

Massachusetts Department of Public Health

Plan for the Prevention, Reduction and Elimination of Healthcare Associated Infections in Massachusetts

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A. Establishment of the Prevention Program

1. Legislation: Health Care Reform Law 2006. In April 2006, the groundbreaking Massachusetts health care reform law (Chapter 58 of the Acts of 2006) directed the Massachusetts Department of Public Health (MDPH), Division of Health Care Quality (DHCQ) to develop a Statewide Infection Prevention and Control Program. The Betsy Lehman Center for Patient Safety and Medical Error Reduction (BLC) convened a panel of experts and key stakeholders. This Expert Panel, with the assistance of a variety of local and national advisors, reviewed available evidence, made recommendations delineating the evidence-base strength of those recommendations, and developed specific proposals for prevention and reporting. Under the health care reform law a state budget line item was established to support the program.
 - a. Healthcare Associated Infection (HAI) Prevention Program
Based on the recommendations of the Expert Panel, a collaborative of key components of the MDPH, including the DHCQ (the state regulatory and survey agent), the BLC and the Bureau of Infectious Diseases (BID), established the Healthcare-Associated Infection (HAI) Prevention and Control Program (HAI Program) in February 2008.

2. Legislation: Massachusetts Cost Containment, Transparency and Efficiency Act of 2008 (Chapter 305 of the Acts of 2008). This legislation also required reporting of HAIs (and other serious adverse events defined by the National Quality Forum) and the establishment of a comparative quality and cost information website, including data on HAIs and serious reportable events (SREs).
 - a. Health Care Quality and Cost Council (HCQCC)

The HCQCC is charged with establishing statewide goals for improving health care quality, containing health care costs, and reducing racial and ethnic disparities in health care. The MDPH Commissioner, John Auerbach, is a member of the HCQCC, and MDPH chairs several HCQCC committees that are developing and addressing the HAI and SRE prevention and reporting goals. The HCQCC receives input and advice from an Advisory Committee that includes representation from consumers, business, labor, health care providers, and health plans. Among the Council's specific goals and strategies is the public reporting of HAIs and SREs.
3. Expert Panel Recommendations and Best Practices
 - a. The Expert Panel endorsed a comprehensive set of recommendations encompassing HAI reporting and "best practices" for preventing HAIs, including programmatic aspects of hospital infection prevention and control programs. Technical specifications of these recommendations and a full description of the evidence-based process by which they were developed can be found in Part 1 of the full report --- Prevention and Control of Healthcare Associated Infection in Massachusetts, Part 1: Final Recommendations of the Expert Panel, January 31, 2008. Part 2 of the report contains the detailed information on several related projects that were undertaken. These included: a statewide survey of acute care hospitals to determine their current activities and capacity for participating in additional HAI prevention and/or reporting efforts, focus groups with hospital executives concerning mandatory HAI reporting, formative research with the general public to determine appropriate formats for conveying HAI information, an economic analysis of HAI costs in Massachusetts, and a synopsis of literature concerning best practices for educating healthcare workers on prevention of HAIs. The full report can be found at: www.mass.gov/dph/dhcq.
4. Experience With Program Implementation and Reporting of Process and Outcome Measures
 - a. Workforce assessment

Demands on infection prevention professionals in Massachusetts have increased, with significant time spent on a wide range of other activities including quality assurance, data management, staff education, occupational health, emergency preparedness and environmental issues. In February 2007 there was an average of one infection preventionist (IP) full-time equivalent (FTE) per 178 hospital beds. Less than sixty percent of IPs stated that the resources for infection control activities in their hospital were adequate, even though the perceived rating of institutional support for infection control program activities was high.

- 1) Baseline data
 - i Practices: - Infection prevention directors of 71 acute care hospitals were surveyed in February 2007 and 68 (96%) responded. All of the hospitals were involved in the federally-required Centers for Medicare & Medicaid Services (CMS) programs, and many also participated in other multi-institution efforts to prevent HAIs, including the Institute for Healthcare Improvement (IHI) 100,000 Lives Campaign, Leapfrog, and Patients First. Prevention activities included strategies to reduce central line-associated bloodstream infections (CLABSIs), consistent and timely antibiotic prophylaxis for surgery, and isolation of patients who are positive for methicillin resistant *Staphylococcus aureus* (MRSA). All hospitals were involved in efforts to improve hand hygiene adherence and decrease risk of infection through contact precautions. Most hospitals evaluated the adherence to these efforts and the effect of prevention activities on HAI rates. A majority had identified barriers to adherence and there was a wide range of educational and other interventions being conducted to improve effectiveness and increase performance.
 - ii Reporting - In their recommendations, the Expert Panel supported the use of the Centers for Disease Control and Prevention's (CDC) National Healthcare Safety Network (NHSN) for the collection and transmission of data and identified 10 outcome and 3 process measures for reporting and analysis. They recommended 3 outcome measures for public reporting, 4 outcome and 3 process measures be reported to the BLC for evaluation before public reporting (but with the plan for public release in the future) and 3 outcome measures be monitored internally within healthcare facilities until more satisfactory standard definitions and/or metrics are established for reporting. In April of 2009, the first preliminary public report, based on the first four months of data collection was released by the MDPH. This report presented central line associated blood stream infection (CLABSI) rates by type of ICU, preliminary deep surgical site infection (SSI) rates for hip and knee arthroplasty (insufficient period of follow-up) and experience with the implementation of NHSN (with no pilot period).
 - iii Multi-drug resistant organisms (MDRO) - As an initial step in the surveillance and control of multi-drug resistant organisms, the Expert Panel recommended a point prevalence survey of MRSA infections and colonization in ICU patients. This survey was performed in September 2008. A second point prevalence survey was recommended by the TAG to enhance understanding of these results, and this was completed in September 2009.
 - iv Race and ethnicity - Understanding and preventing racial and ethnic disparities in healthcare is a high priority. Beginning January 1, 2009, all Massachusetts acute care hospitals were required to submit

data on race and ethnicity using “optional” NHSN fields and Massachusetts’ expanded ethnicity codes.

B. Program Principles - The Massachusetts Statewide Infection Prevention and Control Program embarked on a comprehensive and thoughtful process to address infection prevention, public reporting and improvement initiatives. The following principles reflect the broad-based approach to addressing the issue of HAI in Massachusetts.

1. HAIs are recognized as an indicator of patient safety.
2. The prevention of HAI is a leadership, organizational and management priority.
3. Activities are based on current standards of practice and research, published guidelines, accreditation and regulatory requirements and related legislation.
4. Targets and metrics are consistent with those identified by national organizations including CDC, the National Quality Forum (NQF), the Society for Healthcare Epidemiology of America (SHEA), the Association of Practitioners in Infection Control and Epidemiology (APIC) and the Infectious Diseases Society of America (IDSA).
5. Commitment to prevention of all avoidable infections through culture change and proven quality improvement models.
6. Selection of priority best practices for monitored application in healthcare facilities, with prioritization of interventions over 5 years for maximal impact on morbidity and mortality.
7. Effective partnerships and breakthrough collaboratives that utilize integrated approaches for improvement.
8. Promotion of transparency to motivate accountability and performance improvement and to provide consumers with information to make informed health decisions.
9. Building capacity in an ongoing fashion
10. Public engagement
11. Sustainability – The prevention of HAI is a prioritized MDPH initiative.
12. Learning from experience including the effective and timely analysis of initiatives to accelerate program improvement.

C. Leadership and Technical Advisory Group

1. Leadership Group
 - a. Integration and coordination of the Division of Health Care Quality (DHCQ), Betsy Lehman Center for Patient Safety and Medical Error Reduction (BLC), and the Bureau of Infectious Diseases Prevention, Response and Services (BID) staff.
 - b. The HAI Program Leadership Group consists of the Director and Deputy Director of the Bureau of Health Care Safety and Quality (BHCSQ, the Bureau containing DHCQ), the HAI program manager of the DHCQ, the program infection preventionists (2), the lead hospital surveyors (2), the Director of the Betsy Lehman Center, the program epidemiologists (2), the State Epidemiologist, the HAI Prevention Plan Coordinator and the project

manager of the primary contractor, JSI Research and Training Institute, Inc. (JSI).

2. In response to the requirements of the HAI prevention funding awarded as part of the American Recovery and Reinvestment Act of 2009 (ARRA), a State HAI Prevention Coordinator position has been designated and was filled by September, 2009.
3. Role Definitions
 - a. Bureau of Health Care Safety and Quality (BHCSQ) - fiscal oversight of the HAI Program and supervision of the infection preventionists, and regulatory and technical personnel.
 - b. Betsy Lehman Center for Patient Safety and Medical Error Reduction (BLC) - convening of expertise around best practices and research questions, and as a repository of pilot study data.
 - c. Healthcare Associated Infection (HAI) Program - under the leadership of the plan coordinator, direction of the program and adherence to the plan.
 - d. Bureau of Infectious Diseases (BID) - technical support for infection prevention recommendations, policies, and epidemiology of HAIs.
 - e. JSI Research & Training Institute, Inc., (JSI) - major contractor providing technical support to all program components and operations, and management of sub-contracts.
 - f. Technical Advisory Group (TAG)
 - 1) The TAG consists of hospital epidemiologists, infection preventionists, other clinicians, consumers, advocates, academics, and representatives from state agencies, professional organizations and trade organizations.
 - 2) The TAG advises the MDPH on all issues related to HAI and prevention, the results of reports and surveys, the application of surveillance and control methods and the presentation of the results to healthcare providers and the public.
 - 3) A full listing of TAG members and affiliations can be found in Attachment 1.
4. Partnerships
 - a. State Agencies
 - 1) Massachusetts Department of Public Health
 - 2) Betsy Lehman Center for Patient Safety and Medical Error Reduction
 - 3) Massachusetts Board of Registration in Medicine
 - 4) MassHealth (Medicaid agency)
 - b. Trade organizations (hospital association, long term care, etc.)
 - 1) Massachusetts Hospital Association (MHA)
 - 2) Massachusetts Senior Care Association
 - 3) Massachusetts League of Community Health Centers
 - 4) End Stage Renal Disease Network of New England

- c. Professional societies (physicians, nurses, nurse executives, specialty nurses, etc.)
 - 1) Association of Practitioners in Infection Control and Epidemiology
 - 2) Society for Healthcare Epidemiology of America
 - 3) Massachusetts Infectious Diseases Society
 - 4) Massachusetts Medical Society
 - 5) Massachusetts Nurses Association
 - 6) Infusion Nurses Society
- d. Consumer groups
 - 1) Massachusetts Coalition for the Prevention of Medical Errors
 - 2) Medically Induced Trauma Support Services
 - 3) Health Care for All
- e. Other
 - 1) Massachusetts Association of Health Plans
 - 2) MassPro (the Massachusetts CMS Quality Improvement Organization (QIO))
 - 3) All four Massachusetts medical schools
 - 4) Eight specialty, tertiary care and community hospitals

D. Completed and Ongoing Activities

1. Designation of Coordinator - In line with Activity A of the Healthcare Associated Infections: Building and Sustaining State Programs to Prevent Healthcare Associated Infections section of the Epidemiology and Laboratory Capacity Cooperative Agreement, MDPH has designated a coordinator of the HAI Prevention and Control Plan.
2. Infection Prevention Learning Collaboratives
 - a. From July 2007 through June 2009, the Massachusetts Coalition for the Prevention of Medical Errors (the Coalition) <http://macoalition.org/education.shtml> provided educational programming and practice improvement coaching in collaboration with the MDPH and the Massachusetts Hospital Association (MHA), engaging hospital senior leadership and active participation of infection prevention and quality improvement staff. Activities included the following:
 - 1) Seven statewide conferences and thirteen audio conferences focusing on cutting edge infection prevention and quality improvement strategies. All hospitals participated in one or more of these programs.
 - 2) Six workshops and two conference calls to facilitate senior leadership engagement. As a result of this engagement, senior leaders from all hospitals signed a letter of commitment prioritizing infection prevention for their facility.
 - 3) Maintenance of an active web site to share information.
 - 4) Creation of an active infection prevention listserv with approximately 300 members.

- 5) Production and dissemination of a compendium of 34 successful prevention projects reported by 24 hospitals.
 - 6) MDPH has contracted with the Coalition to extend and complement previous efforts to prevent HAIs. The Coalition will conduct two collaborative initiatives targeting reductions in central line associated blood stream infections (CLABSI), and multi-drug resistant organisms (MDROs), and will be guided in this work by the HAI TAG.
3. Validation - Validation of data collected in an HAI reporting system is critical for the interpretation of results and the credibility of the system. Validation protocols (details in further sections) will be developed, piloted and fully implemented.
 - a. The goal of the validation plan is to verify the completeness and accuracy of reporting for CLABSI in ICUs, surgical site infections (SSI) for knee and hip arthroplasty, hysterectomy, and coronary artery bypass graft (CABG) procedures.
 - b. In 2010, the HAI program epidemiologists, the department's infection preventionists and contractors of the MDPH will pilot these protocols, reporting outcomes to the TAG.
 - c. In consultation with the TAG, the application of validation protocols will be evaluated and potentially refined in late 2010, and applied to all acute care facilities in two steps, with 36 sites by December 2010 and all sites by December 2011.
 - d. The data validation and verification protocols will be essential ongoing components of the HAI program.
 4. Expansion to Additional Sites - The health reform legislation and the HCQCC have mandates for expanding HAI prevention efforts across the full spectrum of health care delivery. The Infection Prevention Work Group of the Patient Safety Sub-Committee of the HCQCC has investigated best practices and reporting metrics for a number of care sites and agencies, engaging experts in each area of healthcare to contribute to an understanding of the care setting, the challenges faced in regard to infection prevention and best practices that have been identified.
 - a. Ambulatory surgery - Best practices are being identified and metrics are being determined for ambulatory surgical centers (ASCs).
 - 1) In 2008, regulations were promulgated requiring free-standing ASCs to report infections through NHSN and infection control process measures according to guidelines presently under development.
 - 2) By July 2010, all free standing ASCs will be enrolled in NHSN.
 - 3) By December 31, 2011, a report of selected measures will be posted for public access.
 - 4) Surveyors will utilize the certification standards being developed by CMS when assessing these sites.
 - b. Dialysis units – Best practices and potential reporting metrics are being identified for free-standing dialysis centers.

- 1) Measures for the reporting of HAIs including but not limited to bloodstream infections, will be established through a consultative process including the TAG and experts in dialysis care and infections in dialysis patients.
 - 2) Operators of dialysis units will be encouraged to participate in performance improvement collaboratives, such as that operated by the CDC/Delmarva Foundation Partnership or equivalent.
 - 3) In 2012, regulations for infection prevention and public reporting of quality measures, including HAI will be promulgated for dialysis units.
 - 4) By December 31, 2012, all free-standing dialysis units will be required to have in place reporting procedures specified by MDPH for the reporting of identified quality measures.
- c. Extended care - inclusive of long-term care, rehabilitation hospitals and long-term/acute facilities
- 1) A task group consisting of infection preventionists from extended and acute care facilities, experts in the area of extended care and geriatrics, and representatives of the extended care industry have reviewed potential metrics to monitor and report in these settings including influenza immunization of staff and residents.
 - 2) Metrics under consideration for recommendation to the HCQCC include indwelling urinary catheter days, immunization of staff and residents against influenza and hospitalization for infection.
 - 3) Surveys will be conducted in 2010 to assess the feasibility of these measures and a “needs assessment” will be used to evaluate the educational and technical requirements for future implementation. Data currently collected will provide baseline information for rates of infection, urinary catheterization and immunization, and will provide direction on the necessity of capturing additional HAI related information.
 - 4) The utility of NHSN for these facilities will be evaluated.
 - 5) Metrics will be established by July 2011.
 - 6) There will be ongoing evaluation of the performance of the metrics with adjustments made as needed, in consultation with the TAG.
- d. Infusion therapy centers
- 1) In 2010, MDPH will continue the collaboration established with the Infusion Nurse’s Society and additional stakeholders in the evaluation of infection prevention in infusion therapy centers and to provide direction on the implementation of evidence based guidelines.
- e. Home care and hospice
- 1) In 2011, MDPH will convene a task group to assess the current status of infection prevention in home care and hospice programs and to provide consultation on plans for assuring application of best practices and the potential for reporting measures of infection.

- f. Primary care facilities
 - 1) The Healthcare Quality and Cost Council will require all settings in which patient care is delivered to establish a Patient Safety Program by 2012. MDPH will continue to participate in this process to ensure infection prevention is identified as a core component.

E. Program Targets and Best Practices

1. Initial Prevention Targets

- a. Central line associated blood stream infections (CLABSI) in intensive care units (ICU) - 50% rate reduction by 2014 as compared to the Massachusetts rate identified in 2009.
- b. Surgical site infections (SSIs) - 25% rate reduction in deep incisional and organ space infections complicating hip and knee replacements, hysterectomies and coronary artery bypass graft (CABG) procedures by 2014 as compared to the Massachusetts rates identified in 2009.
- c. Ventilator associated pneumonia (VAP) - 95% compliance with established VAP prevention program in place (self-measurement, justified program components - “bundle” or equivalent) by 2012.
- d. Multi-drug resistant organisms MDRO, Methicillin-resistant *Staphylococcus aureus* (MRSA) - 50% reduction in invasive MRSA cases associated with healthcare.
- e. *Clostridium difficile* - 30% reduction in *C. difficile* infection per 1000 hospital discharges by 2014 as compared to the infections coded in hospital discharges in 2008.
- f. Selection of further targets and their implementation. The TAG will work with MDPH to identify new and enhanced prevention goals by mid-2012.

2. Review and Update of Expert Panel Recommendations

- a. The TAG, with consultation of outside experts, will provide an ongoing review of current best practices and developments in the field of infection prevention.
- b. An annual review of priority targeted interventions and measures will be completed with members of the TAG. Order of priority of review:
 - 1) 2010 - Catheter Associated Urinary Tract Infection (CAUTI), Multidrug-resistant organism (MDRO), *Clostridium difficile* associated disease (CDAD)
 - 2) 2011 - CLABSI, Surgical Site Infection (SSI)
 - 3) 2012 - Ventilator associated pneumonia (VAP), MDRO, CDAD
 - 4) Thereafter, as indicated by ongoing review of the evidence-base and feedback from facilities across the spectrum of healthcare.

3. Validation of Reported Measures

- a. A data quality assurance and validation system is critical to the success of the statewide program. To ensure the accuracy and completeness of the individual facility rates and the overall metrics MDPH is working with its technical contractor to develop and implement methods of data validation, including, but not limited to:
 - 1) Laboratory report reviews
 - i. Laboratory results indicating positive blood cultures in ICU patients will be obtained from acute care hospitals. These data will be compared to trends in reported CLABSIs. Outliers or facilities with CLABSI reports appearing to be discordant with numbers of positive blood cultures will be investigated for unreported bacteremias.
 - ii. Positive blood culture reports will also result in medical record reviews by program staff to assess relatedness to central line utilization or surgical procedures.
 - 2) Medical record reviews
 - i. Medical record reviews designed as a component of the validation protocols developed in 2010 will be performed on a sample of reported cases to rule out “false positives”.
 - 3) Review of clinical laboratory and discharge data
 - i. Laboratory reports obtained through Electronic Laboratory Reporting (ELR), the Hospital Discharge Data Set (HDDS) and the Centers for Medicare and Medicaid Services (CMS) performance measures (such as the Surgical Care Improvement Project (SCIP) measures) will be analyzed as sources of relevant data on progress toward goals as well as for validation of reported measures by December 2011.
 - 4) Data review of procedures and central venous catheter days to assess accuracy of denominator data
 - i. Volume of procedures and numbers of catheter days will be monitored over time for consistency and will be compared to data from the HDDS.
 - ii. Outlier analysis and follow-up will be used for validation.
 - 5) Emergency department records
 - i. Massachusetts collects emergency department visit data and short stay data at acute care hospitals. These data sets will be used to identify patients re-admitted with potential wound infections and will be compared to reported occurrences.
 - 6) Algorithms for checks of internal data consistency will be developed for NHSN data and other data systems employed.

4. Ongoing Initiative

- a. Immunization against influenza - achieving at least 90% immunization of healthcare workers against influenza
 - 1) In 2008-09, MDPH required acute care facilities to report their success in providing influenza vaccine to their employees (defined by payroll).
 - 2) In September 2009, MDPH required acute care facilities, licensed clinics and extended care facilities (extended care facilities had been required previously to provide seasonal influenza vaccine) to provide both seasonal and pandemic H1N1 influenza vaccine to all personnel (broadly defined to include contractors, volunteers and students) free of charge. Due to the newness of the requirements and difficulties associated with vaccine supply, only the acute care facilities were required to report immunization levels in 2010. The deadline for submission of these data is April 15, 2010.
 - 3) In 2011, MDPH will require extended care facilities to report influenza immunization rates for all personnel.
 - 4) In 2012, MDPH will require licensed clinics to report staff immunization rates for all personnel.

5. Communication Plan

- a. Consistent with the principles of transparency and public engagement, the HAI Program's ultimate goal for surveillance and reporting is to provide full public access to data on reported outcomes and process measures that are required by the MDPH. Format will be determined by MDPH with the advice of the TAG (see below). All meetings of the TAG are open meetings and minutes and reports are public documents.
- b. Periodic presentations are provided for the Massachusetts Public Health Council, which constitutes the legal entity of MDPH under the Commissioner who serves as chair with authority to approve regulations. Promulgation of regulations and regulatory amendments are subject to public comment and review and approval of the Public Health Council.

6. Agency and Provider Accountability

- a. Healthcare facilities will be held accountable under regulations of the MDPH Division of Healthcare Quality for full compliance with:
 - 1) Implementation of best practices, including recommendations of the Expert Panel, any revisions in these guidelines as indicated above, the Healthcare Infection Control Practices Advisory Committee (HICPAC) and requirements of CMS.
 - 2) Maintenance of participation in NHSN and timely and accurate completion of data collection and entry.
 - 3) Full and complete reporting of mandated process and outcome measures.

F. Surveillance and Reporting

1. Utilization of NHSN and Other Mechanisms of Reporting

a. Expectations

- 1) All licensed acute care hospitals are currently enrolled in and utilizing NHSN effectively and reliably.
- 2) By July 1, 2010, all ambulatory surgical centers will be enrolled in NHSN and proficient in the use of the appropriate NHSN modules addressing quality metrics identified by MDPH for reporting.
- 3) By December 31, 2012, all dialysis units will have established policies and procedures to assure the transmission of reports of blood stream and/or other infections associated with dialysis at transition of care to acute care or extended health care facilities.
- 4) By July 1, 2010, all extended care facilities will be capable of reporting quality metrics identified by MDPH in a form and manner determined by MDPH.
- 5) In the event of the development of appropriate and feasible modules for NHSN reporting of metrics from extended care facilities, NHSN may be adopted by these facilities for reporting.
- 6) By December 31, 2010, all clinical laboratories licensed to provide diagnostic services in the Commonwealth will be reporting data required by MDPH regulations through the established electronic laboratory reporting (ELR) system.

b. Health Care Facility Support

- 1) NHSN provides interactive distance learning and is available for individualized consultation at nhsn@cdc.gov
- 2) JSI maintains a dedicated e-mail address (haihelp@jsi.com) and telephone number (617-385-3992) for submission of questions related to NHSN and surveillance of HAI. Technical assistance will be provided by contractor through December 31, 2011.
- 3) Staff epidemiologists have developed a quality assurance protocol to monitor and provide feedback to hospitals on data reported to NHSN.
- 4) MDPH staff provides additional support on the reporting requirements on a case-by-case basis.

c. Evaluation

- 1) Reviews of data for internal consistency and completeness of meeting NHSN requirements for data entry.
- 2) Application of data validation algorithms.
- 3) Validation procedures, as described above.
- 4) Periodic review, as above.

d. Infrastructure

- 1) Electronic laboratory reporting (ELR)
 - ii. HL7 standards
 - iii. LOINC, SNOMED standards

- iv. All clinical laboratories licensed to operate in Massachusetts will be required to participate in ELR by December 31, 2010.
 - 2) Massachusetts Virtual Epidemiologic Network (MAVEN)
 - i. Web-based, disease surveillance and case management application with ELR interface.
 - ii. Exploration of interoperability with NHSN during 2010-2011.
 - iii. The developed “outbreak module” that has been created in MAVEN offers facilities a web-based outbreak management tool that can interface with MDPH. It is currently being piloted at one hospital. If its utility to infection prevention programs is established, it will be provided free-of-charge to hospitals in 2011.
 2. Procedure for Determining Level of Reporting for HAI Related Process and Outcome Measures (public, agency, internal)
 - a. Default reporting will be to the public
 - b. Reporting to the BLC of any metrics during a pilot phase or when there is uncertainty about the reliability of data collection or basis of comparison of facilities (case mix differences, service provided, level of care, etc.).
 - c. Internal reporting, within the institution for tracking performance and results of quality improvement activities not for public dissemination. Measures where standardization is uncertain or are relevant to specialized services provided may be recommended for internal reporting. These measures must be in a format available for review by MDPH.
 3. Public Reporting of HAI Related Process and Outcome Measures
 - a. Communication Plan – All public reporting will be accomplished:
 - 1) Through periodic written reports.
 - 2) Through a website that is part of or linked to the existing HCQCQ site: “My Health Care Options”.
 - 3) By July 1, 2010, the following data, related to reporting requirements for acute care hospitals will be available on the website:
 - i. SSI resulting after primary hip or knee arthroplasty, by hospital, July 1, 2008 - June 30, 2009.
 - ii. CLABSI (Criterion 1) in ICU patients, by hospital, July 1, 2008 - June 30, 2009.
 - iii. CLABSI (Criteria 1, 2 and 3) in ICU patients, in aggregate, by ICU type.
 - iv. SSI resulting from abdominal and vaginal hysterectomy, in aggregate, by hospital type, July 1, 2008 - June 30, 2009.
 - v. SSI resulting from CABG, in aggregate.
 - vi. Point prevalence surveys of MRSA in ICUs, September 2008 and September 2009, in aggregate.

- vii. Influenza vaccination of employees, 2008 - 2009, in aggregate.
- viii. Influenza vaccination of health care personnel, 2009 - 2010, by hospital.
- 4) By July 1, 2011, reportable outcome and process measures for infection prevention in ambulatory surgical centers and long term care facilities will be added to the web site.
- 5) Public reporting of HAI will utilize CDC recommended qualitative indicators, including standardized infection ratios (SIR).
- b. Reporting from non-acute healthcare facilities and agencies – enhanced surveillance
 - 1) Identification of measures for extended care, dialysis units, home care and hospice and other sites, as per above.
 - 2) Implementation
 - i. Data systems will be identified as measures and capacities are established.
 - 3) Ongoing evaluation of validity, utility, transparency and public application.
- c. Multi-drug resistant organisms (MDRO) and *Clostridium difficile*
 - 1) Methicillin-resistant *Staphylococcus aureus* (MRSA)
 - i. MDPH will continue and expand reporting of invasive MRSA infection, with implementation of electronic laboratory reporting from all licensed clinical laboratories by December 31, 2010.
 - ii. Clinical laboratories will connect via ELR as per requirements that became effective as regulatory amendments in 2008 (105 CMR 300).
 - iii. All laboratories will report isolates of MRSA obtained from blood cultures or from cultures of other normally sterile body fluids and sites.
 - iv. By July 2011, MDPH will analyze these reports and calculate population-based rates of invasive MRSA infection using hospital proportion of hospital discharges to estimate proportion of Massachusetts population at risk.
 - v. MDPH will explore methods to capture admission date with laboratory reports received through ELR in order to establish likelihood of laboratory results representing healthcare-acquired infections.
 - a) If feasible, by July 2012, MDPH will analyze these laboratory results with respect to positive cultures collected before and after two days following date of admission.
 - vi. By December 31, 2010, MDPH will publicly report population-based rates of invasive MRSA infection, in aggregate, statewide and by region, to establish a benchmark.

- a) It will be noted that these rates will initially be inclusive of community-associated, as well as healthcare associated, infections.
 - b) If feasible, per above, by December 31, 2012, MDPH will publicly report rates of healthcare-associated invasive MRSA infection (as defined above in terms of culture positivity after admission) by hospital.
 - vii. MDPH will continue to encourage and accept submission of all clinical isolates of *S. aureus* potentially resistant to glycopeptide antibiotics such as vancomycin, as part of state and national surveillance for confirmed vancomycin resistance.
 - viii. MRSA point prevalence surveys
 - a) The results of the second MRSA point prevalence study in ICUs will be analyzed by February 2010.
 - b) By July 2010, the results of the second point prevalence survey will be reviewed by the TAG and recommendations will be made as to the need or design of further studies or prevention measures.
- 2) Antibiofilms
- i. MDPH will continue to monitor aggregate antibiotic susceptibility reports from clinical laboratories for proportion of *Staphylococcus aureus* isolates that are non-susceptible to oxacillin (MRSA). Currently, such “antibiograms” are submitted voluntarily, and laboratories will be encouraged to continue doing so.
 - ii. By December 31, 2010, regulation will be promulgated to require all licensed clinical laboratories in Massachusetts to adhere to the Clinical and Laboratory Standards Institute (CLSI) guideline for standard reporting of antibiograms, as presented in *Analysis and Prevention of Cumulative Antimicrobial Susceptibility Test Data; Approved Guideline - Third Edition (M39-A3)*, or as amended in further editions, and with consideration given to laboratory volume of specimens processed and results generated.
 - iii. By December 31, 2010, regulation will be promulgated to require all licensed clinical laboratories in Massachusetts to submit institutional antibiograms for sequential 12 month periods (calendar, academic or fiscal year), with consideration given to laboratory culture volume and multiple sources of culture submission (outpatient versus inpatient).
 - iv. MDPH will explore electronic means of transmission of antibiogram data or direct transmission of susceptibility test results.

- v. MDPH will provide periodic public reports of trends in *S. aureus* susceptibility to oxacillin and other antimicrobial agents, based on antibiogram analysis.
- 3) *Clostridium difficile*
- i. MDPH will monitor *C. difficile* infection in hospitalized patients using the uniform Hospital Discharge Data Set (HDDS) and codes for *C. difficile* infection (ICD-9: 008.45; ICD-10: A04.7) in any field.
 - ii. By December 2010, MDPH will provide a report on *C. difficile* infection in Massachusetts; trends, demographics, hospitalization type (primary or secondary diagnosis) and outcomes, using the HDDS and death certificate data.
 - iii. By December 31, 2011, MDPH, in consultation with the TAG, will review available data and data sources on *C. difficile* infection and make a determination as to useful public reporting by facility or facility type.
 - iv. By January 1, 2011, all clinical laboratories will report stool specimens positive for evidence of toxigenic *C. difficile* infection by ELR.
 - vi. MDPH will explore methods to capture admission date with *C. difficile* laboratory reports received through ELR in order to establish likelihood they represent healthcare-acquired infections.
 - vii. In 2012, MDPH will evaluate the use of laboratory reporting of stool specimens positive for evidence of toxigenic *C. difficile* infection as a means of monitoring trends in *C. difficile* infection and as a surrogate for infection acquired in a healthcare facility (positive 48 hours or more hours after admission, with a negative or absent earlier result) versus community-acquired.
- 4) Other MDROs
- i. Recognizing that MRSA infection accounts for a small proportion of all healthcare-associated infections, MDPH will put into place monitoring of antibiograms for trends in other organisms of concern associated with healthcare-associated infection, including, but not limited to, gram-negative bacilli in general, extended-spectrum beta-lactamase (ESBL) producing organisms and carbapenemase-producing organisms.
 - ii. MDPH will co-sponsor conferences on infections due to extended-spectrum beta-lactamase-producing organisms, carbapenemase-producing organisms and other gram-negative MDROs in the spring and fall of 2010.
 - iii. By December 31, 2010, MDPH will present a report to the TAG on occurrence and trends in MDROs of concern to

inform and guide consideration of further surveillance activities and prevention initiatives.

- 5) Response to MDRO surveillance findings outside of expected
 - i. By July 1, 2011, MDPH, in consultation with the TAG, will develop guidelines for the interpretation of facility/agency specific surveillance indicators of prevalence or incidence of MDROs that will trigger surveys and interventions to establish cause and recommend evidence-based prevention interventions.
4. Evaluation of Validity, Utility, Transparency and Public Application of Reported Measures
- a. Analysis
 - 1) JSI will develop and implement protocols using shared products of CDC and other states to validate completeness and accuracy of reporting. These protocols will be piloted in 3 acute care facilities in early 2010 and then applied to the 36 acute care facilities by December 31, 2010. All acute care facilities will have these validation methods applied by December 31, 2011.
 - 2) In 2010, JSI and MDPH will explore the use of the hospital discharge data set, CMS performance measures and ELR data for use in validation of measures reported by acute care hospitals.
 - b. Provider input
 - 1) MDPH infection preventionists will collect programmatic suggestions from facility-based providers and others as part of their routine and complaint generated visits. Periodic surveys of providers will be performed to assess their opinions regarding surveillance and use of data.
 - c. Public input
 - 1) Public input will be solicited on the accessibility and utility of data presented to the public.
 - 2) Utility and public application of the data reported by facilities will be measured by consumer satisfaction surveys, number of “hits” on the reporting web sites and surveys of how consumers use the reported information in making informed decisions.
 - i. Consumer surveys will be conducted annually beginning in 2011.
 - ii. Web site visits will be monitored monthly.
 - iii. Public feedback will be continuously solicited.
 - d. CDC recommendations
 - 1) Evaluation and validation of mandatory reporting will be guided by protocols developed by CDC.
 - e. Experience of other jurisdictions
 - 1) The shared experiences of other jurisdictions will be of great value in operations of the program and evaluation of parameters of success.

- f. Process for selection of additional HAI process and outcome measures
 - 1) CDC and the United States Department of Health and Human Services (DHHS) guidance.
 - 2) Recommendations of the TAG.
 - 3) Identification of emerging HAI issues.
 - 4) Experience of other jurisdictions.

G. Evaluation and Oversight

1. Oversight

- a. Healthcare facilities will be held accountable under regulations of the MDPH Division of Healthcare Quality for full compliance with:
 - 1) Incorporation of review of compliance with HAI prevention and reporting requirements in routine and other surveys.
 - 2) Periodic review of HAI prevention and reporting efforts by MDPH infection preventionists.
 - 3) Review of NHSN data and other reports.
- b. Experience with review and oversight will guide ongoing improvement of processes and responses to serious breaches in infection control, suspect cases and clusters, and outbreaks.
- c. The formalization of infection prevention review and oversight will enhance the already well-established collaboration of DHCQ and BID in occurrence and outbreak investigation and follow-up.

2. Efficacy of Acute Care Facility Programs

- a. Process measures
 - 1) MDPH infection preventionists and DHCQ surveyors will review facility adherence to best practice process measures, including but not limited to the central line bundle and VAP prevention processes. Feedback will be given to facilities.
- b. Outcomes
 - 1) Outliers at one or two standard deviations of standardized infection ratio (SIR) of reported outcome measures will be identified for review for accuracy of surveillance and reporting, as well as application of prevention measures.
- c. Programmatic adequacy
 - 1) Routine and complaint driven surveys will assess application of best practices, effectiveness of multidisciplinary teams (as evidenced by minutes of meetings, responses to out of range indicators, quality improvement initiatives), and staffing.

3. Provider Behavior and Behavior Change - All licensed healthcare facilities in Massachusetts are required by regulation or under deemed status to have an infection prevention and control program. As above, facilities are currently required or will be required to report quality indicators related to infection prevention, including process and outcome measures.

- a. Performance
 - 1) Process and outcome measures submitted through NHSN and directly to the MDPH will be monitored for outliers, with both positive and negative deviation from the mean.
 - i. By December 2010, MDPH in consultation with the TAG will establish parameters for identification of outliers for specific process and outcome measures.
 - ii. Using these parameters, MDPH will identify positive and negative outliers and query them for possible explanations of their reports (data error, artifact, successful or failed policies or procedures).
 - iii. MDPH infection preventionists will follow-up with site visits and surveys, as necessary.
- b. Interventions
 - 1) Negative outliers, as defined by the parameters set as above, will be queried as to cause.
 - 2) If response suggests a true outlier condition, a formal survey will result, with a plan of correction being required.
 - 3) The plan of correction will be in place until the facility can successfully demonstrate improved performance on the measure in question.
 - 4) Analysis of reported data will be used to target and promote focused infection prevention programs.

H. Education and Training

1. Promotion of Best Practices - A fundamental commitment is made to the promotion of the best, evidence-based practices that have been demonstrated to reduce HAI. In order to accomplish this, the Statewide Infection Prevention program will:
 - a. Provide clear expectation of hospital compliance with best practices consistent with the recommendations of the Expert Panel, HICPAC and other authoritative sources.
 - b. Routinely communicate updates and revisions to guidance on infection best practices to healthcare facilities and additional stakeholders.
 - c. Promote best practices through statewide prevention collaboratives (see below).
 - d. The Statewide Infection Prevention Program shall solicit feedback on recommended practices, as well as monitor trends in outcome and process measures reported and maintained by the facilities relevant to the practices.
2. Collaborative Learning - A major goal over the next two years will be to establish statewide collaboratives and communities of practice to build capacity in addressing HAI using evidence-based methods. The focus will be on proven methods and assessment applying a general plan-do-study-act (PDSA) cycle approach.

- a. The Massachusetts Coalition for the Prevention of Medical Errors, under contract with MDPH and working closely with the BLC, MHA, MassPro (the state CMS QIO) and the Eastern Massachusetts Health Initiative (Boston-area hospitals sharing best practices to reduce infections), will continue to provide support and facilitation for collaborative efforts in reducing HAIs. The approach will incorporate Positive Deviance change process to promote staff ownership combined with group exploration and idea generation through discovery and action dialogues, applying principles of adult and group learning in working sessions of the collaborative.
- b. Eliminating Central Line Associated Blood Stream Infections (CLABSI). Beginning in October 2009, the Coalition and the MHA will coordinate the participation of at least 10 hospital ICUs in the second cohort of the Initiative to Reduce Central Line Associated Blood Stream Infections based on the Michigan Keystone Initiative. The program will include:
 - 1) Implementation of the Comprehensive Unit-Based Safety Program (CUSP) and other interventions to reduce CLABSI, with focus on creating a culture of safety and the use of checklists, utilizing face-to-face learning sessions and monthly coaching calls for ICU staff, and monitoring rates before and after the interventions. CUSP learning sessions, coaching calls, and data monitoring and review activities are scheduled for October 2009 through May 2011.
 - 2) Efforts will be made to replicate this program in all ICUs in acute care hospitals by December 31, 2011, using the local capacity generated by participation in the CUSP.
- c. Multi-Drug Resistant Organisms - The Coalition, under contract with MDPH, will begin a second HAI prevention collaborative applying the Positive Deviance approach, combined with conventional quality improvement approaches, including tests of change (PDSA cycles) to address a range of MDROs, including, but not limited to, MRSA, *Clostridium difficile* and vancomycin-resistant enterococci (VRE).
 - 1) The Coalition will collaborate with MassPRO to share best practices identified during the MRSA prevention efforts under the CMS 9th Scope of Work.
 - 2) The Coalition will continue the collaboration with the Eastern Massachusetts Health Initiative in ongoing and extended efforts to reduce infections related to MDROs.
 - 3) The Coalition and MDPH will continue to seek input and advice from the TAG on best practices and evidence-based approaches.
 - 4) Hospital teams will participate in learning groups, face-to-face sessions, coaching calls and sharing of experiences (June, 2010 through October, 2011).
 - 5) The MHA will continue to engage senior hospital leadership in these efforts.

- 6) On-going review of the collaborative process will lead to the identification of sustainable programs to maintain reductions in infections related to MDROs.
 - 7) By December 2011, BLC and MDPH will take this information and establish standards for policies and procedures to reduce MDROs.
 - 8) Established standards and outcome measures will be monitored through 2012 by surveys and reports of MDROs.
 - 9) Evaluation of results of MDRO infection reduction initiatives will be reviewed by the TAG at the end of 2010 for the purposes of consideration of new or modified recommendations.
- d. Massachusetts Neonatal Quality Improvement Collaborative – Mass NeoQIC is an existing collaborative of neonatologists from all 10 level 3 neonatal intensive care units (NICUs) in Massachusetts. They have approached MDPH to work with them in their efforts to reduce preventable infections. They meet 2-3 times per year and are in the process of exploring formal incorporation. Massachusetts level 3 NICUs have joined the Vermont Oxford Network (VON) and have reached out to colleagues in neighboring states, including the New York Regional Perinatal Centers for sharing of best practices and data. The member NeoQIC NICUs are currently tracking the VON infection indicators, as well as reporting CLABSIs to MDPH through NHSN. They have executed formal agreements to share deidentified data among member NICUs.
- 1) MDPH recognizes NeoQIC as a quality improvement collaborative and will partner with NeoQIC in the area of infection prevention.
 - 2) MDPH staff will work with MassNeoQIC in identification of best practices, reporting of NICU measures of infection and utilization of data for quality improvement.
 - 3) MDPH will use NeoQIC as an additional source of consultation related to infection prevention issues in neonatal intensive care.
3. Solicitation of Best Practices and Sharing of Successful Program Elements.
- a. In addition to formal collaboratives, the BLC, the MDPH and contractors will create opportunities for the sharing of best practices across the spectrum of health care delivery, including hospitals, outpatient care sites, ASCs, dialysis units, home care, etc. This will be done through annual and more frequent conferences, surveys and visits by MDPH infection preventionists and Division of Health Care Quality staff.
 - b. The BLC and MDPH will utilize the TAG in an advisory capacity and convene work groups on specific topics and issues. The goal will be to create “communities of practice” within and across disciplines.
4. Standards for Competence and Practices
- a. In 2010, MDPH will engage the TAG in further defining best practices for training and certification of professionals in HAI prevention.

- b. MDPH will consult with internal and external expertise in regard to establishing requirements for education, training and certification of healthcare professionals in HAI prevention.
5. Health Department Training
- a. MDPH staff will participate in conferences and training opportunities presented by CDC and other agencies, as well as participate in educational programs provided by partners in HAI prevention, including JSI and sub-contractors.
 - 1) MDPH and JSI staff will continue to participate in monthly NHSN state users calls.
 - 2) MDPH staff will participate in monthly Council of State and Territorial Epidemiologists (CSTE) calls.
6. Healthcare Facility Staff Training
- a. JSI will provide four teleconference training sessions for facilities utilizing NHSN. Topics will focus on data cleaning issues, updates to NHSN modules, NHSN skills, and analysis of data.
 - b. NHSN training will be ongoing for current and new users.
 - c. Working with professional organizations and academic partners, MDPH will offer or co-sponsor conferences and other opportunities in infection prevention education.
 - d. As new facilities, such as ASCs and extended care facilities begin reporting process and outcome measures, MDPH will provide technical assistance in the use of NHSN and other data systems to be used for monitoring and reporting.
 - e. Training on NHSN and applicable NHSN modules will be offered to ASC staff in 2010.
 - f. As metrics are developed for extended care facilities prior to June 30, 2010, appropriate face-to-face and teleconference trainings will be designed and offered on data systems, surveillance definitions and reporting.
 - g. By July 2012, MDPH will promulgate regulations to require all licensed healthcare facilities to provide annual infection prevention training for all staff, appropriate to their job function, and suitable to the work site, including but not limited to hand hygiene, newly identified best practices, cleaning and disinfection, and emerging infections. Details of these regulations will be determined through the established regulatory development and promulgation process.

I. Public Engagement and Education

- 1. Communication Plan - The Statewide Infection Prevention Program will issue reports of mandated outcome and process measures, by facility and in aggregate, at least annually.

2. Assuring Transparency
 - a. All reports of measures mandated to be reportable will be posted on the web sites indicated above.
 - b. All meetings of the TAG shall be open and all minutes and reports shall be treated as public documents, unless the TAG is acting in a capacity of consultation or review with the BLC under its confidentiality protection.
3. Evaluating Penetration and Utilization of Reported HAI Information
 - a. The Statewide Infection Prevention Program will assess use of published information by the public through:
 - 1) Review of consumer queries or complaints addressed to MDPH.
 - 2) Surveys of consumer knowledge, attitudes and behaviors related to the reported data.
 - 3) Questions in the 2011 Behavioral Risk Factor Surveillance System (BRFSS) addressing awareness of HAI, knowledge of programs to address HAI, and understanding and use of comparative data provided by the Statewide Infection Prevention Program.
 - 4) Feedback provided by organizational partners.
4. Targeted Information and Educational Campaign
 - a. The Statewide Infection Prevention Program will continue to work with the Partnership for Healthcare Excellence and additional consumer advocacy groups on fact sheets, guides and public information efforts to address:
 - 1) Hand hygiene
 - 2) Consumer participation and role in reducing HAI
 - 3) Prudent use of antibiotics
 - 4) Effective use of available sources of information to make health care decisions
 - b. 2009 amendments to hospital licensure require hospitals to establish Patient and Family Advisory Councils. The Statewide Infection Prevention Program will explore the potential for increased patient and family participation through collaboration with these new entities.

J. Ongoing Economic Analysis

1. In addition to the CMS Medicare non-payment of hospital-acquired conditions related to infection prevention (catheter-associated urinary tract infection, vascular catheter-associated infection, mediastinitis after coronary artery bypass grafting and surgical site infections following certain orthopedic procedures and bariatric surgery), the Massachusetts Cost Containment, Transparency and Efficiency Act of 2008 (Chapter 305 of the Acts of 2008) required reporting of healthcare-associated infections (and other serious adverse events defined by the National Quality Forum) with a provision for non-payment of claims for preventable HAIs and other SREs.

2. In 2010, MDPH will seek academic partners to develop a method of using information collected by CMS and the HCQCC on claims denied based on preventable HAI and SREs to assess economic impact of these events.
3. In 2011, MDPH will explore further methods of assessing the economic impact of HAI and implementation of best practices in consultation with the TAG.

K. Appendices

1. Prevention and Control of Healthcare-Associated Infections in Massachusetts, Part 1: Final Recommendations of the Expert Panel at:
http://www.mass.gov/Eeohhs2/docs/dph/patient_safety/haipcp_final_report_pt1.pdf.
2. Prevention and Control of Healthcare-Associated Infections in Massachusetts. Part 2: Findings from Complementary Research Activities at:
http://www.mass.gov/Eeohhs2/docs/dph/patient_safety/haipcp_final_report_pt2.pdf.
3. Technical Advisory Group Membership (attachment 1)
4. Preliminary surveillance report at:
http://www.mass.gov/Eeohhs2/docs/dph/quality/healthcare/hai_prelim_report.pdf.
5. Template for State Healthcare Associated Infections Plan (attachment 2)
6. Gantt chart of selected activities (attachment 3)