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Association Between Local Health Departments' Engagement in PHAB Accreditation and Budget Cuts Prevention

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ASSOCIATION BETWEEN LOCAL HEALTH DEPARTMENTS' ENGAGEMENT IN PHAB
ACCREDITATION AND BUDGET CUTS PREVENTION

by

GHADEER ALBASHIR

(Under the Direction of Gulzar Shah)

ABSTRACT

Objectives: The primary purpose of this study is to examine whether engagement in Public Health Accreditation Board (PHAB) accreditation process and its requirements are associated with budget cuts prevention for local health departments (LHDs). **Methods:** For this study, we performed multinomial logistic regression using the 2016 National Profile of Local Health Departments Survey conducted by the National Association of County and City Health Officials. **Results:** While budget did not change for a majority of LHDs in comparison with previous year (48.6%), there were 28.7% that reported budget increase, and almost a quarter of LHDs had reduced budget (23%). The multinomial logistic regression showed no significant association between LHDs' level of engagement in accreditation by PHAB or having completed three requirements (sometimes referred to as pre-requisites) and their budget increase than the previous year or even maintaining their budget the same as last year. However, government type, service delivery reduction, and proportion of revenue from local sources were significantly associated with budget increase or preserving it at the same level as previous year. **Conclusion/implications:** Given that the improved public health outcomes rely heavily on LHDs' capacity to deliver quality essential public health services, which in turn depend on adequate and consistent funding, it may be essential for LHDs to find ways to overcome financial difficulties, maintain their existing funds, and try to find new revenue sources. Funding agencies and policymakers should support LHDs with adequate funding and find strategies to help LHDs to be well-prepared for any future financial threats. LHDs may also want to diversify their funding through strategies to increase funding from local sources.

INDEX WORDS: Local health departments, Accreditation, Budget, Financial resiliency.

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Fulfillment of the Requirements for the Degree

DOCTOR OF PUBLIC HEALTH

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Chapter 1

Introduction

Statement of the Problem

Creating an effective public health system at the federal, state, and local level with high performance and consistent infrastructure is a big challenge in public health. Therefore, understanding the structure of the public health system in the United States is crucial to improve the nation's public health by increasing quality performance of public health entities. Improving the public health system heavily relies on local health departments which are responsible to carry out the 10 essential public health services and the three core functions of public health. The fragmentation in the structure of public health entities at the three levels-federal, state, and local- leads to organizational inefficiencies, limited financial resources, and inconsistencies in the performance of the core public health functions. The studies that explain the variation in public health structure and the impact of these variations on performance and health outcomes are limited (Hyde and Shortell, 2012). Therefore, research regarding public health delivery systems is necessary to understand the characteristic of public health entities that influence performance and health outcomes.

Local health departments are the backbone of delivery systems for essential public health services aimed to promote and protect the overall health of population. Since, LHDs provide the essential services and core functions to the public, adequate funds are crucial for LHDs to be able to do so. LHDs that have a greater per capita funding were able to improve their performance on their essential services (Mays et al., 2006). However, Public health leaders face many challenges to balance between revenues and spending, provide the adequate financial resources, cost –effective allocations,

efficient management and funds accountability. These challenges have been especially increased after the 2008 economic recession that caused many budget cuts and job losses all over the nation (Shah et al., 2016, Erwin et al., 2013, Erwin et al., 2014). Local public health departments are responsible to meet the community health needs effectively and equitably through careful management of the well-being of the population and good government. However, local health officials (LHOs) are challenged to allocate limited resources (constrained budgets and staff time) to meet the needs for their communities. LHDs should be able to survive through financial stress and continue to address the needs for their communities during economic recession. Resilient LHDs are those who can provide essential services and meet the public needs in face of limited budgets and reduced staff capacities.

Creating a resilient system for LHDs is a big challenge for public health leaders. The two research studies that highlighted characteristics of resilient LHDs during the recession were done by Erwin, Shah, & Mays in 2013 and 2014. Both studies tried to identify modifiable factors that can protect LHDs from budget cuts and job losses in the time of economic recession which include population size, source of revenue, and Local Board of Health (LBOH) authority and services mix. Nevertheless, none of these two studies relate LHDs' financial resiliency to their accreditation status. This study is original because it explores the association between PHAB accreditation process and the ability of LHDs to survive during and after economic recession.

In 2002, the Institute of Medicine (IOM) issued a major report, "*The Future of Public Health in the 21st Century*" that endorsed to explore the public health accreditation for public health departments as a way to improve their performance and

accountability. In response to a call for uniform, consistent and improved performance in public health systems, the Public Health Accreditation Board (PHAB) initiates a national accreditation program for health departments to implement a set of consistent standards and measures to promote high performance and continuous quality improvement of these departments. The national public health accreditation standards and measures are designed to include 12 domains, ten of these domains guide LHDs to achieve the 10 essential public health services, and the other two domains include administrative and management capacity and engagement of the public health governing entity (PHAB, 2014).

Domain 9 of PHAB standards emphasizes the importance of evaluating and continuously improving programs, processes, and interventions of public health by using performance management and quality improvement practices. While performance management identifies actual results against planned ones, quality improvement is part of performance management that addresses specific targets for effectiveness and efficiency. Riley et al., 2010 defined quality improvement as “the use of a deliberate and defined improvement process that is focused on activities that are responsive to community needs and improving population health. It refers to a continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, outcomes, and other indicators of quality in services or processes which achieve equity and improve the health of the community.” Having quality improvement as a major component for PHAB standards provided a national quality improvement mechanism for LHDs to measure their performance for the first time (Beitsch & Bender, 2014). By looking deeply to domain 9, it shows how accreditation process can play a crucial role in

surviving LHDs in economic recession through long term financial planning and quality improvement, therefore, financial resiliency may have a key role to influence LHDs' intention to seek accreditation.

Purpose Statement

The primary purpose of this study is to examine whether engagement in PHAB accreditation and its requirements is associated with budget cuts prevention of LHDs.

In the context of financial decline, studying the factors that are associated with health departments' financial resiliency is very important (Erwin et al., 2014). For LHDs to survive in the time of economic recession, they need to be fully equipped with the right tools; and being accredited might be one of these tools. This research will study the association between budget cuts prevention in LHDs and being involved in the requirements of accreditation and/or being fully accredited and explain how the accreditation process may help LHDs to survive in scarce resources.

Yeager et al., 2015 argued that the literature needs more information about the associated factors with LHDs' participation in accreditation process to develop targeted strategies for LHDs to become accredited. Therefore, this study will help public health leaders to better understand the wide spectrum of LHDs seeking accreditation and offer those leaders key tools for their LHDs to survive in financial recession.

Research Questions/Hypotheses

In this study, we hypothesize that LHDs with current Community Health Assessment (CHA), Community Health Improvement Plan (CHIP), and Strategic Plan (SP) and have higher engagement in actual accreditation process are less likely to have budget cuts.

Research Questions.

The research questions of this study include the following:

1. Are LHDs with current Community Health Assessment ((completed within 5 years) less likely to have budget cuts?
2. Are LHDs with current Community Health Improvement Plan (completed within 5 years) less likely to have budget cuts?
3. Are LHDs with current Strategic Plan (completed within 5 years) less likely to have budget cuts?
4. Are LHDs with higher engagement in actual accreditation less likely to have budget cuts?

Research Hypotheses.

To pursue the research questions, the following hypotheses will be tested:

Research Hypothesis 1. LHDs with current Community Health Assessment ((completed within 5 years) are less likely to have budget cuts.

Null Hypothesis 1. LHDs with current Community Health Assessment ((completed within 5 years) are NOT less likely to have budget cuts.

Research Hypothesis 2: LHDs with current Community Health Improvement Plan (completed within 5 years) are less likely to have budget cuts.

Null Hypothesis 2: LHDs with current Community Health Improvement Plan (completed within 5 years) are NOT less likely to have budget cuts.

Research Hypothesis 3: LHDs with current Strategic Plan (completed within 5 years) are less likely to have budget cuts.

Null Hypothesis 3: LHDs with current Strategic Plan (completed within 5 years) are NOT less likely to have budget cuts.

Research Hypothesis 4: LHDs with higher engagement in actual accreditation are less likely to have budget cuts.

Null Hypothesis 4: LHDs with higher engagement in actual accreditation are NOT less likely to have budget cuts.

Significance of the Study

Examining the relationship between LHDs' engagement in accreditation process and budget cuts prevention after the era of economic recession will fill important gaps in the existing research literature. There is a dearth of such studies in the recent literature examining this relationship. While some studies showed the factors associated with LHDs' financial resiliency during the 2008 recession, none of these studies related the accreditation process to LHDs' ability to prevent budget cuts. This study will provide us with better understanding of how CHA, CHIP, and SP may help LHDs to survive in harsh financial environment since these three requirements focus on the long-term planning of LHDs.

Overall, information about LHDs' financial resiliency and how accreditation process affects their ability to manage financial downturn is related to the public health performance and health outcomes. Such information will enable policymakers and public health leaders to understand how to help local health agencies delivering effective, efficient, and equal public

health services in the U.S. Our findings will benefit LHDs to be better prepared for any future financial threats and be able to do more with less funds. The study will also benefit the Public Health Accreditation Board to improve the best strategies to help LHDs to engage in the accreditation process smoothly and overcome any barriers to this process.

CHAPTER 2

Literature Review

Background

The public health systems in the U.S are complex as they contain different entities which partner and collaborate at the national, state, and local level to achieve the common goal of protecting and promoting the health of public. Public health systems include the governmental public health agencies as the main pillar of public health; the health care delivery systems that assure the health of the public; the public health academia which is responsible to train public health workers and conduct research; communities represented by many entities like schools, organizations, and religious congregations; businesses and employers; and the media as potential partner in the public health systems. (IOM, 1988).

Governmental public health agencies are made up of 51 states (including the District of Columbia), and roughly 3,000 local governments, and 565 federally recognized tribal agencies (NACCHO, 2014). Governmental public health agencies have a crucial role in supporting the delivery of public health services. The state and local public health governance authorities vary across the U.S; therefore, public health services are delivered through a variety of organizational structures. Variation in the structure and governance of public health entities impacts their performance and ultimately the health outcomes in the public health systems (the area of research that has limited evidence to explain) (IOM, 2003). The state public health agencies have a primary role in providing different population-based public health services related to primary prevention, screening, and treatment of diseases and conditions. Local health departments (LHDs) are also engaged in population health and primary prevention activities through provision of the 10 essential public health services and the three core functions (IOM, 1988, Shah et al., 2016, Leep & Shah, 2012). Local health departments are considered as the most

critical and dominant component of the public health systems in the United States. Most of these state and local health departments are governed by a board of health which may practice an authority role in making policies and enforcing them or an advisory capacity by advising health officials on public health policies and concerns (Shah, Sotnikov, Leep, Ye, & Corso, 2017, Shah, Sotnikov, Leep, Ye, Van-Wave, 2017). State and local health agencies that are linked with a board of health are more likely to sustain their public health responsibilities (Hyde & Shortell, 2012). The public health systems represent multiple heterogeneous actors that play crucial roles to improve the quality and quantity of U.S population life through delivering the core functions of public health and the essential public health services. However, the availability and the quality of essential public health services are different from one community to another (Mays et al., 2004).

Theoretically, LHDs performance vary from one to another because activities performed by the public health systems are shaped by different factors, for example, resources available to the system which are usually include funds and personnel, the way these recourses are organized, and the type of communities the system is serving (Pfeffer & Salancik, 1978, Ulrich & Banrey, 1984, Handler et al., 2001), the structure of the system which refers to the size of public health system (the number of people served by the system) and the governmental authorities within the system including the type of governmental jurisdictions and governance structures, and the health resources and needs within the community that it serves whether it is underserved or impoverished community (Mays et al., 2006). Researchers found system size as the strongest factor of performance of essential services. Small health systems face more challenges to perform different services comparing with larger ones (Mays, Halverson, Baker, Stevens, Vann, 2004, Turncock, Handler, Miller, 1995, Richards, Rogers, Christenson, Miller, Taylor, Cooper,

1995). In addition, the studies revealed a strong evidence that adequate governmental funding is essential for an effective health systems; improving performance requires large outlays of additional funds. The governmental authority findings on performance were not consistent, but mixed/shared systems are doing better than centralized/decentralized systems to perform essential services.

Building a strong health infrastructure is very crucial to prevent and respond to health problems and promote the population health. Different health systems inside this infrastructure work all together to identify health problems and their risks on population, prevent communicable diseases, educating different stakeholders, provide access to health services and resources, and protect the overall health of population (Luo, Sotnikov, Shah, Galuska, & Zhang, 2013). Mays et al. (2004) suggested that improving the public health infrastructure requires health leaders to consider economic and institutional structures when they provide any public health activity. Authors also found an association between public health spending, governing boards, and state-local administrative relationship and the effectiveness of public health activities where policymakers needs to manage the public health systems with their available funding and administrative structure to provide effective outcomes.

Public Health Finance

The public health finance is one of the main topics in the public health services and systems research (PHSSR) especially after the 2008 financial crisis which led to major losses in LHDs' budgets, workforce, and public health programs (Willard et al., 2012, NACCHO, 2011, Shah, Leep, & Leider, 2016). Public health finance is a critical field since it is related to public health performance and health outcomes which can reflect the health of communities served by health agencies. Moulton et al., 2004 offered a working definition for public health finance as a

field of science and practice that deals with acquisition, management, and use of financial resources to advance the health of populations through prevention and health promotion. The relationship between available resources in public health and the health system performance and the impact of this performance on the communities' health is very important in the area of public health services and systems research (Scutchfield et al., 2007). The literature review revealed an important association between public health inputs (larger budgets, staff, jurisdiction, boards of health) and higher level of performance (Erwin et al., 2008, Minnesota Public Health Research to Action Network, 2011). Some of the studies that show how LHDs' resources matter include Grembowski et al., 2010 who found how improvement in LHDs' expenditures is associated with declines in black and white mortality. Furthermore, Mays and Smith, 2011 found that increased expenditures in LHDs resulted in mortality decrease due to different diseases. Moreover, Erwin et al., 2011 also found a significant association between LHDs' expenditures increase and state – level infectious disease morbidity decrease. In 2012, Erwin et al. likewise found consistent results with the previous studies when authors found that association between improvement in LHDs' expenditure and decrease in morbidity and mortality of population. Therefore, assuring adequate funds to LHDs is very important to be able to provide the essential public health services and perform better with the core functions of public health.

LHDs are challenged to allocate limited resources like constrained budgets and staff time to meet the needs for their communities. The decisions for resources allocation in local health departments are usually made collaboratively between health officials, staff, and governing entity like board of health. In addition, there are many decision-making tools that can be used for resources allocation. One important tool is needs assessment where LHDs can set priorities and take decisions depending on the recent completed information about their community health

needs. This process includes developing cost-efficient methods to assess needs of the community and find resources for these activities (Baum et al., 2011).

Characteristics of Financial Resiliency

The economic recession that happened in 2008 had adversely affected the public finance across the nation (Rein & Ogden, 2012, Weston-Cox, 2012). The impact of this economic crisis played an important role to assess the financial situation of LHDs. In 2008, LHDs were seriously affected by the economic crisis by losing jobs and revenues; an estimated loss of 39,600 jobs from 2008-2011, and almost half of LHDs reported a decline in budgets (NACCHO, 2014). The lost in jobs and funds affected the ability of LHDs to protect the public from any public health threats (Willard et al, 2012, Erwin et al, 2011).

The National Association of County and City Health Officials (NACCHO) has a critical role to monitor and assess the finance of LHDs. During the economic recession in 2008, NACCHO was able to implement a surveillance system to evaluate the impact of recession on program and budget cuts and job losses to eventually assess the financial status for LHDs. One of the study NACCHO conducted in 2012 shows the ability of LHDs to serve their communities was influenced by funding cuts. The study also found a surprising results for lack of change over time; although the nation as a whole was able to recover some, the LHDs continued to struggle from recession (Leep & Bhutta, 2012).

In this context, the concept of financial resiliency comes very useful to survive financial stress and address the needs of the community even through financial downturns. Erwin et al., 2014 defined financial resilience as “the LHDs’ ability to enhance or preserve their financial capacity by strategically managing risks and absorbing financial shocks, without a decline in

their financial capacity”. Knowing the associated factors with LHDs’ financial resiliency and what make LHDs resilient during financial decline is very important because it will benefit LHDs that went through budget cuts by offering them many good lessons on how to protect their departments from any future threats.

The literature review provided some articles that discussed the associated factors with budget cuts in LHDs after the economic decline. Willard et al., 2012 found LHDs with a LBOH were less likely to experience budget cuts than those without a LBOH, particularly for LHDs serving populations of 50,000 or greater. The study did not find a statistically significant association between governance type (state vs local) and the likelihood of experiencing budget cuts. The study showed that LHDs serving larger populations and obtain greater proportion of revenue from clinical services are less likely to go through budget cuts.

Erwin et al., 2013 found LHDs that successfully survived through economic recession were serving smaller population, were better resourced in 2005, were less likely to have had a board of health with the authority to hire/fire, and were less likely to be dependent on local resources compared to local health departments which experienced significant losses in funding by 2010. One major finding in this study is that even though characteristics of financial resiliency vary significantly by the size of the LHDs’ jurisdictional population, some of these characteristics are modifiable ones that LHDs can control and manage to protect themselves from any future economic crisis.

Erwin et al., 2014 identified some of the modifiable factors that protect LHDs from budgets cuts during economic stress. They found that LHDs that serve larger populations and have a LBOH were less likely to have suffered economic losses during the recession. They also found LHDs that survived during the economic decline were more likely to have relied on non-

local sources of revenue and use federal and state revenues instead. LHDs that weathered against economic stress were the ones that have a diversified service mix (having more treatment, population, and regulatory services), and were located in communities with good socioeconomic environments (insured population).

Ye et al., 2015 found that governance type and total expenditures were related to budget cuts. They found LHDs that have higher expenditures were more likely to experience budget cuts while agencies with small budgets are less likely to have reduction in budgets. Also, LHDs that have relied on local sources revenue were less likely to have budget cuts. The study also showed that LHDs that are governed by local or shared structure are more likely to have budget cuts compared to ones that are state governed. In addition, the study found no association between having a LBOH and budget cuts in LHDs.

Kavanagh and Gudgeirsson in 2010 presented eight characteristics of resilient systems that include diversity (by avoiding a single point of failure or relying on a single solution), redundancy (have more than one way to escape or rescue), decentralization (asking department managers to be more active member by participating in financial strategy planning and budget managing), transparency (make things clear to figure out where a problem may lie), collaboration (work together to become stronger), fail gracefully (knowing that failure happens; and when it happens it won't make things worse), flexibility (be able to change when plans aren't working; stability is not favorable), and foresight (think about what is coming and prepare by long-term planning). The authors found that long-term financial planning was the key to resiliency to improve the organization's long-term financial health. Therefore, LHDs can improve their performance by preparing long-term plans in place.

In this context, accreditations process for LHDs can be helpful to achieve such a long – term planning since the Public Health Accreditation Board (PHAB) requires LHDs to have a community health assessment, a community health improvement plan, and strategic plan. These three requirements offer the groundwork for health department programs, services, policies, and interventions, and any future plans. The accreditation process itself may improve the quality of services that LHDs offer to the public and the overall performance of these departments (Russo & Kuehnert, 2014, El-Jardali et al., 2014). Also, accreditation process and its requirements (CHA, CHIP, and SP) are likely to give LHDs an edge in budget cuts prevention in the post economic recession era.

Public Health Accreditation

The Public Health Accreditation Board (PHAB) is a nonprofit entity established in 2007 by four leading national public health organizations (American Public Health Association, Association of State and Territorial Health Officials, National Association of Local Boards of Health, and the National Association of County and City Health Officials). PHAB aims to promote the health of people by advancing the quality performance and improvement of different health departments. Therefore, the board launched the national, voluntary accreditation program for local, tribal, state, and territorial departments in September, 2011 and started to accredit health departments in 2013 (CDC, 2016).

The Robert Wood Johnson Foundation (RWJF) and the Centers for Disease Control and Prevention (CDC) support the program's development and startup. PHAB made significant development in this voluntary accreditation system, supported by combined funding from the RWJF and the CDC. The program is based on set of standards and measures that health departments should comply with to ensure the best quality of service for their communities to

keep them healthy and safe. PHAB standards are based on the three core functions of public health (policy development, assessment, reassurance) and the 10 essential services of public health. The standards are divided into 12 domains: each of the 10 essential public health services has one domain, in addition to the other two: public health department administration and public health governance (PHAB, 2011).

PHAB Accreditation Requirements

Community Health Assessment.

“Community health assessment is a systematic examination of the health status indicators for a given population that is used to identify key problems and assets in a community. The ultimate goal of a community health assessment is to develop strategies to address the community’s health needs and identified issues” (Turnock, 2009). This participatory and collaborative process aims to gather information about the health status of the population that the health department serves, identify areas for health improvement along with factors that contribute to health issues, and determine the resources that will be used to address population health improvement (PHAB, 2012).

The data that CHA collects from the communities cover a broad range, from general demographic information, to epidemiological and environmental measures. An ideal assessment includes information on risk factors, quality of life, mortality, morbidity, community assets, forces of change, social determinants of health and health inequity, and information on how well the local public health systems provide the essential public health services (NACCHO, 2014). The partnership between the LHDs and their communities is the essential tool in the CHA process to identify key health issues from

the data collected to establish health priorities, develop action plans, and create baseline indicators (Irani et al., 2006; Spice & Snyder, 2009; Byrne et al., 2002). Assessment is named as one of three core public health functions by the Institute of Medicine (IOM) in 1988 in its seminal report on *The Future of Public Health*. The benefits for health departments conducting CHA have been well established in the literature (Kruger et al., 2009; Stanley & Stein, 1998; Irani et al., 2006; Byrne et al., 2002; Abarca et al., 2009). CHA offers valuable insight into community health problems by allowing health professionals to identify and address areas of need in a certain region, especially when Geographic Information Systems (GIS) or other software systems may be utilized to analyze CHA data (Basara & Yuan, 2008; Scotch & Parmanto, 2005; Kruger et al., 2009). CHA provides the framework for health departments to describe population needs, health outcomes, and resources available to the community. Assessment process also helps to develop the community health improvement plan to solve health problems. Both processes, community health assessment and improvement plan, deliver the logical order for public health practice decision-making and actions (IOM, 1988).

Community Health Improvement plan.

A community health improvement plan is “a long-term, systematic effort to address public health problems on the basis of the results of community health assessment activities and the community health improvement process. This plan is used by health and other governmental education and human service agencies, in collaboration with community partners, to set priorities and coordinate and target resources” (PHAB, 2012). CHIP is based on CHA to describe how the partnership between health departments and the community will take place to improve the health of the population.

Both community members and public health departments' partners work together to set priorities, objectives, strategies, and measures (PHAB, 2012). Different studies showed LHDs that apply assessment and planning tools were able to engage in community partnership and collaborate with other health stakeholders ((Laymon et al., 2015, Wilson et al., 2014, Beatty et al., 2015)

The Institute of Medicine (IOM) in 1988 in its seminal report on *The Future of Public Health* named policy development as the second core public health functions. CHIP is a crucial process to develop policies and define actions aiming to promote health of the community. The plan provides the vision for the community regarding their health and addresses all possible opportunities to improve their health status along with challenges they may have in the process and the range of their strength and weaknesses (USDHHS, 2016). In the community health improvement process, the health system partners and community partners work together on community issues that affect their public health which can be environmental, economic, business, housing and any related issues. This collaborative process addresses health problems and develops the best policies and strategies to solve these problems.

Comprehensive community health assessment and health improvement planning are the foundation to improve and promote community's' health (Abarca et al., 2009). Assessment and policy development are 2 of the 3 core functions of public health as identified by IOM report in 1988. The report describe assessment as community diagnosis made by surveillance, data collection, analysis and forecasting. Community health improvement planning is the key tool to combine problems and prioritization cycle with the best analysis for integrated approach to achieve community goals and improve

population health (IOM, 1997). NACCHO in 2010 reported 43% of LHDs conducted CHA and 38% participated in the development of CHIP within the past 3 years. The PHAB accreditation program is designed to document the capability of public health departments to deliver the three core functions of public health and the ten essential public health services. Therefore, PHAB requires completion of CHA and CHIP as two of the three requirements to accreditation program application. The challenges LHDs went through to recover from the economic crisis of 2008 to maximize efficiency of internal and external work (Willard et al., 2012) can be addressed by looking deeply to the LHDs' capacity to achieve the 3 core functions of public health.

Strategic Plan.

“A strategic plan results from a deliberate decision-making process and defines where an organization is going. The plan sets the direction for the organization and, through a common understanding of the mission, vision, goals, and objectives, provides a template for all employees and stakeholders to make decisions that move the organization forward” (PHAB, 2011). SP is a comprehensive road map for health departments for the coming 3-5 years. The plan provides direction to make decision, set strategy and priority, and take action with the focus on health departments only, not on community (PHAB, 2012). The plan provides the LHDs with a clear picture on where they are heading, how to achieve their goals, and how to measure their progress. The plan is usually aligned with other important assessment, such as local community health improvement plan, the quality improvement (QI) plan, and other operational plans.

Strategic Plan is an important leadership tool that LHDs should implement to have an effective management. SP is developed by LHDs and their board of health with some key

internal and external stakeholders as needed. In strategic planning process, the planning components should be related to the CHA results and CHIP priorities to steer the health departments to the right direction. The community health assessment is usually happened before the planning phases including the CHIP and strategic plan, because CHA will be the foundation to report the priorities that need to be included in CHIP and SP. Therefore, the CHA, CHIP and strategic plan are not isolated processes but rather, they are all connected to enlighten one another (NACCHO, 2010).

PHAB Accreditation Process

According to PHAB, the initial accreditation process consists of seven stages: (1) Preparation, (2) Registration and Application, (3) Documentation Selection and Submission, (4) Site Visit, (5) Accreditation Decision, (6) Annual Reports, and (7) Reaccreditation. To prepare for accreditation, health departments are required to do self-assessment to assess themselves using PHAB standards and measures to identify gaps that need to be filled before applying. The time to prepare for accreditation vary from one health department to another considering the three important requirements for health departments to do: community health assessment, community health improvement plan, and department strategic plan. Such documentation provides health departments with long-term guidance and direction through the process of accreditation. In addition, PHAB strongly recommends health departments when apply for accreditation to have other plans complete/or under development. These plans include workforce development plan, public health emergency operations plan, quality improvement plan, and performance management policy/system (PHAB, 2012).

The first thing health departments should do is to register on PHAB's electronic system, the whole process is done online through e-PHAB. Submitting the application online is the

official commitment for health departments to start the accreditation process. After that, health departments can submit the required documentation that demonstrates their conformity with PHAB standards and measures. Then, PHAB trained site visit team reviews the complete documentation to assess them against standards and measures to develop a site visit report. The team usually conducts a site visit to the health departments gathering more information to validate the documentation submitted to e-PHAB and make visual observation to the site. When the site visit report is complete, PHAB staff review it to ensure the report's clarity and consistency for the accreditation decision. PHAB accreditation committee reviews the final site visit report to determine the accreditation status. On May, 2016, 134 health departments have had the PHAB 5-years accreditation, and other 176 departments started the formal process of achieving accreditation (Kronstadt, Meit, Siegfried, Nicolaus, Bender, & Corso, 2016).

Benefits of Accreditation

Accreditation has been identified by the Institute of Medicine (IOM) and the Centers for Disease Control and Prevention (CDC) as an essential means to strengthen the public health infrastructure (IOM, 2002). The 2002 Institute of Medicine report *The Future of the Public's Health in the 21st Century* supported the public health community to consider accreditation as crucial strategy to boost improvements in the nation's health. The report stated that "Accreditation is a useful tool to improve the quality of services provided to the public by setting standards and evaluating performance against those standards." In 2004, the Robert Wood Johnson Foundation arranged a meeting for public health stakeholders to explore in depth a national accreditation program for state and local public health departments. The consensus resulted in the Exploring Accreditation Project that aims to develop recommendations regarding the possibility of creating a systematic approach for public health management and improvement

through a voluntary national accreditation program for public health departments. The National Association of County and City Health Officials (NACCHO), the Association of State and Territorial Health Organizations (ASTHO), the National Association of Local Boards of Health (NALBOH), and the American Public Health Association (APHA) endorsed The Exploring Accreditation's recommendation for a national model for accreditation (The Exploring Accreditation, 2006-2007).

The project identified expected, obvious, and other unexpected benefits for accreditation. One of the most obvious benefit is to create a benchmark of comprehensive standards for the public health services that every health department should conform with. A second expected benefit for accreditation is to create a consistent framework for quality improvement to increase performance, efficiency, and improve health outcomes. A third obvious benefit is that accreditation considered as an important way to document accountability to the public health leaders, policy makers, and the public which may lead to increased efficiency, fund allocation and cost saving. In addition to these benefits, there are other less obvious ones, for example, the accreditation process can improve the relationships between the health agencies leading to better collaboration and cooperation and better awareness of each agency's activities. Better relationships between health agencies can provide an effective communication to exchange information and share resources. This can promote regionalization among public health jurisdictions. Sharing resources and staff between large and small health departments through regional arrangement can improve efficiency, effectiveness with no need to merge or consolidate them together (Russo, 2007).

The reviewed literature about public health accreditation showed a positive effect of accreditation on public health by improving quality, outcomes, and service operations, with some

degree of quantitative and qualitative evidence. Public health accreditation process will be able to help examining the capacity, accountability, consistency, uniformity among health departments, and strengthening the collaboration among multiple partners(Lenaway, Corso, Buchanan, Thomas, & Astles, 2010 & Riley, Lownik, Scutchfield, Mays, Corso,& Beitsch, 2012), advancing the public health practice for all members of the community and provide access to high-performing health systems for the public. The literature provided pros and cons of public health agency accreditation, and favored a voluntary public health accreditation program.

According to Russo & Kuehnert (2014), the PHAB accreditation program is able to make a change in health practice across the country by showing a huge improvement in health departments' performance in assessing their community and state health and expanding more collaboration with different partners including community-based organizations, other health care organizations, academic organizations, government, and the private sector. In addition, accreditation program is able to improve quality performance management, efficiency and workforce development.

The most recent 2013-2016 survey that was made through a contract between PHAB and social science research organization, NORC, confirmed that more than 90% of health departments that achieved accreditation for 1 year reported advanced effect of accreditation on quality improvement, performance improvement, accountability, transparency, and better management process. The majority of survey respondents agreed on the following benefits of accreditation: (1) Stimulated quality and performance improvement opportunities within the health department (98%) (2)Allowed the health department to better identify strengths and weaknesses (96%) (3)Helped the health department document capacity to deliver the three core functions of public health and the 10 Essential Public Health Services (94%) (4)Stimulated

greater accountability and transparency within the health department (92%) (5) Improved the management processes used by the leadership team in the health department (90%) (6) Improved the health department's accountability to external stakeholders (83%) (7) Allowed the health department to communicate better with the board of health or governing entity (67%). In addition, the impact on quality improvement as a result of accreditation process is (8) the health department had used information from quality improvement processes to inform decisions (98%) (9) The health department had a strong quality improvement culture (92%) (Kronstadt et al., 2016).

Accreditation and Health Departments Performance

PHAB program considered unlike other accreditation processes because the standards of this program are built by focusing on continuous quality improvement (CQI) (Riley et al., 2012). Engaging the CQI in the standards of accreditation added a culture of quality improvement to the field of public health. CQI process use distinctive tools and procedures to reach measurable performance improvement, therefore, combining accreditation with CQI can help health departments to continuously improve their performance (Riley et al., 2010).

During the recent 2008-2010 economic recession, LHDs were forced to cut services and staff to be able to survive. At the same time, public health agencies became more concerned about emergency preparedness, the loss of essential services, and the increasing pressures of infectious and chronic diseases (Willard et al., 2012, NACHHO, 2011, Honore et al., 2010, Riley et al., 2010). At this critical time, the mission of PHAB “to promote and protect the health of communities by advancing the quality and performance of all public health departments in the US.” (PHAB, 2011, Bendar et al., 2007, Russo, 2007) became the most significant and relevant effort in the U.S history of public health. Therefore, LHDs' engagement in CHA, CHIP, and SP

and measuring their performance against PHAB standards and measures will provide health departments “a roadmap for its Quality Improvement (QI) journey” (Beitsch, et al., 2014).

The national public health accreditation process was described as “a platform for quality improvement “(Russo, 2007). The literature assured the potential benefits of QI through accreditation, including reduction of expenditures and costs, increased revenues, improved efficiency and productivity, health departments will also be able to meet the needs and demands of its population and most importantly being able to survive in face of any future threats (Hamm, 2007, Carman et al., 2014). LHDs that went through the accreditation process starting with community partners through CHA, improvement planning efforts for their communities, and strategically and systematically plan for the future of their departments will experience the benefits of QI. Carman and Timsina, 2015 argued that “national public health accreditation might be the vehicle LHDs could use to improve operating environments, better manage resources, and reap rewards associated with meeting national industry standards”.

LHDs’ Intention to Seek Accreditation

LHDs’ participation in PHAB accreditation process will strengthen the LHDs’ performance, which ultimately influence the health of population in a positive way. Thus, information about the factors associated with more engagement in the accreditation process is necessary in planning and developing ways to encourage LHDs to become accredited. The literature documented 3 studies that examined the factors associated with intention of local health departments to seek accreditation. Shah et al., 2013 examined the relationship between LHDs’ intention to seek accreditation and the 3 requirements for accreditation: (1) a community health assessment (CHA), (2) a community health improvement plan, and (3) a strategic plan. They found that LHDs’ involvement in performance related activities, use of QI tools, having

one or more local boards of health, and having an epidemiologist on staff increased their interest and intention to seek accreditation in the future. Yeager et al., 2015 examined the LHDs' organizational factors that are associated with initiating and intending to pursue accreditation. LHDs that have implemented quality improvement programs are more likely to initiate and complete the accreditation process. Similar results were found by Chen et al., 2015 that quality improvement maturity is positively associated with LHDs' attitudes, beliefs, and readiness to seek accreditation. The 3 studies confirmed that quality improvement implementation plays a crucial role in LHDs' decision to pursue accreditation. Since the goal of accreditation process is to increase health departments' performance, a systematic foundation of quality improvement is influential in the overall performance of LHDs. Therefore, studying the value of accreditation and quality improvement and factors that are associated with LHDs' engagement in accreditation and QI implementation is needed (Yeager et al., 2015).

In 2010, Beitsch et al. found that LHDs with centralized governance entity were more likely to have engaged in quality or performance improvement, which eventually will lead LHDs to pursue accreditation. The governance entity is usually the boards of health that exercise a crucial role in LHDs' performance and the health of community. In addition, Shah et al., 2013, argued that LHDs with one or more boards of health are more likely to have the intention to seek accreditation. Nevertheless, Yeager et al., 2015, found no significant relationship between intention to apply for accreditation and the presence of local boards of health with governing authority among LHDs that responded in 2010 or 2013 profile survey.

CHAPTER 3

Methods

Research Design

The study design is cross-sectional, based on secondary analysis of most comprehensive and recent data available. The study aimed to answer the following research questions: 1. Are LHDs with current Community Health Assessment ((completed within 5 years) less likely to have budget cuts? 2. Are LHDs with current Community Health Improvement Plan (completed within 5 years) less likely to have budget cuts? 3. Are LHDs with current Strategic Plan (completed within 5 years) less likely to have budget cuts? 4. Are LHDs with higher engagement in PHAB accreditation less likely to have budget cuts?

Data and Sampling

The study used the 2016 National Profile of Local Health Departments Survey conducted by the National Association of County and City Health Officials (NACCHO). The purpose of the profile survey is to develop a comprehensive description of LHDs' infrastructure and practice. NACCHO administers this study every three years. The 2016 profile study had a response rate of 76% of all LHDs across the United States, providing an overview of LHDs' funding, workforce programs, and partnerships.

The 2016 National Profile of Local Health Departments Survey was conducted to 2,533 LHDs across the country. The main section of the survey instrument, called Core, which contains questions about budget and staff changes and main independent variables (described later in this section) was completed by 1930 LHDs.

The profile of LHDs' survey had two types of questions: the Core questionnaire that was administered to all LHDs in the study population, and the two sets of supplemental questions (or modules) that were administered to randomly selected group stratified random samples of LHDs to answer different sets of questions. LHDs were selected to receive the Core questionnaire only or the Core plus one of the two modules using stratified random sampling (without replacement), with strata defined by the size of the population served by the LHDs.

Measures

The dependent variable (Increase in budget) was measured using the question: "My LHD's current fiscal year budget is ... (Select only one). The response categories included:

1. Less than the previous year's budget
2. Approximately the same (within plus or minus one percent) as the previous year's budget
3. Greater than the previous year's budget
4. Do not know

The instruction for the survey asked the respondents to select one of the applicable categories.

For the multivariable analyses, these categories were re-coded into three categories:

- (a) Less than the previous year's budget [coded as 1];
- (b) Approximately the same (within plus or minus one percent) as the previous year's budget [coded as 2]
- (b) Greater than the previous year's budget [codes as 3].

LHDs with a response of “Do not know” were excluded from the analysis.

Independent variables:

The Four primary independent variables in this study included the following:

- 1) LHD had completed a CHA within 5 years;
- 2) LHD had completed CHIP within 5 years;
- 3) LHD had completed an agency-wide strategic plan within 5 years; and
- 4) LHD’s level of participation in PHAB accreditation.

The first three independent variables were coded as dichotomous for this analysis and come from the answers to the following three survey questions:

- “Has a community health assessment been completed for your LHD’s jurisdiction?”
- “Has your LHD participated in developing a health improvement plan for your community?”; and
- “Has your LHD developed a comprehensive, agency-wide strategic plan?”

Each of these three questions had five response options—Yes, within the last 3 years; Yes, more than 3 but less than 5 years ago; Yes, 5 or more years ago; No, but plan to in the next year; and No. These five response options were recoded into two categories (Yes and No) for each of the three variables to align them with the PHAB requirements definitions of LHDs having completed a CHA, CHIP, and SP within 5 years: 1) “Yes, within last 5 years”; 2) “No,

not within last 5 years.” The survey instrument included definitions for CHA and CHIP, drawing from the glossary that accompanies the PHAB standards.

The fourth independent variable, LHD’s level of participation in PHAB accreditation, coded as four categories for multivariable analysis, was measured using the following survey question:

Which of the following best describes your LHD’s participation in the Public Health Accreditation Board’s (PHAB’s) national accreditation program for LHDs? (Select only one). Please report on PHAB accreditation only; do NOT report on state-based accreditation programs or accreditation for specific programs (e.g., Joint Commission or JCAHO).

This question had the following response categories:

- (a) My LHD has been accredited by PHAB;
- (b) My LHD is part of a PHAB-accredited centralized state integrated local public health department system;
- (c) My LHD has submitted an application for PHAB accreditation;
- (d) My LHD has registered in e-PHAB in order to pursue accreditation;
- (e) The state health agency has registered in e-PHAB in order to pursue accreditation as an integrated system that includes my LHD;
- (f) My LHD plans to apply for PHAB accreditation, but has not yet registered in e-PHAB;

(g) The state health agency plans to apply for PHAB accreditation as an integrated system that includes my LHD, but has not yet registered in e-PHAB;

(h) My LHD has not decided whether to apply for PHAB accreditation;

(i) My LHD has decided NOT to apply for PHAB accreditation; and

(j) Do not know.

For the multivariable analysis, these ten responses options were recoded into three following categories. 1) Accredited, submitted application, or in e-PHAB [combined (a), (b), (c) (d), and (e) above = 3]; 2) Plans to apply [combined (f), and (g) above = 2]; or 3) has decided NOT to apply (h) or 4) Has not decided whether to apply, or does not know [combined (i), and (j) above =1]

For additional independent variables (the control variables in this study), I used some of the variables used in Erwin et al. study in 2014, which include organizational characteristics like presence or absence of a board of health, the type of governance. The study also controlled for proportion of funding from local sources, size of LHDs' jurisdiction population, level of service delivery,

The variables were measured as the following:

1. Presence or absence of a board of health variable is measured by the question "Does your LHD have one or more local boards of health? The answers will be re-coded as [1= yes, and 0= No].

2. Type of governance variable is measured by the percentage of each three LHDs' governance classification coded as (1= unit governed by both state and local authorities 2= unit of state government 3=unit of local government)
3. Proportion of funding from local sources variable is measured by the percentage of funding from local sources using the question: Does your LHD receive any revenue from local source? The answers are re-coded as [1=yes 0=No].
4. Size of LHDs' jurisdiction population. The data provides 7 levels of population categories (1= <25,000 2=25,000 –49,999 3=50,000–99,999 4=100,000–249,999 5=250,000–499,999 6=500,000–999,999 7=1,000,000+). The levels were re-coded in three categories [1=<50,000, 2= 50,000-499,999 3= \geq 500,000]
5. Level of service delivery. The question indicates how the level of service delivery changed during 2015 in terms of budget or number of staff allocated to work in this area. The variable was measured by the question “Please indicate the overall direction of change in the following programmatic areas as: 1) reduced 2) little/no change 3)expanded, or 4) I don't know

(Immunization, Epidemiology and surveillance, Communicable disease screening or treatment, Blood lead screening, High blood pressure screening, Diabetes screening, Maternal and child health services, Obesity prevention, tobacco, alcohol, or other drug prevention, Emergency preparedness, Environmental health, including food safety). The answers are re-coded as service reduction=1, little/no change, expanded, don't know=0)

6. LHDs' engagement with non-profit hospitals on Community Health Needs Assessment (CHNA). This variable was measured by the question: "Which of the following describes the extent of your LHD's engagement with non-profit hospitals on the most recent community health assessment (CHNA) developed by the hospital? [1] My LHD has collaborated or is currently collaborating with one or more non-profit hospitals on a CHNA. [2] My LHD is currently discussing with one or more non-profit hospitals potential future collaboration on a CHNA. [3] My LHD has not engaged in discussion or collaboration with a non-profit hospital on CHNA. [4] I do not know my LHD's extent of engagement with non-profit hospitals on CHNA.

The answers were re-coded as My LHD has collaborated or is currently collaborating with one or more non-profit hospitals on a CHNA=4, My LHD is currently discussing with one or more non-profit hospitals potential future collaboration on a CHNA=3, My LHD has not engaged in discussion or collaboration with a non-profit hospital on CHNA=2, I do not know=1.

Statistical Methods

Multinomial logistic regression was used to assess the nature of association between the dependent variable increase in budget and the independent variables – accreditation status, CHA, CHIP, SP –controlling for additional characteristics of LHDs. This statistical method is used because the dependent variable (increase in budget) is ordinal with more than two levels which include [3=Greater than the previous year's budget, 2=approximately the same (within plus or minus one percent) as the previous year's budget, 1= Less than the previous year's budget]. This predictive analysis used maximum likelihood estimation to evaluate the probability of

categorical membership. Researchers prefer multinomial logistic regression because it is a powerful analysis that does not assume normality, linearity, or homoscedasticity. The main assumption in this analysis is the independence among the dependent variable choices. This means the choice of one category is not related to the choice of another category. The analysis also assumes non-perfect separation which means “If the groups of the outcome variable are perfectly separated by the predictor(s), then unrealistic coefficients was estimated and effect sizes was greatly exaggerated” (Starkweather & Moske, 2011).

CHAPTER 4

Results

Dependent Variable

We performed descriptive analyses to calculate percentages and frequencies for the categorical variables and means and standard deviation for the two continuous variables, population size and proportion of local sources funds. Out of the 1,930 LHDs who responded to the survey, 1,670 LHDs responded to the question “My LHD’s current fiscal year budget is ... [1] *Less than the previous year's budget* (represented by 379 LHDs (22.7%)), [2] *Approximately the same as the previous year's budget* (represented by 812 LHDs (48.6%), and [3] *Greater than the previous year's budget* (represented by 479 LHDs (28.7%) (Table 1). Therefore, the dependent variable (increase in budget) has three categories that were included in the multinomial regression model.

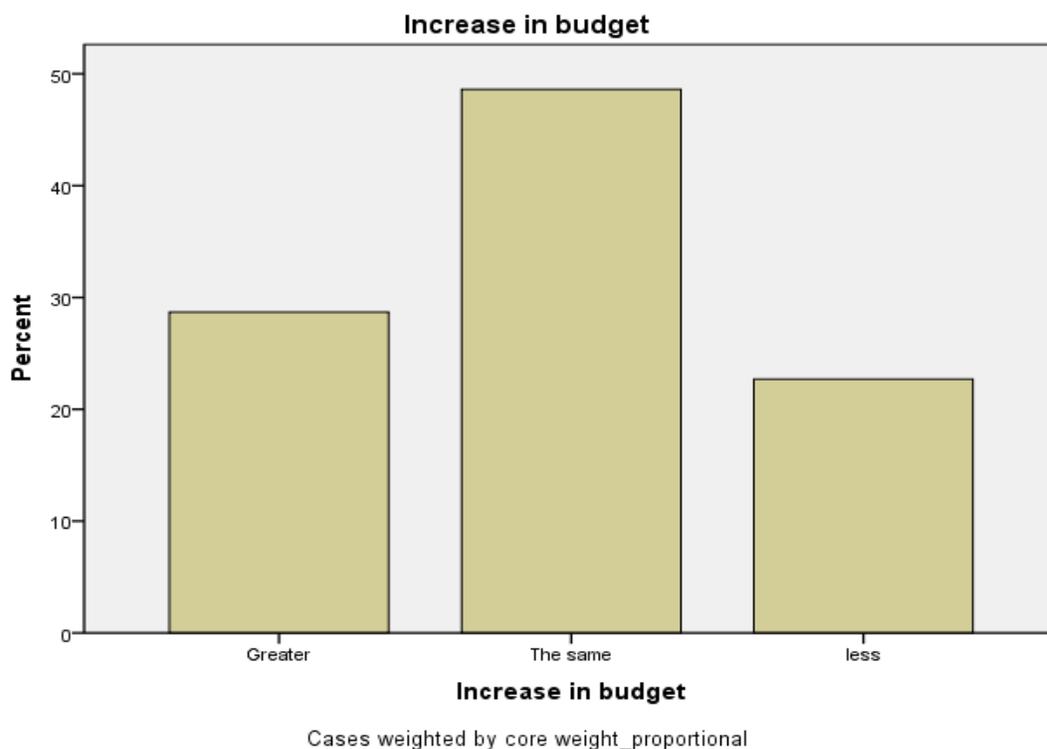


Figure 1. Percentage of the LHD’s current fiscal year budget comparing with the previous.

Independent Variables

The independent variables considered for multinomial analyses include accreditation status, CHA, CHIP, and strategic plan completed within the last five years. As Table 1 shows, only 20% of the 1,811 LHDs who completed the question regarding accreditation status had submitted their application to be accredited. Another 19.2% of LHDs are planning to apply, 33.4% are not decided whether to apply or not, and 27.3% of them are not applying or don't know the answer. Looking at Table 1 again, the percentage of LHDs that completed the 3 prerequisites of PHAB accreditation in the last five years was higher than those who did not. 76.4% LHDs completed CHA, 65.4% LHDs completed CHIP, and, 52.2% LHDs completed SP.

The study controlled for different variables including governance type, linkage with a LBOH, LHDs' partnership with Community Health Needs Assessment (CHNA), service reduction, population size, and the proportion of the local resources funds. Out of the three governance categories (shared, state, and local), state governance was the highest category with 72%. LHDs that have an associated LBOH were 1,280 out of 1,889 with a valid percentage of 67.7%. 55.8% of the total LHDs who completed the survey were collaborating with one or more non-profit hospitals on a CHNA. Out of the 1,930 LHDs, 628 (32.5%) LHDs had experienced service reductions in different programmatic areas. The local resources funds for LHDs show a mean of 0.33 and 0.28 of standard deviation, while the jurisdiction population size has a mean of 1.44 and 0.59 of standard deviation (Table 1).

Table 1
Descriptive Statistics for the Variables in the Analyses

Increase in budget	Frequency	Valid Percent
Greater	479	28.7
The same	812	48.6
less	379	22.7
Accreditation involvement		
Not applying/do not know	495	27.3
undecided	604	33.4
Plan to apply/SHA will apply	347	19.2
Application or statement submitted	365	20.1
Community Health Assessment in last five years		
yes	1474	76.4
no	456	23.6
Community Health Improvement plan in last five years		
yes	1263	65.4
no	667	34.6
Strategic plan in last five years		
yes	1007	52.2
no	923	47.8
Service reduction		
0 (unchecked)	1302	67.5
1 (checked)	628	32.5
CHNA involvement		
My LHD has collaborated non-profit hospitals on a CHNA	1077	55.8
My LHD is currently discussing collaboration on a CHNA	106	5.5
My LHD has not engaged in collaboration on CHNA	160	8.3
I do not know	586	30.4
Have LBOH		
unchecked	609	32.3
checked	1280	67.7
Governance category		
shared	378	19.6
state	1389	72
local	162	8.4
	Mean	Std. Deviation
Local source	0.339	0.28838
Jurisdiction Population	1.4402	0.59961
Total Number of LHDs	1930	

Bivariate Analysis

The study hypotheses assumed that LHDs that are engaged in PHAB accreditation or have completed the CHA, CHIP, SP requirements are more likely to show decline in budget which is explained by our dependent variable (increase in budget). The bivariate analysis was done between the dependent variable and independent variables to test the study hypotheses. The Chi-square test in Table 2 shows non-significant relationship between accreditation involvement of LHDs and increase in budget with the p-value of .47. However, the Chi-square test for CHIP, CHA, and SP showed a significant relationship between these independent variables and the dependent variable (increase in budget) with p-values < .001 for all the variables.

The bivariate analysis also shows a significant association between the dependent variable budget increase and the rest of the independent variables. The variables governance category with $p < .001$ service delivery reduction ($p < .001$), having a local board of health ($p < .001$), collaboration with non-profit hospitals on community health needs assessment ($p < .001$), jurisdiction population size ($p < .001$), and local source funds with $p < .001$. Therefore, the dependent variable shows a significant relationship with all the independent variables except for the PHAB accreditation status.

Table 2

Bivariate statistics for the dependent variable with different independent variables

		Increase in budget			Chi-Square
		Greater	same	less	p
Accreditation involvement	Not applying/don't know	115 26.30%	222 50.70%	101 23.10%	0.474
	undecided	160 29.00%	267 48.50%	124 22.50%	
	Plan to apply/ will apply	91 32.30%	132 46.80%	59 20.90%	
	Application submitted	101 31.50%	141 43.90%	79 24.60%	
Community Health Assessment in last 5 years	yes	397 30.70%	578 44.70%	317 24.50%	.000
	no	82 21.70%	234 61.90%	62 16.40%	
Community Health Improvement plan in last 5 years	yes	345 31.40%	476 43.30%	278 25.30%	.000
	no	134 23.60%	335 58.90%	100 17.60%	
Strategic plan in last 5 years	yes	283 32.60%	379 43.60%	207 23.80%	.000
	no	196 24.50%	433 54.10%	172 21.50%	
Service reduction	0 (unchecked)	347 30.90%	584 52.00%	192 17.10%	.000
	1 (checked)	132 24.20%	227 41.60%	187 34.20%	
CHNA involvement	LHD has collaborated with non-profit hospitals on a CHNA	308 32.20%	416 43.50%	232 24.30%	.000
	LHD is currently discussing collaboration on a CHNA	28 28.00%	40 40.00%	32 32.00%	
	LHD has no CHNA collaboration	33 23.90%	74 53.60%	31 22.50%	
	I do not know	8 15.10%	40 75.50%	5 9.40%	

Have LBOH	unchecked	122	293	105	.000
	checked	347	506	269	
Jurisdiction Population	<50,000	265	549	221	.000
	50,000-499,999	176	228	135	
	500,000+	38	35	23	
Governance category	shared	54	169	39	.000
	state	386	582	292	
	local	39	61	47	
		Mean			
Local Source		0.3374	0.3703	0.2852	0.001
		Standard Deviation			
		0.27806	0.30243	0.23973	

Multinomial Logistic Regression

The bivariate analysis that was done in Table 2 confirmed a strong relationship between CHA, CHIP, and SP completion for LHDs and budget cuts prevention but not with their involvement in PHAB accreditation. However, after executing the multinomial regression analysis and controlling for other independent variables, the relationship between the dependent variable and the four independent variables became insignificant for all four. The multinomial regression analysis was done through 4 models to get the best fit for the overall results. Each model represents the dependent variable with each independent variables (PHAB involvement, CHA, CHIP, and SP) controlled by governance category, LBOH linkage, population size, service reduction, CHNA involvement, and proportion of local source funds. From the 4 models that were computed, the Nagelkerke Pseudo R-squares were .11 (PHAB accreditation involvement), .10 (CHA) .11 (CHIP) and .11 (SP), indicating a fair amount of variation explained by the independent variables. The likelihood ratio Chi-squared statistics for each of the four models—

84.9 (PHAB accreditation involvement), 79.7 (CHA), 81.2 (CHIP), and 80.5 (SP)—had P-values less than 0.001, showing that there was no model for which all of the regression coefficients in the model were equal to zero.

Statistical Results

The multinomial logistic regression in the first model showed no significant association between LHDs that are accredited by PHAB and a budget decrease from the previous year (AOR= .711, $p=.275$), (AOR= .747, $p=.339$) (Table 3). On the other hand, the model showed that LHDs that rely on local sources for funds are less likely to have budget cuts (AOR= 2.73, $P=.015$, 95% CI, 1.211-6.168), (AOR= 4.16, $p<.001$, 95% CI, 1.885-9.197). LHDs that have shared governance structure are also less likely to have budget cuts than LHDs with local or state governance (AOR= 3.38, $P=.029$, 95% CI, 1.13-10.08), (AOR=6.06, $P=.001$, 95% CI, 2.10-17.4). LHDs that did not experience services reduction in fiscal year of 2015 are also less likely to report decreases from their prior year's budget (AOR= 2.51 $p<.001$, 95% CI, 1.70-3.70), (AOR=2.12, $p<.001$, 95% CI, 1.45-3.10). After controlling for other variables, the variables CHNA involvement, having a LBOH, and population size have no more significant association with the dependent variable (increase in budget) with P-value=.711, .327, .082 respectively.

The second model in Table 4 showed no more significant association between CHA completion and decrease in budget after controlling other variables with AOR= 1.0 and $p=.786$. However, the model maintained the significant association between budget increases or the same as last year and the variables like local sources funds, shared governance category, and service reduction with (AOR= 2.7, $P=.015$) (AOR= 2.60, $P=.06$) (AOR= 2.49, $p<.001$). The model showed no significance for CHNA involvement, having LBOH, or population size with the dependent variable.

The third model in Table 5 also showed no more significant association between CHIP completion and increase in budget after controlling other variables with AOR= 1.13 and p= .61. The model kept the significant association between local sources funds, service delivery reduction, and shared governance category and the dependent variable with AOR= 2.6, p= .020, AOR= 2.6, P=.059, AOR=2.5 p< .001 respectively. The model also showed no significance for CHNA involvement, having a LBOH, or population size with the dependent variable.

In the fourth model, the strategic plan completion was insignificant variable after controlling for other variables with AOR= 1.24 and P= .288. The model was consistent with the previous models by showing the significant association between local sources funds, shared governance category, and service delivery reduction and budget increase with AOR= 2.6, p= .01 AOR= 2.6, p= .06 AOR=2.5 p< .001 respectively

Table 3

Multinomial logistic regression analysis of the dependent variable with the independent variable (PHAB accreditation involvement) controlled by the rest of independent variables.

	Great Budget Vs Less Budget				Same Budget Vs Less Budget			
	p	Exp(B)	95% CI		p	Exp(B)	95% CI	
			LL	UL			LL	UL
Local_ source	0.01	2.73	1.21	6.16	.00	4.16	1.88	9.19
[Accreditation involvement = not applying/don't know]	0.27	0.71	0.38	1.31	0.33	0.74	0.41	1.35
[Accreditation involvement = undecided]	0.68	1.11	0.64	1.93	0.87	0.95	0.55	1.65
[Accreditation involvement = plan to apply/ will apply]	0.86	1.05	0.58	1.88	0.53	1.20	0.67	2.14
[Accreditation involvement = application submitted]	.....	.....	.....	.....	.....	.....	.....	.....
[governance category = shared]	0.02	3.38	1.13	10.08	0.00	6.06	2.10	17.43
[governance category = state]	0.11	1.65	0.88	3.11	0.08	1.76	0.92	3.34
[governance category = local]	.....	.....	.....	.....	.....	.....	.....	.....
[Have LBOH= unchecked]	0.32	1.27	0.78	2.09	0.17	1.39	0.86	2.26
[Have LBOH= checked]	.....	.....	.....	.....	.....	.....	.....	.....
[Service reduction = unchecked]	.00	2.51	1.70	3.70	.00	2.12	1.45	3.10
[Service reduction = checked]	.....	.....	.....	.....	.....	.....	.....	.....
[CHNA involvement = LHD has collaborated on a CHNA]	0.71	1.34	0.28	6.35	0.28	0.49	0.13	1.82
[CHNA involvement = LHD is currently discussing collaboration]	0.86	0.86	0.16	4.62	0.16	0.35	0.08	1.52
[CHNA involvement = LHD has no CHNA collaboration]	0.69	1.39	0.26	7.45	0.51	0.62	0.14	2.61
[CHNA involvement = Don't know]	.....	.....	.....	.....	.....	.....	.....	.....
[population category =<50,000]	0.08	0.50	0.22	1.09	0.74	1.14	0.50	2.61
[population category =50,000-499,999]	0.44	0.74	0.35	1.58	0.99	0.99	0.44	2.23
[population category =500,000+]	.....	.....	.....	.....	.....	.....	.....	.....

Note. CI= confidence interval; LL= lower limit; UL= upper limit; Nagelkerke R-squared for the model = .116, p-values in bold indicate significance of differences at $p \leq .05$, Indicate reference category.

Table 4

Multinomial logistic regression analysis of the dependent variable with the independent variable (Community Health Assessment completed in the last 5 years) controlled by the rest of independent variables.

	Great Budget Vs Less Budget				Same Budget Vs Less Budget			
	p	Exp(B)	95% CI		p	Exp(B)	95% CI	
			LL	UL			LL	UL
Local source	0.02	2.58	1.15	5.80	0.00	3.86	1.76	8.47
[CHA completed = yes]	0.78	1.09	0.58	2.02	0.42	0.79	0.44	1.40
[CHA completed = No]	.....	.....	.....	.....	.....	.....	.....	.....
[governance category = shared]	0.06	2.60	0.94	7.15	0.00	4.12	1.56	10.87
[governance category = state]	0.11	1.63	0.88	2.98	0.12	1.61	0.87	2.97
[governance category = local]	.....	.....	.....	.....	.....	.....	.....	.....
[Have LBOH= unchecked]	0.41	1.22	0.75	1.98	0.23	1.33	0.83	2.13
[Have LBOH= checked]	.....	.....	.....	.....	.....	.....	.....	.....
[Service reduction = unchecked]	.00	2.49	1.70	3.66	.00	2.10	1.45	3.06
[Service reduction = checked]	.....	.....	.....	.....	.....	.....	.....	.....
[CHNA involvement = LHD has collaborated on a CHNA]	0.85	1.15	0.24	5.45	0.22	0.44	0.12	1.64
[CHNA involvement = LHD is currently discussing collaboration]	0.75	0.76	0.14	4.06	0.13	0.33	0.07	1.39
[CHNA involvement = LHD has no CHNA collaboration]	0.83	1.19	0.22	6.35	0.34	0.50	0.12	2.10
[CHNA involvement = Don't know]	.....	.....	.....	.....	.....	.....	.....	.....
[population category =<50,000]	0.03	0.45	0.21	0.94	0.99	1.00	0.45	2.20
[population category =50,000-499,999]	0.39	0.72	0.34	1.51	0.91	0.96	0.43	2.12
[population category =500,000+]	.....	.....	.....	.....	.....	.....	.....	.....

Note. CI= confidence interval; LL= lower limit; UL= upper limit; Nagelkerke R-squared for the model = .109; p-values in bold indicate significance of differences at $p \leq .05$; Indicate reference category.

TABLE 5

Multinomial logistic regression analysis of the dependent variable with the independent variable (Community Health Improvement plan completed in the last 5 years) controlled by the rest of independent variables.

	Great Budget Vs Less Budget				Same Budget Vs Less Budget			
	p	Exp(B)	95% CI		p	Exp(B)	95% CI	
			LL	UL			LL	UL
Local source	0.02	2.61	1.16	5.86	0.00	3.79	1.72	8.34
[CHIP completed=Yes]	0.61	1.13	0.70	1.83	0.31	0.79	0.50	1.24
[CHIP completed=No]	.....	.....	.....	.....	.....	.....	.....	.....
[governance category = shared]	0.05	2.66	0.96	7.35	0.00	3.98	1.50	10.56
[governance category = state]	0.10	1.65	0.89	3.03	0.14	1.58	0.85	2.91
[governance category = local]	.....	.....	.....	.....	.....	.....	.....	.....
[Have LBOH= unchecked]	0.40	1.22	0.75	1.99	0.24	1.32	0.82	2.12
[Have LBOH= checked]	.....	.....	.....	.....	.....	.....	.....	.....
[Service reduction = unchecked]	.00	2.50	1.70	3.67	.00	2.10	1.45	3.05
[Service reduction = checked]	.....	.....	.....	.....	.....	.....	.....	.....
[CHNA involvement = LHD has collaborated on a	0.88	1.12	0.23	5.34	0.25	0.46	0.12	1.73
[CHNA involvement = LHD is currently	0.73	0.74	0.14	4.00	0.14	0.34	0.08	1.44
[CHNA involvement = LHD has no CHNA	0.84	1.18	0.22	6.25	0.37	0.52	0.12	2.16
[CHNA involvement = Don't Know]	.....	.....	.....	.....	.....	.....	.....	.....
[population category =<50,000]	0.03	0.45	0.21	0.94	0.99	0.99	0.45	2.18
[population category =50,000-499,999]	0.40	0.72	0.34	1.52	0.92	0.96	0.43	2.12
[population category =500,000+]	.....	.....	.....	.....	.....	.....	.....	.....

Note. CI= confidence interval; LL= lower limit; UL= upper limit; Nagelkerke R-squared for the model = .111; p-values in bold indicate significance of differences at $p \leq .05$; Indicate reference category.

TABLE 6.

Multinomial logistic regression analysis of the dependent variable with the independent variable (Strategic plan completed in the last 5 years) controlled by the rest of independent variables

	Great Budget Vs Less Budget				Same Budget Vs Less Budget			
	p	Exp(B)	95% CI		p	Exp(B)	95% CI	
			LL	UL			LL	UL
Local source	0.01	2.66	1.19	5.96	0.00	3.98	1.82	8.69
[SP completed=Yes]	0.28	1.24	0.83	1.85	0.77	0.94	0.64	1.39
[SP completed=No]	.....	.....	.....	.....	.....	.....	.....	.....
[governance category = shared]	0.06	2.60	0.95	7.14	0.00	4.25	1.61	11.16
[governance category = state]	0.10	1.65	0.90	3.03	0.12	1.62	0.88	2.97
[governance category = local]	.....	.....	.....	.....	.....	.....	.....	.....
[Have LBOH= unchecked]	0.40	1.23	0.75	1.99	0.23	1.32	0.82	2.13
[Have LBOH= checked]	.....	.....	.....	.....	.....	.....	.....	.....
[Service reduction = unchecked]	.00	2.48	1.69	3.64	.00	2.10	1.45	3.06
[Service reduction = checked]	.....	.....	.....	.....	.....	.....	.....	.....
[CHNA involvement = LHD has collaborated on a	0.83	1.18	0.24	5.60	0.21	0.43	0.11	1.60
[CHNA involvement = LHD is currently	0.77	0.78	0.14	4.17	0.12	0.32	0.07	1.37
[CHNA involvement = LHD has no CHNA	0.79	1.24	0.23	6.63	0.36	0.51	0.12	2.14
[CHNA involvement = Don't Know]	.....	.....	.....	.....	.....	.....	.....	.....
[population category =<50,000]	0.05	0.48	0.22	1.01	0.98	0.99	0.44	2.19
[population category =50,000-499,999]	0.44	0.74	0.35	1.56	0.91	0.95	0.43	2.13
[population category =500,000+]	.....	.....	.....	.....	.....	.....	.....	.....

Note. CI= confidence interval; LL= lower limit; UL= upper limit; Nagelkerke R-squared for the model = .110; p-values in bold indicate significance of differences at $p \leq .05$; Indicate reference category.

CHAPTER 5

Discussion and Conclusion

Improving the nation's public health is heavily reliant on local health departments (LHDs) to carry out the three core functions of public health (assessment, policy development, and assurance) and to provide the 10 essential public health services (EPHS) that align with these 3 core functions. LHDs' performance to deliver these essential services is associated with different factors. One of the factors that is most strongly associated with LHDs' performance is funding. Honore et al. (2004) found increased per capita funding is associated with higher LHD performance on the 10 EPHS, and local funding appears to contribute the most to performance (Hyde, 2010). Keeping these funds available and running every fiscal year is a big challenge for LHDs especially in the post economic recession times. This study examined different factors that can be associated with LHDs' maintaining annual fiscal year funding.

The initial bivariate results revealed no significant association between the dependent variable increase in budget and LHDs involved in PHAB accreditation process. On the other hand, the results confirmed a strong association between LHDs that did not have budget decrease and their CHA, CHIP, and SP completion, having a LBOH, smaller population size, shared governance structure, local source funding, collaborating with non-profit hospitals on CHNA, and LHDs that had no reductions in their services delivery. However, after controlling for certain variables in the study, the results were totally statistically insignificant for most of the independent variables using multinomial logistic regression analysis.

The study results found LHDs which are involved in the PHAB accreditation process or which have completed the PHAB requirements CHA, CHIP, or SP were not statistically associated with budget cuts prevention. These interesting results surprisingly show no

relationship between funding change and PHAB accreditation process. Public health department accreditation is one of the most important accomplishments in the field of public health. It is well-documented in the literature that accreditation has a progressive effect on the performance of health departments by focusing on quality improvement, accountability, consistency, efficiency in health departments' capacity and activity to improve the nation's health as whole (Lenaway et al., 2010 & Riley et al., 2012). Although, the accreditation process provide health departments with tremendous benefits and advantages, someone may ask why the accreditation process is not associated with budget cuts prevention. Looking to PHAB accreditation standards and measures in domain 11, maintaining administrative and management capacity, standard 11.2 addresses establishing effective financial management systems. PHAB standards and measures thus require LHDs to have effective financial systems. One possible reason for these results may be that the PHAB accreditation process was only launched in 2013, and the positive effect of PHAB accreditation on LHDs' finances may not still be apparent. Probably, the PHAB accreditation process may not have enough lag time to show its actual benefits for LHDs.

There are several factors associated with the likelihood of a budget increase/decrease in among LHDs. Having a LBOH, population size, governance category, and revenue source are the main factors that had been used in previous studies. However, the direction of the relationship to these factors were inconsistent (Willard et al., 2012, Erwin et al., 2013, Ye et al., 2015). By contrast, one of the main factors in our study that was associated with budget cuts prevention at LHDs is local funding. Local funding as defined in the NACCHO survey is "All income originating from local government, including allocations from county, city, or town government; School Boards; taxing districts; property tax millage, etc." These findings is

consistent with Ye et al. (2015) study where they found LHDs that obtained a greater proportion of revenue from local funds are less likely to go through budget cuts.

Another main factor associated with protection from budget cutse was maintaining service delivery. This study findings indeed shows LHDs that had no service delivery reduction in the following areas were more likely to increase their budget or keep it the same as last year than those who reduced their services: immunization; epidemiology and surveillance; communicable disease screening or treatment; blood lead screening; high blood pressure screening; diabetes screening; maternal and child health services; obesity prevention; tobacco, alcohol, or other drug prevention; emergency preparedness; and environmental health. Other studies have not looked at service delivery level in terms of LHDs' funding, thus; this study added a new factor that associated with budget cuts prevention.

The last significant factor to affect budget increase was governance category. The study found LHDs that have shared governance structure were more likely to have budget increase or keep the same budget as last year than LHDs with a local or state governance. These findings were inconsistent with Ye et al., 2015 study that found LHDs with local or shared governance were more likely to have budget cuts than state governed LHDs.

Our study findings showed no significant influence for having a LBOH on maintaining LHDs' budget. These findings are consistent with Ye et al., 2015 and Erwin et al., 2013 study that found LHDs that successfully survived through economic recession were less likely to have had a LBOH with the authority to hire/fire.

Our study also showed no difference in population size [$<50,000$, $50,000-499,999$, $\geq 500,000$] on budget increase in model 1, however, population size was significant factor to

increase budget in model 2, 3 and 4 with p-value =.03, .03, and .05 respectively. So, larger jurisdiction population was associated with the LHDs' budget cuts prevention in the last 3 models. These findings are consistent with Willard et al., 2012 and Erwin et al., 2014 studies. Lastly, the study findings did not show a significant association for LHDs that collaborate with non-profit hospitals on CHNA on their budget increase or maintaining it the same.

Conclusion

LHDs have the main role to improve public health by controlling and preventing disease. Providing LHDs with adequate and consistent funding is the critical key to meet public health needs. The NACCHO 2016 national profile data shows almost a quarter of LHDs (23 %) have experienced budget cuts from the previous year. This is a clear sign that the budget challenges of LHDs still exist a decade after the 2008 recession, and that LHDs throughout the nation are having a long and undefined recovery. Therefore, LHDs have to find ways to overcome these financial difficulties, maintain their existing funds, and try to find new revenue sources. The IOM, 2012 report "*For the Public's Health: Investing in a Healthier Future*" explained that improving health outcomes in the nation requires a transformational change toward investing in population-based prevention which require stable funds for health departments.

The main purpose of this study was to explore factors associated with LHDs' maintaining their budgets. The findings of this study did not show any significant relationship between the PHAB accreditation process including CHA, CHIP, and SP completion and preventing budget cuts for LHDs. On the other hand, it showed a significant association between local funding sources, governance type, and service delivery reduction and budget cuts prevention. . However, the results from previous studies in the literature were inconsistent with our study. For example, greater dependence on local source was not a significant factor in Willard et al., 2012, and Erwin

et al., 2013, even though, it was an important factor in this study and Ye et al., 2015. One possible reason for this is timing; local source funds may decrease right after a recession and then with a recovery the local funding may return (Ye et al., 2015). This suggests that local funding sources are more volatile to economic pressures and are not as stable of a funding source for LHDs. Therefore, LHDs' survival requires to find out new sources of funds that are more stable and less susceptible to budget cuts emanating from economic recession.

The findings of this study add to the literature in Public Health Services and Systems Research (PHSSR) by providing insights about factors associated with stable funding for LHDs to support and improve the public health systems. In addition, PHAB will benefit from this study by understanding more in-depth how to help LHDs in planning for accreditation and addressing the financial management domain in a better way. The study also provides health officials and policymakers with factors that can create budgetary policies to better insulate critical LHDs from economic disruptions.

Limitations and Recommendations

This study used a cross-sectional data (rather than longitudinal). This enabled us to observe the dependent variable at a single point in time but not over a period of time. Therefore, we were not able to detect the development or changes in budgets overtime. The data are self-reported, and NACCHO did not verify the data independently. So, the findings may include recall bias and inaccuracies. Also, the PHAB accreditation process is a relatively new phenomenon started in 2011 with first batch of health departments receiving accreditation in 2013. Consequently, the positive effect of accreditation on LHDs may not have occurred due to lack of lag time between this cause and effect. There may also be variation in how to define the concept of "financial resiliency". This study for example combined budget increases and

budgets maintained at the same funding levels as the prior fiscal year. Future studies may find other associated factors to budget increase compared to budget maintenance. Future studies can also provide improved insights by conducting longitudinal studies that measure the dependent variable over a period of time rather than one single time.

References

1. Abarca, C. Grigg, M. Steele, J.A. Osgood, L. and Keating. H. 2009. Building and Measuring Infrastructure and Capacity for Community Health Assessment and Health Improvement Planning in Florida. *J Public Health Management and Practice*, 15(1), 54–58
2. Basara, H. & Yuan, M. 2008. Community health assessment using self-organizing maps and geographic information systems. *International Journal of Health Geographics*, 7(67). 10.1186/1476-072X-7-67
3. Baum, N.M, DesRoches, C., Campbell, E.G, Goold, S.D. 2011. Resource Allocation in Public Health Practice: A National Survey of Local Public Health Officials. *J Public Health Management and Practice*, 17(3), 265–274.
4. Beatty, K.E., Mayer, J., Elliott, M., Brownson, R.C., Wojciehowski, K. 2015. Patterns and predictors of local health department accreditation in Missouri. *J Public Health Manag Pract.* 21(2):116---125.
5. Beitsch, L.M., Riley, W., Bender, K. 2014. Embedding quality improvement into accreditation: evolving from theory to practice. *Public Health Manag Pract.* 20(1):57-60.
6. Beitsch, L. M., C. Leep, G. Shah, R. G. Brooks, and R. M. Pestronk. 2010. Quality improvement in local health departments: Results of the NACCHO 2008 survey. *Journal of Public Health Management and Practice* 16(1):49–54

7. Beitsch, L.M, Riley, W., Bender, K. 2014. Embedding quality improvement into accreditation: evolving from theory to practice. *Public Health Manag Pract.*; 20(1):57-60
8. Bender, K., Benjamin, G., Fallon, M.M., Jarris, P.E., Libbey, P.M. 2007. Exploring accreditation: striving for a consensus model. *J Public Health Manag Pract.* 13(4):334-336.
9. Byrne C., Crucetti J. B., Medvesky M. G., Miller M. D., Pirani S. J., Irani P. R. 2002. The process to develop a meaningful community health assessment in New York State. *Journal of Public Health Management & Practice.* 8(4):45–53
10. Carman, A.L., Timsina, L., Scutchfield, F.D. 2014. Quality improvement activities of local health departments during the 2008-2010 economic recession. *Am J Prev Med.* 46(2):171-174
11. Carman, A.L. and Timsina, L. 2015. Public Health Accreditation: Rubber Stamp or Roadmap for Improvement. *American Journal of Public Health.* Vol 105, No. S2
12. Centers for Disease Controls and Prevention (CDC). (2016). *Public Health Accreditation Board.* Retrieved from http://www.cdc.gov/stltpublichealth/hop/pdfs/PHAB_Factsheet.pdf
13. Chen, L.W, Nguyen,A., Jacobson, J.J, Gupta, N, Bekmuratova, S., and Palm, D. 2015. Relationship between Quality Improvement Implementation and Accreditation Seeking in Local Health Departments. *Am J Public Health.* Vol. 105 Suppl 2, pp. S295-302

14. El-Jardali, F., Hemadeh, R., Jaafar, M., Sagherian, L., El-Skaff, R., Mdeihly, R. & Ataya, N. 2014. The impact of accreditation of primary healthcare centers: successes, challenges and policy implications as perceived by healthcare providers and directors in Lebanon. *BMC health services research*, 14(1), 86
15. Erwin, P.C., Greene, S.B., Mays, G.P., Ricketts, T.C., Davis, M.V. 2011. The association of changes in local health department resources with changes in state-level health outcomes. *Am J Public Health*. 101: 609-15.
16. Erwin, P.C., Shah, G.H., Mays, G. 2013. The Resilient Local Health Department: Surviving the 2008 Economic Crisis. *Frontiers in Public Health Systems and Services*. 2(5), Article 4. Available at:
<http://uknowledge.uky.edu/frontiersinphssr/vol2/iss5/4>
17. Erwin, P.C. 2008. The performance of local health departments: a review of the literature. *J Public Health Manag Pract*. 14: E9-18.
18. Erwin, P.C. Mays, G.P. Riley, W.J. 2012. Resources That May Matter: The Impact of Local Health Department Expenditures on Health Status. *Public Health Rep*. 2012 Jan-Feb; 127(1): 89–95
19. Erwin, P.C., Shah, G.H. Mays, G.P. 2014. Local Health Departments and the 2008 Recession: Characteristics of Resiliency. *American Journal of Preventive Medicine*; 46(6):559–568.
20. Erwin, P.C., Shah, G.H. Mays, G.P. 2014. Local Health Departments and the 2008 Recession: Characteristics of Resiliency. *American Journal of Preventive Medicine*; 46(6):559–568.

21. Grembowski, D., Bekemeier, B., Conrad, D., Kreuter, W. 2010. Are local health department expenditures related to racial disparities in mortality? *Soc Sci Med*; 71:2057-65.
22. Hamm, M.S. 2007. Quality Improvement Initiatives in Accreditation: Private Sector Examples and Key Lessons for Public Health. Princeton, NJ: Robert Wood Johnson Foundation.
23. Handler, A., Issel, M., Turnock, B.J. 2001. A conceptual Framework to measure performance of the public Health system. *Am J Pubic Health*. 91(8):1235-1239
24. Honore, P.A, Scott, W. 2010. Priority Areas for Improvement of Quality in Public Health. Washington, DC: Department of Health and Human Services.
25. Honore, P.A., Simoes, E.J., Jones, W.J. et al. 2004. Practices in public health finance: an investigation of jurisdiction funding patterns and performance. *J Public Health Management Practice*; 10(5): 444-450.
26. Hyde, J. 2010. The structure and organization of local and state public health agencies in the United States: a systematic review. Pre-publication copy.
27. Hyde, J.K. and Shortell, S.M. 2012. The Structure and Organization of Local and State Public Health Agencies in the U.S. A Systematic Review. *American Journal of Preventive Medicine*;42(5S1):S29–S41 S29
28. Hyde, J.K., Shortell, S.M. 2012. The structure and organization of local and state public health agencies in the U.S.: a systematic review. *Am J Prev Med*; 42(5 Suppl 1):S29-41. doi: 10.1016/j.amepre.2012.01.021.

29. Institute of Medicine (IOM). 2002. *The Future of the Public's Health in the 21st Century*. Washington, DC: National Academy Press.
30. Institute of Medicine. 1988. *The Future of Public Health*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/1091>.
31. Institute of Medicine. 2003. *The Future of the Public's Health in the 21st Century*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/10548>.
32. Institute of Medicine. 2012. *For the Public's Health: Investing in a Healthier Future*. Washington, DC: National Academies Press.
33. Institute of Medicine. 1997. *Improving Health in the Community: A Role for Performance Monitoring*. Washington, DC: National Academy Press.
34. Irani, P., Halasan, C., Landen, M., & McCusker, D. 2006. Community health assessment: Driving for current, easily accessible population health data. *Journal of Public Health Management Practice*, 12(2), 113-118.
35. Kavanagh, S. and Gudgeirsson, P. 2010. Financial Resiliency: Time to Prosper. Retrieved from [Public management.icma.org/pm](http://Public%20management.icma.org/pm)
36. Kronstadt, J. Meit, M. Siegfried, A. Nicolaus, T. Bender, K. Corso, L. 2016. Evaluating the Impact of National Public Health Department Accreditation — United States. *MMWR* / August 12, 2016 / Vol. 65 / No. 31
37. Kruger, D., Shirley, L., Morrel-Samuels, S., Skorcz, S., & Brady J. 2009. Using a community-based health survey as a tool for informing local health policy. *Journal of Public Health Management Practice*, 15(1), 47-53.

38. Laymon, B., Shah, G., Leep, C.J., Elligers, J.J., Kumar, V. 2015. The proof's in the partnerships: are Affordable Care Act and local health department accreditation practices influencing collaborative partnerships in community health assessment and improvement planning? *J Public Health Manag Pract.*; 21(1):12---17.
39. Leep, C., Shah, G.H. 2012. NACCHO's 2010 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.* 18(2) 186–189
40. Leep, C.J, & Bhutta, C.B. 2012. NACCHO Monitors the Financial Health of Local health departments: new tools make financial data more accessible to public health practitioners. *J Public Health Manag Pract.*18(4):393-5.
41. Lenaway, D., Corso, L., Buchanan, S., Thomas, C., & Astles, R. 2010. Quality improvement and performance: CDC's strategies to strengthen public health. *Journal of Public Health Management Practice, 16(1)*, 11–13.
42. Luo, H. Sotnikov, S. Shah, G. Galuska, D. A. Zhang, X. 2013. Variation in Delivery of the 10 Essential Public Health Services by Local Health Departments for Obesity Control in 2005 and 2008. *Journal of Public Health Management & Practice: January/February 2013 - Volume 19 - Issue 1 - p* 53–61
43. Mays, G.P., McHugh, M., Shim, K. 2006. Institutional and economic determinants of public health system performance. *Am J Public Health*; 96(3): 523-531

44. Mays, G.P., Smith, S.A. 2011. Evidence links increases in public health spending to declines in preventable deaths. *Health Aff (Millwood)*; 30:1585-93.
45. Mays, G.P. McHugh, M.C., Shim, K. Perry, N. Lenaway, D., Halverson, P.K., and Moonesinghe, R. 2006. Institutional and Economic Determinants of Public Health System Performance. *Am J Public Health*; 96(3): 523–531.
46. Mays, G.P., Halverson, P.K., Baker, E.L., Stevens, R., and Vann, J.J. 2004. Availability and perceived effectiveness of public health activities in the nation's most populous communities. *Am J Public Health*; 94(6):1019-26.
47. Minnesota Public Health Research to Action Network. 2011. Factors Associated with Local Public Health Department Performance: Literature Review. Retrieved from http://www.health.state.mn.us/divs/opi/pm/ran/docs/1110ran_litreview.pdf
48. Moulton, A., Halverson, Paul K., Honoré, P.A., Berkowitz, B. 2004. Public Health Finance: A Conceptual Framework. *Journal of Public Health Management & Practice*: Vol10 - Issue 5 - p 377–382
49. National Association of County & City Health Officials. 2010. Developing a Local Health Department Strategic Plan: A How-To Guide. Retrieved from <http://www.naccho.org/uploads/downloadable-resources/Programs/Public-Health-Infrastructure/StrategicPlanningGuideFinal.pdf>
50. National Association of County & City Health Officials. 2011. 2010 National Profile of Local Health Departments. Retrieved from

http://archived.naccho.org/topics/infrastructure/profile/resources/2010report/upload/2010_profile_main_report-web.pdf

51. National Association of County & City Health Officials. 2014. 2013 National Profile of Local Health Departments. Retrieved from <http://archived.naccho.org/topics/infrastructure/profile/upload/2013-National-Profile-of-Local-Health-Departments-report.pdf>
52. National Association of County & City Health Officials. 2013. Mobilizing for Action through Planning and Partnerships handbook. Retrieved from http://www.naccho.org/topics/infrastructure/mapp/upload/MAPP_Handbook_fnl.pdf.
53. National Association of County and City Health Officials. 2011. Local health department job losses and program cuts: findings from July 2011 survey. Washington DC: National Association of County and City Health Officials. www.naccho.org/topics/infrastructure/lhdbudget/upload/Overview-Report-Revised-Final.pdf.
54. Pfeffer, J., Salancik, G. 1978. *The External Content of Organizations*. New York, NY: Harper and Row.
55. Public Health Accreditation Board. 2011. Standards and measures (version 1.0). Retrieved from <http://www.phaboard.org/wp-content/uploads/PHAB-Standards-and-Measures-Version-1.0.pdf>
56. Public Health Accreditation Board. 2012. National Public Health Department Accreditation Prerequisites. Retrieved from <http://www.phaboard.org/wp-content/uploads/PrerequisitesJuly-2012.pdf>

57. Public Health Accreditation Board. 2011. Acronyms and Glossary of Terms Version 1.0. Retrieved from <http://www.phaboard.org/wpcontent/uploads/PHAB-Acronyms-and-Glossary-of-Terms-Version-1.02.pdf>.
58. Public Health Accreditation Boards. 2014. Standards and Measures. Retrieved from <http://www.phaboard.org/accreditation-process/public-health-department-standards-and-measures/>
59. Carman, A. L. & Timsina L. 2015. Public Health Accreditation: Rubber Stamp or Roadmap for Improvement. *Am J Public Health*; 105(Suppl 2): S353–S359.
60. Rein, A.S., Ogden, L.L. 2012. Public health: a best buy for America. *JPublic Health Manag Pract*; 18(4):299-302.
61. Richards, T.B. Rogers, J.J. Christenson, G.M. Miller, C.A.Taylor, M.S. Cooper, A.D. 1995. Evaluating local public health performance at a community level on a statewide basis. *J Public Health Manag Pract*. 1(4):70-83.
62. Riley, W.J., Moran, J.W., Corso, L.C., Beitsch, L.M., Bialek, R., Cofsky, A. 2010. Defining quality improvement in public health. *JPublic Health Manag Pract*;16(1):5-7
63. Riley, W.J., Parsons, H.M., Duffy, G.L., Moran, J.W., Henry, B. 2010. Realizing transformational change through quality improvement in public health. *J Public Health Manag Pract*; 16(1):72-78.

64. Riley, W., Lownik, E., Scutchfield, D., Mays, G., Corso, L., & Beitsch, L. 2012. Public health department accreditation, setting the research agenda. *American Journal of Preventative Medicine*, 42, 263-271.
65. Russo, P. 2007. Accreditation of public health agencies: a means, not an end. *Journal of Public Health Management and Practice*, 13(4), 329-331.
66. Russo, P., & Kuehnert, P. 2014. Accreditation: a lever for transformation of public health practice. *Journal of Public Health Management and Practice*, 20(1), 145-148.
67. Scotch, M. & Parmanto, B. 2005. Development of SOVAT: A numerical-spatial decision support system for community health assessment research. *International Journal of Medical Informatics*, 75(2006), 771-784.10.1016/j.ijmedinf.2005.10.008
68. Scutchfield, F.D., Marks, J.S. Perez, D.J., Mays, G.P. 2007. Public health services and systems research. *Am J Prev Med*; 33:169-71
69. Shah, G.H., Luo, H., Winterbauer, N., Madamala, K. 2016. Addressing psychological, mental health and other behavioral healthcare needs of the underserved populations in the U.S.: Role of local health departments. *Perspectives in Public Health*. 136(2)86-92
70. Shah, G.H., Sotnikov, S., Leep, C., Ye, J., Corso, L. 2017. Local Boards of Health Characteristics Influencing Support for Health Department Accreditation. *J Public Health Manag Pract*. E-Pub ahead of print: August 21, 2017; doi: 10.1097/PHH.0000000000000623

71. Shah, G.H., Sotnikov, S., Leep, C., Ye, J., Van-Wave, T.W. 2017. Creating a Taxonomy of Local Boards of Health Based on Local Health Departments' Perspectives. *Am J Public Health*; 107(1): 72-80.
72. Shah, G.H., Ye, J., Leep, C.J., Leider, J.P. 2016. Local Health Departments' Approaches to Deal With Recession: What Strategies Are Used to Minimize the Negative Impact on Public Health Services to Community? *J Public Health Manag Pract*. 22(6), 537–541
73. Shah, G., Beatty, K., & Leep, C. 2013. Do PHAB accreditation prerequisites predict local health departments' intentions to seek voluntary national accreditation? *Frontiers in Public Health Services and Systems Research*, 2(3).
74. Shah, G.H., Ye, J., Leep, C.J., Leider, J.P. 2016. Local Health Departments' Approaches to Deal With Recession: What Strategies Are Used to Minimize the Negative Impact on Public Health Services to Community? *J Public Health Manag Pract*. 22(6), 537–541
75. Spice, C. & Snyder, K. 2009. Reviewing self-reported impacts of community health assessment in local health jurisdictions. *Journal of Public Health Management and Practice*, 15(1), 18-23.
76. Stanley, S. & Stein, D. (1998). Health watch 2000: Community health assessment in south central Ohio. *Journal of Community Health Nursing*, 15(4), 225-236.
77. Starkweather, J. & Moske, A.K. (2011). Multinomial Logistic Regression. Retrieved from https://it.unt.edu/sites/default/files/mlr_jds_aug2011.pdf

78. The Exploring Accreditation. (2006). Final recommendation for voluntary national accreditation program for state and local public health departments. Retrieved from <http://www.phaboard.org/wp-content/uploads/ExploringAccreditationFullReport.pdf>
79. Turnock B. 2009. *Public Health: What It Is and How It Works*. Sudbury, MA: Jones & Bartlett.
80. Ulrich, D., Banrey, J.B. 1984. Perspectives in organizations: resource dependence, efficiency, and population. *Acad manag Rev*; 9(3):471-481.
81. United States Department of Health and Human Services, Healthy People. 2010. Washington, DC; Centers for Disease Control and Prevention, National Public Health Performance Standards Program, www.cdc.gov/nphpsp/FAQ.pdf
82. Weston-Cox, P. 2012. The impact of the economic downturn on environmental Health services and professionals in North Carolina. *J Environ Health*; 74(10):16-20.
83. Willard, R., Shah, G.H., Leep, C., Ku, L. 2012. Impact of the 2008–2010 economic recession on local health departments. *J Public Health Manag Pract*; 18(2):106–14.
84. Wilson, K.D., Mohr, L.B., Beatty, K.E., Ciecior, A. 2014. Describing the continuum of collaboration among local health departments with hospitals around the community health assessments. *J Public Health Manag Pract*; 20(6):617---625.

85. Ye, J., Leep, C., Newman, S. (2015). Reductions of Budgets, Staffing, and Programs among Local Health Departments: Results from NACCHO's Economic Surveillance Surveys, 2009-2013. *J Public Health Management Practice*, 21(2), 126–133
86. Yeager, V.A, Ferdinand, A.O, Beitsch, L.M, and Menachemi, N. (2015). Local Public Health Department Characteristics Associated With Likelihood to Participate in National Accreditation. *Am J Public Health*. Vol 105, No. 8