Quality Improvement Trends in Public Health Practice

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Abstract

Background: The Public Health Quality Improvement Exchange (PHQIX) is a resource that supports public health practitioners in the rapidly evolving landscape of quality improvement (QI) in public health. Supported by the Robert Wood Johnson Foundation, this effort has published 130 in-depth descriptions of real-world QI initiatives on its website since it launched in 2012.

Research Objectives: To explore the trends in QI work performed by public health practitioners through the analysis of metadata that accompanies published QI documentation. To provide insight into how the methods, tools, scope, and focus of a QI initiative may vary by characteristics or QI experience of an organization.

Data Sets and Sources: A database of 130 public health QI projects shared by registered PHQIX users. QI initiative data were submitted by employees of state, local, and tribal health departments.

Study Design: Review and analysis of existing data set.

Analysis: Exploratory analysis of user-submitted summaries of QI initiatives including information about the health department and the population it serves, tools and methods used, project duration, and the organization's level of QI activity. We present descriptive statistics of these attributes and explore connections between various attributes.

Principal Findings: A total of 130 QI initiatives from 32 different states are featured on the PHQIX website. The self-reported level of QI activity at the submitting organization varies from "Informal QI" (28%) to "QI Community" (5%).[1] The population served by the organizations ranges from less than 24,499 people (5%) to more than 1,000,000 (15%). Although the most commonly used QI method or approach is the plan–do–check–act (PDCA) cycle (92%), Rapid Cycle Improvement (20%), Kaizen (18%) and Lean/Six Sigma (12%) are also employed. The most frequently used QI tools are brainstorming (67%), fishbone diagrams (55%), flow charts (49%), process maps (48%), and surveys (45%). The most common partner organizations for QI initiatives are local health departments (21%), state health departments (18%), and community-based organizations (13%).

Conclusions: A variety of health departments and institutes across the United States conduct QI initiatives in public health. These initiatives focus on many different public health domains and currently favor the PDCA cycle, Kaizen, brainstorming, use of fishbone diagrams, flow charts, process maps, and survey methods. Although a relationship does not appear to exist between size or type of health department and the capacity of that health department or the methods and tools it employs, an organization's self-reported QI level may be associated with the number of QI initiatives it performs annually as well as the duration and focus of those initiatives.

Implications for Public Health Practice and Policy: As the field of QI in public health practice evolves, resources targeted to different types of practitioners will need to keep pace with demand. Understanding the trajectory of the field of QI in public health is important for practitioners and researchers alike. Findings from this study will provide insight into QI initiatives currently being performed as well as the types of projects that can be expected as organizational experience and collaboration grow.

[1] QI levels were adapted from the National Association of City and County Health Officials' (NACCHO's) phases of a culture of quality from the Roadmap to a Culture of Quality Improvement, http://qiroadmap.org/.

Background

The Public Health Quality Improvement Exchange (PHQIX) is a resource that supports public health practitioners in the rapidly evolving landscape of quality improvement (QI) in public health. Supported by the Robert Wood Johnson Foundation, this effort has published 130 in-depth descriptions of real-world QI initiatives on its website since it launched in 2012. PHQIX is unique among resources for public health practitioners in its exclusive focus on QI in public health and its integrated search capacity.[1] The primary resource on the PHQIX website is the set of initiative descriptions that present detailed data in a structured format, and may also include attachments such as diagrams, tools, and storyboards.

Research Objective

To explore the trends in QI work performed by public health practitioners through the exploration of metadata that accompanies published QI documentation. To provide insight into how the methods, tools, scope, and focus of a QI initiative may vary by characteristics or QI experience of an organization.

Data Sets and Sources

A database of 130 public health QI projects shared by registered PHQIX users. QI initiative data were submitted by employees of state, local, and tribal health departments.

Study Design

We conducted a thorough review of all 130 QI initiatives published on PHQIX as of April 6, 2015. Using the faceted search function of PHQIX, we explored the relationships between data fields associated with health departments and those associated with their respective QI initiatives.

Analysis

Exploratory analysis of user-submitted summaries of QI initiatives including information about the health department and the population it serves, tools and methods used, project duration, and the organization's level of QI activity. We present descriptive statistics of these attributes and explore connections between various attributes.

Principal Findings

A total of 130 QI initiatives are featured on the PHQIX website from 32 different states (**Figure 1**). The self-reported level of QI activity at the submitting organization varies from "Informal QI" (28%) to "QI Community" (5%). The population served by the organizations ranges from less than 24,499 people (7%) to more than 1,000,000 (16%). As shown in Figure 2, the most common population groups are 100,000 to 249,999 (25%) and 250,000 to 499,999 (17%). The most common submitting organization type (Figure 3) was county health department (46%), followed by state health department (15%) and multi-county health department (9%). Although the most commonly used QI method or approach is the plan-do-check-act (PDCA) cycle (92%), Rapid Cycle Improvement (20%), Kaizen (18%), and Lean/Six Sigma (12%) are also employed. The most frequently used QI tools are brainstorming (67%), fishbone diagrams (55%), flow charts (49%), process maps (48%), and surveys (45%). The most common partner organizations for QI initiatives are local health departments (21%), state health departments (18%), and community-based organizations (13%).
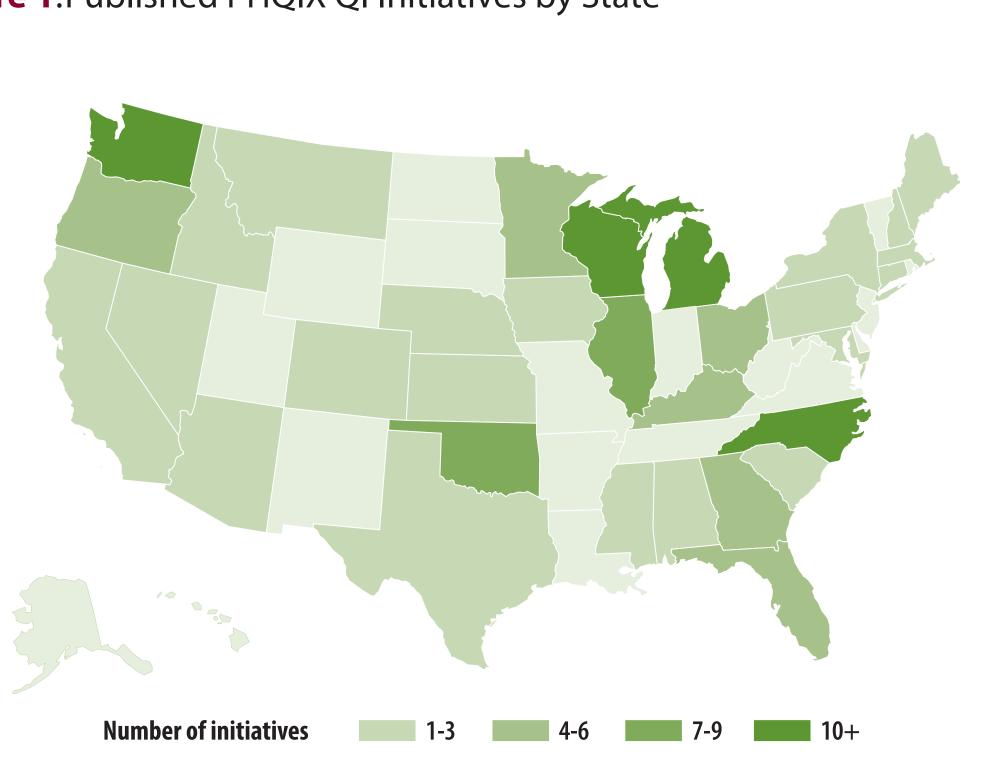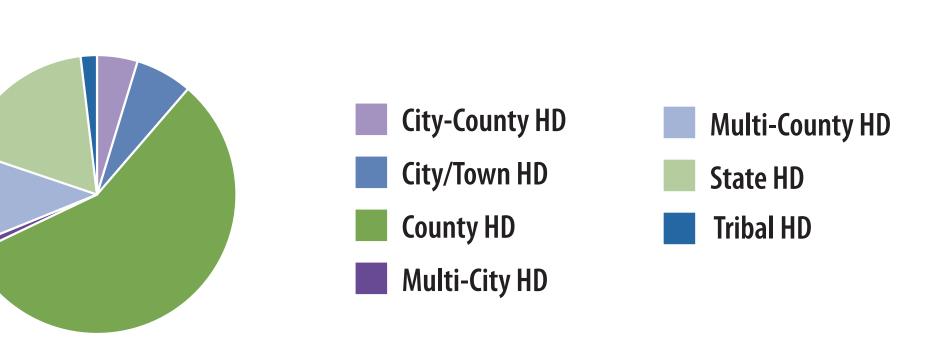
Figure 1. Published PHQIX QI Initiatives by State

Number of initiatives 1-3   4-6   7-9   10+

Figure 2. Percentage of Published QI Initiatives by Population Served (N=130)

Less than 24,499
25,000 to 49,999
50,000 to 99,999
100,000 to 249,999
250,000 to 499,999
500,000 to 999,999
1,000,000 +

Figure 3. Percentage of Published QI Initiatives by Organization Type (N=130)

City-County HD
City/Town HD
County HD
Multi-City HD
Multi-County HD
State HD
Tribal HD

Principal Findings (continued)

Tables 1 and 2 show the number of initiatives for which the submitting organizations indicated that they used a specified QI method/approach and tools, respectively. Accounting for the population served by a health department, we found very little variation in QI methods and tools used, with the exception of an increase in use of the Kaizen method for larger populations served (29.7% for populations >500,000 over smaller populations served (14.5% for populations <500,000). We also observed a slightly greater likelihood of the use of Lean/Six Sigma for larger populations served (16.2% for populations >500,000) than for smaller populations served (10.7% for populations <500,000). The same was true for Rapid Cycle Improvement (27.6% for populations >250,000 and 15.9% for populations <250,000)

Table 1. QI Method/Approach for Published QI Initiatives (N=130)

QI Method/Approach	Number of Initiatives	%
PDCA/PDSA Cycle (Plan-Do-Check-Act)	119	91.5%
Rapid Cycle Improvement	26	20.0%
Kaizen	23	17.7%
Model for Improvement	17	13.1%
Lean/Six Sigma	15	11.5%
Business Process Analysis	3	2.3%
Nominal Group Technique	2	1.5%
SDCA Cycle (Standardize-Do-Check-Act)	1	0.8%
Adaptive Promising Practice	1	0.8%

Table 2. QI Tools for Published QI Initiatives (N=130)

QI Tool	Number of Initiatives	%
Brainstorming	89	68.0%
Fishbone diagram	72	55.4%
Flow chart	63	48.5%
Process maps	62	47.7%
Surveys	59	45.4%
Root cause analysis	48	36.9%
Five whys	42	32.3%
Cause and effect diagrams	35	17.7%
Prioritization matrix	27	20.8%
Affinity diagram	26	20.0%
Pareto chart	19	14.6%
Run chart	16	12.3%
Multi-voting technique	11	8.5%
Force-field analysis	10	7.7%
Check sheet	9	26.9%
SWOT (Strengths-Weaknesses-Opportunities-Threats) Analysis	7	5.4%
Radar chart	5	3.8%
Tree diagram	4	3.1%
Histogram	4	3.1%
Control chart	3	2.3%
Interrelationship digraph	3	2.3%
PDPC (Process Decision Program Chart)	3	2.3%
SMART chart	2	1.5%
Control and influence plots	1	0.8%

Table 3 shows the number of initiatives for which the submitting organizations partnered with specified organizations. Although the most common partner organization types do not seem to be significantly affected by submitting organization type or organizational QI level, state health departments are more likely to

Principal Findings (continued)

have a partner organization for their QI initiative. State health departments partner with local health departments, state health departments, and community-based organizations in 37%, 42%, and 47% of initiatives, respectively. Meanwhile, local health departments partner with the same organization types at rates of 16%, 13%, and 7%, respectively.

Table 3. Partner Organizations for Published QI Initiatives (N=130)

QI Method/Approach	Number of Initiatives	%
Local health department	27	20.8%
State health department	23	17.7%
Community-based organization	17	13.1%
University	9	6.9%
Hospital	7	5.4%
Professional association	6	4.6%
Community health center	5	3.8%
Public health institute	3	2.3%
Tribal health department	1	0.8%

At the time of submission, PHQIX users are asked to indicate the organizational QI level for their particular organization (informal QI, formal QI in specific areas, formal agency-wide QI, QI culture, or QI community).[2] Tables 4, 5, and 6 show the most commonly indicated focus activities for initiatives submitted by organizations with Informal QI, Formal QI in Specific Areas, and Formal Agency-Wide QI, respectively. These data indicate that organizations with a lower organizational QI level report with higher frequency that they perform initiatives focused on access to care, immunizations, and WIC, while those with a slightly higher organizational QI level more frequently report that they perform initiatives focused on data collection and management/information technology, environmental health, and quality improvement and accreditation readiness.

Table 4. Most Common Focus Activities for QI Initiatives Submitted by Health Departments with Informal QI (N=35)

Focus Activity	Number of Initiatives	%
Customer service/satisfaction	6	17.1%
Access to care	6	17.1%
Women, Infants & Children (WIC)	5	14.3%
Policies / internal procedures and processes	5	14.3%
Organizational effectiveness	5	14.3%
Communicable/infection diseases	4	11.4%
Childhood immunizations—administration of vaccine to population	4	11.4%
Communications	4	11.4%
Food service establishments	4	11.4%

Table 5. Most Common Focus Activities for QI Initiatives Submitted by Health Departments with Formal QI in Specific Areas (N=47)

Focus Activity	Number of Initiatives	%
Organizational effectiveness	12	25.6%
Customer service/satisfaction	10	21.3%
Policies / internal procedures and processes	8	17.0%
Access to care	8	17.0%
Environmental health	7	14.9%
Communications	7	14.9%
Quality improvement and accreditation readiness	6	12.8%
Data collection and management/information technology	6	12.8%
Capacity development	6	12.8%
WIC	6	12.8%
Prenatal care	5	10.6%
Workforce development	5	10.6%

Principal Findings (continued)

Table 6. Most Common Focus Activities for QI Initiatives Submitted by Health Departments with Formal Agency-Wide QI (N=25)

Focus Activity	Number of Initiatives	%
Quality improvement and accreditation readiness	11	44.0%
Policies / internal procedures and processes	7	28.0%
Environmental health	5	20.0%
Communicable/infection diseases	4	16.0%
Data collection and management/information technology	4	16.0%
Customer service/satisfaction	4	16.0%
Maternal and child health home visits	3	12.0%
Reportable diseases	3	12.0%
Organizational effectiveness	3	12.0%
Communications	3	12.0%

As shown in Figure 4, the number of QI initiatives performed per year by an organization appears to be associated with the indicated organizational QI level of that organization. The percentage of organizations that perform 1 to 3 initiatives drops from 80% for those with informal QI to 17% for those with a QI community. Additionally, the percentage of organizations that perform 7 to 10 initiatives rises from 0% for those with informal QI to 46% for those with a QI culture.

Figure 4. Annual Number of QI Initiatives by Organizational QI Level

Informal QI (N=35)   Formal QI in Specific Areas (N=47)   Formal Agency-Wide QI (N=25)   QI Culture (N=13)   QI Community (N=6)

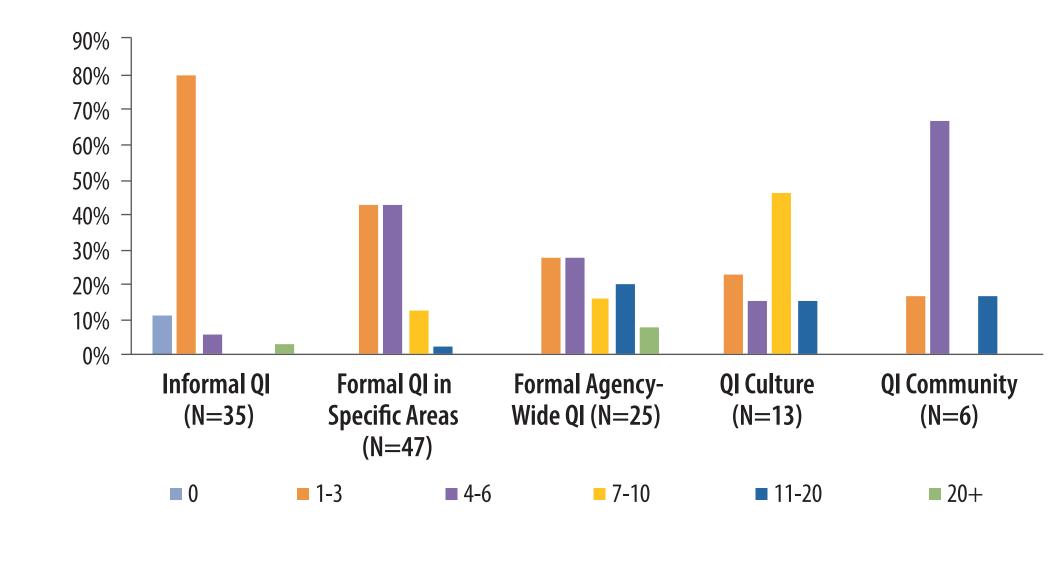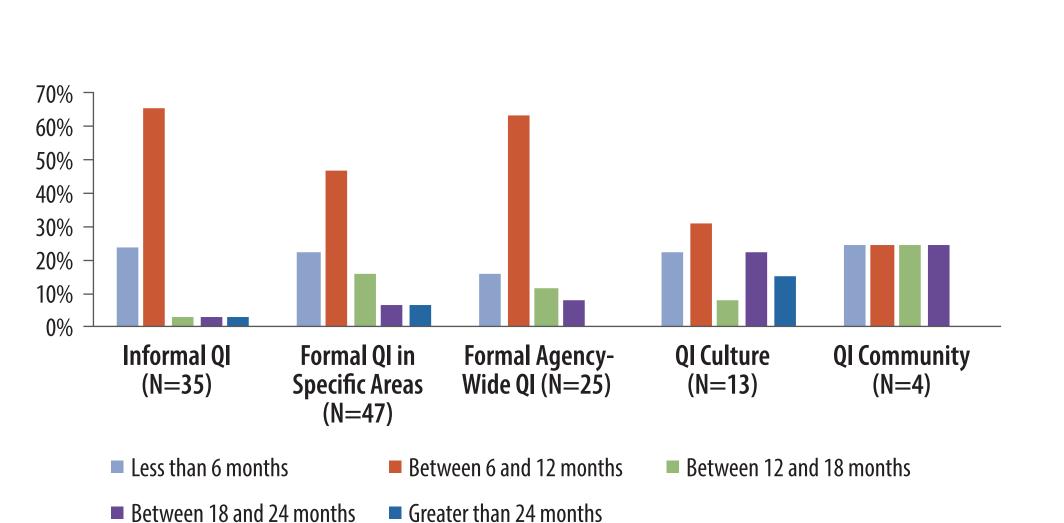0   1-3   4-6   7-10   11-20   20+

Figure 5 shows the percentage of published QI initiatives, for each organizational QI level, for which the duration of the initiative was within each designated timeframe. The data seem to indicate an association between the organizational QI level of a health department and the length of the QI initiatives that it undertakes. Although the percentage of initiatives with a duration of less than 6 months does not seem to vary with QI level, the percentage of 6- to 12-month initiatives drops from 66% for organizations with informal QI to 31% for those with a QI culture. Also, the percentage of 12- to 18-month, 18- to 24-month, and greater than 24-month initiatives increases from 3% each for organizations with informal QI to 8%, 23%, and 15% respectively, for those with a QI culture.

Figure 5. Duration of QI Initiatives by Organizational QI Level

Informal QI (N=35)   Formal QI in Specific Areas (N=47)   Formal Agency-Wide QI (N=25)   QI Culture (N=13)   QI Community (N=4)

Less than 6 months   Between 6 and 12 months   Between 12 and 18 months
Between 18 and 24 months   Greater than 24 months

Conclusions

A variety of health departments and institutes across the United States conduct QI initiatives in public health. These initiatives focus on many different public health domains and currently favor the PDCA cycle, Kaizen, brainstorming, use of fishbone diagrams, flow charts, process maps, and survey methods. Although a significant relationship does not appear to exist between size or type of health department and the capacity of that health department or the methods and tools it employs, an organization's self-reported QI level may be associated with the number of QI initiatives it performs annually as well as the duration and focus of those initiatives.

Implications for Public Health Practice and Policy

As the field of QI in public health practice evolves, resources targeted to different types of practitioners will need to keep pace with demand. Understanding the trajectory of the field of QI in public health is important for practitioners and researchers alike. Findings from this study will provide insight into QI initiatives currently being performed as well as the types of projects that can be expected as organizational experience and collaboration grow.

References

1. Pina, J. et al. Synonym-based Word Frequency Analysis to Support the Development and Presentation of a Public Health Quality Improvement Taxonomy in an Online Exchange. Stud Health Technol Inform, 2013. **192:** p. 1128.

2. QI levels were adapted from the National Association of City and County Health Officials' (NACCHO's) phases of a culture of quality from the Roadmap to a Culture of Quality Improvement http://qiroadmap.org/.