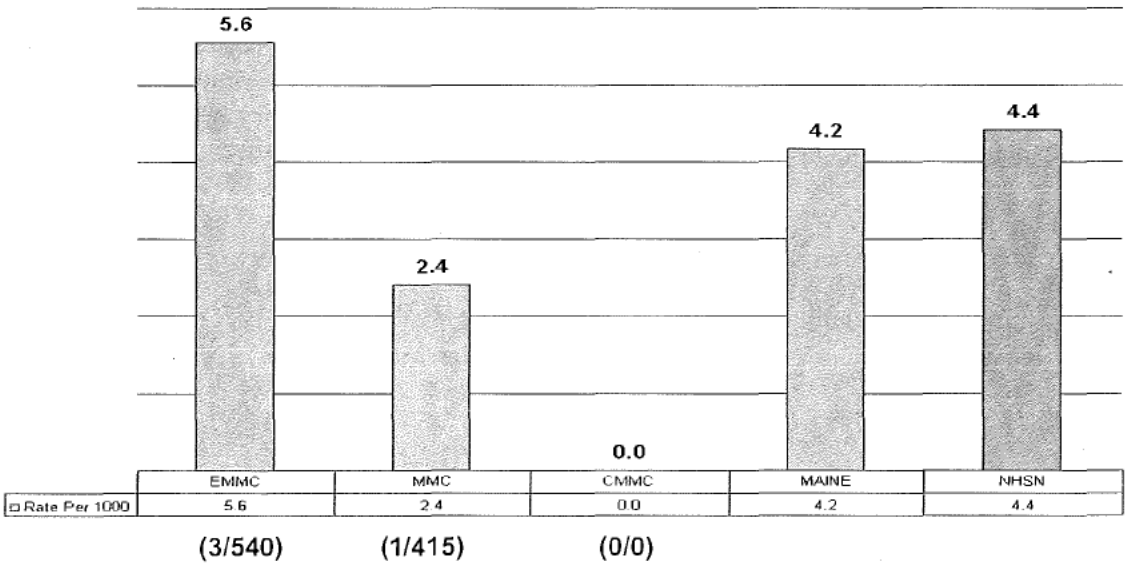


Table 12: CLABSI rates for newborns weighing 751-1000 grams (26.4-35.2 ounces)

HAI-2: CLABSI Rate per 1,000 Central-Line or Umbilical Catheter Days for NICU Patients Weighing 1001-1500 grams, Maine Jan 2007 - July 2008 Compared to National Healthcare Safety Network Data for 2006 (from Amer Journal of Infect Control, June 07)

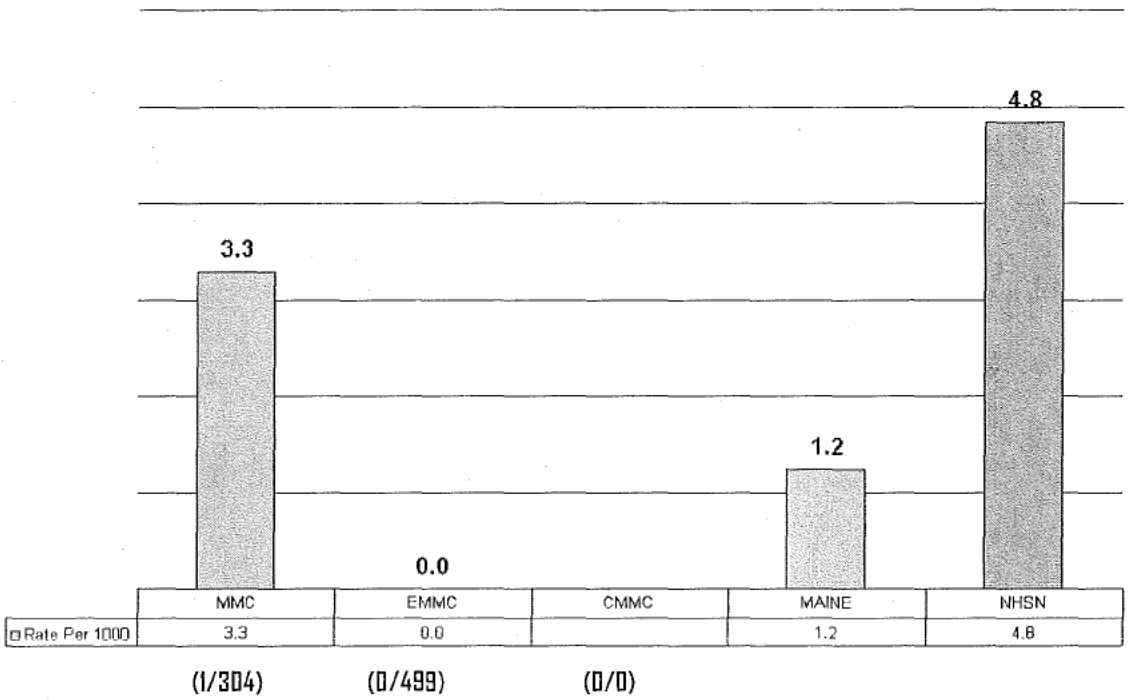


Table 13: CLABSI rates for newborns weighing 1001-1500 grams (35.2-52.8 ounces)

HAI-2: CLABSI Rate per 1,000 Central-Line or Umbilical Catheter Days for NICU Patients Weighing 1501-2500 grams, Maine Jan 2007 - July 2008 Compared to National Healthcare Safety Network Data for 2006 (from Amer Journal of Infect Control, June 07)

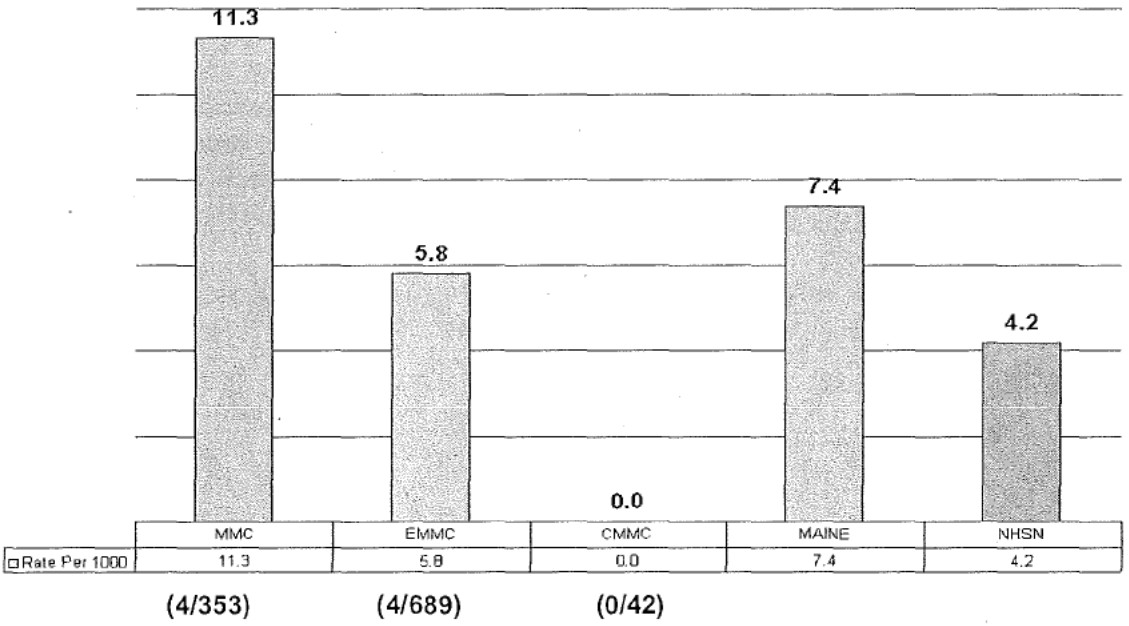


Table 14: CLABSI rates for newborns weighing 1501-2500 grams (52.8-88 ounces)

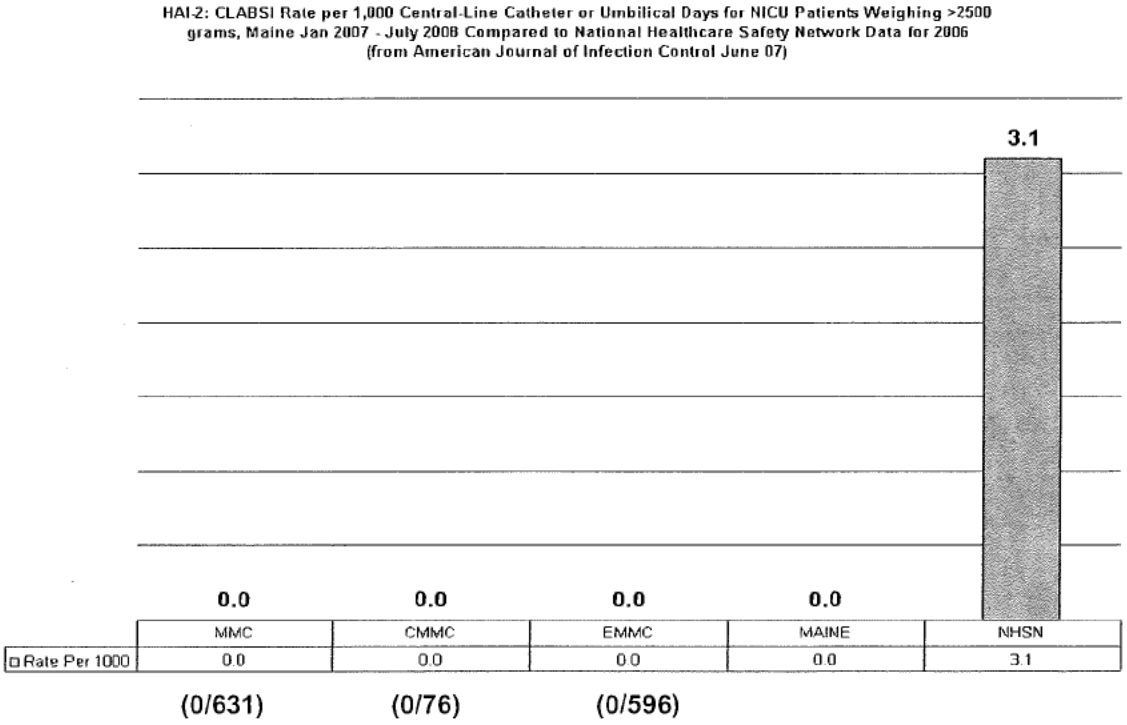
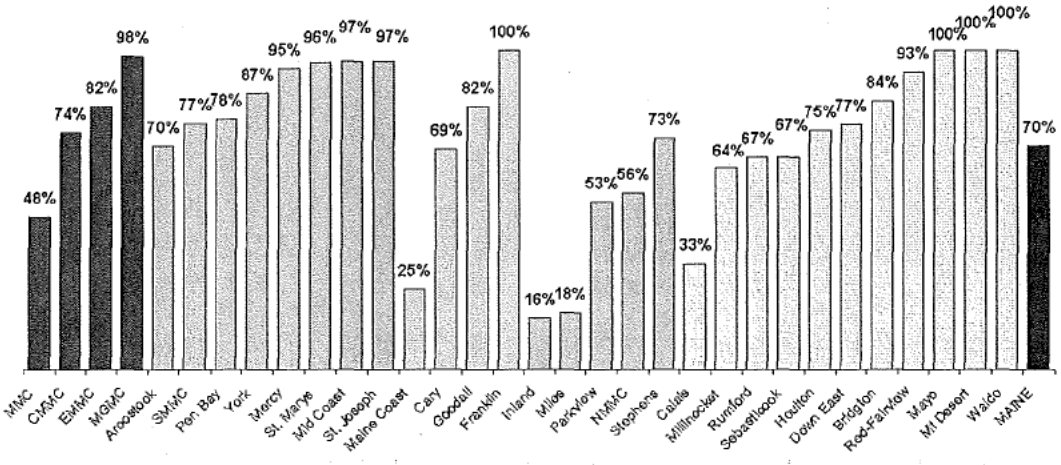


Table 15: CLABSI for newborns weighing over 2500 grams (88 ounces) compared to NHSN benchmark

There are groups, or "bundles" of preventive strategies for central line associated bloodstream infection and ventilator associated pneumonia whose use is associated with fewer cases of these diseases. The following tables demonstrate how frequently these prevention bundles are employed in various care settings in Maine hospitals.

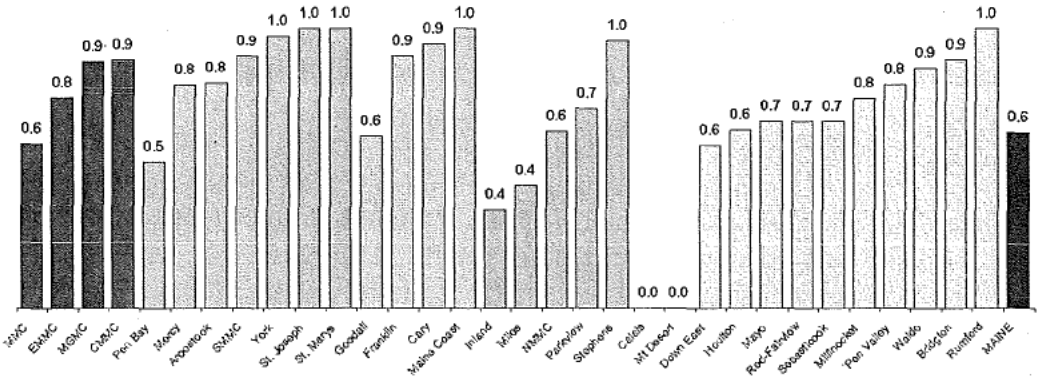
HAI-3: Percentage of ICU* patients with central line catheters for whom all five of the "central line bundle" elements are documented
Maine 2007 Q1 to 2008 Q2



	MMC	CMMC	EMMC	MGMC	Aroostook	Pen Bay	Mercy	St. Marys	Mid Coast	St. Joseph	Maine Coast	Cary	Goodall	Franklin	Inland	Miles	Parkview	NMMC	Stephens	Calais	Millinocket	Rumford	Sebasticook	Houlton	Down East	Bridgton	Red-Fairview	Mayo	Mt Desert	Waldo	MAINE
	Peer Group A				Peer Group B						Peer Group C				Peer Group D					Peer Group E												
Numerator	721	294	692	300	33	51	139	192	111	86	20	60	14	45	4	5	20	10	16	1	7	2	6	6	10	53	43	11	1	12	3095
Denominator	1505	396	839	305	47	65	147	200	115	89	79	87	17	45	25	28	38	18	22	3	11	3	9	8	13	63	46	11	1	12	4410

Table 16: CLABSI prevention bundle use in patients in intensive care units

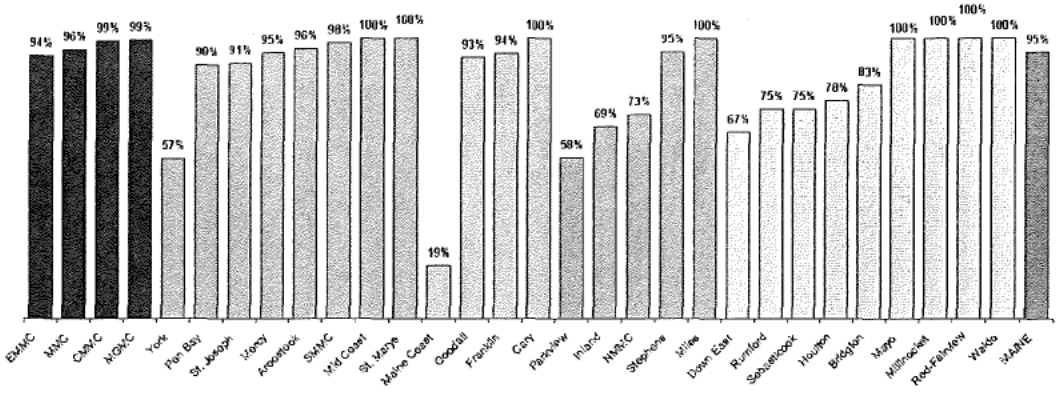
HAI-4: Percentage of patients in surgical suites with central line catheters for whom the four insertion-related elements of "central line bundle" compliance are documented
Maine 2007 Q1 to 2008 Q2



	MMC	EMMC	MGMC	CMMC	Pen Bay	Mercy	Aroostook	SMMC	York	St. Joseph	St. Marys	Goodall	Franklin	Cary	Maine Coast	Inland	Miles	NMMC	Parkview	Stephens	Calais	Mt Desert	Down East	Houlton	Mayo	Red-Fairview	Sebasticook	Millinocket	Penobscot Valley	Waldo	Bridgton	Rumford	MAINE
	Peer Group A				Peer Group B							Peer Group C				Peer Group D					Peer Group E													
Numerator	177	144	37	86	12	4	46	9	138	1	2	8	9	49	32	6	7	12	5	23	0	0	7	7	4	8	2	6	4	24	16	10	204
Denominator	301	191	42	97	23	5	57	10	142	1	2	13	10	52	32	17	16	19	7	24	2	1	12	11	6	12	3	8	5	28	18	10	452

Table 17: CLABSI prevention bundle use in patients in surgical suites (ratio)

HAI-5: Percentage of patients on ventilators in ICUs* for whom all four of the "ventilator bundle" compliance elements are documented Maine 2007 Q1 to 2008 Q2



	EMMC	MMC	CMMC	MGMC	York	Pen Bay	St. Joseph	Mercy	Acadia	SMMC	Mid Coast	St. Marys	Maine Coast	Goodall	Franklin	Cary	Parkview	Inland	NMMC	Stephens	Miles	Down East	Rumford	Sebasticook	Houlton	Bridgton	Mayo	Millinocket	Red Fairview	Waldo	MAINE
	Peer Group A				Peer Group B								Peer Group C				Peer Group D					Peer Group E										
Numerator	616	1292	566	330	20	57	41	73	81	116	65	126	8	27	50	143	19	11	19	59	21	2	3	6	7	5	26	20	54	10	3851
Denominator	656	1344	572	340	49	63	45	77	84	118	65	126	42	29	53	143	33	16	26	62	21	3	4	8	9	6	26	20	54	10	4045

Table 18: Ventilator associated pneumonia prevention bundle use in patients in intensive care units (Note: Actual occurrence of ventilator associated pneumonia is not measured; see discussion under Section III below.)

II. Statewide Collaborative Efforts

During 2008, the statewide **Maine Infection Prevention Collaborative** (MIPC) was formed. Given the variation in infection control and prevention capabilities, sharing resources and knowledge among hospitals makes sense, both to leverage learning and improvement opportunities as well as to extend services beyond individual hospital walls.

Because of geographic distance considerations, the Collaborative has a northern and a southern work group. The southern Maine work group had been formed previously, and includes acute care hospitals in the MaineHealth and Central Maine Healthcare systems, as well as hospitals that are members of neither system. Long term care facilities and some infectious disease physician practices have been involved the southern Maine work group as well. The northern Maine work group was convened in September 2008 by Eastern Maine Healthcare. Between the northern and southern work groups, there has been active participation in the statewide collaborative by 35 hospitals, and the four remaining community hospitals have recently committed to active participation.

The statewide group is supported by a state level coordinating committee that held its first monthly meeting in September 2008. Members include representatives from the two work groups as well as the Maine Quality Forum, the Maine Hospital Association, the Maine Center for Disease Control and the Northeast Health Care Quality Foundation (Medicare QIO for Maine).

Collaborative accomplishments and projects include:

- Development of the Maine Infection Prevention Collaborative Charter, which defines the activities necessary for participation and governance of the organization
- Hosted a group of physicians and administrators from the Duke Infection Control Outreach Network, an infection control and prevention network formed in 1997 that includes 36 hospitals
- Planning for the first combined meeting of the northern and southern work groups with the coordinating committee. This will take place on February 3, 2009. The agenda includes a national speaker with extensive expertise in working with successful collaboratives, which is a popular and effective model for quality improvement work for multi-organizational groups.
- Commitment to share data among member institutions
- Development and implementation of a common hand hygiene assessment tool, with intent to share hand hygiene performance data for process improvement
- Development of a common tool and survey of infection control program capacity and activities in Maine's hospitals

The survey is important because although health care associated infection (HAI) and the transmission of multi-drug resistant organisms are of concern to all Maine hospitals, the capacity of hospitals to address these problems varies considerably, based largely on available expertise and resources. For example, in some hospitals, infectious disease specialist physicians serve as hospital epidemiologists and one or more nurses or medical technologists provide infection prevention and control services; in others, a single nurse fulfills these duties and other quality control and reporting functions in addition to other hospital responsibilities.

- Work with the statewide professional association for hospital pharmacists as they develop an antibiotic stewardship education program scheduled for June 2009 that may lead to the development of collaborative antibiotic stewardship programs

Some Maine hospitals have comprehensive antibiotic stewardship programs in which a clinical pharmacist and an infectious disease specialist physician participate in the antibiotic medication management of patients with infections; most do not have the specialized expertise in-house and may have more limited programs.

Other collaborative initiatives under discussion include:

- Public awareness campaign to disseminate information on drug-resistant organisms, especially methicillin-resistant staph aureus (MRSA) This is currently being planned by the Infectious Disease section of the Maine Center for Disease Control and Prevention (Maine CDC).
- Participation in the federal Center for Disease Control and Prevention's "National Healthcare Safety Network" (NHSN) system of data reporting and feedback. NHSN is a voluntary web-based reporting and surveillance system for capturing data on infections associated with health care delivery. NHSN provides protocols, data collection forms, and data analysis comparing the user's rates with national aggregates. NHSN will soon release a data collection module specific to multiple drug-resistant organisms such as MRSA and C. difficile. The QIO has committed to piloting the use of this module with four hospitals as soon as it is available. In preparation for this work, the Maine Hospital Association and the QIO co-sponsored a statewide educational session in early 2008 which featured a speaker from NHSN and experts from the Institute for Healthcare Improvement who shared recommended strategies to reduce MRSA infections. The QIO presented additional MRSA reduction education to a statewide hospital group in November 2008.

A number of ongoing statewide efforts among infection control professionals pre-date the formation of the new Maine Infection Prevention Collaborative and deserve emphasis. The Pine Tree Chapter of the Association for Professionals in Infection Control and Epidemiology (APIC) is a statewide group of infection preventionists who meet quarterly and work together to emphasize prevention of health care associated infections. Currently, APIC has 75 members including 34 hospital members, 12 long term care members, 7 members from home health or community health centers, the QIO and the Maine CDC.

The Maine CDC holds quarterly meetings of its Infections Disease Public Health Work Group, whose membership includes infectious disease physicians, internists, infection control professionals, and other health professionals in Maine. Topics discussed in 2008 include influenza hospitalizations, invasive MRSA case reporting, Lyme disease update, mumps update, and multiple drug resistant organism infections.

The Maine CDC also holds an annual, well-attended full-day conference. This year "Emerging Infectious Diseases in Maine: The Public Health Response" was held at the Augusta Civic Center on October 28, 2008. A panel discussion moderated by the Maine Quality Forum followed a presentation on "Clinical Management of Drug Resistant Organisms."

III. New Indicators

The Maine Quality Forum Advisory Council has no current plans to add to the list of performance measures (noted previously) now required for reporting to the Maine Health Data Organization by Maine hospitals on health care associated infection prevention processes or outcomes but will reassess its current requirements.

In its process of initial selection of indicators for public reporting, the MQF Advisory Council and its Infectious Disease Workgroup adopted commonly used principles to guide selection. These include *importance* (in the indicator's ability to improve population health), *clear definition*, *reliability, validity* (measures what is intended), *understandability* (by all who use it), *risk-adjustment* (the risk of the observed population should be measurable), *reasonable effort required for collection,* and *actionability* (opportunity for improvement based on the measured results).

In addition, the Advisory Council believes that all required reported measures should be approved by the National Quality Forum (NQF). NQF is a not-for-profit membership organization which approves quality indicators using a consensus process. Currently all HAI indicators required by MQF are NQF-approved. Following is a list of NQF indicators not currently collected by MQF, with explanations:

- Catheter associated urinary tract infections
    - These are associated with relatively low morbidity and cost. Collection of performance data is not felt to be a *reasonable target for resource investment.*
- Ventilator associated pneumonia
    - This diagnosis *lacks clear definition* criteria. MQF does collect *process indicators* aimed at prevention.
- Surgical site infections (in cardiac surgery, hip and knee replacement, colon surgery, hysterectomy, and vascular surgery)
    - In a rural state like Maine, many patients receive follow-up care outside the facility where the surgery was done. This, coupled with short lengths of postoperative stays, makes the measure *unreliable. Risk adjustment* is also a problem.
- Late sepsis or meningitis in neonates and in very low birth weight neonates

Rather than present misleading data to the public, the Advisory Council decided not to require reporting of these indicators at this time. Most concerning to the Advisory Council were the unresolved methodological issues resulting in inaccurate identification of infections and uninterpretable comparison rates.

Selection of performance indicators in this area is an evolving process. Maine has been a leader in the performance measurement and public reporting of healthcare associated infection occurrence and prevention. However, since the initial development of the current set of required indicators by the Advisory Council, there has been increasing

public concern about multi-drug resistant organisms such as MRSA and C. difficile and a desire for a wider spectrum of provider-specific information. There has been further work on development of performance evaluation in infection control and prevention by federal agencies, professional societies, the National Quality Forum, and other states. The Advisory Council will develop a process to reassess the current reporting requirements related to health care associated infection during the coming year.