HHS Public Access

Author manuscript

J Public Health Manag Pract. Author manuscript; available in PMC 2016 April 14.

Published in final edited form as:

J Public Health Manag Pract. 2015 ; 21(2): 176–185. doi:10.1097/PHH.0000000000000113.

Factors Driving the Adoption of Quality Improvement Initiatives in Local Health Departments: Results From the 2010 Profile Study

Huabin Luo, PhD, **Sergey Sotnikov, PhD**, **Anita McLees, MA, MPH**, and **Shereitte Stokes, PhD**

Department of Public Health, Brody School of Medicine, East Carolina University, Greenville, North Carolina (Dr Luo) and Office for State, Tribal, Local and Territorial Support, Centers for Disease Control and Prevention, Atlanta, Georgia (Drs Sotnikov and Stokes and Ms McLees)

Abstract

Background—Over the past decade, quality improvement (QI) has become a major focus in advancing the goal of improving performance of local health departments (LHDs). However, limited empirical data exists on the current implementation of QI initiatives in LHDs and factors associated with adoption of QI initiatives.

Objectives—(1) To examine the current implementation of QI implementation initiatives by LHDs and (2) to identify factors contributing to LHDs' decision to implement QI initiatives.

Methods—In this study, a novel theoretical framework based on analysis of QI in medicine was applied to analyze QI by LHDs. LHDs' QI adoption was assessed by the number of formal QI projects reported by LHDs that responded to module 1 of the 2010 National Profile of Local Health Department Study (Profile Study) conducted by the National Association of County & City Health Officials. The Profile Study data were merged with data from the Health Resources and Services Administration's Area Resource Files and the Association of State and Territorial Health Officials' 2010 Survey. Logistic regression analyses were conducted using Stata 11 SVY procedure to account for the complex sampling design.

Results—The Profile Study data indicated that about 73% of the LHDs reported implementing 1 or more QI projects. LHDs with large jurisdiction population (>50 000), higher per capita public health expenditure, a designated QI staff member, or prior participation in performance improvement programs were more likely to have undertaken QI initiatives.

Conclusion—According to the Profile Study, more than a quarter of LHDs surveyed did not report implementing any formal QI projects. Greater investments in QI programs and designation of QI staff can be effective strategies to promote QI adoption. The validity of the definition of a

Correspondence: Huabin Luo, PhD, Department of Public Health, Brody School of Medicine, East Carolina University, Greenville, NC 27834 (luoh@ecu.edu).

The authors declare no conflicts of interest.

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention. The authors acknowledge the contribution of Dr Timothy Van Wave, Office for State, Tribal, Local and Territorial Support, Centers for Disease Control and Prevention, who served as a consultant for the project.

formal QI project needs to be established. More research to identify the barriers to successful QI implementation at LHDs is also needed.

Keywords

determinants; local health departments; quality improvement

Over the past 2 decades, various initiatives have been undertaken to promote quality improvement (QI) at local health departments (LHDs).[1–6] The Public Health Accreditation Board was established in 2007 to manage and promote a national voluntary accreditation program for state, tribal, local, and territorial public health departments, a central tenet of which is continuous QI.[7] National organizations have developed materials and initiatives to promote QI, such as the Association of State and Territorial Health Officials' (ASTHO's) accreditation and performance improvement guide for state health agencies. In addition, the federal government implemented the National Public Health Improvement Initiative, a cooperative agreement program beginning in 2010 that is intended to institutionalize QI in 73 state, tribal, local, and territorial public health agencies.[8] In recent years, QI and accreditation have become part of a national focus to advance the quality and performance of public health and improve population health.[6,9,10]

Quality improvement, along with voluntary accreditation, is critical to improving the performance of state and local public health agencies.[11,12] Operational definition of QI in public health has recently been developed.[9,13] Nationwide efforts such as the National Public Health Improvement Initiative, which facilitates training and capacity building for state, tribal, local, and territorial departments in the areas of performance management and QI have been implemented in the last 4 years.[14] Quality improvement initiatives, however, as a necessary tool for continuous improvement of effectiveness and efficiency of public health systems, are still new to the culture of public health practice and management. The barriers and drivers of QI implementation in public health are not well known or understood. Extending from prior research,[7,14–18] this study applied a QI implementation model from the medical field to assess the factors impacting QI by LHDs. A systemic application of conceptual framework for QI not previously used in public health could help better understand and identify the factors that influence the adoption of QI initiatives by LHDs. Moreover, using a recent national survey LHDs in 2010, this study provided an update of QI at LHDs from previous studies[14,16,18] that used earlier data from the National Profile of Local Health Department Study (the Profile Study).[19] By applying a novel theoretical framework based on analysis of QI in medicine to public health, the study makes a new contribution to existing literature on the topic. The objective of this study was to establish a new baseline for the current status of implementation of QI initiatives at the LHD level and explore barriers and facilitators for adoption of LHDs' QI initiatives. A better knowledge of which factors contribute to QI implementation will help design more effective strategies to facilitate QI adoption at LHDs.

Conceptual Framework

Quality improvement as a strategy to achieving better health outcomes has been embraced by the medical community much earlier than public health.[20] Thus, it was decided to incorporate prior experiences in QI from the medical sector in developing a QI adoption framework for public health. In this study, we followed the QI implementation framework in clinical service settings proposed by Alexander and Herald,[20] which is based on the Consolidated Framework for Implementation Research developed by Damschrode and colleagues,[21] and provides a more integrative framework. The major strength of the Alexander and Herald (AH) framework is that it is based on the synthesis of existing literature on QI implementation in the medical field. The AH framework states that QI adoption may be explained by 3 major factors:

- Content,
- Processes, and
- Context. Specifically, the implementation of QI will depend on:
    1. Familiarity of an organization with QI *content* (eg, QI information accessibility, QI applicability, and awareness about QI);
    2. Organizational *processes* used to implement the QI innovations (eg, communication/feedback, education, leadership, and task integration); and
    3. QI *context* that represents the resources, policy, or management environment where QI innovations are being implemented, including:
        - The *internal* attributes of an organization implementing QI (eg, culture/climate, resources/support, structure/staffing, and workload), and
        - *External* features that influence an organization's decision to implement QI (eg, competition, external mandates, and reimbursement policies).

According to strategic management theory, organizations that align themselves with their unique market environments are better positioned to achieve their goals.[22,23] Researchers have studied the external environment's influence on hospitals' adoption of information technology,[24] electronic health records,[25] and on LHDs' performance of essential public health services.[26] More recently, Yeager and colleagues[16] applied resource dependency theory to assess the correlation of environmental factors (eg, primary care physicians per capita) and LHDs' QI initiatives.

In this study, we hypothesize that LHDs would be more likely to undertake QI initiatives if LHDs:

- Have previously applied recommended QI frameworks (eg, Six Sigma) (*content factors in the AH model*).
- Have conducted activities that contain QI elements or prerequisites, such as staff training in QI methods, participated in performance improvement programs, and

community health assessment. For instance, community health assessment is a prerequisite for accreditation. And the objective of accreditation is QI (*process factors in the AH model*).

- Have more financial and manpower resources and a better QI infrastructure (eg, higher per capita expenditure, designated QI staff) (*internal context factors in the AH model*).
- Are located in a community with more medical resources (eg, primary care physicians and hospital beds per capita). In these communities, clinical providers might have implemented QI in their practices, which through the process of peers pressure and diffusion of innovations could promote adoption of QI at LHDs) (*external context factors in the AH model*) (Figure).

Methods

Data

The data on LHD QI activities come from module 1 of the 2010 National Association of County & City Health Officials Profile Study.[27] The complete technical documentation, including the instruments, is available for review on the National Association of County & City Health Officials Web site.[28] The overall response rate for the 2010 Profile survey was 82% (2107 of 2565 LHDs); and the response rate for module I, which contained all questions on QI, was 85% (531 of 624 LHDs). We merged the Profile survey data with the Area Resource File (ARF, 2010 edition) and the Association of State and Territorial Health Officials (ASTHO) 2010 survey by federal information processing standards codes to establish proxies for factors affecting QI adoption as described in the Figure.

Measurement

Outcome measures—Two outcome indicators of QI initiatives were examined in this study. The first outcome variable "QI implementation," was intended to measure the proportion of LHDs that reported implementation of *any* QI activities. It was created by using LHDs responses to the following 4 statements that best characterized LHDs' QI activities:

1. The LHD has implemented a formal QI program agency-wide.
2. Formal QI activities are being implemented in specific programmatic or functional areas of the LHD but not on an agency-wide basis.
3. LHD's QI activities are informal or ad hoc in nature.
4. The LHD is not currently involved in QI.

In our analysis, we coded the first 3 responses as "1" and the last response as "0" to define this variable.

The second outcome variable is intended to measure the intensity of QI implementation activities as established by the number of *formal QI projects* implemented by those engaged in any QI activities. The 2010 Profile questionnaire defined a formal project as "a systematic

QI initiative that includes an aim statement; a work plan with tasks, responsibilities; intervention strategy(ies); and measures for tracking change." The *formal QI projects* variable was based on the following question from the Profile Study: "In the past 12 months, how many formal projects has your LHD implemented to improve the quality of a service, process, or outcome?" (This question was asked only from the subset of LHDs that chose the first 3 responses to the first outcome variable described earlier.) The responses to the question included "none," "1–3," "4–6," "7–10," and "11–20" formal projects. Given that the frequency of selecting the last 3 categories was small (see details in the "Results" section), we decided to combine them into one category. Thus, we coded this *formal QI projects* variable (as count variable) by the number of formal QI projects into 3 categories: "none" as "0," "1–3 projects" as "1," and "4 or more projects" as "2."

The selection of independent variables was guided by the aforementioned AH model[20] and other prior research.[24–26,29] We included the following variables as proxies for *QI content, process, and context* factors influencing QI implementation:

QI content: Per the AH model,[20] QI content refers to QI accessibility and applicability. In the 2010 Profile Study, LHDs were asked whether they used any of the following frameworks or approaches to QI in the past year: Balanced Score Card, Baldridge Performance Excellence Criteria, Lean, Plan-Do-Check-Act, Six Sigma, or other. We included this variable as a proxy for QI content. It is coded "1" if any of the frameworks was selected, otherwise as "0."

Process factors: The process factor variables selected from the 2010 Profile Study include the following: (1) participation in performance-related programs (Yes/No), including "Turning Point," "National Public Health Performance Standards," and "Multi-state Learning Collaborative; (2) LHD staff QI training (Yes/No); (3) establishing an agency-wide strategic plan in the past 5 years (Yes/No); and (4) completion of community health assessment in the past five years (Yes/No). These process variables were selected to re-flect exposure to early QI initiatives (1), level of training in formal QI methods, and organization-wide efforts, such as strategic planning and community health assessments, that may include various QI elements (3 and 4).

Context: Internal factors: The following internal factor variables were selected from responses to the 2010 Pro-file Study Core questionnaire to reflect LHDs' foundational capacities, which are important factors to multiple LHDs activities, including QI implementation: (1) Annual LHD expenditure per capita was calculated as total LHD public health expenditure divided by the total jurisdiction population. We took the logarithmic value of this variable to correct for skewedness in distribution. (2) The number of LHD employees in full-time equivalents per 10 000 people. (3) Characteristics of LHD director, including full-time employment (Yes/No), length of tenure as LHD director (in years), and LHD director master's degree (Yes/No). (4) LHD's workload (total number of activities performed [a total of 87 activities/services were surveyed in the 2010 Profile Study] by an LHD divided by the total full-time equivalents at the LHD). (5) Having a designated QI staff.

Context: External factors: The following proxy measures of external factors were selected from the 2010 Profile, ARF file, and the 2010 ASTHO survey:

1. From the 2010 Profile Study: Jurisdiction population size (<50 000, 50 000–499 999, 500 000+); jurisdiction type (one county/single city vs multicounty/multicity/combined); governance (decentralized [local] vs state/shared); presence of local board of health (Yes/No).
2. From the ARF: Poverty rate, number of primary care physicians (general practice) per 10 000 population, number of hospital beds per 10 000 population, presence of a federally qualified health center (FQHC) (Yes/No). These ARF variables were measured at the county level. For LHDs whose jurisdictions cover several counties, the population-weighted average was calculated for the 3 ratio variables. For LHDs whose jurisdictions were city/multicity, and hence did not match a specific county's federal information processing standards code, data from the ARF were merged with the 2010 Profile Study data by zip code. The FQHC variable was coded "1" if there was at least 1 FQHC in the county, and coded as "0" otherwise.
3. From the 2010 ASTHO survey: State agency QI implementation variable was obtained from responses of state public health agency officials to the question: "Does your state/territorial health agency have its own QI process in place? Responses included "Yes, fully implemented department-wide"; "Yes, partially implemented department-wide"; "Yes, fully implemented for specific programs"; "Yes, partially implemented for specific programs"; and "No." We coded the first 4 "Yes" responses as "1" and the "No" response as "0."

Statistical analysis

We first used χ^2 tests and *t* tests to provide descriptive statistical analyses of *QI implementation* and *formal QI projects variables*. Then, we ran a binary logistic regression model and an ordinal regression model to assess associations of the factors as depicted in the Figure with the 2 outcome variables *QI implementation and formal QI projects*, respectively. We assessed proportional odds assumption for the ordinal regression model analysis and it is appropriate to use ordinal regression ($P = .47$). Analyses were conducted using Stata 11 (College Park, Texas) survey procedures. We used survey weights provided by the 2010 Profile Study to account for the complex sampling design and obtain nationally representative estimates. Results were considered significant if $P < .05$.

Results

Descriptive results

In 2010, overall, 84.43% (95% confidence interval [CI], 81.06–87.82) of LHDs reported undertaking any type of QI activities (formal and informal/ad hoc). Specifically, 14.82% (95% CI, 11.69–17.96) of LHDs reported implementation of an agency-wide formal QI activity; 30.29% (95% CI, 26.18–34.39) implemented formal QI activities in specific programmatic or functional areas but not on an agency-wide basis; 39.33% (95% CI, 34.87–43.79) were involved in informal or ad hoc QI activities; 15.56% (95% CI, 12.18–18.94) did not report any QI activity at all (Table 1).

Among the subset of LHDs (n = 449) that reported participating in formal or informal QI, 73.12% (95% CI, 68.21–77.20) (not shown in Table 1) reported implementing at least 1 formal QI project. Specifically, 56.58% (95% CI, 51.70–61.46) implemented 1 to 3 projects; 16.54% (95% CI, 13.10–19.98) and 26.88% (95% CI, 22.39–31.37%) did not implement any formal QI projects (Table 1).

Table 2 presents LHD bivariate descriptive statistics results. First, we divided LHDs into 2 subsamples by the *QI implementation (Yes/No) variable.* LHDs were more likely to implement QI if they had already participated in performance-related activities, completed a community health assessment in the past 5 years, or completed strategic planning. Those LHDs in jurisdictions with a population of 500 000+, having local board of health, higher per capita public health expenditure, or a full-time agency director were more likely to implement QI.

Second, we categorized LHDs into 2 groups by the *formal QI projects* (*Yes*/*No*) variable. As shown, LHDs that used at least 1 QI framework, participated in performance-related activities completed strategic planning, or provided staff QI training, were more likely to have implemented QI projects. LHDs were more likely to implement *formal QI projects* in jurisdictions with a population of 500 000+, having higher per capita public health expenditure, more staff members, having an agency director with a master's degree, with less workload, or having a designated QI staff. LHDs with one-county/single-city jurisdiction were less likely to implement formal QI projects.

Logistic regression results

Table 3 displays results of 2 logistic regressions with *QI implementation* and *formal QI projects* as dependent variables. As shown in model 1, the probability of LHDs to implement any QI activities was positively correlated with the completion of a community health assessment in the past 5 years (adjusted odds ratio [AOR] = 3.56; 95% CI, 1.35–9.36), participation in performance-related activities (AOR = 4.74; 95% CI, 2.05–10.98), a high per capita public health expenditure (AOR = 2.40; 95% CI, 1.28–4.50), or existence of a local board of health (AOR = 2.62; 95% CI, 1.04–6.59).

As shown in model II, LHDs having used at least 1 QI framework (AOR = 2.53; 95% CI, 1.42–4.49), having completed a community health assessment in the past 5 years (AOR = 3.28; 95% CI, 1.30–8.28), with a higher per capita public health expenditure (AOR = 1.62; 95% CI, 1.01–2.60), having a designated QI staff (AOR = 3.97; 95% CI, 2.07–7.64), or in a jurisdiction population size of 500 000+ (AOR = 3.85; 95% CI, 1.14–10.31) were likely to implement more QI projects. One-county/single-city LHDs (AOR = 0.43; 95% CI, 0.19–0. 95) were likely to implement fewer QI projects (Table 3).

Discussion

This study attempted to identify the factors associated with LHDs' QI initiatives by applying a new AH framework on QI from the medical field to public health. Different from prior research, this study systematically assessed QI content, process, and contextual factors that could influence QI implementation at LHDs. The findings of this study may provide

important insights for public health leaders and practitioners engaged in the current accreditation movement with a focus on QI.

QI content

Our analysis suggests that the use of a QI framework (a proxy for QI content factor) was significantly associated with implementing formal QI projects. This finding suggests that knowledge of QI frameworks, such as Plan-Do-Study-Act, Six Sigma, Lean, may assist with and promote the implementation of formal QI projects at LHDs. However, the 2010 Profile Study data indicated that among the 339 LHDs that reported completion of 1 or more QI projects, approximately half of them (50.4%) did not report any use of the QI frameworks surveyed in the Profile Study (data not shown in Table 1). It is unclear whether LHDs applied other frameworks, but this finding suggests that some LHDs may not be associating the implementation of formal QI with application of standard frameworks or methods.

Process factors

With regard to process factors, 2 of the 4 factors included in our analyses are significantly correlated with the *QI implementation* and *QI projects* variables. First, completion of a community health assessment within the past 5 years was positively associated with both QI implementation and QI projects. The aim of the community health assessment is to collect data on health status of the population, identify important factors that impact health, areas for health improvement, and resources that can be used for health improvement.[30] Since the release of the Public Health Accreditation Board national voluntary public health accreditation program, the completion of a health assessment is a prerequisite for accreditation.[30] This may mean that current accreditation initiatives could contribute to more QI initiatives at LHDs. Yet, evidence also suggests that more efforts are needed to facilitate LHDs' in community health assessment, community health improvement plan, and strategic planning.[31] Second, participation in past performance-related activities, such as "Turning Point" "National Public Health Performance Standards," and "Multi-state Learning Collaborative," was also positively associated with QI implementation (analytical model I). An earlier report found that LHDs that participated in the Multi-state Learning Collaborative,[2] an early QI program, made significant progress in QI.[32] The other 2 process variables, staff QI training and completion of strategic planning, were significant factors in bivariate analyses. Thus, our findings suggest that these well-established processes helped LHDs prepare for improved QI uptake.

Internal factors

For internal factors, our analysis indicated that LHDs with a higher per capita expenditure (analytical models I and II) were more likely to engage in QI initiatives. This finding is in line with prior research that established a link between larger financial and human resources and better LHD performance in general.[33–36] Since QI initiatives are usually adopted to improve performance, the positive association between funding level and QI initiatives makes sense. Another internal factor variable—a designated QI staff at LHDs, was also statistically significant (analytical model II), suggesting that creating a position of a

performance improvement manager (a strategy used by National Public Health Improvement Initiative) may be a viable strategy to promote QI within and across LHDs.

External factors

Our analysis of external factors suggests that LHDs with a larger jurisdiction population size (analytical model II) and local board of health (analytical model I) are more likely to undertake QI, which is consistent with prior research.[34,35] A negative association between one-county/single-city jurisdiction type and QI initiatives found in the analysis may suggest the need for a more focused, nuanced, and targeted approach to promoting QI for LHDs in one-county/single-city jurisdictions. In addition, the results of our analysis of other external factors (primary care physicians, hospital beds, poverty rate, and presence of FQHC) suggested that these factors were not significant influences in undertaking QI initiatives for LHDs. For example, the primary care physicians variable is not significant in either analytical model I or II ($P = .11$ and $P = .21$), suggesting no association between this important medical infrastructure variable and LHD QI initiatives. Yet, an earlier study using the 2008 Profile Study data by Yeager and colleagues[29] found that the number of primary care physicians per capita was significant and positively related to all staff members receiving QI training at LHDs. Different study design could account for the difference. For instance, they included 7 QI related process factors as the dependent variables. Further, our analysis controlled more covariates, such as QI process factors. The systematic approach applied in our analysis is an important step in understanding factors affecting QI initiatives at LHDs.

Additional analyses revealed that among these 339 LHDs, approximately 7% did not implement any of the essential elements for formal QI as surveyed in 2010 Profile Study: “mapping a process,” “identifying root causes,” “obtaining baseline data,” “setting measurable objectives,” “testing the effects of an intervention,” “analyzing the results of the test,” or “formally adopting a tested intervention.” It is not clear whether other QI elements that were not included as survey items in the Profile Study might have been applied by these LHDs. These findings may suggest that some LHDs did not fully understand what formal QI is or how to implement formal QI.

In addition to the 2010 Profile Study, the National Association of County & City Health Officials also surveyed QI implementation in the 2005 and 2008 Profile studies. The 2008 Profile Study indicated that 55% of LHDs reported active engagement in formal QI activities,[18] and the 2005 Profile Study data indicated that 71% of LHDs had been involved in quality and performance improvement activities during the past 3 years.[37] However, because of wording changes of the questions in these 3 surveys, LHDs’ progress in QI could not be assessed. Yet, the 45% of LHDs that implemented formal QI in 2010 is comparable with the 55% of LHDs that implemented formal QI in 2008 because the 2008 Profile Study included “formal” QI in the question (ie, “Has your LHD undertaken any formal QI or performance improvement efforts *in the past two years*?”). The budget and staff cuts during the recent economic recession[38] could possibly account for the reported decline in QI initiatives. Nevertheless, a consensus definition of QI[13] and consistent questions should be used in future surveys.

Limitations of this this study should be noted. First, all responses are self-reported and could be subject to report bias. Second, formal QI projects are subject to different interpretation and understanding, which, as a result, could lead to misclassification of responses. Third, some other factors, such as LHD leadership involvement in QI (a process factor), which was noted as an important factor in several other studies,[39,40] was not included. Fourth, we applied multiple comparisons in the analyses. Thus, interpretation of findings needs to take into consideration type I error. Nonetheless, most results are significant at $P = .01$. Fifth, although the 2010 Profile Study data were the most current data at the time of the study, LHDs were just at the early stage to adopt QI techniques and developing competencies in using QI in 2010. Therefore, QI progress needs to be updated with new data. Finally, this study is cross-sectional and therefore causal or temporal relationships are not possible to ascertain.

Future research

The year 2010 probably marked the point in time when LHDs began to embrace accreditation and QI. Further study is needed to assess the progress and pitfalls of QI implementation at LHDs, including whether well-established QI approaches were applied and whether the implemented QI initiatives achieved its intended objectives. Additional studies are needed to estimate the cost of QI and identify strategies in implementing QI, including data collection. A separate study is needed to evaluate improvements in efficiency and effectiveness resulting from QI initiatives at LHDs. Further research using different theoretical models to identify the enabling and restraining factors that impact QI is also needed.

Conclusion

Our analysis indicates that a substantial proportion of LHDs are still not involved in implementing QI initiatives by 2010. The 2010 Profile Study revealed that about 16% of LHDs did not undertake any QI activities and more than a quarter of LHDs surveyed did not report implementing *formal QI projects* in 2010. The current level of adoption of QI in public health may be improved, and additional efforts are needed to promote QI in LHDs, especially for one-county/single-city jurisdiction LHDs, and LHDs with limited resources. Targeted investments in QI programs and designation of QI staff seem to be effective strategies to increase the number of LHDs that implement QI initiatives. The validity and interrater reliability of the definition of a formal QI project need to be established. The AH model applied in this study provided a useful framework to identification of external and internal factors that influence QI implementation at LHDs. More research is needed to further validate the model with new data sets.

References

1. Baker SL, Beitsch L, Landrum LB, Head R. The role of performance management and quality improvement in a national voluntary public health accreditation system. J Public Health Manag Pract. 2007; 13(4):427–429. [PubMed: 17563634]
2. Beitsch LM, Thielen L, Mays G, et al. The Multistate Learning Collaborative, states as laboratories: informing the national public health accreditation dialogue. J Public Health Manag Pract. 2006; 12(3):217–231. [PubMed: 16614557]

3. Centers for Disease Control and Prevention. [Accessed October 15, 2012] National Public Health Performance Standards program. http://www.cdc.gov/od/ocphp/nphpsp. Published 2008
4. Mays G, Beitsch LM, Corso L, Chang C, Brewer R. States gathering momentum: promising strategies for accreditation and assessment activities in Multistate Learning Collaborative applicant states. J Public Health Manag Pract. 2007; 13(4):364–373. [PubMed: 17563624]
5. Public Health Foundation. [Accessed October 15, 2012] Performance management & quality improvement. http://www.phf.org/focusareas/qualityimprovement/Pages/QualityImprovement.aspxPublished 2008
6. Honore PA, Wright D, Berwick DM, et al. Creating a framework for getting quality into the public health system. Health affairs (Project Hope). 2011; 30(4):737–745. [PubMed: 21471496]
7. Bender K, Halverson PK. Quality improvement and accreditation: what might it look like? J Public Health Manag Pract. 2010; 16(1):79–82. [PubMed: 20009649]
8. Centers for Disease Control and Prevention. [Accessed October 19, 2013] National Public Health Improvement Initiative. http://www.cdc.gov/stltpublichealth/nphii/about.html
9. Riley W, Lownik B, Halverson P, et al. Developing a taxonomy for the science of improvement in public health. J Public Health Manag Pract. 2012; 18(6):506–514. [PubMed: 23023274]
10. Riley WJ, Parsons HM, Duffy GL, Moran JW, Henry B. Realizing transformational change through quality improvement in public health. J Public Health Manag Pract. 2010; 16(1):72–78. [PubMed: 20009648]
11. Bender K, Benjamin G, Carden J, et al. Final recommendations for a voluntary national accreditation program for state and local health departments: steering committee report. J Public Health Manag Pract. 2007; 13(4):342–348. [PubMed: 17563621]
12. Institute of Medicine. The Future of the Public's Health in the 21st Century. Washington, DC: National Academies Press; 2007.
13. Riley WJ, Moran JW, Corso LC, Beitsch LM, Bialek R, Cofsky A. Defining quality improvement in public health. J Public Health Manag Pract. 2010; 16(1):5–7. [PubMed: 20009636]
14. Leep C, Beitsch LM, Gorenflo G, Solomon J, Brooks RG. Quality improvement in local health departments: progress, pitfalls, and potential. J Public Health Manag Pract. 2009; 15(6):494–502. [PubMed: 19823154]
15. Leep CJ. 2005 National Profile of Local Health Departments. J Public Health Manag Pract. 2006; 12(5):496–498. [PubMed: 16912618]
16. Yeager VA, Menachemi N, Savage GT, Ginter PM, Sen BP, Beitsch LM. Using resource dependency theory to measure the environment in health care organizational studies: a systematic review of the literature. Health Care Manage Rev. 2013; 25:25.
17. Beitsch LM, Rider NL, Joly BM, Leep C, Polyak G. Driving a public health culture of quality: how far down the highway have local health departments traveled? J Public Health Manag Pract. 2013; 1:1.
18. Beitsch LM, Leep C, Shah G, Brooks RG, Pestronk RM. Quality improvement in local health departments: results of the NACCHO 2008 Survey. J Public Health Manag Pract. 2010; 16(1):49–54. [PubMed: 20009644]
19. Leep CJ, Shah GH. NACCHO's National Profile of Local Health Departments study: the premier source of data on local health departments for surveillance, research, and policymaking. J Public Health Manag Pract. 2012; 18(2):186–189. [PubMed: 22286289]
20. Alexander JA, Hearld LR. The science of quality improvement implementation: developing capacity to make a difference. Med Care. 2011; 49(suppl20):S6–S20. [PubMed: 20829724]
21. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci. 2009; 4(50):50. [PubMed: 19664226]
22. Thompson, JD. Organizations in Action. New York, NY: McGraw-Hill; 1967.
23. Venkatraman N, Camillus JC. Exploring the concept of "fit" in strategic management. Acad Manag Rev. 1984; 9(3):513–525.
24. Menachemi N, Shin DY, Ford EW, Yu F. Environmental factors and health information technology management strategy. Health Care Manage Rev. 2011; 36(3):275–285. [PubMed: 21646886]

25. Kazley AS, Ozcan YA. Organizational and environmental determinants of hospital EMR adoption: a national study. J Med Syst. 2007; 31(5):375–384. [PubMed: 17918691]
26. Mays GP, McHugh MC, Shim K, et al. Institutional and economic determinants of public health system performance. Am J Public Health. 2006; 96(3):523–531. [PubMed: 16449584]
27. National Association of County & City Health Officials. 2010 National Profile of Local Health Departments. Washington, DC: National Association of County & City Health Officials; 2011.
28. National Association of County & City Health Officials. [Accessed October 19, 2013] Data requests and technical documentation. http://www.naccho.org/topics/infrastructure/profile/techdoc.cfm
29. Yeager VA, Menachemi N, Ginter PM, Sen BP, Savage GT, Beitsch LM. Environmental factors and quality improvement in county and local health departments. J Public Health Manag Pract. 2013; 19(3):240–249. [PubMed: 23348521]
30. Public Health Accreditation Board. [Accessed October 29, 2013] Measures and Standards, Version 1. http://www.phaboard.org/wp-content/uploads/PHAB-Standards-and-Measures-Version-1.0.pdf
31. Shah GH, Beatty K, Leep C. Do PHAB accreditation prerequisites predict local health departments' intentions to seek voluntary national accreditation? Front Public Health Serv Syst Res. 2013; 2(3):1–12.
32. Joly BM, Booth M, Shaler G, Mittal P. Assessing quality improvement in local health departments: results from the Multi-State Learning Collaborative. J Public Health Manag Pract. 2012; 18(1):79–86. [PubMed: 22139315]
33. Kennedy VC. A study of local public health system performance in Texas. J Public Health Manag Pract. 2003; 9(3):183–187. [PubMed: 12747314]
34. Mays GP, Halverson PK, Baker EL, Stevens R, Vann JJ. Availability and perceived effectiveness of public health activities in the nation's most populous communities. Am J Public Health. 2004; 94(6):1019–1026. [PubMed: 15249309]
35. Turnock BJ, Handler A, Hall W, Potsic S, Nalluri R, Vaughn EH. Local health department effectiveness in addressing the core functions of public health. Public Health Rep. 1994; 109(5): 653–658. [PubMed: 7938386]
36. Erwin PC. The performance of local health departments: a review of the literature. J Public Health Manag Pract. 2008; 14(2):E9–E18. [PubMed: 18287909]
37. National Association of County & City Health Officials. 2005 National Profile of Local Health Departments. Washington, DC: National Association of County & City Health Officials; 2006.
38. Willard R, Shah GH, Leep C, Ku L. Impact of the 2008–2010 economic recession on local health departments. J Public Health Manag Pract. 2012; 18(2):106–114. [PubMed: 22217535]
39. Gunzenhauser JD, Eggena ZP, Fielding JE, Smith KN, Jacobson DM, Bazini-Barakat N. The quality improvement experience in a high-performing local health department: Los Angeles County. J Public Health Manag Pract. 2010; 16(1):39–48. [PubMed: 20009643]
40. Mason M, Schmidt R, Gizzi C, Ramsey S. Taking improvement action based on performance results: Washington State's experience. J Public Health Manag Pract. 2010; 16(1):24–31. [PubMed: 20009641]

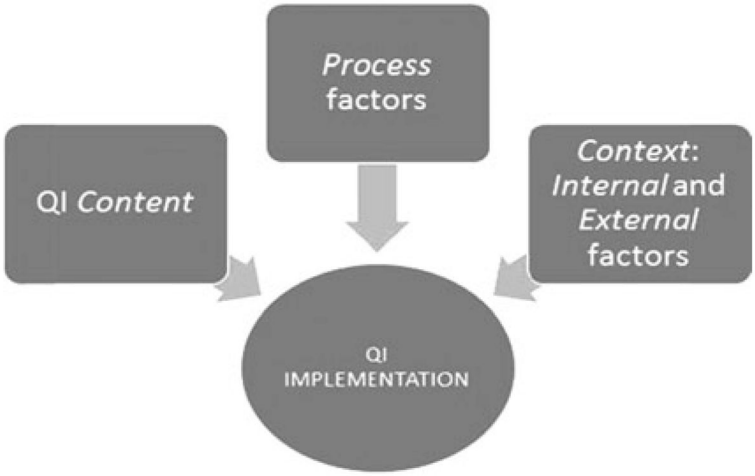

FIGURE.

A Conceptual Model of Local Health Department's Undertaking QI Initiatives

Abbreviation: QI, quality improvement.

TABLE 1

Distribution of LHDs by Implementing QI and by QI Projects Implemented

QI by LHDs	%	95% CI
QI implementation (N = 522 LHDs)	84.43	81.06–87.82
A formal QI program agency-wide	14.82	11.69–17.96
A formal QI program in specific programs	30.29	26.18–34.39
LHD's QI is informal and ad hoc	39.33	34.87–43.79
Not involved in QI	15.56	12.18–18.94
Number of QI projects (N = 449 LHDs)		
None	26.88	22.39–31.37
1–3	56.58	51.70–61.46
4–20	16.54	13.10–19.98

Abbreviations: LHD, local health department; QI, quality improvement.

TABLE 2

Descriptive Statistics of LHDs Conducting Any QI Initiatives (QI Implementation) and Formal QI Projects

	QI Implementation				Formal QI Projects			
Variables	**Yes**	**95% CI**	**No**	**95% CI**	**Yes**	**95% CI**	**No**	**95% CI**
Content factor								
Using QI framework	NA[a]				49.52[b]	43.8–55.25	7.21	2.06–12.35
Process factors								
Health assessment	81.07[b]	77.13–85.01	56.29	44.37–68.20	83.36	79.04–87.69	76.54	68.04–85.03
Participation in performance-related activities	50.25[b]	45.18–55.32	13.07	4.79–21.34	54.83[c]	48.98–60.68	37.32	27.57–47.08
Strategic planning in the past 5 y	42.92[b]	38.10–47.74	17.94	8.97–26.92	48.34[b]	42.68–54.00	29.42	20.68–38.17
Staff QI training	NA[a]				80.73[b]	76.10–85.35	55.29	45.28–65.30
Internal factors								
Per capita PH expenditure (log)	3.70[d]	3.62–3.79	3.33	3.00–3.65	3.79[c]	3.70–3.89	3.47	3.29–3.65
FTEs per 10 000 population	7.47	6.61–8.33	6.20	2.85–9.55	7.94[d]	6.82–9.05	6.29	5.18–7.41
Full-time agency director	93.09[c]	90.44–95.72	83.00	73.76–92.24	94.89	92.21–97.57	87.97	81.38–94.55
Director having master's degree	52.88	47.79–57.96	42.65	30.41–54.89	56.81[d]	50.93–62.69	42.27	32.33–52.21
Director's tenure of office, y	8.25	7.47–9.02	7.99	5.93–10.05	8.60	7.66–9.53	7.39	6.00–8.78
Workload[e]	2.93[d]	2.53–3.33	5.07	3.06–7.08	2.45[c]	2.10–2.80	4.16	3.06–5.26
Designated QI staff	NA[a]				38.35[b]	32.85–43.85	13.03	6.59–19.47
External factors								
Jurisdiction population size								
<50 000	60.23[d]	55.66–64.80	72.63	62.94–82.32	55.00[c]	49.50–60.50	73.23	65.25–81.22
50 000–499 999	33.90	29.51–38.29	25.23	15.73–34.73	37.98	32.70–43.26	24.15	16.37–31.93
500 000+	5.87	4.35–7.40	2.14	0.02–4.26	7.01	5.06–8.98	2.62	0.65–4.58
One county/single city	89.48	86.77–92.20	86.31	78.43–94.19	87.59[d]	84.20–90.99	94.20	89.94–98.46
Decentralized (local)	77.17	73.15–81.19	74.09	64.02–84.17	75.35	70.54–80.15	81.23	73.75–88.71
Presence of local board of health	78.20[c]	74.26–82.14	62.01	50.54–73.47	75.61	70.86–80.35	84.45	77.30–91.59
Poverty rate	13.63	13.11–14.14	13.58	12.17–14.99	13.82	13.21–14.42	13.21	12.25–14.18
Doctors per 10 000 population	2.43	1.94–2.91	1.82	1.31–2.25	2.41	1.81–3.04	2.26	1.62–3.12

J Public Health Manag Pract. Author manuscript; available in PMC 2016 April 14.

Variables	QI Implementation				Formal QI Projects			
	Yes	95% CI	No	95% CI	Yes	95% CI	No	95% CI
Hospital beds per 10 000 population	34.16	30.39–37.92	34.63	25.78–43.49	34.59	30.16–39.01	33.71	26.33–41.09
Presence of FQHC	55.23[d]	50.31–60.15	70.43	59.43–81.43	56.54	50.84–62.23	51.10	41.18–61.01
State agency conducted QI	91.10	88.19–94.01	93.33	87.60–99.06	90.36	86.91–93.82	92.92	87.38–98.46

Abbreviations: FQHC, federally qualified health center; FTE, full-time equivalent; LHD, local health department; QI, quality improvement.

[a]Skip question in model I.

[b]$P < .001$

[c]$P < .01$

[d]$P < .05$.

[e]Total number of activities performed by an LHD divided by the total FTEs at the LHD.

TABLE 3

Logistic Regression Results of Factors Associated With LHDs' QI Implementation

	Model I DV: QI Implementation			Model II DV: Formal QI Projects		
Variables	**AOR**	**95% CI**	***P***	**AOR**	**95% CI**	***P***
Content factor						
Using QI framework	NA[b]			2.53	1.42–4.49	.00
Process factors						
Health assessment	3.56	1.35–9.36	.01	3.28	1.30–8.28	.01
Participation in performance-related activities	4.74	2.05–10.98	.00	1.27	0.69–2.32	.44
Strategic planning in the past 5 y	1.85	0.64–5.35	.26	0.81	0.45–1.46	.48
Staff QI training	NA[b]			1.06	0.53–2.14	.86
Internal factors						
Per capita PH expenditure (log)	2.40	1.28–4.50	.01	1.62	1.01–2.60	.04
FTEs per 10 000 population	0.96	0.89–1.04	.34	1.01	0.98–1.04	.59
Full–time agency director	0.79	0.19–3.35	.75	1.74	0.45–6.71	.42
Director having Master degree	0.44	0.17–1.17	.10	0.92	0.49–1.70	.78
Director's tenure of office, y	0.97	0.93–1.02	.31	1.00	0.98–1.03	.75
Workload[c]	1.09	0.94–1.27	.25	0.97	0.87–1.08	.58
Designated QI staff	NA[b]			3.97	2.07–7.64	.00
External factors						
Jurisdiction population size (vs <50 000)						
50 000–499 999	1.87	0.72–4.86	.20	1.82	0.92–3.64	.09
500 000+	5.20	0.62–43.38	.13	3.85	1.44–10.31	.01
One county/single city (vs others)	0.70	0.16–3.08	.64	0.43	0.19–0.95	.04
Decentralized (local) (vs others)	0.68	0.24–1.92	.47	0.96	0.48–1.91	.90
Presence of local board of health	2.62	1.04–6.59	.04	0.75	0.41–1.37	.35
Poverty rate	0.99	0.91–1.08	.88	1.00	0.94–1.06	.94
Doctors per 10 000 population	3.63	0.73–18.01	.11	1.28	0.87–1.88	.21
Hospital beds per 10 000 population	0.99	0.98–1.01	.45	1.00	1.00–1.01	.24
Presence of FQHC	0.65	0.27–1.59	.34	1.28	0.72–2.30	.40
State agency conducted QI (vs no formal QI)	1.18	0.32–4.40	.80	0.49	0.15–1.64	.24

Abbreviations: AOR, adjusted odds ratio; DV, dependent variable; FQHC, federally qualified health center; FTE, full-time equivalent; LHD, local health department; QI, quality improvement.

[a]Model I, binary logistic regression model; model II, ordinal regression model.

[b]Skip question in model I.

[c]Total number of activities performed by an LHD divided by the total FTEs at the LHD.