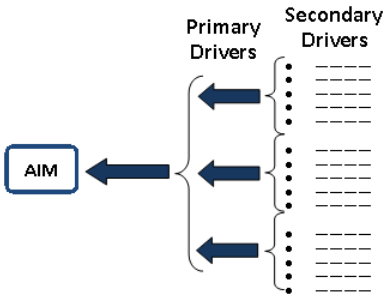
ANTIBIOTIC STEWARDSHIP PROGRAM

Public Health Foundation

A Public Health and Healthcare Collaboration

The Public Health Foundation (PHF) is leading an effort to develop and pilot a driver diagram for public health and healthcare to work together to reduce antibiotic resistant infections. Collaboration across public health and healthcare is necessary to achieve optimal results in this community health challenge. This program grew out of PHF's partnership with the Centers for Disease Control and Prevention (CDC) and the Institute for Healthcare Improvement (IHI) to develop a framework of key drivers for reducing inappropriate antibiotic utilization in hospitals.

Public Health Antibiotic Stewardship Driver Diagram



Some drivers of optimal antibiotic use fall outside the direct control of public health (e.g., use of antibiotics in livestock food supplies), while others sit squarely within the focus of the public health system. In 2012, PHF led development of a driver diagram illustrating public health's role in promoting optimal antibiotic use. Based on input from an interdisciplinary team of experts in quality improvement (QI), infection control, epidemiology, and public health leadership, the driver diagram outlines primary and secondary drivers of optimal antibiotic use to help reduce the spread of antibiotic resistant infections.

This packet includes:

- **The Public Health Antibiotic Stewardship Driver Diagram**
- **Case stories from state and local pilot sites**

2013 Pilot Activities

PHF is facilitating pilot activities that use the Public Health Antibiotic Stewardship Driver Diagram in collaborative efforts between the public health and healthcare systems. Current pilot sites include:

- Independence Health Department (Independence, Missouri)
- Connecticut Department of Public Health
- Maine Center for Disease Control and Prevention

Success factors in this work included:

- **Use of the Public Health Antibiotic Stewardship Driver Diagram.** A driver diagram illustrates primary and secondary drivers of a health challenge; each pilot site used the driver diagram as a reference for selecting points of intervention.
- **Use of QI Tools and Methods.** The work of all three pilots incorporated QI to ensure that improvement strategies were effectively targeted and adopted.
- **Collaboration Between Public Health and Healthcare.** Each health department functioned as a resource to its healthcare partners, helping them to meet regulatory requirements and address fiscal needs, convening and facilitating productive discussions, and communicating about joint activities.

Accomplishments of this Work

- More adoption of best practices
- Expanded partnerships and commitment to continue them
- Education on appropriate antibiotic use for physicians, pharmacists, nurses, and others

Details on the pilot programs are provided in the attached case stories. PHF plans to expand the reach of this program by launching additional pilot work around the country, and is developing an intervention guide to accompany the Public Health Antibiotic Stewardship Driver Diagram.

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Public Health's Role in Antibiotic Stewardship

Driver Diagram

Efforts to promote optimal antibiotic use should employ both the public health and healthcare systems. While some drivers of antibiotic resistance fall outside the direct control of public health (e.g., use of antibiotics in livestock food supplies), others highlighted here sit squarely within the focus of public health organizations.

This diagram outlines primary and secondary drivers of optimal antibiotic use. It compliments a driver diagram being piloted in eight hospitals by the Institute for Healthcare Improvement (IHI). PHF is actively seeking comments on the driver diagram from healthcare and public health organizations already engaged in efforts to address antibiotic resistance.

AIM

Promote Optimal Antibiotic Use

Goals

- Preserve antibiotics for the future
- Decrease demand by the public for inappropriate use
- Reduce the spread of antibiotic resistance
- Decrease adverse events associated with inappropriate antibiotic use
- Decrease costs associated with antibiotic use

PRIMARY DRIVERS

SECONDARY DRIVERS

Appropriate Use of Antibiotics

Partnerships, Communication, Reimbursement, & Stewardship

- Provide information on which antibiotics are most effective within your community at a certain point in time
- Provide information on which diseases are prevalent within a community at a point in time
- Develop policies that create incentives for appropriate antibiotic use
- Develop appropriate policies for daycare, work, and school on appropriate attendance during illness (staying away and going back)

Data Monitoring, Transparency, and Stewardship Infrastructure

Surveillance, Analysis, Feedback, Triage, & Leveraging Resources

- Leverage existing infrastructure to promote better antibiotic use
- Use local resistance data to inform antibiotic choice
- Explore ways to gather use and prescribing data

Knowledge, Awareness, and Perception of the Importance of Appropriate Antibiotic Use

Share Evidence Broadly, Provide Education, Create Urgency, & Empower Alternative Action

- Develop intervention plans for segmented target audiences (consumers, providers, insurers, policy makers, etc.)
- Change attitudes and perceptions about what constitutes appropriate antibiotic use
- Educate health departments and public health professionals
- Incorporate antibiotic usage into community assessment and improvement plans

Policy, Communication, Education, Incentives, Partnerships, and Facilitation

This model was developed collaboratively by public health professionals with expertise in antimicrobial resistance and quality improvement. This work was funded through a collaborative agreement between the Public Health Foundation and the U.S. Centers for Disease Control and Prevention.

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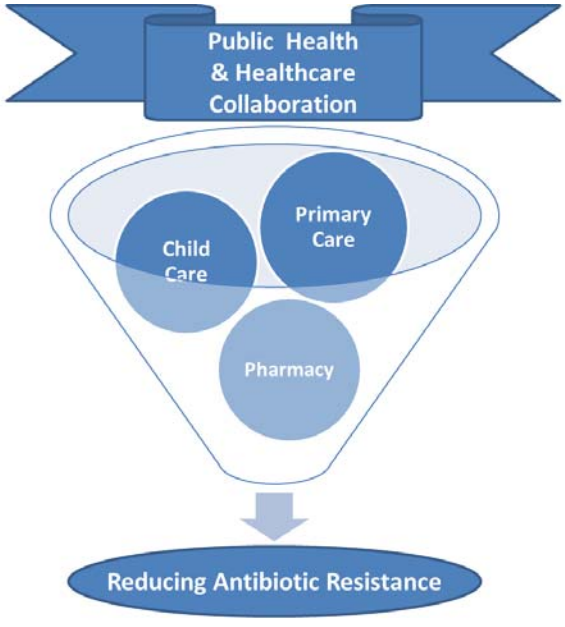
Story From the Field

Local Antibiotic Stewardship Program: At the Nexus of Public Health and Healthcare

In 2012, the Independence Health Department (Independence, Missouri) identified an increase in antibiotic resistant infections in the community that warranted improved policies addressing antibiotic use in schools and childcare facilities. The department began participating in an Antibiotic Stewardship Program organized by the Public Health Foundation (PHF). Promoting optimal antibiotic use through both the public health and healthcare systems, the Public Health Antibiotic Stewardship Driver Diagram provided the backbone for this pilot initiative. Because of their excellent working relationship with Centerpoint Medical Center, the health department collaborated with the hospital to address antibiotic resistant infections; it was a natural next step in their growing partnership.

INDEPENDENCE HEALTH DEPARTMENT

The public health team in Independence kept the driver diagram nearby to guide initial brainstorming as they created a series of logic models to pinpoint opportunities for intervention. Independence devised a multi-pronged approach which focused on two points of intervention: healthcare providers and childcare providers. PHF's technical assistance enabled the use of quality improvement in selecting interventions to promote optimal antibiotic use as outlined in the driver diagram.



Collaborating with Healthcare Providers

The Independence team designed resources that can be easily integrated into practitioners' work with the goals of increasing multidisciplinary communication, cooperation, and awareness with minimal effort by the providers themselves. These efforts include:

- An interdisciplinary reporting system for alerts and advisories related to antibiotic resistant disease incidence and news.
- Quick reference pocket cards to guide physicians about the safest and most effective treatment for common diagnoses at the moment they write an antibiotic prescription, if indicated.
- An educational 3x5" card developed and distributed as part of the Centers for Disease Control and Prevention (CDC) Get Smart campaign for pharmacists to give patients who receive antibiotics; the headline "You've just had a prescription filled, here's what you need to know" signals the importance of safe antibiotic use.
- An educational prescription pad developed and distributed as part of the CDC Get Smart initiative for providers to give patients who do not receive antibiotics; this prescription pad provides information on diagnosis, general instructions, and medications that may ease symptoms.
- Continuing Medical Education programs for professionals in both healthcare and public health provided in coordination with Centerpoint Medical Center.
- A grant application to the Healthcare Foundation of Kansas City to secure funding for coordination and expansion of various elements of the Antibiotic Stewardship Program.

Collaborating with Childcare Providers

The Independence team created clear standards that childcare providers can implement when working with families in the community. Using public recognition as an incentive and thoughtfully incorporating accessible language for instructions and explanations, they are initiating the following efforts:

- The Missouri Department of Health and Senior Services created the *Prevention and Control of Communicable Diseases: Guide for School Administrators, Nurses, Teachers, Child Care Providers, and Parents or Guardians* which includes resources about everything from a "cover your cough campaign" to hand washing reminders, to lessons about the misuse of antibiotics and antibiotic resistant disease. Locally, the Communicable Disease staff in the Independence Health Department promotes and shares this excellent resource with schools and childcare providers.
- A new Start Right Rating System to publicly recognize childcare centers that cooperate with standards as well as those taking extra steps to ensure that safe antibiotic use practices and policies are followed.
- Basic education for childcare providers and parents about the risk of antibiotic resistant infections with the goal of reducing inappropriate antibiotic use and overall reduction in the need for antibiotics.

Using the Public Health Antibiotic Stewardship Driver Diagram as a guide, the Independence Health Department is off to a strong start in raising awareness of antibiotic resistant infections and how to keep them at bay in the community. In the coming months, they plan to further develop these programs and expand the collaboration between public health and healthcare systems so that they are sharing more information about diagnoses of antibiotic resistant infections and the rate of antibiotic prescription use. In 2014, they will survey physicians and child care centers to measure the impact of these initiatives, and work with pharmacies to assess whether there has been a decrease in prescriptions for antibiotics.

Success Factors

- **Prior relationship between healthcare organization and public health department**
- **Identify receptive points of intervention for implementation**

Related Resources

- Public Health Antibiotic Stewardship Driver Diagram — The driver diagram used by the Independence Health Department to guide their strategies for this program.
- PHF provides customized training, facilitation, and workforce development services to public health agencies and other groups that protect the public's health. To inquire about technical assistance, please visit PHF at www.phf.org/TechnicalAssistance or call 202-218-4415.

Acknowledgements

Special thanks to Deresa Hampton and Shawnna Jackson from the Independence Health Department for providing content for this story. Funding for this story was provided by the Centers for Disease Control and Prevention under Cooperative Agreement Number 5U38HM000518-03. The contents of this document are solely the responsibility of PHF and do not represent the official views of CDC.

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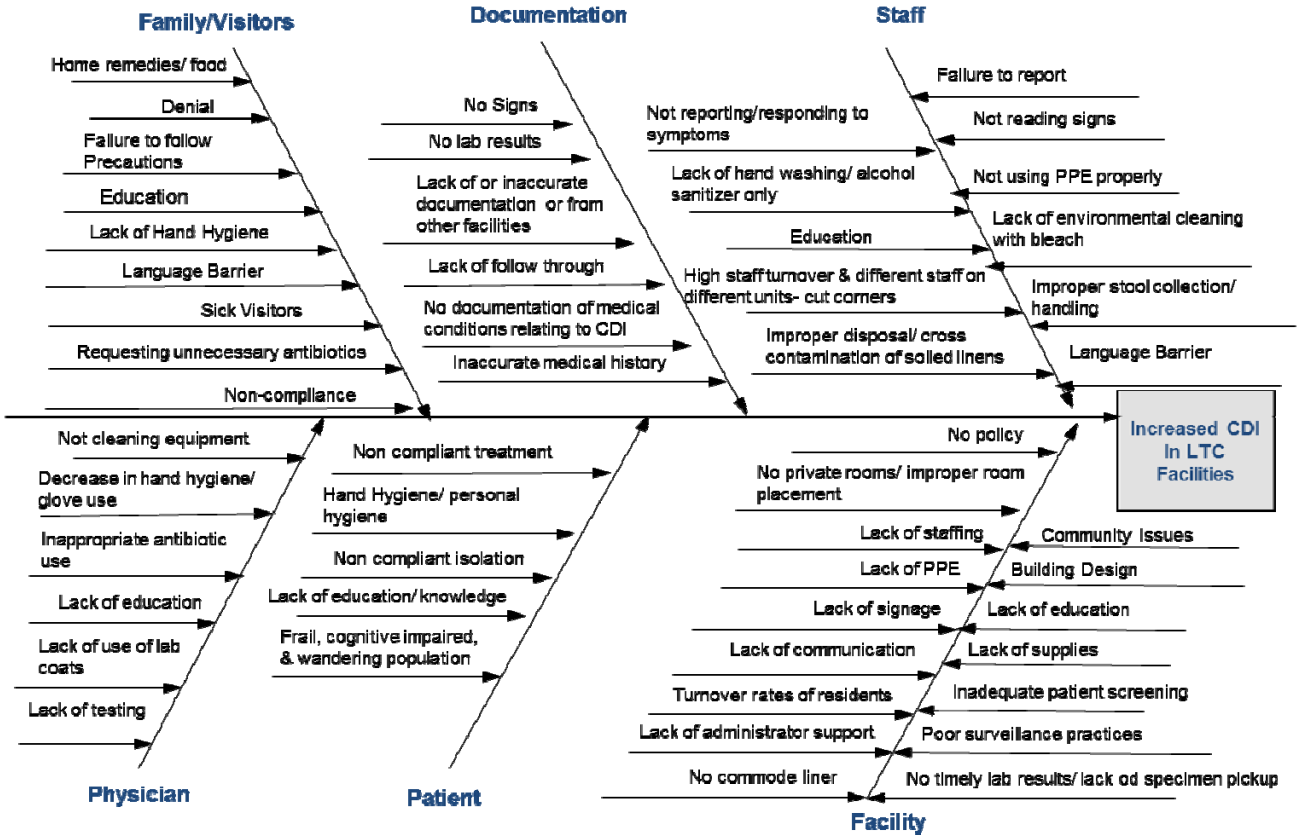
Story From the Field

Tackling Healthcare Associated Infections through QI

When the staff in the Connecticut Department of Public Health (CDPH) recognized an opportunity to address the significant challenges posed by *Clostridium difficile* infection (CDI), they decided to address the problem using a collaborative approach at regional long-term care (LTC) facilities. Because residents at LTC facilities often have compromised immune systems due to chronic health issues, they have increased vulnerability to healthcare associated infections (HAI), such as CDI. In response to growing CDI prevalence and using the Public Health Antibiotic Stewardship Driver Diagram as a reference, CDPH proposed the creation of an interdisciplinary CDI Prevention Collaborative in LTC facilities to reduce HAI among nursing home residents.

Figure 1. Causes of Increased CDI in LTC Facilities



CDPH's push to incorporate quality improvement (QI) into its work led them to pursue opportunities to support QI activities, including those related to CDI prevention. In 2012, CDPH received the Public Health Foundation's (PHF) Future of Public Health Award in recognition of its promise to generate measurable outcomes benefiting the future of public health through applied QI. PHF trained CDPH staff to incorporate QI methods into CDI Prevention Collaborative efforts, and CDPH became part of PHF's Antibiotic Stewardship Program. Nurses from 25 LTC facilities in Connecticut received training in QI and best practices in reducing CDI during the project kickoff session. Following training, CDPH used monthly tracking and reporting calls among participating LTCs to monitor the effectiveness of integrating best practices into CDI prevention protocols at the facilities. In addition to these calls, CDPH asked Qualidigm, a local quality improvement partner, to preform site visits at participating facilities.

Interdisciplinary Integration

To improve interdisciplinary CDI prevention protocols, CDPH used QI tools and models such as Plan-Do-Check-Act (PDCA) cycle, flow charts, and cause and effect diagrams. The team also developed a best practices checklist to simplify implementation of best practice protocols in the future and continued use of QI methods. LTC facilities worked with state surveyors to develop new signage to notify staff and visitors of CDI cases and proper prevention practices. As implementation proceeded, staff reported improved communication and morale at the LTC facilities.

Interdisciplinary Integration (continued)

LTC facilities adopted process measures to track implementation success, including:

- Observations of staff compliance with new precaution signs about contact with CDI patients.
- Tracking the rate and consistency with which residents with infections and their family members receive documentation and educational materials about CDI.
- Tracking alignment of provider prescribing practices with best practices in CDI prevention and antibiotic stewardship.

CDPH is also tracking incidence of CDI to determine the impact of these efforts on infection rates in the state's LTC facilities and will start a campaign to encourage facilities to enroll in the National Healthcare Systems Network.

Keys to Success

The LTC Prevention Collaborative benefited from the support and endorsement of CDPH senior leadership and external partners, including two LTC Associations, the Connecticut Hospital Association, LTC Nursing Association, and the Center for Medicare and Medicaid Services Quality Improvement Organization. These partners facilitated LTC recruitment for the program, emphasizing that it was a well-organized, collaborative initiative. CDPH has expanded the LTC Prevention Collaborative statewide and plans on increasing the number of facilities participating in the collaborative.

QI Tools Used

- An **AIM statement** restricts the problem statement to discrete issue on which the improvement team will focus. CDPH used an AIM statement to guide their efforts to analyze existing processes and implement process improvement using QI tools.
- A **flowchart** visually depicts all the steps and decision points in a process from start to finish. Program participants used flowcharts to document processes which helped in analyzing both current and future problems.
- A **cause and effect diagram** displays multiple potential causes for a problem. CDPH used a cause and effect diagram to categorize ideas into themes for analysis and to show current successes and strengths, which helped to empower participants (see Figure 1).

Related Resources

- CDI Resources for Health Departments
  http://www.cdc.gov/HAI/organisms/cdiff/Cdiff_faqs_HCP.html
- Future of Public Health Awards
  http://www.phf.org/programs/futureaward/Pages/Future_of_Public_Health_Award.aspx
- Centers for Disease Control and Prevention (CDC) Report, *Antibiotic Resistance Threats, 2013*
  http://www.cdc.gov/drugresistance/threat-report-2013/

About the Future of Public Health Awards

PHF's 2012 Future of Public Health Award recognized promising proposed initiatives in public health that utilize QI to influence positive outcomes in CDC's Winnable Battles. Award winners received onsite technical assistance to build capacity in QI and advance programs to improve outcomes. To learn more about the program and other PHF services, visit http://www.phf.org.

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Story From the Field

Maine CDC: Working with Healthcare to Address Antibiotic Resistant Disease

New Strategies to Tackle Antibiotic Resistant Disease

Maine Center for Disease Control and Prevention
An Office of the Department of Health and Human Services

In 2010, Maine Center for Disease Control and Prevention (Maine CDC) began an antibiotic stewardship effort in order to reduce the rising rates of multiple drug resistant organisms in hospitals. Maine CDC held a two day certification program for antibiotic stewardship that was attended by a pharmacist and champion physician from every acute care hospital. Maine CDC also collaborated with the University of New England to study regional differences in antibiograms. During this time, Maine CDC began statewide education of nursing facilities regarding infection prevention and control practices. In 2011 to 2012, four nursing homes in the Augusta-Waterville area reported outbreaks of *Clostridium difficile* infection (CDI) — an infection that is largely the result of taking antibiotics. Maine CDC then joined the Public Health Foundation's (PHF) Antibiotic Stewardship Program, which fosters collaboration between public health and healthcare partners to optimize antibiotic use and reduce antibiotic resistant disease. Based on Maine's surveillance data, Maine CDC concentrated its interventions on long-term care facilities (LTCs) — and "hot spots" within LTCs — with the highest rates of CDI. Maine CDC identified the Augusta-Waterville area and worked collaboratively with the Northeast Healthcare Quality Foundation (a Quality Improvement Organization) to reduce CDI rates in this region.

> *"I am thoroughly convinced that if we do not address antibiotic stewardship and the appropriate use of antibiotics, we will continue to see increasing resistance and the problems of resistant infections will grow dramatically over the ensuing years."*
>
> — Stephen D. Sears, MD, MPH
> State Epidemiologist, Maine CDC

New Strategies to Tackle Antibiotic Resistant Disease

Using PHF's Public Health Antibiotic Stewardship Driver Diagram, Maine CDC identified drivers for preventing and treating CDI at Augusta LTCs, which had many of the state's highest CDI rates. Maine CDC then developed interventions to strengthen these drivers within each facility, including:

- Establishing standardized protocols for containing CDI outbreaks
- Establishing a universal protocol for nursing facilities regarding prevention of *C. difficile* transmission
- Training employees at LTCs to use tracer kits to improve environmental cleaning
- Training employees on hand hygiene compliance and observation
- Holding monthly educational meetings to discuss CDI prevention and treatment protocols
- Collecting facility-specific data to track CDI trends within and across LTCs
- Educating physicians on best practices for antibiotic use for outpatients, both children and adults

With guidance from PHF's Senior Quality Advisor Jack Moran, Maine CDC created a Fishbone (or Cause and Effect) Diagram to identify barriers to preventing transmission and acquisition of antibiotic resistant disease within LTCs. Then Maine CDC worked with each LTC to pinpoint and correct specific barriers. The LTC infection preventionists found working closely with Maine CDC and the Northeast Healthcare Quality Improvement Organization (QIO) was essential to successfully adopting the new protocols. Maine CDC was dedicated to building collaborative relationships with the LTCs to achieve their common goals. Throughout this process, the LTCs viewed Maine CDC as a facilitator and guide in infection prevention — not merely a regulatory enforcer.

Collaborating with Healthcare Partners

Because this challenge exists at the crossroads of public health and healthcare, Maine CDC engages healthcare partners to optimize the effectiveness efforts to reduce CDI at LTCs. In order to reduce antibiotic resistant infections at LTCs, the health department has formed partnerships with the following organizations:

- The Northeast Health Care Quality Foundation, a regional QIO experienced at addressing antibiotic resistant infections in healthcare facilities
- The University of New England School of Pharmacy (UNESP), which analyzed Maine CDC's data about rates of antibiotic resistance by organism and by region
- The Maine Medical Association/Maine Independent Clinical Information Service (MICIS), which distributed United States Centers for Disease Control and Prevention (CDC) Get Smart materials and a Maine CDC physician pocket reference for prescribing antibiotics and provided onsite education to LTC medical directors and other physicians to improve prescribing practices
- LTCs in the cities of Augusta and Waterville, which effectively adopted new strategies and interventions to reduce CDI

Expanding the Reach of Collaboration

Maine CDC is monitoring CDI trends in LTCs, and will release a report on infection rates in July 2014. To expand the reach of its pilot activities, Maine CDC will partner with the Maine Medical Association to educate 400 additional outpatient physicians and LTC directors about practices to reduce the spread of CDI. Maine CDC also hopes to bring this collaborative approach to addressing antibiotic resistant infections to many more LTCs in Maine. To do this, Maine CDC is partnering with the Maine Healthcare Association, a provider organization serving nursing facilities. The Maine Healthcare Association will host two webinars in which Maine CDC and the QIO will share four tools developed during the pilot with other LTC facilities throughout Maine.

Related Links and Resources

- Public Health Antibiotic Stewardship Driver Diagram — The driver diagram referenced by Maine CDC used to identify drivers for preventing CDI. www.phf.org/abxdriverdiagram
- PHF provides customized training, facilitation, and workforce development services to public health agencies and other organizations that protect the public's health. To inquire about technical assistance, please visit PHF at www.phf.org/TechnicalAssistance or call 202-218-4415.
- PHF's Antibiotic Stewardship Program — Information about PHF's Antibiotic Stewardship Program, which helped support efforts by Maine CDC to prevent CDI. www.phf.org/antibioticstewardship

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