

Research Findings Brief

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Costs of Quality Improvement Implementation among Local Health Departments in Nebraska

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Introduction

Quality improvement (QI), regardless of where a local health department (LHD) stands on accreditation, is an essential task for all health departments.¹ QI initiatives may have a great potential to enhance the value of public health services. However, very little is known about how QI can increase the value of public health services or about the costs required to implement QI initiatives. Knowing this information will enable LHDs to better allocate and utilize their limited resources for suitable QI initiatives, thus potentially increasing the value of the public health services delivered to the populations served. The purpose of this study is to measure and estimate the costs of implementing various types of QI initiatives in LHDs in Nebraska.

Methods

Four LHD sites were selected based on the considerable variation in rurality of the jurisdiction (including population density and number of frontier counties and urban counties), size of the LHD (including population size and number of counties served), stage of QI implementation, and demographic and socioeconomic characteristics of the populations served. Using the concepts of the Substance Abuse Services Cost Analysis Program approach,² we adapted and administered the Cost and Labor of Quality Improvement Implementation Survey to LHD directors and/or financial officers from the 4 LHD sites. The survey collected data on all costs related to the identified QI project, including personnel compensation (salaries and fringe benefits by job type), supplies and materials, contracted services, buildings and facilities, equipment, and other miscellaneous resources. The survey also collected information on those who were involved in the QI project, including the job type of personnel, number of personnel in each job type, and time spent by each person in performing each specific activity of the QI project.

Cost estimation and analysis of the identified LHD QI initiatives were conducted following the procedures of economic evaluation established by Drummond et al.³ In addition to estimating the costs of labor and non-labor resources for each QI project, the unit cost for each QI project was estimated by dividing the total cost of each QI project by the change (improvement) in the key respective outcome measures.



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¹ Baker, S. L., Beitsch, L., Landrum, L. B., & Head, R. (2007). The role of performance management and quality improvement in a national voluntary public health accreditation system. *Journal of Public Health Management and Practice*, 13(4), 427-429.

² Zarkin, G. A., Dunlap, L. J., & Homsy, G. (2004). The substance abuse services cost analysis program (SASCAP): A new method for estimating drug treatment services costs. *Evaluation and Program Planning*, 27(1), 35-43.

³ Drummond, M. F., O'Brien, B., Stoddart, G. L., & Torrance, G. W. (1997). *Methods for the economic evaluation of health care programmes*. Oxford: Oxford University Press.

Results

Table 1 identifies the QI projects and shows the selected characteristics of the 4 LHD sites. Serving a population of 289,800 with a population density of 337 people per square mile, LHD C is the only single-county LHD that is located in an urban area. The other 3 LHDs are all regional multi-county LHDs that contain only rural counties, with variation in population size and density, number of counties, and number of frontier counties.

Table 1. Quality Improvement Projects and Characteristics of Selected Local Health Department Sites

Local Health Department	Quality Improvement Project	Total # of Counties	Population Size	Population Density	# of Frontier Counties	# of Urban Counties
A	Credit card finance charges	7	95,484	20.3	3	0
B	Document management	4	45,955	20.2	1	0
C	Living Well program patient referral	1	289,800	337.2	0	1
D	Breastfeeding education of Women, Infants, and Children program clients	4	52,359	23.2	0	0

Local Health Department A

Description of Quality Improvement Project: Credit Card Finance Charges

LHD A implemented a QI project to correct the process associated with a history of incurring finance charges on its credit card account. Implementation of the QI project took place between December 18, 2011, and December 19, 2011 (i.e., a period of 2 days). The QI method used to address this issue was a procedure within the Six Sigma technique that focuses on continuous process improvement called DMAIC. DMAIC stands for the following steps in the process: Define opportunity, Measure performance, Analyze opportunity, Improve performance, and Control performance. DMAIC is used to reduce variation in existing processes.⁴ LHD A took the following steps to address the problem: changed the day of the week that vouchers were sent to the fiscal agent for payment, sent reminders to staff to turn in invoices/vouchers, gave the office manager access to the credit card account so that the charges could be viewed and payments could be made before finance charges were incurred, developed a policy regarding responsible use of the credit card, gave regular status reports to the director/QI team/fiscal agent, and reviewed the project quarterly.

Resource Items

Those who were involved in LHD A's QI project included 3 LHD staff members, a fiscal contractor, and an external in-kind consultant from a local hospital within the LHD district. Communication services, specifically Internet services, were also used to implement the QI project.

Costs of Quality Improvement Project Implementation

Labor costs (including the estimated cost for in-kind consultation) for the implementation of LHD A's QI project were estimated at \$365.48. Non-labor costs were estimated at \$41.94. Thus, the total cost of LHD A's QI project was estimated at \$407.42. The aim of LHD A's QI project was to reduce average credit card finance charges. The LHD reduced its credit card finance charges from \$181.65 (prior to the QI implementation) to \$0 (after the QI implementation). Therefore, the unit cost for the QI project was estimated to be \$2.24 per dollar of reduction in credit card finance charges (Table 2).

⁴ Duffy, G. L., Moran, J. W., & Riley, W. J. (2010). *Quality function deployment and lean-Six Sigma applications in public health*. Milwaukee, WI: ASQ Quality Press.

Table 2. Costs of Quality Improvement Project (Credit Card Finance Charges) Implementation for Local Health Department A

Labor costs	Non-labor costs	Total costs	Unit cost for QI project*
\$365.48	\$41.94	\$407.42	\$2.24

* Unit cost was measured by dividing the total cost by the change in the key respective outcome measure.

Local Health Department B

Description of Quality Improvement Project: Document Management

LHD B is currently in the process of developing its infrastructure in order to apply for Public Health Accreditation Board (PHAB) accreditation. One of the key components of the accreditation process is organizing documentation on the various policies and procedures necessary for an LHD to operate. One of the standard steps recommended by the PHAB is for the LHD to systematically review the documentation required within the standards and measures and make notes on items that need to be completed to ensure that the LHD is “up to speed.”⁵ Therefore, LHD B is currently in the process of implementing a QI project to ensure that all policies are easily retrievable by staff. LHD B began implementation on April 1, 2013. The QI methods used in this project include a Plan-Do-Study-Act (PDSA) cycle and a root cause analysis. A PDSA cycle tests a change in the real work setting by planning it, doing it, studying the results, and acting on the results.⁴ A root cause analysis analyzes the events that led to a problem, with the goal of identifying why and how the problem happened.⁶ LHD B has also taken or will take some of the following steps in their QI project: conduct a staff exercise in which each person retrieves 10 policies to determine baseline data on how long it takes to find the policies; interview staff to determine what makes the policy-retrieval process harder or easier; and determine potential solutions, design and implement a new process, and review the process for improvement or unintended consequences.

Resource Items

Those who have been involved in LHD B’s QI project include 10 LHD staff members, a QI consultant, and a technical assistant from the Nebraska Department of Health and Human Services. Originals and copies of QI handbooks and guidebooks have also been used for the QI project. There have also been costs associated with travelling for training purposes and space used by the LHD’s QI activity.

Costs of Quality Improvement Project Implementation

As mentioned above, implementation of LHD B’s QI project is ongoing. Therefore, the costs reported here are the costs that have been incurred from the beginning of implementation on April 1, 2013, to June 16, 2014 (i.e., a period of 14.5 months). Labor costs for the implementation of LHD B’s QI project were estimated at \$4,528.32. Total non-labor costs were estimated at \$823.67. Thus, the total cost of LHD B’s QI project was estimated at \$5,351.99. The aim of LHD B’s QI project was to decrease the average time required to locate a policy. So far, LHD B has experienced a reduction in the average time to locate a policy from 11 minutes (prior to the QI implementation) to 4 minutes (14.5 months after the start of QI implementation). Therefore, thus far, the unit cost for the QI project was estimated to be \$764.57 per minute of reduction in the average time required to locate a policy (Table 3).

Table 3. Costs of Quality Improvement Project (Document Management) Implementation for Local Health Department B

Labor costs	Non-labor costs	Total costs	Unit cost for QI project*
\$4,528.32	\$823.67	\$5,351.99	\$764.57

* Unit cost was measured by dividing the total cost by the change in the key respective outcome measure.

⁵ Public Health Accreditation Board (2013). Getting Started. Accessed on March 15, 2013 at <http://www.phaboard.org/accreditation-overview/getting-started/>

⁶ Agency for Healthcare Research and Quality (2013). Root Cause Analysis. Accessed on March 15, 2013 at <http://psnet.ahrq.gov/primer.aspx?primerID=10>.

Local Health Department C

Description of Quality Improvement Project: Living Well Program Patient Referral

LHD C implemented a QI project between November 2012 and April 2014 (i.e., a period of about 18 months) to improve the process of recruiting active participants in the Living Well program by developing a structure for local health care providers to refer patients to the program. The Living Well program, an evidence-based program, is based on the Stanford University Chronic Disease Self-Management program, which is well established in the literature as an effective program to help chronic disease sufferers manage their disease.⁷ The Living Well program consists of a 6-session interactive workshop in which participants learn coping skills to live with their chronic diseases and develop positive changes for a healthier lifestyle.⁸ The Living Well program had been in place within this LHD district since 2009, but the program had had limited success in having participants complete the workshops. Thus, LHD C took the following steps to address the problem: worked together with the local medical society to contact health care providers about the Living Well program, developed a provider network recruitment plan, educated and informed providers about the coordinated referral system, conducted interviews and focus groups with providers to get feedback on the referral system, and evaluated the effectiveness of the QI project. The tools used in the QI project included a Fishbone diagram, a process map, and a PDSA cycle. A Fishbone diagram shows a variety of causes identified that contribute to a specific effect or outcome.⁹ A process map displays the main steps in a process and how these steps relate to each other, using standardized symbols.⁴

Resource Items

Those involved in LHD C's QI project included an LHD staff member who served as the coordinator, another LHD staff member who provided grant management and oversight for the QI project, and 2 office staff members who provided accounting and administrative services. LHD C also contracted services from the local medical society to develop a physician referral program. The contract involved holding lunch-and-learn sessions with local physicians and office managers to garner interest and involvement with the Living Well program. There was also media promotion that utilized print advertisements.

Costs of Quality Improvement Project Implementation

Labor costs for the implementation of LHD C's QI project were estimated at \$47,765. Non-labor costs were estimated at \$10,284. Thus, the total cost of LHD C's QI project was estimated at \$58,049. The aim of LHD C's QI project was to increase the percentage of registered participants who complete the 6-session interactive workshop provided by the Living Well program. LHD C experienced a 10.1% increase in that percentage after the QI project was implemented (i.e., from 70.2% to 80.3%). Therefore, the unit cost for the QI project was estimated to be \$5,747 per percentage increase in the number of registered participants who complete the 6-session interactive workshop (Table 4).

Table 4. Costs of Quality Improvement Project (Living Well Program Patient Referral) Implementation for Local Health Department C

Labor costs	Non-labor costs	Total costs	Unit cost for QI project*
\$47,765	\$10,284	\$58,049	\$5,747

* Unit cost was measured by dividing the total cost by the change in the key respective outcome measure.

⁷ Lorig, K. R., Ritter, P., Stewart, A. L., et al. (2001). Chronic disease self-management program: 2-year health status and health care utilization outcomes. *Medical Care*, 39(11), 1217-1223.

⁸ Living Well (2013). About Living Well. Accessed on March 15, 2013 at <http://www.livingwellne.org/about/>.

⁹ ImproHealth. (2011). Fishbone Diagram. Retrieved from:

http://www.improhealth.org/fileadmin/Documents/Improvement_Tools/Fishbone_diagram.pdf Accessed September 28, 2011.

Local Health Department D

Description of Quality Improvement Project: Breastfeeding Education of Women, Infants, and Children Program Clients

LHD D implemented a QI project between June 1, 2012, and May 31, 2014 (i.e., a period of 2 years) to achieve a goal of increasing the percentage of clients in the LHD's Women, Infants, and Children (WIC) program benefits who receive individualized breastfeeding education during every WIC clinic visit. The Special Supplemental Nutrition Program for WIC is a federally funded program that provides low-income pregnant and postpartum women, infants, and children with nutritious food, nutrition counseling (including breastfeeding support), and linkage to services.¹⁰ Studies have found that participation in WIC has increased the number of low-income women initiating breastfeeding their babies.¹⁰ Additionally, a study on the effect of prenatal breastfeeding education on WIC participants found that those who received prenatal breastfeeding education were more likely to breastfeed longer than those who did not.¹¹ A PDSA cycle was used by LHD D to test a change in the real work setting by planning it, doing it, studying the results, and acting on the results.⁴

Resource Items

Five LHD staff members were directly involved in the QI project, including 2 registered dietitians (RDs), 2 licensed practical nurses (LPNs), and a program coordinator. The RDs and LPNs provided breastfeeding education to the WIC program clients. Each client could have received a maximum of 3 interactions with the breastfeeding educator during the course of their pregnancy, with approximately 10 minutes for each interaction. Clients were also given a breastfeeding education flow sheet that helped to ensure that breastfeeding education was completed by WIC staff. The program coordinator coordinated the QI project and created the Breastfeeding Education Record, which served as a tracking tool to record whether breastfeeding education was given in each clinic visit and what was taught during the visit, thus promoting the continuity of education between visits. Other LHD staff members who were involved in the project included 3 office clerks.

Costs of Quality Improvement Project Implementation

Labor costs for the implementation of LHD D's QI project were estimated at \$7,979.57. Non-labor costs were estimated at \$1,269.60. Thus, the total cost of LHD D's QI project was estimated at \$9,249.17. The aim of LHD D's QI project was to increase the percentage of eligible registered clients who receive breastfeeding education. LHD D experienced a 62% increase in that percentage after the QI project was implemented (i.e., from 38% to 100%). Therefore, the unit cost for the QI project was estimated to be \$149.18 per percentage increase in the daily average number of eligible registered clients who receive breastfeeding education (Table 5).

Table 5. Costs of Quality Improvement Project (Breastfeeding Education of Women, Infants, and Children Program Clients) Implementation for Local Health Department D

Labor costs	Non-labor costs	Total costs	Unit cost for QI project*
\$7,979.57	\$1,269.60	\$9,249.17	\$149.18

* Unit cost was measured by dividing the total cost by the change in the key respective outcome measure.

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¹⁰ Chatterji, P., & Brooks-Gunn, J. (2004). WIC participation, breastfeeding practices and well-baby care among unmarried, low-income mothers. *American Journal of Public Health, 94*, 1324-1327.

¹¹ Reifsnider, E. & Eckhart, D. (1997). Prenatal breastfeeding education: Its effect on breastfeeding among WIC participants. *Journal of Human Lactation, 13*(2), 121-125.