Programs to prevent *C. difficile* infection: a multiple strategy approach in Massachusetts

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Since 2007, the Massachusetts Department of Public Health has sponsored programs to support healthcare-associated infection (HAI) prevention. Hospital-based efforts led to a 25% reduction in *C. difficile* infections (CDIs) among participating facilities. Current programs address the challenge of unnecessary antibiotic use in elderly long-term care residents, decreasing an important risk factor for CDI.

*Clostridium difficile* is a potentially life-threatening bacterium and the most commonly recognized cause of infectious diarrhea in hospitalized patients. In the past decade, the epidemiology of *Clostridium difficile* infection (CDI) has shifted, showing evidence of increased incidence and severity. Risk factors include advanced age, exposure to antimicrobials, and hospitalization, making residents of long-term care facilities particularly vulnerable. Between 2003 and 2009 the number of discharges from Massachusetts hospitals with a discharge diagnosis of CDI increased over 40%, as did the rate per 1,000 discharges.

The Department of Health and Human Services National Action Plan to reduce healthcare-associated infections (HAIs) calls for a 30% reduction in hospital-onset CDI by 2014. Guidelines exist for the prevention of CDI in healthcare settings, but are not universally followed. To support state-level efforts to reach HAI targets, the Centers for Disease Control has made funding available for HAI prevention. The Massachusetts Department of Public Health (MDPH) has partnered with the Massachusetts Coalition for the Prevention of Medical Errors since 2007. A two-year hospital-focused CDI prevention initiative was launched in 2009, followed by collaborations with long-term care facilities (LTCFs) (2011-2012), and most recently, a focus on decreasing inappropriate antibiotic use. This article describes our early successes and ongoing efforts to support CDI prevention in Massachusetts healthcare facilities.

25% reduction in *C. difficile* infection

The *C. difficile* Prevention Collaborative (2009-2011) brought 27 hospitals together to implement strategies to prevent transmission of hospital-acquired *C. difficile* infection (HACDI). By program’s end we achieved a 25% reduction in HACDI per 10,000 patient days among participating hospitals.

The Massachusetts CDI Prevention Collaborative provided support to these facilities using a core set of change principles and strategies (Table 1).

Participating hospital teams augmented the resources offered by the Collaborative with their own commitment and creative approaches to achieve an overall 25% decrease in the rate of CDI per 10,000 patient days. The work on *C. difficile* prevention in Massachusetts healthcare facilities continues and is currently supported by Masspro as part of the 10th scope of work.

Leveraging hospital knowledge to create cross-continuum collaborations and focus on antibiotic use

In 2011 the Massachusetts Infection Prevention Collaboration expanded to include the Massachusetts Senior Care Association. With this new partnership we extended our CDI prevention work to include the state’s LTCFs. With traditionally fewer resources than their hospital counterparts, representatives of the long-term care community have actively and enthusiastically engaged in this work.

In initial work with LTCFs, the challenges of antibiotic stewardship came to the fore, since antibiotic use is an important risk factor for *C. difficile* infection in the elderly. These challenges are heightened when long-term care residents move back and forth between hospitals and their facilities.

With additional CDC funding, the current Massachusetts initiative (2012-2013) brings together improvement teams from 31 LTCFs and 10 hospital emergency departments. The focus
of this work is to reduce inappropriate testing and treatment of urinary tract infection (UTI) in elderly LTCF residents.

The challenge

About one-third of antibiotic use in long term care residents is prescribed for the treatment of urinary tract infection; much of this may be unnecessary [1]. Up to half of elderly LTCF residents have asymptomatic bacteriuria [2], that is, bacteria in the urinary tract without an active infection. National medical specialty society guidelines recommend that a UTI be diagnosed, for most of the population, only when specific symptoms in addition to a positive culture are present [3].

A continued widespread misunderstanding exists among those who care for the elderly—that many non-specific symptoms, such as change in mental status, fatigue, or falls, are likely due to urinary tract infection. Consequently, the elderly with no specific symptoms of UTI are being treated on the basis of a positive culture. This practice persists, despite research that clearly demonstrates no benefit from treating residents with asymptomatic bacteriuria. The American Geriatric Society recently listed giving antibiotics for asymptomatic bacteriuria as one of the top five things clinicians and patients should question [4].

Our approach (Table 2)

Similar to the CDI prevention learning collaborative, we are encouraging participating facilities to:

- Create multidisciplinary teams
- Attend regional workshops, webinars and conference calls
- Engage leadership and include front-line staff in identifying barriers and developing solutions
- Use a quality improvement framework and tools
- Enhance communication within facilities, and encourage increased understanding, trust and communication between ED providers and staff in long-term care facilities
- Track core measures using interactive Excel workbooks

To address knowledge gaps and ongoing myths on this topic we have added the following features:

- Education for improvement teams on:
  - Increasing risks of antibiotic use, for individuals and the broader community
  - High prevalence of asymptomatic bacteriuria in

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Table 1. Principles and strategies for reduction of CDI

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<thead>
<tr>
<th>Principle</th>
<th>Strategy</th>
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<td>Lasting change is facilitated when a broad range of staff roles are included in the work from the beginning.</td>
<td>Encouraged creation of multidisciplinary improvement teams, including representatives from infection prevention, nursing, quality improvement, clinical leadership, microbiology, pharmacy and environmental services.</td>
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<td>Sustainable change is enhanced through a combination of shared best practices and local modification</td>
<td>Provided a common set of practice and policy recommendations for surveillance, testing, isolation, hand hygiene, contact precautions, and environmental cleaning and disinfection</td>
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<td>Quality improvement approaches should include a combination of shared learning and site-based learning through small tests of change</td>
<td>Programming included: three statewide full-day learning and sharing workshops, regional workshops featuring expert presentations and accomplishments of Collaborative participants, list serve access, and regular communication with team leaders, and coaching as needed.</td>
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<td>Front-line staff engagement in identification of barriers and potential solutions enhances lasting change</td>
<td>In addition to traditional quality improvement training approaches that would include best practices in infection prevention and a framework and tools for quality improvement, specific strategies for engaging front-line staff in improvement work were offered.</td>
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<td>Program support should be responsive to the needs of participants</td>
<td>Periodic one-one phone conversations and group coaching calls identified challenges. For example, an interest in antibiotic stewardship led to the creation of an informal workgroup and conference calls with a CDC expert.</td>
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<td>Ongoing review of data is essential to quality improvement activities</td>
<td>Participants tracked rates of healthcare-acquired C. difficile infection, using the CDC’s NHSN definition. An Excel workbook was distributed for data entry that also created run charts showing progress over time that could be shared with facility teams.</td>
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LTCF residents

- Myths and facts regarding signs and symptoms of UTI in this population
- Development and distribution of materials and tools to support facility efforts
  - Graphic clinician education sheets (using an Academic Detailing approach) for both LTCF and ED prescribers and nurses
    - are based on social science principles of adult learning and behavior change
    - address common myths and facts
    - recommend alternatives to testing when appropriate
    - acknowledge both clinical and non-clinical influences on testing and treatment.
  - Educational pamphlets for LTCF residents/families, and ED visitors/families:
    - address importance of prudent antibiotics in the elderly
    - include a UTI-specific information sheet
  - UTI protocol for LCTFs
    - Provides decision support tool for urine testing and treatment
    - Enhances communication between nursing staff and prescribers

This program runs through July 2013. Practice support tools are available on the website of the Massachusetts Coalition for the Prevention of Medical Errors. [http://macoalition.org/evaluation-and-treatment-uti-in-elderly.shtml](http://macoalition.org/evaluation-and-treatment-uti-in-elderly.shtml)

### Table 2. Strategies for CDI prevention

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<th>Most frequent areas for improvement included:</th>
<th>Improvement approaches included:</th>
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<td>Cleaning and disinfection (71%)</td>
<td>Combining leadership support with front-line staff participation for a top-down/bottom-up approach</td>
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<td>Timing and communication around lab test ordering (71%)</td>
<td>Reinforcing training and education in infection prevention practices</td>
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<td>Consistent use of contact precautions (57%)</td>
<td>Improving communication on test results and contact precautions</td>
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<td>Hand hygiene (21%)</td>
<td>Enhancing culture of infection prevention through ongoing conversation, review of data, and distinctive signage and videos.</td>
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<td>Patient placement (14%)</td>
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### References

2. Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults, CID 2005;40:643-654