

Quality Improvement in North Carolina's Public Health Departments

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North Carolina has been a leader in the application of quality improvement (QI) to public health practice. Over the past decade, numerous developments have served to accelerate the adoption of QI in North Carolina's local health departments. The outstanding results from the widespread application of QI should help North Carolina to become a healthier state.

For decades, numerous industries—including health care—have used quality improvement (QI) methods and tools to reduce errors, improve efficiency and effectiveness, and improve customer satisfaction. Recently, public health professionals have begun to focus on applying QI methods to improve the practice of public health.

One of the main factors driving the increasing adoption of QI methods in public health in North Carolina and across the country is the escalating and unsustainable cost of health care in the United States, which has caused leaders to focus on improving population health. An example of this focus is the increasing influence of the Triple Aim Initiative of the Institute for Healthcare Improvement, which lists improving population health as 1 of its 3 aims (the other aims are lowering the per-capita cost of health care and improving the patient experience of care) [1]. The Triple Aim framework has been embedded into many aspects of federal policy related to health care reform.

Governmental fiscal austerity is placing enormous pressure on health departments to do more with less. Tight budgets and fewer resources are powerful drivers for implementing QI methods in public health—especially the use of Lean methods, which focus on continuously reducing waste and increasing efficiency. Austerity is also stimulating the brisk pace of change in public health; for instance, legislation was recently passed in North Carolina that allows local health departments to be consolidated into human services agencies [2]. Public health leaders and managers therefore need change-management skills, the acquisition of which is facilitated by adopting QI methods.

Accreditation is another important driver of QI adoption. Accreditation has traditionally been a quality assurance activity; in public health, however, accreditation has been designed to drive health departments to implement QI methods. This motive applies to both North Carolina's man-

datory local health department accreditation program and the voluntary national accreditation program of the Public Health Accreditation Board. Data from North Carolina's local health department accreditation program suggests that this program has indeed promoted adoption of QI by North Carolina's local health departments [3].

Background and History of QI in Public Health Departments in North Carolina

North Carolina has been a leader in the application of QI principles to public health practice. For example, in 2001 the Cabarrus Health Alliance enrolled in the Institute for Healthcare Improvement's learning collaborative on improving access and efficiency in outpatient clinics, making it one of the first health departments in the country to use formal QI methods to improve its services. Cabarrus Health Alliance's success with QI continued as members of this department spread QI methods throughout their agency over the ensuing decade, becoming a model for institutionalizing QI methods both for health departments in North Carolina and nationally [4].

North Carolina is 1 of only 2 states that mandate that all local public health departments in the state be accredited. In 2005, the North Carolina General Assembly established an accreditation system for local health departments and required that all departments apply for initial accreditation by December 1, 2014 [5, 6]. As of May 25, 2012, 69 of North Carolina's 85 local health departments had been accredited [7]. Accreditation ensures accountability and standardization of local public health services, and it promotes the implementation of QI activities in local health departments [8].

What makes the current accreditation program so successful is the fact that it is not punitive. Instead, the program follows QI principles and builds on the collaborative strength of local public health departments, ultimately assuring that they are implementing best practices in their performance

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Case Study:

Quality Improvement in the Macon County Health Department

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The Macon County Public Health Department (MCPH) was accredited in December 2008. MCPH has always focused on providing quality services to the residents of Macon County, North Carolina. However, in 2009, the focus of the department's quality program shifted with the establishment of a part-time position for a quality program manager, implementation of a quality improvement (QI) program, and establishment of a QI Council. These changes were no simple task for MCPH to achieve, as they required the total commitment and support of the county manager, the Macon County Board of Health, and the department's leaders.

Over the past 4 years—in partnership with staff from the Center for Public Health Quality, the North Carolina Institute for Public Health, the North Carolina Public Health Academy, the North Carolina State University Industrial Extension Service, and the Robert Wood Johnson Foundation's Multistate Learning Collaborative—MCPH began to focus on changing its quality culture. We started by providing training sessions for staff and management, including: The Change Process, Change Management, Introduction to Performance Improvement, Performance Improvement in the Workplace, Introduction to Lean Process Terminology, Lean 100, the Public Health QI 101 Program, the QI Advisor Program, Traits of Highly Effective Teams, and Introduction to Triple Aim. This training phase took 2 years to complete, but the department will reap an enduring benefit from these efforts. Most of the classes mentioned above—The Change Process, Change Management, Introduction to Performance Improvement, Performance Improvement in the Workplace, Introduction to Lean Process Terminology, Lean 100, Introduction to Triple Aim, and Traits of Highly Effective Teams—were conducted in the first 6 months of implementation. Once staff members had a basic understanding of the change

process and the basic principles of QI and Lean, we sent 2 teams to the Public Health QI 101 Program. Upon their return, the QI 101 team members shared their experiences and what they had learned with other MCPH staff members. While the training phase was taking place, staff members participated in a number of small QI initiatives in an effort to gain understanding of the process and to help cultivate QI buy-in from all involved.

QI methods have proven to be an invaluable asset for MCPH. Once we felt we were on our way, with the initial trainings completed and a few small-win projects under our belt—projects accomplished in a short time frame, addressing relatively simple problems, and viewed as likely to be successful—we then began focusing on projects that would have a greater impact on the organization's overall performance, improve patient/customer service outcomes, and achieve demonstrable cost savings. We reinvested any cost savings from waste reduction efforts into other mission-critical activities.

One of the first major projects we undertook was to increase access to services through improvements in our appointment scheduling process. We began by participating in the Center for Public Health Quality's Public Health QI 101 Program. MCPH had historically scheduled clinics in half-day increments, and by specific program group and type. This siloed system created a considerable backlog in access at some clinics, with patients having to wait 1 or 2 months for an appointment, while other clinics had high no-show rates and/or appointment slots going unfilled. The team's aim was to make it possible for all patients to be seen within 72 hours of calling to make an appointment, while also improving patient and staff satisfaction. The team measured progress by tracking 3 metrics: the amount of time that patients had to wait between calling to make an appointment and being seen

of the 3 core functions of public health—assessment, policy development, and assurance—as well as integrating these best practices with the 10 essential public health services [6, 9, 10].

Also in 2005, the North Carolina Division of Public Health (DPH) took a visionary path by creating a new position: Director of Performance Improvement and Accountability. The director's charge was to promote accreditation and QI activities across the public health system in North Carolina. It quickly became obvious that significantly more resources and infrastructure would be required to support QI methods across 85 local health departments and DPH, which collectively employ a workforce of approximately 10,000 people [11].

That same year, the Robert Wood Johnson Foundation launched the Multistate Learning Collaborative to explore

the role of accreditation in improving performance and stimulating states' capacities to use QI methods. North Carolina was 1 of the first 5 states to participate in this 5-year initiative, which eventually expanded to involve 18 states. North Carolina's participation spurred numerous QI activities in the state, such as the highly successful Child Health Collaborative led by Cabarrus Health Alliance in partnership with the Children and Youth Branch of DPH, and it created additional demand for building QI capacity in the state's local health departments.

Another major milestone occurred in 2008. At that time, the Beaufort County Health Department became one of the first health departments in the country to apply Lean QI methods, which focus on using tools to reduce waste from all processes and on developing a culture that fosters waste reduction [12]. Beaufort County partnered with the North

in the clinic, the number of appointment slots available versus the number that were unfilled, and the number of appointments kept.

Team members first conducted several short work sessions in which they defined the scope of the problem, made visits to other health departments that had already implemented a more integrated scheduling system, and clarified the project goals. North Carolina State University's Industrial Extension Service then assisted the team in kicking off a 4-day kaizen event (4 consecutive days of rapid cycle improvement activities using Lean tools and plan-do-study-act cycles). During the kaizen event, the team conducted brainstorming sessions, created work-flow diagrams, performed gemba walks (directly observing the processes being improved), and developed detailed process maps in an effort to identify problem areas, generate ideas for potential changes, and test those ideas on a small scale. The team developed a timeline to implement the changes, and plans were set in motion. The end result was better than anyone had expected. Almost immediately, all programs impacted by the implementation of the new scheduling process were scheduling patients for visits in less than 72 hours, and no-show rates decreased, visit numbers increased, and staff downtime was virtually eliminated. In addition, patient and staff satisfaction increased.

Due to the enormous successes of this and subsequent small-win projects, MCPH successfully conducted additional QI initiatives resulting in positive changes in quality of services. Some of these QI projects brought about improvements in child health visit flow, environmental health complaints, medical records flow, the client feedback process, laboratory flow, men's health, school health information technology, vaccine storage and management, and the work flow of the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). As a result of these efforts, MCPH staff members have also been invited to participate in several regional QI initiatives, including the Western North Carolina 22-County Regional Community Health Assessment, the Diabetes

Management Project, the Senior Health Issues Project, the Childhood Obesity/Healthy Kids Project, and community transformation projects.

To encourage the ongoing engagement of staff members in continuous improvement and to keep them informed regarding the status of QI/Lean projects, MCPH has established a shared computer directory for each project, which is accessible by all staff members. Stored in the directory are each team's aim statement, kaizen event documents (gemba walks, process maps, and flow diagrams), team meeting notes, and other team-related communications. In addition, MCPH has a hallway lined with bulletin boards highlighting each team's activities and the results of their work.

MCPH is committed to continuing its QI/Lean journey, paying close attention to improving the quality of care and the patient experience, improving efficiency throughout the agency, and ultimately improving the health of the community. NCMJ

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Carolina State Industrial Extension Service to pilot the use of Lean methods in their family planning clinic, which was struggling with inefficiencies and long wait times for clients. The pilot program was a major success—staff members on the initial pilot team cut their clinic visit times in half and generated tremendous engagement and excitement among other staff members. Because of this success, Beaufort County's incubator network—the Northeastern North Carolina Partnership for Public Health—launched Lean QI projects in all 10 of the partnership's health departments, again with impressive results and cost savings [13].

Development of the Center for Public Health Quality

Given the increasing importance of QI and the fact that the North Carolina public health system lacked adequate

resources to support its implementation, public health leaders began working together to design a comprehensive resource. In 2008, DPH leaders worked with the North Carolina Association of Local Health Directors, the North Carolina Institute for Public Health, North Carolina Area Health Education Centers, the North Carolina Hospital Association, and 3 foundations—The Duke Endowment, Blue Cross and Blue Shield of North Carolina Foundation, and the Kate B. Reynolds Charitable Trust—to plan the design of a comprehensive quality center for North Carolina's public health system. The plans were finalized in 2009, and the foundations provided start-up funds for the Center for Public Health Quality (CPHQ), which would focus on providing QI training and support for North Carolina's 85 local health departments. The mission of the CPHQ is to collaborate with local, state, and national partners to transform the pub-

lic health system so that it fosters and supports continuous QI. The CPHQ works at both the state and local level to provide training, share evidence-based approaches about what works in public health, promote performance measurement, lead strategic QI initiatives, and engage leadership in driving organizational change to support continuous improvement.

The CPHQ developed training programs for every local health department across the state and for the staff members who lead QI efforts for their agencies. The training programs were adapted from the highly successful North Carolina Area Health Education Centers QI 101 program, which employs the Model for Improvement, a QI method that is commonly used in health care settings. Given that the value of Lean QI methods was clearly demonstrated by the Northeastern North Carolina Partnership for Public Health, the CPHQ also worked in partnership with the North Carolina State University Industrial Extension Service to integrate Lean methods and tools into all of its training programs.

From the beginning, demand for the CPHQ's training programs was high among local health departments. At one point, a waiting list of 23 agencies had accrued, requiring the center to quickly expand its training capacity. Due to the high demand for QI training and support among local health departments, the CPHQ could not meet DPH's demand for support of its QI efforts in the first years that the center was in operation. Fortunately, in late 2010 the CPHQ was awarded a 5-year grant from the National Public Health Improvement Initiative of the Centers for Disease Control and Prevention, which allowed the CPHQ to greatly expand its QI programs for DPH.

Progress in Local Health Departments

A primary focus of the CPHQ is building the capacity of the North Carolina public health workforce to use QI methods and tools to improve programs and services. Local health departments have been pioneers in these efforts, and the programs they developed are now being used successfully at the state level within DPH.

Building Workforce Capacity: The Public Health QI 101 Program

The Public Health QI 101 Program is an 8-month, longitudinal, experiential learning program designed to help staff

members of a local health department build their expertise in using QI methods and tools while simultaneously improving the quality of their programs and services. The program is based on principles of adult learning, and participants learn by applying QI methods and tools to a specific project in their health department. The program begins with a half-day of training for health directors and their designated QI leaders. During the training, participants are assisted in selecting a project and an appropriate team, instructed regarding the role of leaders in supporting QI efforts, and taught how to apply strategies to change the culture so that it better supports continuous improvement. Over the next 2 months, members of the project teams attend 3 webinars that assist them in outlining their QI project aims and teach them how to create a detailed map of their current process. Teams then attend a 2-day workshop during which they learn a variety of methods and tools for testing and implementing process changes. After returning home from this first workshop, the teams spend 3 months—the action period—attending action-period webinars and conducting a 4-day rapid cycle improvement event within their organization. At the end of the action period, teams attend the second and final 2-day workshop, during which they share their accomplishments and learn about and create plans for sustaining and spreading the use of QI methods. After the second workshop, health directors are also engaged via webinars that encourage them to continue developing strategies to support their QI teams in sustaining the gains from their projects, as well as to spread QI methods throughout their organizations.

Dramatic improvements and returns on investment have been achieved by the 47 local agencies in North Carolina that have completed the Public Health QI 101 Program [14]. For example, the Beaufort County Health Department's Special Supplemental Nutrition Program for Women, Infants, and Children achieved a program-wide 17% increase in the proportion of postpartum mothers who were engaging in breastfeeding (from 32% to 49%) [15]. A team from the Yadkin County Health Department streamlined their cervical cancer screening process and decreased the time for abnormal result notifications from 36 days to 12 days; they also eliminated enough waste to see 65 additional patients per month, and they generated new revenues of \$78,000 per year. The return on investment was calculated to be

TABLE 1.
Examples of Results from the Public Health Quality Improvement 101 Program

Project focus area	Improvement achieved
Child health	Immunization rates for children younger than 2 years of age increased from 71% to 86%.
Maternal health	The wait for an initial prenatal appointment decreased from 54 days to 15 days.
Women's health and family planning	Total visit time decreased from 2 hours and 40 minutes to 1 hour and 49 minutes.

Note: Data are from an internal evaluation performed by the Center for Public Health Quality.

\$2.27 for each dollar invested in the project (unpublished data). See Table 1 for additional examples of results from the Public Health QI 101 Program. Cornett and colleagues [14] recently published an article in the *Journal of Public Health Management and Practice* that provides comprehensive data showing the overall impact of the program.

Public health leaders have been very pleased with the results from their QI efforts in the Public Health QI 101 Program, which in many cases can be transformative. For instance, a leader in the Appalachian District Health Department remarked, "Specific changes through this process have increased revenue collected at the time of visit, and created a system that flows more smoothly, allowing our clinician to provide services to more clients. QI has created an environment of possibilities for the staff at the health department that were never considered before."

Developing QI Leaders: The QI Advisor Program

The ultimate goal of the CPHQ's training programs is to create a culture and an infrastructure that support continuous improvement in all public health agencies. To build on the initial QI capacity developed in the Public Health QI 101 Program, the QI Advisor Program provides advanced QI training to those individuals who will be leading QI efforts in their agencies. These QI advisors coach, mentor, and facilitate improvement teams on an ongoing basis and help the leaders of their agencies to strategically create an infrastructure and a culture that support continuous improvement. To date, 34 QI advisors representing 17 local health departments and 5 DPH programs have been trained in North Carolina.

Evaluation of data from the first cohort of participants in the QI Advisor Program revealed that the program had a substantial impact. For example, the percentage of participants who reported being confident in their ability to provide technical assistance to a QI team increased from 32% at baseline to 89% after completion of the program. In addition, all 11 members of the first cohort of QI advisors reported that they provided technical assistance to at least 1 QI team during the year following their QI 101 experience; on average, each advisor supported 4 projects during that year.

Conclusion

North Carolina's public health departments have developed a tradition of being national leaders in the adoption and application of QI methods. A rapidly growing number of North Carolina's health departments are poised to establish a culture and infrastructure that will allow them to be continuously improving organizations, which will be critical to helping our state achieve its goal of becoming one of the healthiest states in the nation. **NCMJ**

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