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INCREASING LOCAL PUBLIC HEALTH EMERGENCY PREPAREDNESS CAPACITY BY BUILDING FROM WITHIN THE CURRENT INFRASTRUCTURE

by

Marcus A. Castle

June 2020

Thesis Advisor: Anke Richter
Second Reader: Lynda A. Peters (contractor)

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State and local public health departments are losing the ability to respond to and protect the community from public health threats. Increase to public health funding follows after an identified threat because current capacity cannot absorb a new mission. Given the decrease in federal funding and subsequent loss of response capacity, how can local public health reconfigure its organizational structure or find alternate sources of funding to maintain or increase current response capacity? This thesis traces the growth of public health from a single program to today's U.S. Department of Health and Human Services supporting state and local health departments through federal grant funds. Using case studies and comparing federal grant awards to the structures of state and local departments, this thesis reveals how reliance on federal funding affects the organization of public health. The research demonstrates the direct correlation between the current structure and a century of funding one program per threat. Reliance on federal grants imperils the United States public health system because state and local departments must reorganize in order to sustain ongoing public health missions. The conclusion includes four recommendations that may improve the overall public health network by modifying funding to a more inclusive process, changing the type of federal grants, restructuring to support larger domains, and increasing state and local budgets to support response capacity.

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INCREASING LOCAL PUBLIC HEALTH EMERGENCY PREPAREDNESS CAPACITY BY BUILDING FROM WITHIN THE CURRENT INFRASTRUCTURE

Marcus A. Castle
Program Manager, Maricopa County Department
of Public Health Office of Preparedness and Response
BS, Arizona State University, 2004

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requirements for the degree of

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June 2020

Approved by: Anke Richter
Advisor

Lynda A. Peters
Second Reader

Erik J. Dahl
Associate Professor, Department of National Security Affairs

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ABSTRACT

State and local public health departments are losing the ability to respond to and protect the community from public health threats. Increase to public health funding follows after an identified threat because current capacity cannot absorb a new mission. Given the decrease in federal funding and subsequent loss of response capacity, how can local public health reconfigure its organizational structure or find alternate sources of funding to maintain or increase current response capacity? This thesis traces the growth of public health from a single program to today's U.S. Department of Health and Human Services supporting state and local health departments through federal grant funds. Using case studies and comparing federal grant awards to the structures of state and local departments, this thesis reveals how reliance on federal funding affects the organization of public health. The research demonstrates the direct correlation between the current structure and a century of funding one program per threat. Reliance on federal grants imperils the United States public health system because state and local departments must reorganize in order to sustain ongoing public health missions. The conclusion includes four recommendations that may improve the overall public health network by modifying funding to a more inclusive process, changing the type of federal grants, restructuring to support larger domains, and increasing state and local budgets to support response capacity.

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LIST OF ACRONYMS AND ABBREVIATIONS

ASPR	Assistant Secretary for Preparedness and Response
ASTHO	Association of State and Territorial Health Officials
CARA	Comprehensive Addiction and Recovery Act
CDC	Communicable Disease Center/Centers for Disease Control & Prevention's
CHIP	Children Health Insurance Program
CMS	Centers for Medicare & Medicaid Services
CURES	21st Century Cures Act
DHHS	U.S. Department of Health and Human Services
DHS	U.S. Department of Homeland Security
DOJ	U.S. Department of Justice
ELC	Epidemiology and Laboratory Capacity for Infectious Disease
FEMA	Federal Emergency Management Agency
FDA	U.S. Food and Drug Association
FSA	Federal Security Agency
GAO	U.S. General Accounting Office
HEW	Department of Health, Education, and Welfare
HRSA	Health Resources and Services Administration
MHS	U.S. Marine Hospital Service
MMWR	Morbidity and Mortality Weekly Report
NACCHO	National Association of County and City Health Officials
NCSH	National Clearinghouse for Smoking and Health
NHSS	National Health Security Strategy
NIH	National Institute of Health
NPP	National Preparedness Plan
NRP	National Response Plan
ONDCS	Office of National Drug Control Strategy
PAHPA	Pandemic All-Hazards Preparedness Act
PAHPRA	Pandemic All Hazards Preparedness Reauthorization Act
PDMP	Prescription Drug Monitoring Programs
PfS	Prevention for States Program
PHAB	Public Health Accreditation Board
PHEP	Public Health Emergency Preparedness

PHS	Public Health Service
PHSA	Public Health Service Act
SAMHSA	Substance Abuse and Mental Health Service's
SNAP	Special Supplemental Nutrition Assistance Program
SSA	Social Service Act
TB	Tuberculosis
TFAH	Trust for America's Health
USDA	Department of Agriculture
VA	U.S. Department of Veterans Affairs
VAA	Vaccination Assistance Act
VFC	Vaccine for Children
WIC	Women, Infant, and Children

EXECUTIVE SUMMARY

The absence of state and federal funding in state and local public health departments is resulting in a declining and inexperienced workforce, forcing departments to shutter programs and reducing response capacity and capabilities. The United States public health system, created over a century ago, is struggling to better protect the population from disease threats and chronic illnesses. As the public health system decreases its size and activities, the country will become more susceptible to the next public health event that may have a greater impact than previous ones. Thus, this research addresses the question of how local public health can reconfigure itself and suggests alternative language to federal grant funding for the purpose of maintaining or increasing public health's current response capacity.

To answer this question, the thesis traces the evolution of the public health system and its responsibility to identify diseases and create disease-specific response programs within state and local jurisdictions. To determine the preparedness needs for an effective response and reveal the consequences of a single program creation, this thesis features three case studies: the anthrax attacks of 2011, Hurricane Katrina response, and opioid public health emergency. These events illustrate how a singular public health need resulted in a new state or local program. Further comparison of the origination of decades-old programs illustrates how federal funding grants today generally fund a large percentage of state and local programs.

To emphasize the influence federal grant funding has on the organizational structure of state and local public health departments, this thesis compares federal grants awarded to the organizational charts of some state and local public health departments. To show a deeper connection, it includes examples of common public health programs operating at the federal level before funding flowed to state and local health departments such as tuberculosis. The organizational structure of state and local health departments mirrors the naming conventions of federal grants received. Historically, the identification of a new public health need precedes the creation of a program to address that need. For example, the Vaccine Assistance Act of 1962 allocated grant funding to state and local

public health programs for the purpose of creating immunization programs, later to include Vaccine for Children (VFC).

This thesis details how the reliance on federal grant funding and language has led state and local health departments to a point of collapse. The public health grant language provides for a narrowly focused work activity, typically for a certain disease, rather than supporting public health as a whole. Thus, individual programs and silos have been developed. Federal grant funding to state and local departments accounts for an average of 51% or greater of budgets, causing significant funding restrictions in maintaining quality and experienced staff.[1]

The discovery of new disease or chronic illness spurs federal legislation and funding for new public health programs tasked to mitigate new threats. This pattern continues to limit local and public health departments' preparedness ability to respond to ordinary local events, let alone any new emerging and unknown threats impacting the nation.

The data suggest that state and local jurisdictions have given little to no consideration to increasing public health budgets. Although programs are struggling to maintain operational capacity, the public health system has an opportunity to reconfigure itself from a disease-focused structure to one that will merge multiple programs into larger areas of service. This thesis includes the following four recommendations that require the collaboration of federal, state, and local public health departments:

1. Amendments to Grant Language: modification of federal grant language from a narrow, singular mission to broader language that allows for greater inclusion of other programs with similar goals or for merging multiple grants into greater service areas. This change may increase efficiency and decrease the duplication of activities.

2. State and Local Departments Restructuring: health departments need to reconfigure current structures from the individual federal grant programs

[1] Association of State and Territorial Health Officials, "ASTHO Profile of State and Territorial Public Health Vol. 4," November 2017, 127–83, www.astho.org/profile.

to broader areas of need such as the domains created through the Public Health Emergency Preparedness (PHEP) Cooperative Agreement Public Health Accreditation Board (PHAB) standards and measurements. Such a change would allow individual programs to merge and focus on the greatest need.

3. Change Grant Types Awarded: federal block grants allow for a broader use and do not typically follow a narrow mission. A change does not mean less oversight, but the ability of state and local departments to be more inclusive with responsibility shared across the entire public health system.

4. Responsible Funding for Maintaining Response Workforce: Restructuring from individual needs and programs may allow state and local public health departments to fund the public health system at an appropriate response workforce level.

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I. INTRODUCTION

The anthrax attacks in 2001 revealed how under-prepared the U.S. public health system was to respond to a biological attack. Almost immediately, the federal government created the Centers for Disease Control and Prevention's (CDC) Public Health Emergency Preparedness (PHEP) Cooperative Agreement. In response to the attack, the initial goal of the PHEP agreement was to provide the necessary funding to the public health system to increase capacity for the rapid identification and response to a biological, infectious disease, natural disaster, or other public health emergency.

Approximately sixty percent of state and local health departments rely solely on federal PHEP funding to operate their preparedness programs.[2] This dependence suggests annual federal funding hampers states and local capacity. A decrease in funding may lead to reduced program operations and, possibly, response capacity. Public health preparedness funding has declined by sixty percent between 2003 and 2016.[3] Thus, this decline in PHEP funding may threaten response capability at the state and local levels.

Historically, higher PHEP federal funding levels have elevated the public health response capacity. One example is the improved response capacity demonstrated by the coordinated response to the 2009 H1N1 outbreak in the United States.[4] Hypothetically, funding cuts will continue to jeopardize the ability of state and local health departments to maintain this high preparedness standard. As of 2016, local health departments have lost over 50,000 jobs due to

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[2] Joan Ellison et al., *2010 National Profile of Local Health Departments*, (National Association of County and City Health Officials, Washington, DC: August 2011), 53.

[3] Bhavini Patel Murthy et al., "Progress in Public Health Emergency Preparedness—United States, 2001–2016," *American Journal of Public Health* 107, no. S2 (September 2, 2017): 4, https://doi.org/10.2105/AJPH.2017.304038.

[4] Michael Stoto, "Measuring and Assessing Public Health Emergency Preparedness," *Journal of Public Health Management and Practice* 19 (2013): 5, https://doi.org/10.1097/PHH.0b013e318294b0e3.

continual funding decreases.[5] Based on the state-level funding of the fixed infrastructure of laboratory capacity, disease reporting systems, and communications tools, the budget cuts would logically have a deeper impact on local public health departments.

The responsibilities of state and local public health departments are to monitor disease threats, place into action activities that limit disease illness, improve the health of its respective jurisdiction through health education and services, and have the ability to mount a response to jurisdictional threats without federal support. The decreasing federal funding to some individual grant programs, narrow grant language of others, and inconsistent state funding are decreasing the ability of public health departments to operate in a day-to-day capacity. This can mean departments no longer have a response capability comprised of experienced professionals to rapidly identify, respond to, and mitigate public health threats. Health departments report using only 30 percent of trained staff in a response: a failing grade that characterizes the public health struggles.[6] Responding to a public health threat ranging from a sole individual with a new emerging infectious disease to a pandemic requires preplanning, training and sufficient levels of an experienced public health workforce for an efficient and successful response operation.

Because funding for local health departments is unlikely to increase, public health should consider alternative capacity- building strategies to support the public health mission and response capabilities. This thesis explores some of the organizational and funding sources that could improve the ability of local health departments to better detect and respond to a local or national public health emergency.

A. RESEARCH QUESTION

Given the decrease in federal funding and subsequent loss of response capacity, how can local public health reconfigure its organizational structure or find alternate sources of funding to maintain or increase current response capacity?

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[5] Matthew Watson et al., "Strengthening U.S. Public Health Preparedness and Response Operations," *Health Security* 15, no. 1 (February 2017): 20.

[6] Joan Ellison et al., *2010 National Profile of Local Health Departments*, (National Association of County and City Health Officials, Washington, DC: August 2011), 53.

Sub-questions:

1. How have multiple federal grants affected state and local public health organizations' overall response capacity?

- Have the grants divided organizations' structure between preparedness and day-to-day activities in state and local health departments? If so, what has been the impact on preparedness staffing levels?
- How have grants affected the cross functionality of public health departments' capabilities?

2. What are the short- and long-term impacts to public health preparedness capacity facing this decreased funding?

- What are the potential staffing impacts within public health organizations impacting preparedness due to funding changes?
- How much capacity can be documented as "lost," and in what areas of public health have these losses occurred?

3. By adjusting the organizational structure of public health departments, what solutions may be feasible?

- Are public health departments' programs structurally fixed based on grant funding or can cross-functionality be achieved within the current grant structure?
- What changes to the state and local public health organizational structure can improve activity collaboration and improve the public health mission?

4. Can modifications to current federal grants allow for expanding responsibility to the current public health structure?

B. LITERATURE REVIEW

This literature review contains the most recent federal, state, and local public health documents about the status of public health funding and preparedness. The following sections review federal and non-profit groups' surveys, annual reports, grant guidance, and scholarly articles referencing public health system capacity.

1. Preparedness Standard

The short history of public health preparedness started after the anthrax mailings in 2001. The federal government created the PHEP cooperative agreement and passed the Pandemic and All-Hazards Preparedness Act (PAHPA). The purpose of these programs was to recruit, train, and retain the highest level of public health professionals for the purpose of planning for and responding to a major public health emergency.[7]

Within the last fifteen years, the PHEP program has injected millions of dollars into state and local health departments, establishing a national response framework for the ability to plan for, detect, and respond to public health events. The program supports state and local agencies with preparedness planning, communication systems, exercises and training, epidemiological disease reporting systems, emergency operations equipment, and analytical laboratory capacity.[8] The PHEP's capacity-building guidance, funding, and deliverable requirements within the agreement to state and local public health departments are continuing to create a higher response capacity than what existed before the 2001 anthrax attacks.[9] Federal reports from the Assistant Secretary for Preparedness and Response (ASPR), CDC PHEP, and PAHPA include details of capacity increases and are referenced in coming chapters.

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[7] Alyson Richmond et al., "A Brief History and Overview of CDC's Centers for Public Health Preparedness Cooperative Agreement Program," *Public Health Reports* 125, no. Suppl 5 (2010): 9, https://doi.org/10.1177/2F00333549101250S503.

[8] Centers for Disease Control and Prevention Center for Preparedness and Response, "Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health" (U.S. Department of Health and Human Services, January 2019), 1–3, https://www.cdc.gov/cpr/readiness/00_docs/CDC_PreparednesResponseCapabilities_October2018_Final_508.pdf

[9] Stoto, "Measuring and Assessing Public Health Emergency Preparedness," 1.

The PAHPA created the ASPR position and program to provide guidance and charge health departments the responsibility to support the federal preparedness activities. The main guiding document supporting PAHPA and PHEP is the National Health Security Strategy (NHSS).[10] The strategic objective of the NHSS is to prepare the health department system for the response to and recovery from an event affecting America's health. The strategy also includes guidance on how public health, healthcare, and emergency systems support the national response mission by increasing "a skilled workforce."[11]

Sustaining the PHEP grant infrastructure, including laboratories, databases, communication systems, and staff, is expensive. The preparedness programs require the response infrastructure to build the state and local health departments' ability to detect, categorize, and respond to a biological or infectious disease threat. The CDC, the National Association of County and City Health Officials (NACCHO), and other non-profit organizations such as the Trust for America's Health (TFAH) document public health funding in recent years as stagnant or decreasing.[12] TFAH is one of many reports that reveals personnel staffing has been modified, reduced, or replaced based upon remaining budget balances. A report by Murthy et al. in the *American Journal of Public Health* notes evaluating state PHEP programs over a fifteen-year period reveals the CDC's PHEP dollars have fallen sixty percent from over a decade ago.[13]

NACCHO, a non-profit organization, supports over three thousand state and local health department members. Historically, this organization has tracked and analyzed public health challenges. The reports produced by NACCHO aggregate public health information on capacity. A recent report in 2016 revealed fifty-one thousand fewer public health positions than in 2010.[14]

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[10] Assistant Secretary for Preparedness and Response, *National Health Security Strategy 2015–2018*, (Washington, DC: Department of Health and Human Services 2015), https://www.hsdl.org/?view&did=767930.

[11] Assistant Secretary for Preparedness and Response, *National Health Security Strategy 2015*.

[12] Ellison et al., *2010 National Profile*, 41.

[13] Bhavini Patel et al., "Progress in Public Health Emergency Preparedness—United States, 2001–2016," *American Journal of Public Health* 107, no. S2 (September 2017): 1, https://doi.org/10.2105/AJPH.2017.304038.

[14] Watson et al., "Strengthening U.S. Public Health Preparedness and Response Operations,"1.

This loss decreases public health response capacity because a smaller work force undoubtedly can accomplish less.

Fluctuating funding and staffing decrease public health's ability to respond to and recover from a major public health emergency. An experienced public health professional is the most flexible and costly component of the PHEP grants. Not only do agencies lose valuable talent but also institutional knowledge and experience that will hamper public health's capacity to mount an efficient response. The de Beaumont Foundation's Health Workforce survey reveals that one-third of public health professionals are between 50 and 60 years old, meaning the loss of institutional knowledge may be also occurring with retirement.[15]

With an aging work force, knowledgeable staff will be replaced with a less experienced and unfamiliar workforce, decreasing the system's capacity. Recent challenges such as Ebola, Zika, and vaccine hesitancy demonstrate the increasing complexities of today's public health mission. The possibility exists that not having a robust response experience and a historic understanding of public program coordination within the new public health workforce may lead to a less efficient response.

2. Future Challenges

The continued advancement of public health readiness is in jeopardy. Although the initial PHEP and PAHPA money applied to bioterrorism threats, the funding now encompasses all hazards, covering more public health emergencies. Analysis from the CDC and the Department of Homeland Security (DHS) concludes that widespread disease outbreaks or pandemics threaten the homeland.[16] Common infectious diseases from the measles to hemorrhagic fevers such as the Ebola virus pose a growing threat to the United States.

Responding to any infectious disease begins at the local level with initial identification. Depending on the public health response, it may be contained to single cases. The level of public

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[15] "Public Health Workforce Interests and Needs Survey," de Beaumont Foundation, accessed April 26, 2018, http://www.debeaumont.org/phwins/.

[16] Richmond et al., "A Brief History and Overview of CDC's Cooperative Agreement Program," 52.

health response necessary to prevent or mitigate an outbreak is dependent on the severity and knowledge of the illness. State and local public health departments are responsible for beginning the response to infectious disease outbreaks and ask for assistance when case the count grows beyond their capacity or when response costs have a greater economic impact. The individual state and surrounding jurisdictions absorb the response costs. In contrast, a single case of a new and highly infectious disease, such as Ebola, requires multiple agencies, hundreds of man-hours, and response costs into the hundreds of thousands that will later be subsidized by federal grants.[17]

In addition to the already cited sources, this thesis features additional data from scholarly articles, peer-reviewed publications, public health department websites, public health non-profit associations, and federal grant data reports from the CDC. TFAH and NACCHO are professional organizations that support advancing health services and produce annual reports and infographics revealing the reliance of state and local health department programs on federal grant budgets. In later thesis chapters, data findings from TFAH and NACCHO reports will compare state to state funding inconsistencies across the United States to explain why a public health department's reliance on federal funding means a decrease in capacity with each grant allotment.

C. RESEARCH DESIGN

Public health has a responsibility to be prepared to respond at a moment's notice. Since preparedness funding will, in all likelihood, not increase, public health needs to become more resilient within its current structure. The impacts of funding changes have decreased the size of the public health workforce and made it difficult to replace knowledgeable and experienced professionals. The research needs to reveal any other opportunities to increase local public health response capacity through organizational change or alternate funding.

To answer the first sub-question about what short- and long-term impacts should public health preparedness capacity expect from decreased funding, this thesis reports data and surveys from the CDC, NACCHO, and TFAH on how much funding has decreased and how many

[17] Grace E., Chase et al., "Public Health Economic Burden Associated with Two Single Measles Case Investigations—Colorado, 2016–2017," *Morbidity and Mortality Weekly Report* 66, no. 46 (November 24, 2017): 1274, https://doi.org/10.15585/mmwr.mm6646a3.

positions have been lost. Part of the research explores the loss of preparedness knowledge due to the number of employees who have left the program and cannot pass experience on to those less experienced.

To document the preparedness and public health growth and funding cycle that historically has only occurred after an emergency, two case studies have been conducted: the anthrax and Hurricane Katrina responses. These case studies compared local health departments' needs in state and national public health emergencies. These two responses demonstrate public health's need to maintain a robust preparedness capacity in order to rapidly identify a public health emergency that may impact individual or multiple states. The goal is to highlight how an infusion of emergency funding maintains a higher level of personnel, the ability to increase staff's level of knowledge, and the capacity to sustain a lengthy response without assistance. This short-term response is the standard and all is lost when funding changes, reverting into the operational silos.

Different open-source database searches provided the documentation for the case studies. The CDC's Morbidity and Mortality Weekly Report (MMWR) features state and local health department response data. In conjunction with the MMWR, some news outlets and media releases include sufficient information on the public health response. In addition, over the years more anthrax case investigation details have been published, revealing a much deeper level of confusion during the initial response. The most important component of this research identified the gaps in staff capacity and knowledge that were needed to support a response of this magnitude.

To answer the second sub-question of how multiple federal grants affected state and local public health organizations' response capacity, this research compares the organizational structure of state and local public health departments to public health funding sources. The CDC, Association of State and Territorial Health Officials (ASTHO), and NACCHO profiles of all state and local departments demonstrate how federal and state funding impacts their organizations. In addition, the profiles reveal how state and local departments rely on and use funding for positions and programs. A comparison of organizational structures and funding demonstrates how public health departments parallel the federal funding sources in individual programs.

A review of the type of federal grants determines the degree of public health departments' flexibility, or lack thereof, in identifying alternate preparedness capacity strategies throughout the public health organization. The analysis of federal grant funding activities such as those within the PHEP Cooperative Agreement and Epidemiological Laboratory Capacity reveals confusion, possible duplication of effort, and the development of silos due to narrow grant language. Exploring how federal programs came into existence and then later providing funding through grants further demonstrates the structure of organizations.

Cross-work opportunities from multiple funding sources such as immunization, PHEP or any epidemiological grant may provide opportunities for organizational realignment away from individual program needs to broader areas of focus. The hypothesis that the restrictive nature of the grants, the narrow work activity, and reliance on federal funding all freeze the ability of state and local public health departments to realign themselves. The ensuing recommendations explore how improving grant language would support a reorganization for the purpose of increasing preparedness capacity through strengthening the workforce and establishing broader focus areas.

D. CHAPTER OUTLINE

Chapters II and III present the historical structure and growth of the public health system over the past century. Chapter III includes case studies showing how the growth of public health follows the identification of a new need. The case studies also highlight the need for maintaining a preparedness system. Chapter IV examines how the impacts of federal grant names and funding awarded to state and local jurisdictions drive organizational structure. Remaining chapters unpack how the current findings are placing public health's ability to respond in jeopardy and make recommendations that may help improve the system.

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II. PUBLIC HEALTH GROWTH

This chapter traces the inception and growth of the national public health system based on the identification of a new disease or chronic illness, legislation to support it, and mitigation programs that follow. The relationship between the legislation and growth of the public health system over the last century reveals its impact on today's public health structure at the federal, state, and local levels. This chapter demonstrates that public health, from its inception, has systematically grown in response to specific threats, epidemics, and the need for social services to improve the nation's health and resiliency against disease.

A. IDENTIFICATION OF NEED CREATES PUBLIC HEALTH STRUCTURE

The United States public health system emerged from two hundred years of adapting to disease outbreaks, finding new chronic and acute illnesses, responding to public health emergencies, and fighting emerging infectious diseases that threatened the country. The origins of the public health institution began with Congress passing the Act for Relief of Sick and Disabled Seamen in 1798 which formed the U.S. Marine Hospital Service (MHS).[18] MHS' first priority was treating U.S. seamen from illnesses contracted at sea or in other countries before their reentry into the United States.

The first marine hospital opened in Boston Harbor, and the organizing of medical staff and their activities began to mold the public health services.[19] During the 1800s, recognizing a need for public health standardization, Massachusetts legislators created laws requiring the tracking of births, deaths, and marriages.[20] The new laws eventually led to standard disease nomenclature, other public health education programs, and the first State Board of Health. One of the State Board's actions in advancing public health was passing legislation expanding the responsibility of

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[18] Boston University School of Public Health, "A Brief History of Public Health," Academic, Boston University of Public Health, October 1, 2015, http://sphweb.bumc.bu.edu/otlt/MPH-Modules/PH/PublicHealthHistory/PublicHealthHistory_print.html.(Feb 6, 2019)

[19] Boston University School of Public Health, "A Brief History of Public Health."

[20] Boston University School of Public Health, "A Brief History of Public Health."

the medical community to report dangerous diseases to MHS. The growing United States and its increasing contact with foreign countries amplified the federal government's responsibilities to protect the nation and the general population from new disease threats. This resulted in the opening of more Marine hospitals. The Surgeon General position was created to provide more structured oversight and responsibility for the administration of MHS hospitals.[21]

In a further attempt to protect the nation from diseases, Congress passed the National Quarantine Act of 1878 to prevent contagious diseases such as smallpox or yellow fever from being introduced into and spreading in the United States.[22] To reduce the constant threat of disease outbreaks, MHS began immunization programs in port cities besides Boston to protect all military and federal employees. In 1889, MHS services continued to expand with Congress reorganizing the mobile physicians from various marine hospitals into a permanent unit to be known as the Public Health Service Commissioned Corps lead by the Surgeon General.

The MHS public health mission expansion continued with the passage of the Immigration Act of 1891 that required all immigrants to be examined by commissioned doctors before being admitted into the United States. Thus, MHS hospitals were tasked to stop diseases from entering the United States. By the early 1900s, global travel by citizens of the growing United States led to new disease threats not confined to seamen and immigrants. In 1912, Congress passed a new law transforming the MHS into the Public Health Service (PHS) and authorizing public health agencies outside of hospitals to investigate other human diseases beyond tuberculosis and malaria.

In 1939, the United States established the Federal Security Agency (FSA), a social service department responsible for aligning education, health, and federal social services to include PHS' responsibilities.[23] Shortly after establishing the FSA, many different forms of legislation were

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[21] Profiles in Science, "Reports of the Surgeon General," U.S. National Library of Medicine, accessed January 15, 2019, https://profiles.nlm.nih.gov/spotlight/nn/feature/system.

[22] Jerrold M Michael, "The National Board of Health: 1879–1883," *Public Health Reports* 126, no. 1 (2011): 126, https://doi.org/10.1177/003335491112600117.

[23] Department of Health, Education and Welfare, "An Historical Guide to Hew Excerpt from DHEW Publication No. (Os) 73–45 (July 1, 1972)," ASPE A Common Thread of Service, July 1, 1972, https://aspe.hhs.gov/report/common-thread-service.

passed to strengthen social services, but the most important for advancing today's public health structure was the Public Health Service Act (PHSA) of 1944.[24] The PHSA placed responsibility onto the PHS to administer state grants fighting tuberculosis.[25] Eventually, in 1946 the PHSA was modified and established the Communicable Disease Center (CDC), one of today's most recognizable public health authorities.[26] The CDC was founded to conduct public health research: building upon the original PHSA concept furthered the formation of today's public health structure.[27] While CDC research initially focused on the spread of tuberculosis and malaria across the United States, it uncovered valuable data for the next step of the public health mission: to move beyond protecting immigrants, seamen, the military, and federal employees to the public at large.[28]

Besides establishing the CDC, the PHSA codified the United States public health mission to be inclusive for all, formalizing a system to study and mitigate all disease impacts. Public health professionals recognized the need to expand the public health focus from disease spread caused by human-to-human transmission to disease spread by mosquitos and the health impacts from chronic illnesses. The PHSA also directed the federal government to collaborate with state and local public health departments to translate the laws into actions. This legislation served as the mechanism for the continued expansion and identification of new public health mission components such as mitigating known infectious diseases and researching acute and chronic illnesses.

In 1947, a brand-new mission arose with the idea that a federal agency would have the ability and capacity to respond in support of a natural or human-caused disaster within the United States. The CDC's strong organizational structure, mission, and Commissioned Corps helped the

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[24] Office of Surgeon General, "Public Health Service Act, 1944," *Public Health Reports (1974-)* 109, no. 4 (July-Aug 1994): 468, https://www.jstor.org/stable/4597637.

[25] Office of Surgeon General, "Public Health Service Act, 1944."

[26] Global Health, Division of Parasitic Diseases and Malaria, "Center for Disease Control and Prevention," CDC's Origins and Malaria, July 23, 2018, https://www.cdc.gov/malaria/about/history/history_cdc.html.

[27] "Commissioned Corps of The U.S. Public Health Service," U.S. Department of Health and Human Service, accessed February 6, 2019, https://www.usphs.gov/aboutus/history.aspx.

[28] "Our History—Our Story," Centers for Disease Control and Prevention, December 4, 2018, https://www.cdc.gov/about/history/index.html.

federal government in its recovery efforts after a large-scale industrial accident in Texas City, Texas.[29] This expanded mission was to contain any disease spread that may be caused by the deceased. The successful response led Congress to designate CDC the "official response agency for future epidemics and disasters,," solidifying yet another mission and creating a new branch outside present day-to-day public health activities.[30]

During the 19th century, new disease threats led to the creation of maritime hospitals and the United States Public Health Service, which is still in existence today. The one hundred years that followed saw the federal government continually growing and passing new health and social needs legislation leading to programs such as the Pure Food and Drugs Act (FDA today), Social Security, and National Institute of Health. Besides acts referenced in this chapter, another example is the passage of the Social Security Act which provided health and social benefits to the elderly and children as a result of the Depression and unemployment.[31] The Surgeon General recognized the need for a single oversite body to monitor and align the various health and social outcomes stemming from multiple individual federal programs.[32]

B. PUBLIC HEALTH SERVICE ACT (PHSA) - CENTRALIZATION OF ACTIVITIES

During the United States' involvement in World War II (1941-1945), the FSA grew exponentially, minimizing old and new diseases within the military and promoting the FDA's safety testing of drugs such as penicillin.[33] After World War II, the federal government shifted practices and programs from sustaining the military to protecting the security of the nation's health

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[29] Elizabeth W. Etheridge, *Sentinel for Health A History of the Centers for Disease Control* (University of California Press, 1992), 28.

[30] Bob Kelley, *Centers for Disease Control and Prevention* (Arcadia Publishing, 2015), 28.

[31] Rita L DiSimone, "Social Security Administration Created as an Independent Agency: Public Law 103-296," *Social Security Bulletin* 58, no. 1 (1995): 57.

[32] Lynne Page Snyder, "Passage and Significance of the 1944 Public Health Service Act," *Public Health Reports (1974-)* 109, no. 6 (December 1994): 7, https://www.jstor.org/stable/4597709.

[33] Wallace F. Janssen, "The Story of the Laws Behind the Labels," *FDA Consumer Magazine*, June 1981, 10–16.

and social services programs.[34] The FSA budget continued to increase supporting new measures of the FDA, PHS, and Social Security, making it one of the United States' highest budgeted federal agencies without the responsibility of an executive- level department.[35] In 1953, the FSA was replaced by the Department of Health, Education, and Welfare (HEW) as an executive- level department with a new cabinet advisor to the president.[36]

The emerging HEW and new advisory role to the president came as a way to align old health and social programs to the newly identified threats from chronic diseases, chemical agents, and social services continually spurring additional federal missions, programs, or activities.[37] Resulting from HEW bringing structure into health and social service, higher-level responsibilities to end infectious diseases like polio and rabies emerged leading to state and local public health departments taking on new public health missions.[38] Language in the original PHSA allows for federal funding to be given to state and local health departments to accomplish the operational tasks set forth by federal legislation.[39]

Through the 1940s, the CDC transitioned to providing more oversight through creating programs and training state and local health departments to implement disease control strategies. The CDC's 1950 activities report highlights operational programs, such as disease control measures becoming the responsibility of state and local health departments with CDC support.[40] State and local public health programs began with controlling malaria and typhus. Later, the

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[34] Department of Health, Education and Welfare, "An Historical Guide to Hew Excerpt from DHEW Publication No. (Os) 73–45 (July 1, 1972)."

[35] Mariano-Florentino Cuéllar, "'Securing' the Nation: Law, Politics, and Organization at the Federal Security Agency, 1939–1953," *The University of Chicago Law Review* 76 (November 6, 2006): 622, https://doi.org/10.2139/ssrn.942447.

[36] Cuéllar, "'Securing' the Nation," 593.

[37] Janssen, "The Story of the Laws Behind the Labels," 8–10.

[38] Global Health, Division of Parasitic Diseases and Malaria, "Center for Disease Control and Prevention."

[39] Cuéllar, "'Securing' the Nation," 620,658.

[40] Public Health Service Communicable Disease Center, *Communicable Disease Center 1948–1949 Activities* (Atlanta, GA: Federal Security Agency, 1950), https://stacks.cdc.gov/view/cdc/20732/Share

responsibility of administering older social programs such as tuberculosis, quarantine, and tobacco cessation came as a result of the federal government moving these programs under the CDC umbrella.[41] Figure 1 shows a timeline of early independent social services programs being transferred under the CDC's administration umbrella leading to state and local public health programs.

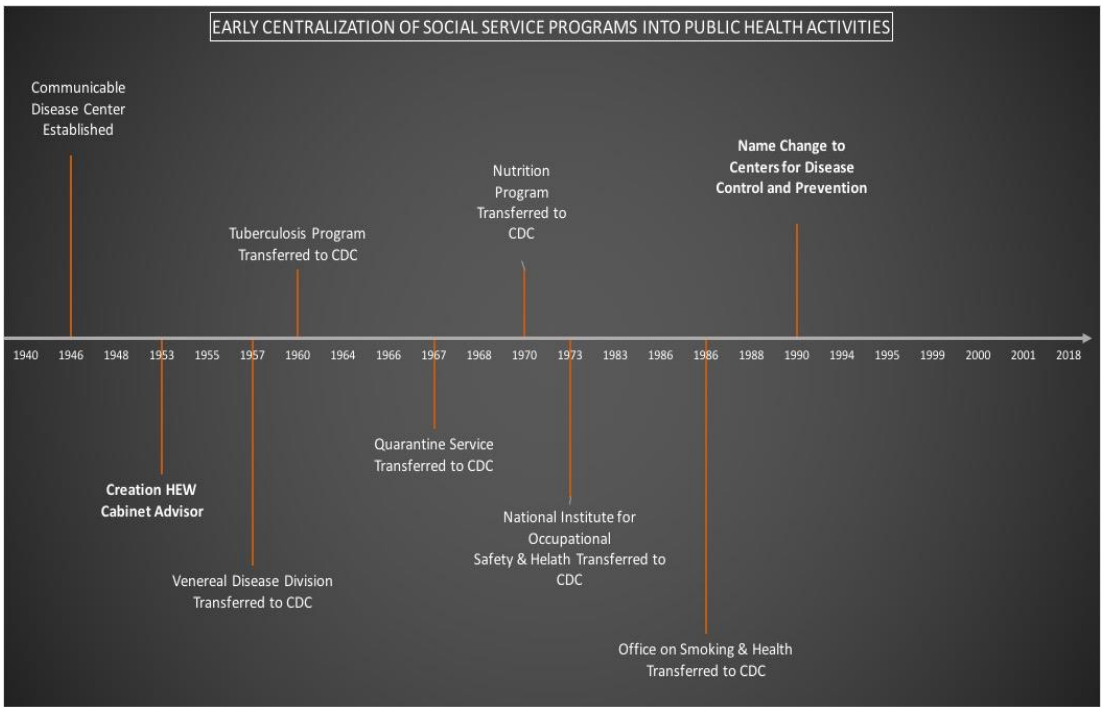

Figure 1. After WWII, preexisting federal social service programs centralized under CDC into public health activities supporting the growth of federal public health system.[42]

The tuberculosis (TB) program grew out of 1912 legislation dedicated to investigating tuberculosis as one of the then leading causes of death in the United States. Over the next thirty

[41] Public Health Service Communicable Disease Center, *Communicable Disease Center*.

[42] Adapted from Center for Disease Control and Prevention, "David J. Sencer CDC Museum: In Association with the Smithsonian Institution," CDC Timelines 1940s-2010s, August 19, 2019, https://www.cdc.gov/museum/timeline/1940-1970.html.

years, TB control became treatment laws, and in 1946, the passage of the Hospital Survey and Construction Act authorized the PHS to fund the construction of new TB hospitals in states.[43] Further modifications to the PHSA in 1957 changed the Immigration and Nationality Act by allowing entry of TB patients who were immediate family members of U.S. citizens or those with lawful resident status into the United States.[44] The oversight requirements of treating and controlling TB patients required a unique skill set found at the CDC. Because of the epidemiological need to contain TB in the United States, the program was moved under the CDC umbrella in 1960.

The CDC's success in increasing disease knowledge through research, surveillance, and creating treatment options shifted new, individual programs or expansion of existing programs such as TB to state and local health departments. An example of program evolution is the Venereal Disease Division. Created in 1938 by the Venereal Disease Control Act, the Venereal Disease Division transferred to the CDC in 1957 to improve knowledge and find new mitigation strategies.[45] The venereal disease program's laboratory expanded the CDC's capacity and was one of the first laws to provide public grants to states through the Social Security Act. One of the most significant moves boosting the CDC staff numbers was when the responsibilities of the stand-alone Foreign Quarantine Service, established in 1878, was transferred in 1967.[46] NIOSH or the National Institute of Occupational Safety and Health, also in the CDC, came about from merging defunct federal programs and changes in the industrial hygiene laws aimed at protecting workers in dusty work conditions since 1914.[47]

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[43] V. M. Hoge, "Progress Report on Hospital Survey and Construction Act," *American Journal of Public Health and the Nation's Health* 39, no. 7 (July 1949): 889, https://doi.org/10.2105/AJPH.39.7.889.

[44] Keith Bowenstein, "Tuberculosis Hospitals Approved for Treatment by the United States Public Health Service," *Interpreter Releases* 36, no. 16 (May 15, 1950): 100.

[45] Elizabeth W. Etheridge, *Sentinel for Health A History of the Centers for Disease Control* (Berkeley, CA: University of California Press, 1992), 89.

[46] Etheridge, Sentinel for Health, 156–57.

[47] Etheridge, 156–57.

In 1950, research on the correlation of cancer and smoking began to be published. In 1955, the Surgeon General provided funding to the Bureau of Census to add questions about the smoking habits of Americans.[48] Over the following decade, health professionals placed mounting pressure on Congress until they passed the Cigarette Labeling and Advertising Act in 1965.[49] This legislation regulated cigarette marketing, including the now well-known "Surgeon General Warning," and established the National Clearinghouse for Smoking and Health (NCSH) for the then Department of Health, Welfare and Education.[50] The program was to collect and disseminate information on the health impact of smoking, encourage educational activities on tobacco use, and conduct more research on long term consequences. In 1981, the Surgeon General Report released findings on the increase in cancer with non-smokers.[51] This was the first indication that non-smokers were impacted by individuals who smoked. In 1986, NCSH was transferred to the CDC, see Figure 1. A short time later, the CDC's Center for Chronic Disease Prevention and Health Promotion was created to increase tobacco education. Due to its success with non-communicable disease threats and expanding environmental and occupational health mission in the United States, the CDC was renamed in 1970 to the Center for Disease Control. In 1990, the word prevention was added becoming what is known today as the Centers for Disease Control and Prevention (CDC).[52]

PHSA legislation paved the path for the continued growth of public health research and for the mitigation of acute and chronic illnesses at all levels of government. The language in the PHSA

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[48] Leonard M. Schuman, "Patterns of Smoking Behavior," *Research Monograph Series: Research on Smoking Behavior* 17, (December 1977): 42.

[49] Virginia L. Ernster, "Trends in Smoking, Cancer Risk, and Cigarette Promotion Current Priorities for Reducing Tobacco Exposure," *Cancer* 62, no. 8 (October 15, 1988): 1709.

[50] Schuman, "Patterns of Smoking Behavior",43.

[51] A. J. Alberg et al., "The 2014 Surgeon General's Report: Commemorating the 50th Anniversary of the 1964 Report of the Advisory Committee to the Us Surgeon General and Updating the Evidence on the Health Consequences of Cigarette Smoking," *American Journal of Epidemiology* 179, no. 4 (February 15, 2014): 408, https://doi.org/10.1093/aje/kwt335.

[52] Center for Disease Control and Prevention, "CDC: The Nation's Prevention Agency," *Morbidity and Mortality Weekly Report* 41, no. 44 (November 6, 1992): 1, https://www.cdc.gov/mmwr/preview/mmwrhtml/00017924.htm.

removes the singular mission of public health at the federal level and allows the CDC to coordinate the legislative public health mission across state and local health departments. Figure 2 shows some familiar programs created through federal legislation and placed under the CDC once identified as an individual federal entity in 1946.

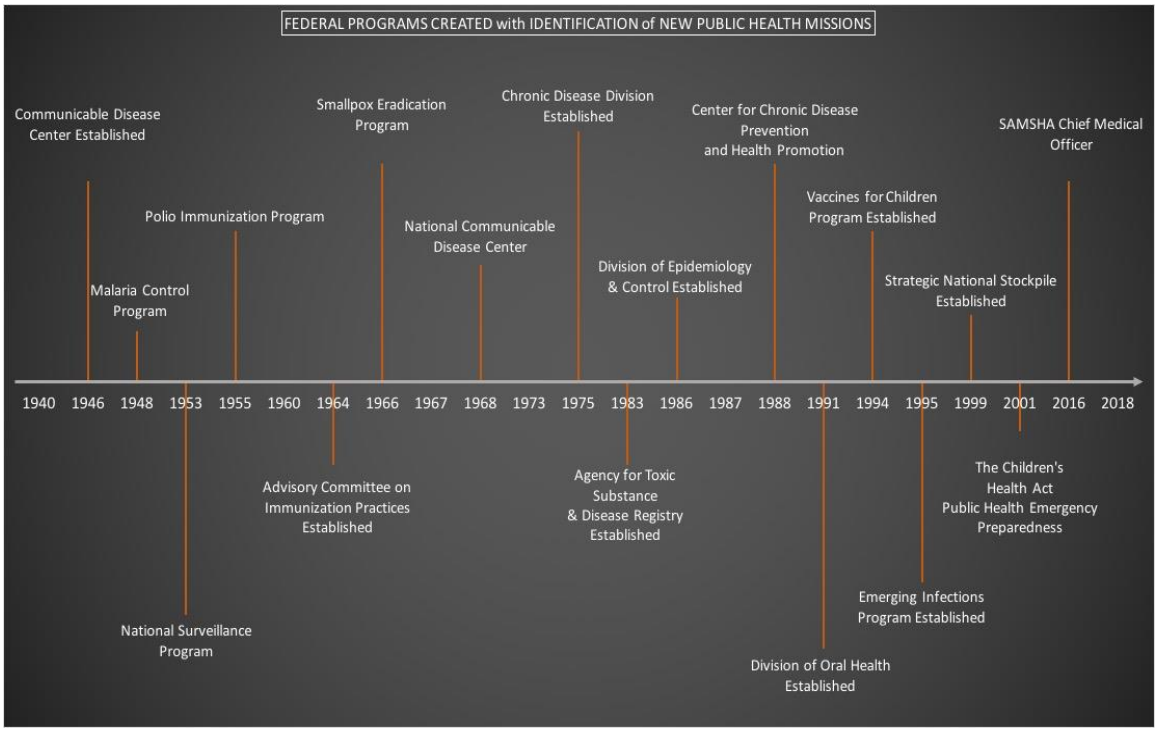

Figure 2. Federal programs created as result of a new public health missions requiring coordination of actions between federal, state and local health departments.[53]

Growing over the past half- century, the PHSA was continually modified from a single tuberculosis program to state and local health departments encompassing most of the federal health and social services program direction and funding.[54] The Social Service Act (SSA) of 1935 was

[53] Adapted from Center for Disease Control and Prevention, "David J. Sencer CDC Museum: In Association with the Smithsonian Institution."

[54] Snyder, "Passage and Significance of the 1944 Public Health Service Act," 73.

one of the earliest forms of legislation improving the health of the nation. The evolution of SSA led to the creation of the U.S. Social Security Administration which was under the Department of Health and Human Services (DHHS) until the mid-1990s. Becoming an individual entity did not remove the responsibility of DHHS to administer all health programs available through Social Security.[55] This allowed Social Security the ability to independently determine who qualified for health and social services. Today the Social Security Act supports the Health Resources and Services Administration (HRSA) program (administered through the CDC) to provide programs such as immunization, nutrition, health education to those with disabilities and children's health. These programs and their funding are further explained in later chapters.

The HRSA website provides links to guidance and the structure for childhood lead programs, health and medical assistance via health clinics to those with HIV/AIDS, and pregnant mothers and their families without access to healthcare.[56] Some programs operated at the state and local level include the Health Workforce, the Maternal and Child Health Bureau, Health Equity coordinated by the CDC, and funding support based on the Social Security Act. Additional funding to support HRSA is in Title V and is one of the largest grant programs that supports all 50 states in meeting health requirements.[57] HRSA grant funding flexibility allows CDC to administer multiple legislation requirements into individual programs, generating the appearance of one funding source.

In 1962, the Vaccination Assistance Act (VAA) amended the PHSA to support state and local departments' implementation of a preschool vaccination program. The CDC established the Immunization Assistance Grant Program to administer the new requirements and provide support

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[55] DiSimone, "Social Security Administration Created as an Independent Agency: Public Law 103-296," 57, 62–63.

[56] Health Resources & Service Administration, "Public Health," April 2017, https://www.hrsa.gov/public-health/index.html.

[57] HRSA Maternal & Child Health, "Title V Maternal and Child Health Service Block Grant," May 2018, https://mchb.hrsa.gov/maternal-child-health-initiatives/title-v-maternal-and-child-health-services-block-grant-program

to state and local health departments.[58] The VAA remains one of the essential means of federal aid to health departments. Medicare and Medicaid legislation through the Social Security Act and the Affordable Care Act supports the Vaccine for Children (VFC) program that began in 1994 and is administered through the Children Health Insurance Program (CHIP) and HRSA. CHIP provides medical coverage and reimbursement funds to state and local health departments that administer vaccines to underserved children throughout their community.[59] A public health clinic or other Federally Qualified Health Center may provide the vaccines.

The Passage of the Children's Health Act (Public Law 136-310) provided federal guidance to the CDC for the establishment of the National Center on Birth Defects and Developmental Disabilities.[60] The PHSA was modified to allow the CDC to meet reporting requirements as part of the Children's Health Act.[61]

One of the most recent laws to be created was the Public Health Security and Bioterrorism Preparedness Act, later becoming the Pandemic All-Hazards Preparedness Act (PAHPA) in 2006. PAHPA's goal is to facilitate collaboration and integration of state and local public health departments into the emergency response community.[62] This cooperative agreement provides state and local public health departments the necessary funding to support emergency response plan development, preparedness training, and the ability to respond to most public health emergencies.

State and local public health departments also implement the U.S. Department of Agriculture's Special Supplemental Nutrition Assistance Program (SNAP) in coordination with the Women, Infant, and Children (WIC) programs supporting health, nutrition, and food assistance

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[58] Public Health Service Act of 2018, Pub. L. No. 115–180, *U.S. Statues at Large* 115(2018): Sec 2105.

[59] Megan Cole, "The Vaccines for Children Program (VFC)," National Center for Health Research, accessed January 3, 2019, http://www.center4research.org/vaccines-children-program-vfc/.

[60] Public Health Service Act of 2000, Pub. L. No. 103–310, *U.S. Statues at Large* 103(2000), STAT 1101, https://www.congress.gov/bill/106th-congress/house-bill/4365.

[61] Public Health Service Act of 2000, STAT 1119.

[62] Justeen Hyde et al., "Better Prepared but Spread Too Thin: The Impact of Emergency Preparedness Funding on Local Public Health," *Disaster Management & Response* 4, no. 4 (October 2006): 108–9, https://doi.org/10.1016/j.dmr.2006.08.002.

to eligible low-income woman, children, and infants.[63] The program provides specific foods, access to health care, and nutrition education to improve the health of women and children. The WIC program is one of the nation's largest and most recognized social service programs and is heavily reliant on federal funding to maintain public health operations.

Public health activities are centuries old but were given structure, direction, and the ability to react to new missions with the passage of PHSA, the creation of the CDC, and a move to cabinet level within HEW. As the United States grew, so did the different kinds of threats, leading the HEW and CDC to transition operational activities to the state and local public health departments. Multiple modifications to the federal public health structure came with new programs in the form of legislation. Eventually, HEW dropped education and HHS became the leader in overseeing and administering public health and social service programs.[64] Tracing public health growth back to the 1800s, the structure and programs grew from a need to stop one infectious disease at ports to responding to new threats and disease outbreaks, eventually adding programs to support non-communicable diseases caused by chronic illness or unhealthy habits. In order to operationalize mitigation strategies, public health grew exponentially, following the pattern of threat identification, legislation, federal program creation, and funding to state and local public health departments through CDC grants. As the federal structure developed new laws, the responsibility of the program was passed on to state and local health departments one program at a time.

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[63] Iowa State University, "New Economic Study Shows Combination of SNAP and WIC Improves Food Security," *Science Daily*, June 13, 2019, https://www.sciencedaily.com/releases/2019/06/190613103120.htm.

[64] "HHS Historical Highlights," U.S. Department of Health and Human Services, accessed February 7, 2019, https://www.hhs.gov/about/historical-highlights/index.html.

III. EXAMPLES OF CAUSE AND CREATION

This chapter provides specific examples of how new public health programs develop following the identification of a public health need. Chapter II included information on how public health advanced from this creation cycle as well as state and local public health departments receiving federal grants to complete tasks. State and local public health departments rely on this cause and creation cycle as their annual budgets struggle to develop and implement new programs. Chapter IV further explores state and local public health reliance on federal funding.

In recent years, two new domains rose to the top of the United States public health priorities list: the PHEP program and multiple HHS opioid epidemic programs, such as the State Opioid Response Grant and Maternal Opioid Misuse model. The PHEP program arose after a chaotic response to anthrax that exposed the need for the public health system to be more fully integrated into the response community. Multiple federal departments, including DHHS, the Department of Justice (DOJ) and the Department of Labor, have created grant programs to combat the opioid epidemic occurring in the United States. Although these examples represent only a subset, the preceding chapter features many other public health programs that follow this pattern.

The PHEP and State Opioid Response Grant programs are modern-day examples of the cause and need for new program creation. The passage of the 2006 PAHPA and the 2016 21st Century Cures Act (Cures Act) provides the most recent examples of the public health mission expanding after the identification of a need. PAHPA was created and implemented over five years. It was developed to address the United States public health system's poor responses to the 2001 anthrax bioterrorism attack and the 2005 Hurricane Katrina natural disaster. The Cures Act authorized funding specific for state and local public health departments to begin addressing the opioid crisis and the newly formed Office of Chief Medical Officer at SAMSHA.[65] These responses reveal a disconnect between federal, state, and local public health departments and determining ultimate responsibility. Prior to these events, no state or local public health department

[65] The Federal Response to the Opioid Crisis: Hearing Before the Committee on Health, Education, Labor, And Pensions, Senate, 115th Cong., October 5, 2017.

had a program with Emergency or Response in its title. Only a handful of municipalities and state health departments began opioid pilot programs with little funding to combat overdoses in their respective jurisdictions.[66]

A. ANTHRAX ATTACK

The Federal Emergency Management Agency (FEMA) was created in 1979 to centralize the federal government's response and recovery role in natural disasters. In 2001, FEMA was considered the lead federal coordination agency for an effective United States response to a national or natural disaster. Up to this point in U.S. history, public health had not been invited to the emergency preparedness table and collaboration requests were largely ignored.

In 2001, letters containing anthrax were mailed to United States congressmen and news stations, infecting many and killing five. This major biological threat in the United States thrust the CDC into the role of leading a federal response for the first time. FEMA and the CDC were ill-prepared. After the response, the CDC acknowledged that it was not prepared to lead a federal response or properly coordinate between public and private agencies while trying to support state and local public health departments.[67] At the time, a public health response to an outbreak most often began within an identified geographical location which allowed time for public health actions including laboratory testing and coordination with all necessary partners prior to making a decision.[68]

Federal, state, and local public health traditional response experience was slow, methodical, and did not require immediate coordination with partners outside of the health industry. As an example, the first week of the 2014–2015 measles outbreak at Disneyland began

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[66] Michael A. Yokell et al., "Opioid Overdose Prevention and Naloxone Distribution in Rhode Island," *Medicine and Health, Rhode Island* 94, no. 8 (August 2011): 240–42.

[67] Robert Copeland et al., *Bioterrorism Public Health Response to Anthrax Incidents of 2001*. GAO-04-152 (Washington, DC: Government Accountability Office, 2003) 70.

[68] Elin Gursky et al., "Anthrax 2001: Observations on the Medical and Public Health Response," *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science* 1, no. 2 (June 2003): 100–102, https://doi.org/10.1089/153871303766275763.

with the California Department of Public Health identifying seven cases within the first three days and notification to partners two days later.[69] When anthrax was identified, the public health enterprise was unprepared for an event of this magnitude, requiring immediate coordination between federal, state, and local public health departments.[70] As the identification of B. anthracis (anthrax) strain immediately pointed to terrorism, public health's little experience within the medical community responding to and treating victims created conflict.[71] With no established protocols on responding to anthrax, the national response was riddled with errors. There was confusion as to which level of government was responsible to lead the response.[72] Without knowing how to coordinate, public health across all levels of government reacted differently and at times, contradictory to each other.[73] According to the U.S. General Accounting Office (GAO) and as included in subsequent CDC grants, lessons learned from the attacks identified three critical areas: the need for the public health system to improve communications, increase public health capacity and infrastructure, and receive training on appropriate response leadership roles.[74]

To close these gaps, U.S. legislators passed the Public Health Security and Bioterrorism Preparedness Act, better known as the Bioterrorism Act, in 2002. This new law amended multiple sections of the 1944 PHSA and created new tasks for the CDC including supporting state and local preparedness and response improvements for a bioterrorism event.[75] The PHSA update included a new section, National Preparedness for Bioterrorism and Other Public Health Emergencies,

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[69] Kathleen Harriman, "2014-2015 California Measles Outbreak: It's a Small World After All" (NVAC Meeting, National Vaccine Advisory Meeting, June 9, 2015), 3, https://www.hhs.gov/sites/default/files/nvpo/nvac/meetings/pastmeetings/2015/2014-2015_california_measles_outbreak.pdf.

[70] Bill Frist, "Public Health and National Security: The Critical Role of Increased Federal Support," *Health Affairs* 21, no. 6 (November 1, 2002): 120, https://doi.org/10.1377/hlthaff.21.6.117.

[71] Gursky et al., "Anthrax 2001," 101.

[72] Bill Frist, "Public Health and National Security," 119.

[73] Gursky et al., "Anthrax 2001," 102.

[74] Copeland et.al., *Bioterrorism Public Health Response to Anthrax Incidents of 2001*, 77.

[75] Murthy et al., "Progress in Public Health Emergency Preparedness—United States, 2001–2016," S180.

requiring an increase in United States public health infrastructure and staff in order to launch an effective response to another bioterrorism threat.[76]

The Bioterrorism Act awarded $2.7 billion in DHHS funding to improve the federal, state, and local public health preparedness and response infrastructure. This act included $940 million for the CDC to award directly to state and local health departments through capacity- building grants.[77] The agreement's goal was to provide a national framework and benchmarks to standardize all states' response capacities to secondary biological events.

The requirements of the Bioterrorism Act led to many changes after its passage. The CDC created the Office of Terrorism Preparedness and Emergency Response, and state and local public health departments followed by creating emergency preparedness programs. The Bioterrorism Act also tasked DHHS to develop the National Preparedness Plan (NPP) and the Department of Homeland Security to create the National Response Plan (NRP). Both were released in 2004. The NPP increased public health preparedness for bioterrorism and other public health emergencies. The NRP directed how the federal government was to respond to a natural disaster or terror event.[78]

State and local public health departments received a surge of funding to support new emergency preparedness programs. Strong language in the PHSA focused specifically on building staff capacity, improving communications across all levels of government, and developing training to prepare for the next terror attack.[79] Traditionally, public health builds capacity by hiring new employees rather than promoting from within. Adding positions for the purpose of creating public

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[76] Public Health Security and Bioterrorism Preparedness and Response Act of 2002 Public Law 107-188, Pub. L. No. 107–108 (2002), 594, https://www.gpo.gov/fdsys/pkg/PLAW-107publ188/pdf/PLAW-107publ188.pdf.

[77] William R. Johnstone, *Bioterror: Anthrax, Influenza, and the Future of Public Health Security* (Westport, CT: Praeger Security International, 2008), 107.

[78] Johnstone, *Bioterror,* 137.

[79] Public Health Security and Bioterrorism Preparedness and Response Act of 2002 Public Law 107-188, *U.S Statutes at Large* 615 (2002).

health response plans to a biological event did not fit the customary infectious disease control mission and led to a slow implementation.[80]

B. HURRICANE KATRINA

In 2005, the response to Hurricane Katrina uncovered the confusion that still existed about how a coordinated response to a major disaster should occur. Although strides had been made to increase preparedness capacity, this disaster highlighted the failure of broader emergency preparedness activities that eventually became common protocols. The failure to rapidly address the complex public health issues underscored the limitations of the NPP to coordinate a federal response. This led to additional changes.

The federal response to Hurricane Katrina lessons learned highlighted ongoing concerns with the public health system's ability to continue providing services to those who qualify, stating, "We are not as prepared as we need to be at all levels within the country."[81] Many people with chronic medical conditions were displaced, losing access to social services and medical treatments.[82] After state and local public health departments lost the ability to provide services, there was no coordination or request for the federal government to provide these necessary services.[83] Because of an absence of public health representation at the leadership level and no documented plan on how state and local health departments communicate needs to the federal government, there was at least a two-week delay before any medical needs assessments could begin.[84] In addition, DHHS, along with state and local health departments, lacked guidance on how to reopen hospitals, revealing the misunderstanding on how an emergency can impact health and medical systems.

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[80] Gursky et al., "Anthrax 2001," 108.

[81] White House, *The Federal Response to Hurricane Katrina: Lessons Learned*, (Washington, DC: White House, 2006), https://georgewbush-whitehouse.archives.gov/reports/katrina-lessons-learned/

[82] White House, *The Federal Response to Hurricane Katrina: Lessons Learned*, 58.

[83] White House, *The Federal Response to Hurricane Katrina: Lessons Learned*, 34-40.

[84] White House, *The Federal Response to Hurricane Katrina: Lessons Learned*, 59.

Again, the federal government responded by passing new legislation, changing the response landscape once again. PAHPA was signed in 2006, a year after Katrina, and five years after the September 2001 anthrax mail attacks. It was Congress' replacement of the Bioterrorism Act of 2002. The new law expanded the requirements of the state and local public health preparedness system from a terrorism focus to include natural and man-made events.

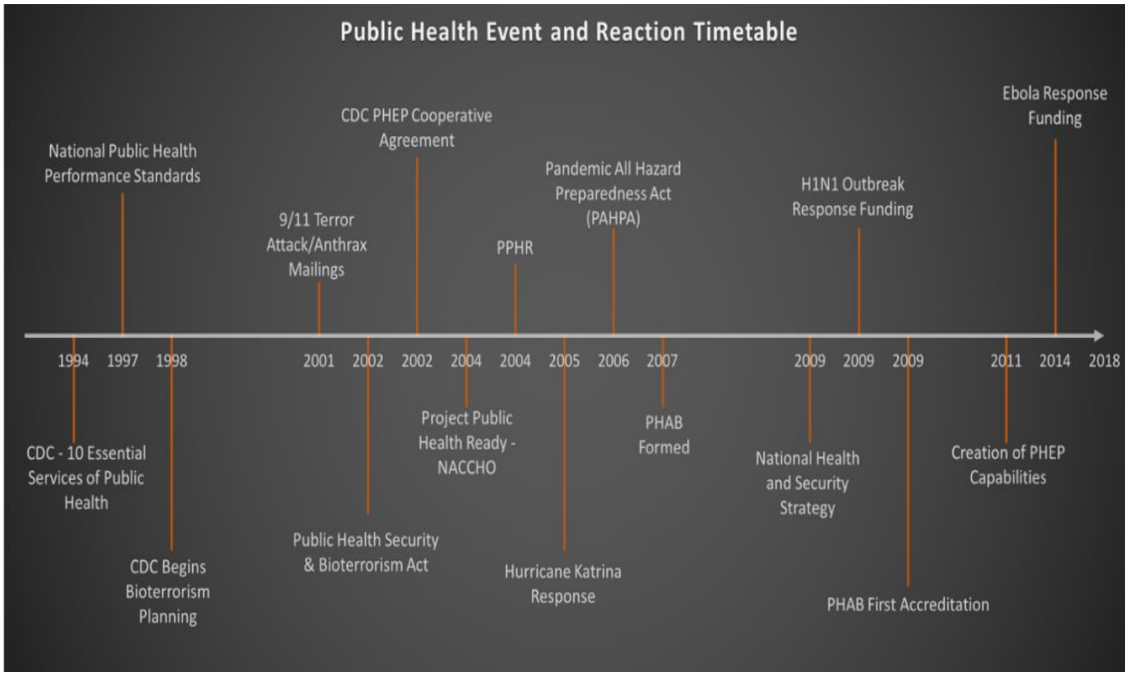

Figure 3. Programs created by federal legislation modifying PHSA and tasking CDC with overseeing and coordinating with state and local public health departments.[85]

As with previous legislation, DHHS created a new office, the Office of the Assistant Secretary of Preparedness and Response (ASPR), for the purpose of increasing response capacity throughout the different levels of government. The secretary -level position was recommended to

[85] Adapted from Global Health, Division of Parasitic Diseases and Malaria, "Center for Disease Control and Prevention." Center for Disease Control and Prevention, "David J. Sencer CDC Museum: In Association with the Smithsonian Institution."

further support the collaboration of health systems, public health systems, and all other required response agencies.

One of the goals of the 2006 PAHPA and later the 2013 Pandemic All Hazards Preparedness Reauthorization Act (PAHPRA) was to improve coordination between all response agencies, ensuring state and local health departments have response plans that align with the federal government and the National Health Security Strategy.[86] The CDC created the PHEP cooperative agreement to provide continuous funding to the state and local public health agencies in support of PAHPRA initiatives. The PHEP agreement was to provide necessary funding for the public health system to increase staff capacity and to rapidly identify and respond to a biological threat, infectious disease, natural disaster, or other public health emergency.[87] The PHEP program closes one of the anthrax response gaps by building capacity within the public health infrastructure. This integration into the broader response community helps to support a future biological attack.

The CDC has more than 70 years of experience in creating new public health programs to protect and improve the health of the American people. Emergency preparedness and response programs are just the latest examples of the public health mentality of creating a new program in response to a new event: terror, natural disaster, disease outbreak, or an emerging infectious disease. New programs created at state and local public health departments are possible because of the federal funding associated with legislation.

State and local public health departments have become reliant on federal funding. The current structure built on programs with specific goals and missions has unintentionally created public health silos. The individualized focus on a specific disease or illness has been more important than trying to integrate the new requirements across the public health enterprise. This approach cannot dominate public health emergency preparedness professionals because such responses require state and local public health departments to employ the entire department to respond to a public health threat.

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[86] Murthy et al., "Progress in Public Health Emergency Preparedness—United States, 2001–2016," 180.

[87] "Public Health Emergency Preparedness (PHEP) Cooperative Agreement," Center for Disease Control and Prevention, accessed April 26, 2018, https://www.cdc.gov/phpr/readiness/phep.htm.

C. OPIOID EPIDEMIC RESPONSE

On October 26, 2017, the Secretary of DHHS declared a public health emergency for opioids under the Public Health Service Act section 319. The Secretary of HHS released the following statement: "The declaration allows for the DHHS to accelerate temporary appointments of specialized personnel to address the emergency (pending any funding needed); work with DEA to expand access for certain groups of patients...for treating addiction; and provide new flexibilities within HIV/AIDS programs."[88]

This public health emergency was not caused by a natural disaster, pandemic influenza, or an infectious disease like the Ebola virus. Opioid abuse in the United States gradually grew to epidemic levels over the past thirty years and between 1999 and 2017, the CDC reports that seven hundred thousand people have died from either prescription or illegal drug overdoses. Furthermore, the CDC is reporting that the crisis migrated from prescription opioids to heroin and eventually to today's synthetic opioids laced with fentanyl.[89]

The origins of this crisis can be traced to the release of the Food and Drug Association (FDA) approving the opioid oxycodone in the late 1990s which was marketed as non-addictive.[90] In 1996, the medical community began measuring pain as the most suitable way for the medical community to identify and treat patients after injury, surgery, or cancer treatment.[91] The medical community, such as the Veterans Health Administration, began to ask patients their level of pain on a scale of zero to ten to determine if it was necessary to prescribe a pain killer or opioid.

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[88] "HHS Acting Secretary Declares Public Health Emergency to Address National Opioid Crisis," U.S. Department of Health and Human Service, October 26, 2017, https://www.hhs.gov/about/news/2017/10/26/hhs-acting-secretary-declares-public-health-emergency-address-national-opioid-crisis.html.

[89] Center for Disease Control and Prevention, "Understanding the Epidemic," Opioid Overdose, December 19, 2018, https://www.cdc.gov/drugoverdose/epidemic/index.html.

[90] World Health Organization, "Curbing Prescription Opioid Dependency," *Bulletin of the World Health Organization* 95, no. 5 (May 1, 2017): 318, https://doi.org/10.2471/BLT.17.020517.

[91] Colin Planalp and Megan Lahr, "The Opioid Epidemic: National Trends in Opioid-Related Overdose Deaths from 2000 to 2016," State Health Access Data Assistance Center, June2018, http://shadac.org/sites/default/files/publications/NATIONAL_opioid_brief_2000-2016.pdf.

The opioid emergency did not happen overnight, and the national emergency indicates that all state and local jurisdictions need support in ending the epidemic. Prior to the emergency declaration, some local municipalities, along with a limited number of state health departments, independently began efforts to combat overdoses. Recognizing the threat of opioid misuse, limited jurisdictions began pilot programs to support those with drug addiction through education, treatment programs, and providing naloxone.[92] These jurisdictions required the ratification of state revised statutes because a lack of federal guidance for individuals providing lifesaving medications under these conditions did not exist. In addition, many state and local jurisdictions identified the difficulties of beginning such opioid programs due to the inability to obtain naloxone from a lack of funding and product cost.[93]

The White House National Drug Control Policy reports of 2006 and 2011 discuss the need for reducing the number of overdose deaths, without mentioning or assigning the mission to the public health enterprise. A mention of public health in the 2006 report tasks DHHS to supply healthcare provider training on how to identify the signs of drug abuse in patients but does not include prevention steps for the patients.[94] The 2011 report ends with a call to action for improving data collection, monitoring, and information sharing of prescriptions, providers, and emergency room health information by the DOJ's Prescription Drug Monitoring Programs (PDMPs). However, the 2011 White House National Drug Policy did not include the public health language describing what actions to take with data collected.[95] The purpose of PDMPs is for collecting and improving the ability of a state agency to analyze controlled substance prescription data between

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[92] Yokell et al., "Opioid Overdose Prevention and Naloxone Distribution in Rhode Island."

[93] Eliza Wheeler et al., "Community-Based Opioid Overdose Prevention Programs Providing Naloxone—United States, 2010" *Morbidity and Mortality Weekly Report* 61, no. 6 (February 2012): 104.

[94] Office of National Drug Control Policy, *The National Drug Control Strategy* (Washington, DC: Office of National Drug Control Policy, February 2006), 13–28.

[95] Executive Office of the President, Office of National Drug Control Policy, "Epidemic: Responding to America's Prescription Drug Abuse Crisis" (American Psychological Association, 2011), 5, https://doi.org/10.1037/e580312012-001.

providers and pharmacists in an attempt to curb the over prescribing of opioids.[96] An example on the ineffectiveness or lack of oversight of PDMPs can be found in the 2011 report, stating that only thirty-six of the nation's forty-three PDMPs were operational.[97] However, PDMP reports do little to increase the sharing of the information collected with appropriate health partners such as public health agencies, even calling on Congress to modify current laws to allow patient information sharing within the U.S. Department of Veterans Affairs (VA).[98] These reports illustrate the lack of support directed to state and local public health departments for the purpose of supporting individuals with drug addictions. This is because DHHS received no tasking to do so.

The Anti-Drug Abuse Act signed in 1988 has been reauthorized multiple times in order to support and fund the President's Office of National Drug Control Strategy (ONDCS). Over the years, this legislation provided funding to states for drug prevention education and providing support services to those with addiction.[99] As previously mentioned, public health's involvement in combating opioid misuses through the years was very limited with a 2007–2009 report listing only four DHHS programs, mostly focused on prevention and medical services.[100] At this time, DHHS' focus was on messaging and educating people about the dangers of drug abuse through programs such as the Substance Abuse and Mental Health Service's (SAMHSA's) point of purchase messaging, the Drug-Free Communities Program focusing on youth, establishing drug-free work places, intervention, and treatment services.[101] Moving ahead, in 2014 ONDCS began

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[96] U.S. Department of Justice Bureau of Justice Assistance. *Harold Rogers Prescription Drug Monitoring Program FY 2016 Competitive Grant Announcement*. OMB No.1121-0329 (Washington, DC: U.S. Department of Justice, 2016) 5–33.

[97] Executive Office of the President, Office of National Drug Control Policy, "Epidemic," 54.

[98] Planalp and Lahr, "The Opioid Epidemic: National Trends in Opioid-Related Overdose Deaths from 2000 to 2016," 6.

[99] Anti-Drug Abuse Act of 1988, Pub. L. No. 100–690 (1988), 102 STAT 4192–4206, https://www.congress.gov/bill/100th-congress/house-bill/05210.

[100] Office of National Drug Control Policy, *National Drug Control Strategy 2008 Annual Report*, Department of Justice and Office of National Drug Control Policy (Washington, DC: March 1, 2008), 71.

[101] White House Office of National Drug Control Policy, 11–23.

supporting seven different DHHS programs, tasking local public health jurisdictions through grant programs such as Administration for Children and Families to support drug treatment and counseling to those who qualify.[102] Over the years, the primary focus within federal legislation and the White House drug policy was on treatment and less on prevention or coordination among all public health partners.

One example of the federal government ramping up support to state and local public health departments appears in August 2015 when the CDC's Division of Non-Infectious Disease was launched and funded the Prevention for States Program (PfS). PfS initially funded $14.4 million to sixteen states that were experiencing the highest rates of opioid deaths.[103] The purpose of PfS was to provide funding to state health departments to establish programs that decrease opioid deaths and improve communication between public health agencies and PDMPs. This program's expansion from sixteen to twenty-nine states by the end of 2017 with $80 million in funding demonstrates how states could not support an opioid response alone.[104]

In 2016, the Comprehensive Addiction and Recovery Act (CARA) tasked the public health system to do more in preventing drug overdoses. The CARA modifies the PHSA, assigning DHHS to support state and local departments in developing and implementing community-wide prevention strategies. This act led to the Grants for Reducing Overdose Deaths providing funding to state health departments for drug or substance abuse education, medication- assisted programs, alternative treatment programs, and providing naloxone to the first responder community.[105] In addition, the Cures Act, passed in 2016, provided new funding for public health and other partners

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[102] Lisa N Sacco and Kristin Finklea, *Reauthorizing the Office of National Drug Control Policy: Issues for Consideration*, CRS Report No. R41535 (Washington, DC: Congressional Research Service, September 30, 2014) 6, https://fas.org/sgp/crs/misc/R41535.pdf.

[103] World Health Organization, "Curbing Prescription Opioid Dependency," 319.

[104] Amber Robinson et al., "From the CDC: The Prevention for States Program: Preventing Opioid Overdose Through Evidence-Based Intervention and Innovation," *Journal of Safety Research* 68 (February 2019): 232, https://doi.org/10.1016/j.jsr.2018.10.011.

[105] Erin Bagalman and Lisa N Sacco, "The Comprehensive Addiction and Recovery Act of 2016 (s. 524): Comparison of Senate- and House-Passed Versions," May 23, 2016, 5–19, https://fas.org/sgp/crs/misc/R44493.pdf.

to increase the capabilities of health information technology.[106] In 2018, DHHS provided $1.8 billion in funding for states, of which the CDC received $930 million specifically for public health funding to address the opioid epidemic.[107]

Today, with federal grant funding and guidance, public health has a new framework to address the opioid epidemic. The Association of State and Territorial Health Officials (ASTHO) notes that there are four different federal departments, including the DOJ and DHHS, and eleven different programs available supporting the state and local response to opioids.[108] DHHS funds seven different divisions including SAMHSA, the CDC, the Administration for Children and Families, and HRSA which are providing funding to state and local public health departments programs to end the opioid epidemic. Federal funding through ONDCS has increased over the years from $15.1 billion in 2010 to $31.1 billion in 2017 to support opioid harm reduction programs, treatment centers, and the purchasing of naloxone.

Billions of federal grant dollars have flooded state and local public health departments to address the opioid crisis. The funding is increasing the state and local public health departments' capacities and capabilities through increasing communication and data sharing with PDMPs. This allows federal funding to support harm reduction and treatment centers, to build collaboration between prescribing opioids groups and drug addiction treatment groups, and to provide information on the purchasing and distribution of naloxone. Prior to the declaration of an opioid emergency and federal laws passed in 2016, state and local public health departments having the responsibility for disease control did not have the funding or data sharing to conduct proper opioid surveillance in order to create prevention programs. Similar to the reactions of death and public

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[106] Michael Gabay, "RxLegal 21st Century Cures Act," *HospPharm* 52, no. 4 (April 2017): 264, https://doi.org/10.1310/hpj5204-264.

[107] Department of Health and Human Services, "Department of Health and Human Services Substance Abuse and Mental Health Services Administration State Opioid Response Grants" (Department of Health and Human Service Center for Disease, August 2018), 6, https://www.samhsa.gov/sites/default/files/grants/pdf/sorfoafinal.6.14.18.pdf.

[108] Association of State and Territorial Health Officials, *Preventing Opioid Misuse and Overdose in States and Territories/Funding Entities*, (Arlington, VA: ASTHO 2019), https://my.astho.org/opioids/resources/funding-entities.

health needs following anthrax and Hurricane Katrina, the new public health opioid funding and programs came only after the federal government passed new legislation that provided program funding for state and local public health departments.

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IV. FEDERAL FUNDING DEFINES AND SHAPES STATE AND LOCAL PUBLIC HEALTH DEPARTMENTS

After World War II, state and local public health departments' organizational structure began taking shape with the passing of new federal laws such as the Social Security Act.[109] This chapter explores how the structure of state and local public health departments grew with the federal government taking on an administrator role and providing grant funding and guidance to state and locals in order to accomplish legislative operational tasks. A data comparison between state and local public health department organizational program titles and the federal grant titles and funding received from the CDC reveals significant similarities.

Chapter II highlights the CDC's success and rapid growth from becoming the administrator of older social programs and the creation of new programs. This success eventually led to more activities than could be accomplished by a single organization. The tasking and federal funding of state and local public health departments began increasing in the 1950s in an effort for federal programs to be operational within state and local jurisdictions. The CDC began awarding more federal funding to state and locals in the form of program grants with specific outcome requirements of each program. Table 1 contains the federal grant award names. This is later correlated to a subset of state and local organizational program names in Table 2.

DHHS in one of the most highly funded executive departments with the responsibility of improving the nation's health. As such, some well-known federal agencies under DHHS are the Centers for Medicare & Medicaid Services (CMS), FDA, HRSA, the Indian Health Service, the National Institute of Health (NIH), and the CDC. These programs provide leadership, education, public health practices standardization, and financial oversight of federal legislation at the state and local levels.

The federal public health structure has grown to include eleven different operating divisions responsible for completing the legislated public health missions set forth at DHHS. Eight

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[109] Etheridge, "Sentinel for Health," 89.

of the eleven divisions provide oversight and grant funding to state and local public health departments which aim to meet the overall DHHS mission and priorities.[110] Funding from the CDC and HRSA programs provide the most federal grant money to state and local public health departments. The federal funding allocated to state and local public health departments is categorical and directed to specific health improvement, disease mitigation, disease prevention, or another legislative requirement.

The CDC provides funding in state and local public health programs within six different public health domains. Per the CDC website, these include the following: Emergency Preparedness, Infectious Disease Prevention, Environmental Health, Public Health Capacity, Injury Prevention, and Chronic Disease Prevention.[111] HRSA's primary funding is used to improve medical services through training and increase access to services for the health of women and children, both of which fall under public health's mission. The U.S. Department of Agriculture (USDA), not DHHS, is responsible for providing federal funding for healthy food grants to state and local health departments such as the Special Supplemental Nutrition Program for Women, Infant, and Children (WIC).[112] WIC is one of the most common state and local public health programs and receives congressional appropriations at approximately $6 billion annually.[113]

Either by developing new or improving existing laws, federal legislation has become a critical factor in creating a new public health initiative. Over the years, new federal legislation changed the PHSA. The 2019 law contains multiple references such as "make grants to States," "assign to programs in each State," and "for the purpose of coordinating control programs in the State." This directed the Secretary of DHHS to provide funding to state and local public health

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[110] "HHS Organizational Chart," U.S. Department of Health & Human Services, Accessed June 6, 2019, https://www.hhs.gov/about/agencies/orgchart/index.html

[111] Centers for Disease Control and Prevention, "Grant Funding Profile Funding Category View," Department of Health and Human Service, June 15, 2019, https://www.cdc.gov/fundingprofiles/index.htm.

[112] "Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)," U.S. Department of Agriculture, November 23, 2019, https://www.fns.usda.gov/wic.

[113] "Policy Basics: Special Supplemental Nutrition Program for Women, Infants, and Children," Centers on Budget and Policy Priorities, April 26, 2017, https://www.cbpp.org/research/food-assistance/policy-basics-special-supplemental-nutrition-program-for-women-infants-and.

departments in support of federal program actions.[114] These programs are subsequently developed following the federal funding guidance, leading to individualized program goals and organizational silos throughout health departments. This pattern has become the norm. At least 70% of state and local public health funds and missions are grant driven, such as the federal government's USDA WIC program (45%), multiple CDC grants and cooperative agreements (16%), and several HRSA grants (10%).[115] Table 1 includes CDC grant funding opportunities, sub-grant program names and federal dollars awarded to a representative sample of states with varying population size and geographic locations. CDC disperses funding allocations based upon each state's population and a small subset of other health factors.

HRSA block grants are the main funding mechanisms awarded to state and local public health departments focusing on improving maternal and child health. These block grants contribute to the ability to ensure that uninsured, vulnerable women, and children have access to different types of health-related social services.[116] HRSA funding supports seventy different program types, including community health centers and public health departments. Public health departments use the Maternal and Child Health Block Grant. This flexible spending HRSA grant includes programs and initiatives such as:[117]

- Adolescent and Young Adult Health
- Child Health
- Children with Special Health Care Needs

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[114] Public Health Service Act of 2019, Pub. L. No. 116–94, U.S. Statues at Large (2019), 103,117,126,141,302 & 439, https://www.congress.gov/bill/106th-congress/house-bill/4365.

[115] Association of State and Territorial Health Officials, "ASTHO Profile of State and Territorial Public Health Vol. 4."

[116] "About HRSA," Health Resources & Services Administration, October 2019, https://www.hrsa.gov/about/index.html.

[117] Committee on Integrating Primary Care and Public Health and Board on Population Health and Public Health Practice, *Primary Care and Public Health: Exploring Integration to Improve Population Health* (Washington, DC: The National Academies Press, 2012), 157, https://www.ncbi.nlm.nih.gov/books/NBK201596/.

- Cross-Cutting/Life Course
- Maternal/Women's Health
- Perinatal and Infant Health
- Data, Research, and Epidemiology
- Workforce Training

Table 1 contains up to at least thirteen of the same CDC grants that each state receives, but the list is not all inclusive of every grant that may be awarded. The more important component in this table is the similarity of grant funding and program requirements within the different states. The amount of funding is reflective of the larger populations but also reveals the inconsistency of federal funding for conducting the same programs in respected states. Comparing the funding difference of two states on different coasts: California's population of 37 million on the west and New Jersey's population of 8.8 million on the east. The state of California receives over four times more grant funding than New Jersey when comparing the same exact grant awards and funding that each state received individually. When comparing two states with approximately 1.8 million in population, Nebraska and West Virginia, the total is about the same, with Nebraska receiving slightly more due to one additional grant supporting CDC bases funding allocation on population size. No matter which comparison is made, urban to rural, east coast to the west, or population bases, each state is receiving the funding to conduct the same public health activity. The next step will explore how grant funding received may influence the organizational structures of state and local public health departments.

Table 1. 2017 CDC grant funding opportunities and sub-program names. These are different grants made available to state and local health departments in support of protecting the health and well-being of the U.S. population.[118]

	GRANT CATEGORY	TOTAL AWARD
ARIZONA	Birth Defects, Developmental Disabilities, Disability and Health	$935,500
	CDC-Wide Activities and Program Support	$1,953,592
	Chronic Disease Prevention and Health Promotion	$13,450,387
	Emerging and Zoonotic Infectious Diseases	$2,331,306
	Environmental Health	$1,227,513
	Health Reform - Childhood Obesity	$2,099,652
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$8,996,059
	Immunization and Respiratory Diseases	$6,719,108
	Injury Prevention and Control	$3,397,079
	Occupational Safety and Health	$486,000
	Public Health Preparedness and Response	$11,546,221
	Public Health Scientific Services (PHSS)	$459,783
	Vaccines for Children	$1,661,698
	Zika Preparedness and Response	$6,692,082
	Total	$61,955,980

118 Adapted from Centers for Disease Control and Prevention, "Grant Funding Profile Funding Category View."

	GRANT CATEGORY	TOTAL AWARD
CALIFORNIA	Agency for Toxic Substances and Disease Registry (ATSDR)	$856,060
	Birth Defects, Developmental Disabilities, Disability and Health	$1,638,605
	CDC-Wide Activities and Program Support	$13,558,425
	Chronic Disease Prevention and Health Promotion	$49,900,693
	Emerging and Zoonotic Infectious Diseases	$11,895,003
	Environmental Health	$4,114,518
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$103,236,813
	Immunization and Respiratory Diseases	$35,691,722
	Injury Prevention and Control	$11,149,992
	Occupational Safety and Health	$8,346,849
	Public Health Preparedness and Response	$62,648,635
	Public Health Scientific Services (PHSS)	$1,393,722
	Vaccines for Children	$8,201,830
	Zika Preparedness and Response	$30,995,478
	Total	$343,628,345
COLORADO	Agency for Toxic Substances and Disease Registry (ATSDR)	$385,472
	Birth Defects, Developmental Disabilities, Disability and Health	$2,826,945
	CDC-Wide Activities and Program Support	$2,022,419
	Chronic Disease Prevention and Health Promotion	$10,830,451
	Emerging and Zoonotic Infectious Diseases	$7,292,064
	Environmental Health	$1,568,284
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$10,229,506
	Immunization and Respiratory Diseases	$6,118,083
	Injury Prevention and Control	$5,380,802
	Occupational Safety and Health	$5,414,931
	Public Health Preparedness and Response	$10,256,388
	Public Health Scientific Services (PHSS)	$515,931
	Vaccines for Children	$1,565,732
	Zika Preparedness and Response	$936,408
	Total	$65,343,416
CONNECTICUT	Agency for Toxic Substances and Disease Registry (ATSDR)	$528,752
	Birth Defects, Developmental Disabilities, Disability and Health	$20,676
	CDC-Wide Activities and Program Support	$2,555,403
	Chronic Disease Prevention and Health Promotion	$6,689,271
	Emerging and Zoonotic Infectious Diseases	$5,265,720
	Environmental Health	$1,801,397
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$7,101,712
	Immunization and Respiratory Diseases	$5,307,151
	Injury Prevention and Control	$3,037,332
	Occupational Safety and Health	$1,737,965
	Public Health Scientific Services (PHSS)	$8,493,952
	Vaccines for Children	$2,035,420
	Zika Preparedness and Response	$1,044,709
	Total	$45,619,460

	GRANT CATEGORY	TOTAL AWARD
ILLINOIS	Agency for Toxic Substances and Disease Registry (ATSDR)	$2,000,000
	Birth Defects, Developmental Disabilities, Disability and Health	$2,177,186
	CDC-Wide Activities and Program Support	$4,049,953
	Chronic Disease Prevention and Health Promotion	$22,823,979
	Emerging and Zoonotic Infectious Diseases	$5,233,386
	Environmental Health	$1,849,912
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$31,724,970
	Immunization and Respiratory Diseases	$13,885,987
	Injury Prevention and Control	$5,757,788
	Occupational Safety and Health	$2,619,847
	Public Health Preparedness and Response	$26,492,071
	Public Health Scientific Services (PHSS)	$535,449
	Vaccines for Children	$4,108,381
	Zika Preparedness and Response	$4,518,704
	Total	$127,777,613
INDIANA	Birth Defects, Developmental Disabilities, Disability and Health	$215,536
	CDC-Wide Activities and Program Support	$2,575,761
	Chronic Disease Prevention and Health Promotion	$7,974,481
	Emerging and Zoonotic Infectious Diseases	$2,237,765
	Environmental Health	$1,131,322
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$6,051,088
	Immunization and Respiratory Diseases	$5,728,209
	Injury Prevention and Control	$4,239,675
	Occupational Safety and Health	$150,000
	Public Health Preparedness and Response	$248,211
	Public Health Scientific Services (PHSS)	$494,697
	Vaccines for Children	$1,485,102
	Zika Preparedness and Response	$1,228,845
	Total	$33,760,692
KANSAS	Birth Defects, Developmental Disabilities, Disability and Health	$449,995
	CDC-Wide Activities and Program Support	$1,556,367
	Chronic Disease Prevention and Health Promotion	$12,258,055
	Emerging and Zoonotic Infectious Diseases	$1,581,657
	Environmental Health	$696,914
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$2,158,746
	Immunization and Respiratory Diseases	$3,544,433
	Injury Prevention and Control	$2,275,179
	Public Health Preparedness and Response	$7,168,800
	Public Health Scientific Services (PHSS)	$536,231
	Vaccines for Children	$770,632
	Zika Preparedness and Response	$474,569
	Total	$33,471,578

	GRANT CATEGORY	TOTAL AWARD
MASSACHUSETTS	Agency for Toxic Substances and Disease Registry (ATSDR)	$420,000
	Birth Defects, Developmental Disabilities, Disability and Health	$2,009,588
	CDC-Wide Activities and Program Support	$4,577,600
	Chronic Disease Prevention and Health Promotion	$16,723,626
	Emerging and Zoonotic Infectious Diseases	$7,092,965
	Environmental Health	$3,013,287
	Health Reform - Childhood Obesity	$1,800,000
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$17,428,138
	Immunization and Respiratory Diseases	$6,009,677
	Injury Prevention and Control	$5,318,301
	Occupational Safety and Health	$7,942,044
	Public Health Preparedness and Response	$13,671,945
	Public Health Scientific Services (PHSS)	$579,173
	Vaccines for Children	$2,038,447
	Zika Preparedness and Response	$205,830
	Total	$88,830,621
MICHIGAN	Agency for Toxic Substances and Disease Registry (ATSDR)	$505,853
	Birth Defects, Developmental Disabilities, Disability and Health	$1,159,961
	CDC-Wide Activities and Program Support	$6,980,707
	Chronic Disease Prevention and Health Promotion	$24,398,211
	Emerging and Zoonotic Infectious Diseases	$4,820,196
	Environmental Health	$5,384,164
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$14,807,844
	Immunization and Respiratory Diseases	$11,256,512
	Injury Prevention and Control	$7,220,800
	Occupational Safety and Health	$3,196,890
	Public Health Preparedness and Response	$16,457,659
	Public Health Scientific Services (PHSS)	$405,483
	Vaccines for Children	$2,517,517
	Zika Preparedness and Response	$1,806,681
	Total	$100,918,478
MINNESOTA	Agency for Toxic Substances and Disease Registry (ATSDR)	$469,654
	Birth Defects, Developmental Disabilities, Disability and Health	$1,337,090
	CDC-Wide Activities and Program Support	$4,248,173
	Chronic Disease Prevention and Health Promotion	$18,341,376
	Emerging and Zoonotic Infectious Diseases	$12,153,728
	Environmental Health	$2,349,069
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$7,546,379
	Immunization and Respiratory Diseases	$7,597,566
	Injury Prevention and Control	$3,614,160
	Occupational Safety and Health	$4,154,824
	Public Health Preparedness and Response	$11,012,573
	Public Health Scientific Services (PHSS)	$740,170
	Vaccines for Children	$1,766,505
	Zika Preparedness and Response	$1,283,353
	Total	$76,614,620

	GRANT CATEGORY	TOTAL AWARD
NEBRASKA	Birth Defects, Developmental Disabilities, Disability and Health	$150,000
	CDC-Wide Activities and Program Support	$2,757,604
	Chronic Disease Prevention and Health Promotion	$10,989,659
	Emerging and Zoonotic Infectious Diseases	$2,257,188
	Environmental Health	$400,460
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$1,989,035
	Immunization and Respiratory Diseases	$2,505,801
	Injury Prevention and Control	$2,082,884
	Occupational Safety and Health	$2,088,315
	Public Health Preparedness and Response	$5,731,718
	Public Health Scientific Services (PHSS)	$323,952
	Vaccines for Children	$636,443
	Zika Preparedness and Response	$800,704
	Total	$32,713,763
NEW JERSEY	Agency for Toxic Substances and Disease Registry (ATSDR)	$640,498
	Birth Defects, Developmental Disabilities, Disability and Health	$1,218,837
	CDC-Wide Activities and Program Support	$4,788,642
	Chronic Disease Prevention and Health Promotion	$8,002,117
	Emerging and Zoonotic Infectious Diseases	$1,511,946
	Environmental Health	$2,245,118
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$25,708,311
	Immunization and Respiratory Diseases	$7,830,047
	Injury Prevention and Control	$3,173,502
	Occupational Safety and Health	$1,039,870
	Public Health Preparedness and Response	$15,675,702
	Public Health Scientific Services (PHSS)	$187,813
	Vaccines for Children	$2,355,638
	Zika Preparedness and Response	$4,439,101
	Total	$78,817,142
OHIO	Agency for Toxic Substances and Disease Registry (ATSDR)	$499,456
	Birth Defects, Developmental Disabilities, Disability and Health	$549,998
	CDC-Wide Activities and Program Support	$7,146,719
	Chronic Disease Prevention and Health Promotion	$14,983,258
	Emerging and Zoonotic Infectious Diseases	$5,796,212
	Environmental Health	$841,783
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$13,056,060
	Immunization and Respiratory Diseases	$10,748,371
	Injury Prevention and Control	$6,392,381
	Occupational Safety and Health	$2,096,271
	Public Health Preparedness and Response	$17,773,476
	Public Health Scientific Services (PHSS)	$585,553
	Vaccines for Children	$1,559,460
	Zika Preparedness and Response	$2,337,109
	Total	$84,366,107

	GRANT CATEGORY	TOTAL AWARD
OREGON	Agency for Toxic Substances and Disease Registry (ATSDR)	$484,352
	Birth Defects, Developmental Disabilities, Disability and Health	$872,629
	CDC-Wide Activities and Program Support	$1,315,556
	Chronic Disease Prevention and Health Promotion	$14,792,895
	Emerging and Zoonotic Infectious Diseases	$4,772,119
	Environmental Health	$2,108,266
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$5,699,454
	Immunization and Respiratory Diseases	$6,056,505
	Injury Prevention and Control	$4,180,798
	Occupational Safety and Health	$1,744,507
	Public Health Preparedness and Response	$8,250,229
	Public Health Scientific Services (PHSS)	$425,601
	Vaccines for Children	$1,751,091
	Zika Preparedness and Response	$816,726
	Total	$53,270,728
TENNESSEE	Agency for Toxic Substances and Disease Registry (ATSDR)	$305,258
	Birth Defects, Developmental Disabilities, Disability and Health	$605,218
	CDC-Wide Activities and Program Support	$2,583,974
	Chronic Disease Prevention and Health Promotion	$10,303,855
	Emerging and Zoonotic Infectious Diseases	$9,746,290
	Environmental Health	$564,182
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$12,453,492
	Immunization and Respiratory Diseases	$7,968,557
	Injury Prevention and Control	$3,665,554
	Occupational Safety and Health	$491,553
	Public Health Preparedness and Response	$11,144,717
	Public Health Scientific Services (PHSS)	$283,046
	Vaccines for Children	$2,276,977
	Zika Preparedness and Response	$2,145,697
	Total	$64,538,370
UTAH	Agency for Toxic Substances and Disease Registry (ATSDR)	$235,314
	Birth Defects, Developmental Disabilities, Disability and Health	$1,497,290
	CDC-Wide Activities and Program Support	$1,542,711
	Chronic Disease Prevention and Health Promotion	$14,347,747
	Emerging and Zoonotic Infectious Diseases	$3,742,705
	Environmental Health	$2,426,316
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$2,288,410
	Immunization and Respiratory Diseases	$3,300,044
	Injury Prevention and Control	$4,549,871
	Occupational Safety and Health	$1,797,486
	Public Health Preparedness and Response	$6,900,173
	Public Health Scientific Services (PHSS)	$558,233
	Vaccines for Children	$922,593
	Zika Preparedness and Response	$732,061
	Total	$44,840,954

	GRANT CATEGORY	TOTAL AWARD
WASHINGTON	Birth Defects, Developmental Disabilities, Disability and Health	$336,959
	CDC-Wide Activities and Program Support	$1,564,011
	Chronic Disease Prevention and Health Promotion	$21,694,010
	Emerging and Zoonotic Infectious Diseases	$6,950,115
	Environmental Health	$1,412,050
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$14,266,371
	Immunization and Respiratory Diseases	$6,798,766
	Injury Prevention and Control	$4,813,365
	Occupational Safety and Health	$5,144,103
	Public Health Preparedness and Response	$12,617,589
	Public Health Scientific Services (PHSS)	$568,936
	Vaccines for Children	$3,992,153
	Zika Preparedness and Response	$1,543,361
	Total	$81,701,789
WEST VIRGINIA	CDC-Wide Activities and Program Support	$1,483,606
	Chronic Disease Prevention and Health Promotion	$7,956,445
	Emerging and Zoonotic Infectious Diseases	$1,533,539
	Environmental Health	$277,790
	HIV/AIDS, Viral Hepatitis, STI and TB Prevention	$1,698,135
	Immunization and Respiratory Diseases	$2,016,919
	Injury Prevention and Control	$4,033,527
	Occupational Safety and Health	$890,957
	Public Health Preparedness and Response	$5,413,993
	Public Health Scientific Services (PHSS)	$129,603
	Vaccines for Children	$703,838
	Zika Preparedness and Response	$710,663
	Total	$26,849,015

The CDC and HRSA grants listed above are a sample of the different funding opportunities available to local public health departments. State and local health departments rely heavily on these funds to sustain their jurisdictions' public health missions. In turn, they create individual programs tailored to the requirements the federal grant funding allows. Table 2 contains information on a sample of states, the local and state agencies that administer public health programs in each state, and the short list of grants awarded to each state. This table reveals how the name of the federal grant categories supporting state and local health departments mirrors the state and local organizational structure of the programs, offices, or departments. Using these data, a similar organizational structure can be found across the United States, even when comparing one state to another state's local health department. For example, the state of New Jersey and Oregon's

Multnomah County Health Department have the same organizational structure. Both public health departments include organizational titles such as Health and Family Service, HIV & STD, WIC, Communicable Disease and Control, Immunizations/Vaccines, and Public Health Preparedness.

The historical growth of the United States' public health infrastructure can be attributed to this common pattern: the identification of a new disease or chronic illness, its subsequent classification as a public health threat, new legislation modifying the PHSA, and ending with providing grants to state and local public health departments. Examples of how federal funding influences both their organizational structure is evident when comparing the health department organizational names to the awarded federal grants. Further, many different state and local jurisdictions contain the divisions of Disease Control and Epidemiology that include programs such as Communicable Disease, Emerging Infectious Disease, Immunization, Tuberculosis, WIC, HIV, Vaccine and Immunization, and Preparedness. These divisions match word-for-word the federal grant under which money is received. It is important to note that Table 2 uses information published on department websites that may be outdated and does not include the programs' founding date nor the federal grants they may be applied to.

The state and local jurisdictions listed in Table 2 do not include all states, rather than an example of states based on population and geographic location for the purpose of displaying the correlation of federal grant funding activity to organizational structure. The data tables are a small, representative sample of how public health programs at the state and local levels are created to match the CDC programs and subsequent grants received. This further demonstrates how over the life of public health, a new health threat receives action first through legislation, next a federal program is created, and finally, grant funding is passed to locals based on the latest risks. The CDC provides grant guidance with the awards dictating the approved use of the funding for administrative and mitigation efforts.

Table 2. Representative sample of state and local public health department program development based on receiving CDC grants[119]

	Arizona Department of Health Services	Maricopa County Department of Public Health	CDC Funding Opportunities	
	State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
ARIZONA	Bureau of Nutrition and Physical Activity - Healthy Living Bureau of Women & Children's Health - Oral Health - WIC Bureau of Tobacco and Chronic Disease - HIV Prevention Program - Tobacco Free Bureau of Public Health Emergency Preparedness Bureau of Epidemiology and Disease Control - Immunization Program - Environmental Health - Infectious Disease Services Bureau of State Laboratoy Service	Disease Control Division - Offce of Community Wellness & Health Promotion - Office of Epidemioloy - Office of Preparedness and Response Division of Clincal Services - HIV/ STD Program - Tuberculosis (TB) Program - Laboratory Services Division of Community Health Action - Office of Women, Infant & Children (WIC) - Office of Family Health - Office of Oral Health Division of Community Transformation - Office of Community Health Innovations - Nutrition and Physical Activity Division of Program Operations - Chronic Disease Investigation	Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
			CDC-Wide Activities and Program Support	Preventive Health and Health Services Block Grant - PPHF
			Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Mothernood/Infant Health Tobacco Tobacco - PPHF
			Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Disease Epi and Lab Capacity Program - PPHF
			Health Reform - Childhood Obesity	Health Reform - Childhood Obesity
			HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
			Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
			Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
			Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
			Vaccines for Children	Vaccines for Children
	California Department of Public Health	**Santa Cruz Health Service Agency**	**CDC Funding Opportunities**	
	State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
CALIFORNIA	Center for Chronic Disease Prevention & Health Promotion *- Chronic Disease Survillance Branch* *- Nutrition Education Obesity Prevention Branch* *-CaliforniaTobacco Branch* Center for Infectious Diseases *- Division Communicable Disease* *- Communcable Disease Emergency Response* *-Infectious Disease Branch* *- Office of AIDS/HIV* *- Tuberculosis Control Branch* Center for Family Health *- Maternal, Child & Adolescent Health* *-Womn, Infant & Children Program* Emergency Preparedness Office Office of the State Public Health Laboratory	Clinical Services Division -Immunization and Tuberculosis Services -Sexually Transmitted Disease Treatment Service Public Health Division -Children's Medical Service -Communicable Disease Control - Communiy Health Education -Tobacco Education -Nutrition Program -Immunization and Vaccine Program –HIV/AIDS Program -Public Health Readiness & Emergency Planning Team -Influenza	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
			Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
			CDC-Wide Activities and Program Support	Ebola Response and Preparedness Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
			Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Chronic Disease Prevention and Health Promotion Set-Asides Safe Motherhood/infant Health Tobacco
			Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseses Epi and Lab Capacity Program - PPHF
			HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
			Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program
			Occupational Safety and Health	Education and Research Centers
			Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
			Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
			Vaccines for Children	Vaccines for Children

[119] Centers for Disease Control and Prevention.

COLORADO	Colorado Department of Public Health & Environment	El Paso County Pubiic Health	CDC Funding Opportunities	
	State Health Division/Program Titles	Local Health Division/Program Titles	Category	Sub-Category
	Disease Control & Epidemiology Division -Communicable Diseases -Emerging Infectious Program STI/HIV/virl hepatitis -Immunization -Tuberculosis Health Facilities and Emergency Medical Division Laboratory Services Division - Emergency Preparedness Branch Prevention Services Division -Children, Youth & Families Branch - Health Promotion & Chronic Disease Branch Office of Emergency Preparedness and Response Office of Health Equity	Health Services Division - Immunization - Woman, Infant & Children (WIC) - Healthy Children & Families Disease Prevention Health Promotion Division - Tobacco Education & Prevention - Communicable Disease Environmental Health Division - Emergency Preparedness & Response Program - Public Health Laboratory	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
			Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
			CDC-Wide Activities and Program Support	Preventive Health and Health Services Block Grant - PPHF
			Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
			Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Disease
			HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
			Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program
			Occupational Safety and Health	Education and Research Centers
			Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
			Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
			Vaccines for Children	Vaccines for Children

CONNECTICUT	Connecticut Department of Public Health	Farmington Valley Health District	CDC Funding Opportunities	
	State Health Division/Program Titles	Local Health Division/Program Titles	Category	Sub-Category
	Diease and Prevention Division - Epidemiology & Emerging Infections Program - Chronic Disease Prevention & Health Promotion - HIV/STD Control Program - Tobacco Conrol Program Parents and Children Division - Women, Infant & Chldren (WIC) Program - Oral Health - Immunization Program - Connecticut Vaccine Program -Environmental Health	Environmental Health Program Community Health Program - Immunizations - Tobacco Free - Women's, Children & Men's Health Emergency Preparedness Program - Mass Dispensing	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
			Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
			CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
			Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
			Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
			HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
			Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
			Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
			Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
			Vaccines for Children	Vaccines for Children

ILLINOIS

Illinois Department of Public Health	City of Chicago Public Health	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Office of Health Care Regulation Office of Health Protection - Division of Environmental Health - Division of Infectious Diseases -Division of Laboratoires Office of Health Promotion -Division of Oral Health -Division of Chronic Disease Office of Preparedness & Response Office of Women's Health & Family Services - Division of Maternal, Child & Family Services (WIC) - Division of Women's Health	Healthy Mothers and Babies - Women Infant Child Program (WIC) Healthy Living - Ryan White HIV/AIDS Program - Surveillance, Epidemiology and Research - Tobacco Prevention Health Protection and Response - Communicable Disease Information - Immunization Program - Tuberculosis - Prepare Chicago:Emergency Preparedness Health Services - HIV Care - Immunization Clinic - WIC	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

INDIANA

Indiana State Department of Public Health	Marion Public Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Division of Emergency Preparedness Division of Epidemiology Resource Center (ERC) -Infectious Disease Epidemiology - Zoonotic and Vectorborne Epidemiology Division of Health and Human Services - Tubrculosis Control Program - Women, Infant & Children (WIC) Program Immunization -Vaccine for Children Program Indiana Tobacco Prevention & Cessation Commission HIV/STD Division Oral Health Division	Administration - Epidemiology Program - Health Education Promotion & Training - Public Health Emergency Preparedness Program Environmental Health -Environmental Healty Safey Program Population Health - Adoloescent Health - Chronic Disease - Dental Health - Infectious Diseases - Maternal and Child Health - Ryan Whie/HIV Services - Tuberculosis Control - Women, Infants & Children (WIC) Program - Public Health Laboratory	CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

KANSAS

Kansas Department of Health and Environment	Johnson County Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Bureau of Community Health Systems - Preparedness - Rural Health Bureau of Disease Control and Prevention - Immunization - Influenza Information -STI/HIV - Tuberculosis Bureau Epidemiology - Infectious Disease Epi and Response Health Promotion - Tobacco Use Prevention - Physical Activity & Nutrition Program Bureau of Oral Health	Health Services Division - Clinical Services - Public Health Emergency Planning - Laboratory Service Community Health Division - Women, Infant & Children (WIC) - Community Health Program Environmental Health Division - Environmental Health Program - Emergency Preparedness Program - Immunization Program	CDC-Wide Activities and Program Support	Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

MASSACHUSETTS

Massachusetts Department of Public Health	Middlesex County Office of Health Services	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Bureau of Community Health and Prevention Bureau of Environmental Health Bureau of Family Health and Nutrition Health and Nutrition - Women, Infant & Children (WIC) Bureau of Infectious Disease and Laboratory Sciences - Tuberculosis Program - Immunization Program Office of Preparedness & Emergency Management	Division of Public Health Preparedness Environmental Health Division Pediatric Health Program - Well Baby Clinic Tuberculosis Control Program Chronic Disease Self-Management Program	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging and Zoonotic Infectious Diseases Set-Asides Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

MICHIGAN

Michigan Department of Health and Human Services	Oakland County Health Division	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Bureau of Epidemiology and Population Health - Division of Communicable Disease (Infectious Disease Section HIV, STD and Tuberculosis Programs) - Immunization Program - Division of Emergency Preparedness and Response - Division of Environmental Health - Public Safety and Environmental Health - Toxic Substance Program - Division of Women, Infant & Children - WIC Program	HIV/AIDS Prevention & Control Program - Immunizations -Sexually Transmitted Infections - Tuberculosis Dental Program Nutrition Services Unit Communicable Disease Unit Environmental Health Unit Emergency Response and Preparedness Unit Women, Infant & Children (WIC) Children's Special Health Care Services (CSHCS)	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging and Zoonotic Infectious Diseases Set-Asides Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

MINNESOTA

Minnesota Department of Health	Hennepin County Public Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Environmental Health Division Infectious Disease Epidemiology Prevention & Control Divison - Emerging Infections Unit - Zoonotc Disease Unit - STD/HIV & Tuberculosis Unit -Vaccine Preventable Disease Unit Public Health Laboratory Community & Family Health Division -Maternal & Child Health Unit -Supplemental Nutrition Unit Health Promotion & Chronic Disease Division Office of Statewide Health Improvement Division - Healthy Community Unit - Tobacco Prevention & Control Unit Centers for Health Equity & Community Health Division - Emergency Preparedness and Response Program	Public Health Clinical Services - Health Education - HIV/STI - Immunization Service - Tuberculosis Prevention Public Health Protection & Promotion -Child & Teen Checkup -Emergency Preparedness -Environmental Health - Epidemiology, Assessment, ImmuLink -Women, Infants,and Children (WIC) Public Health Aministration - Ryan White Program	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

NEBRAKA

Nebraska Department of Health and Human Service	Lincoln Lancaster Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Division of Behavioral Health Division of Children & Family Services Division of Public Health - Epidemiology & Informatics Unit - Public Health Preparedness & Emergency Response Unit - Environmental Health Unit - Public Health Laboratory Service Unit - Tobacco Free Nebraska Program - Oral Health & Dentistry Program - Immunizations Program - Women, Infants & Children (WIC) - Maternal Child Health Epidemiology - Tuberculosis Control Program	Community Health Service Division - Adult Health Service - Sexually Transmitted Disease Clinic/HIV - Vaccine Clinic Dental Health & Nutrition Services - Dental Health Services - WIC Services Health Promotion, Data & Evaluation Division - Chronic Disease Reduction - Tobacco Prevention & Education - Communicable Disease - Epidemiology - Public Health Emergency Planning	CDC-Wide Activities and Program Support	Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

NEW JERSEY

New Jersey Department of Health	Bergen County Department of Health Services	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Public Health Service Branch Division of Family Services - Chronic Disease Program - Tobacco Control - Women, Infant and Children(WIC) Division of Epidemiology & Environmental Health Division of Public Health Infrastructure, Laboratories & Emergency Preparedness - Emergency Preparedness Section Division HIV, STD and Tuberculosis - Office of Women's Health - Children's Oral Health Program Communicble Disease Service - Vaccine Preventable Disease Program - Infectious & Zoonotic Disease Program	Office of Environmental Health Office of Public Health Emergency Response Office of Health Nursing - Reportable Disease Program - Rabies and Zoonosis Control - Communicable Disease Office of Health Promtion Office of Public Health Outreach - HIV Testing - Tuberculosis Control	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Chronic Disease Prevention and Health Promotion Set-Aside Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

OHIO

Ohio Department of Health Services	Hamilton County Public Health	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Office o Health Improvement and Wellness - Health Service - WIC - Comprehensive Cancer Program/OCISS - Creating Healthy Communities/Chronic Disease Bureau of Infectious Disease - Immunization Program/Vaccines for Children Program - Zoonotic Disease Program -HIV/AIDS Surveillance Program Bureau of Environmental Health and Readiation Protection Office of Health Preparedness Office of Public Health Laboratory Office of Health Policy and Performance Improvement	Division of Community Health Services & Disease Prevention Division of Epidemiology - Vaccine Program Division of STD and Prevention, Testing and Nursing Environmental Health Division	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		CDC-Wide Activities and Program Support	Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Occupational Safety and Health	Education and Research Centers
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

OREGON

Oregon Health Authority Public Health Division	Multnomah County Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Environmental Public Health Section Center for Prevention and Health Promotion - Health Promotion and Chronic Disease Prevention Section - Maternal and Child Health Program - Women, Infant & Children (WIC) Program Center for Public Health Practice - Acute and Communicable Disease Prevention Section - Health Security, Preparedness and Response Section - HIV, STD and Tuberculosis Section - Immunization Program - State Public Health Laboratory	Health Services - Clinics (Children's Care and Women's Health) Child & Family Health Services - Immunizations - Women, Infant and Children (WIC) HIV and STD Services - HIV Testing STD Services Disease Control and Conditions - Infectious Disease - Lead Posisoining Public Health Preparedness	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

TENNESSEE

Tennessee Department of Public Health	Metro Public Health Department Nashville/Davidson County	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Division of Environmental Health Division of Family Health & Wellness - Maternal & Child Health Program -Chronic Disease - Tennessee Tobacco - Women, Infant & Children (WIC) Immunizations, Disease Prevention -Flu Tennessee - Vaccines for Children Program Division Communicable & Environmental Disease Services - Emergency Preparedness Program - Emerging Infections Program - Tuberculosis Elimination Program HIV/STD Program	Environmental Health PEHP - Public Health Emergency Preparedness Family Youth and Infant Health Infectious Disease Program - Immunizations - Tuberculosis -Sexually Transmitted Diseases and HIV/AIDS Epidemiology, Data and Statistics Program Community Development and Planning Division - Tobacco Control School Oral Disease Prevention Program	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Ebola Response and Preparedness Preventive Health Service Block Grant Nutrition, Physical Activity and Obesity
		Chronic Disease Prevention and Health Promotion	Nutrition, Physical Activity and Obesity Safe Motherhood/Infant Healt Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		Environmental Health	Environmental Health Activities
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Vaccines for Children	Vaccines for Children

UTAH

Utah Department of Health	Salt Lake County Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Division of Disease Control and Prevention - Utah Public Health Laboratory - Bureau of Epidemiology *Tuberculosis *Environmental Health * Vaccine Preventable Disease *Sexually Transmitted Infections -Bureau of Health Promotion * Tobacco Prevention & Control Program *Oral Health Program Division of Family Health and Preparedness - Bureau fo Child Development -Bureau of Maternal & Child Health * Maternal Infant Health Program * Women, Infant & Children (WIC) - Bureau of EMS & Preparedness	Emergency Management Bureau - Emergency Medication Distribution Epidemiology Bureau - Foodborne Illnesses - Emerging Infectious Disease Healthy Living Breau - Chronic Disease Program Immunizations Program Infectious Disease Bureau - Communicable Disease - Hepatitis B Sexually Transmitted Disease (STD) Program Tobacco Prevention & Cessation Program Women, Infant & Children Program	Agency for Toxic Substances and Disease Registry (ATSDR)	Agency for Toxic Substances and Disease Registry
		Birth Defects, Developmental Disabilities, Disability and Health	Child Health and Development
		CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging and Zoonotic Infectious Diseases Set-Aside Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

Washington

Washington State Department of Health	Tacoma-Pierce County Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Disease Control and Health Statistics Division - Center for Health Statistics - Communicable Disease Epidemiology - Infectious Disease Program - Public Health Laboratories Office of Emergency Preparedness & Response Environmental Public Health Division - Environmental Epidemiology - Zoonotic Disease Prevention and Community Health Division - Office of Family and Community Health Improvement - Office of Healthy and Safe Communities - Office of Immunization and Child Profile - Office of Nutrition Services	Communicable Disease Control and Public Health Emergency Preparedness Division - Infectious Disease - Tuberculosis (TB) - STD/HIV Services Environmental Health Division - Chronic Disease/Tobacco Free - Immunization - Pysiical Activity Resources Strengthening Families Division - Oral Health - Family Health - Women, Infant & Children (WIC)	CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Occupational Safety and Health	Education and Research Centers
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement CDC Preparedness and Response
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

West Virgina

West Virginia Department of Health and Human Resources	Kanawha Charleston Health Department	CDC Funding Opportunities	
State Health Division/Program Titles	**Local Health Division/Program Titles**	**Category**	**Sub-Category**
Bureau for Public Health - Division of Immunization - Division of Infectious Disease Epidemiology - Division of Tuberculosis Elimination - Division of STD/HIV/Hepatitis - Division of Epidemilogy and Informatics Center for Threat Preparedness - Office of Environmental Helath - Office of Community Health Systems and Health Promotion - Office of Maternal, Child and Family Health	Division of Clinical Services - Immunization Program - STD Prevention & Treatment Program - Tuberculosis (TB) Program Division of Environmental Health Division of Epidemiology - Infectious Disease Program Division of Prevention & Wellness - Physical Activity and Nutrition Program Division of Emergency Preparedness	CDC-Wide Activities and Program Support	Public Health Leadership and Support Preventive Health and Health Services Block Grant - PPHF
		Chronic Disease Prevention and Health Promotion	Cancer Prevention and Control Heart Disease and Stroke Safe Motherhood/Infant Health Tobacco
		Emerging and Zoonotic Infectious Diseases	Emerging Infectious Diseases Vector-borne Diseases Epi and Lab Capacity Program - PPHF
		HIV/AIDS, Viral Hepatitis, STI and TB Prevention	Domestic HIV/AIDS Prevention and Research Sexually Transmitted Infections (STIs) Tuberculosis (TB)
		Immunization and Respiratory Diseases	Immunization Program Influenza/Influenza Planning and Response Immunization Program - PPHF
		Occupational Safety and Health	Education and Research Centers
		Public Health Preparedness and Response	Public Health Emergency Preparedness Cooperative Agreement
		Public Health Scientific Services (PHSS)	Surveillance, Epidemiology, and PH Informatics
		Vaccines for Children	Vaccines for Children

In the early 2000s, the CDC PHEP Cooperative Agreement was created after terrorism and natural disaster responses revealed that state and local public health departments needed funding to increase their ability to respond to public health emergencies. In Table 2, this new funding is found in the CDC Funding Opportunities category of Public Health Preparedness and Response. Each state and local department listed in Table 2 contains a division, office, or some application to support emergency preparedness and response activities.

A creation cycle of one program and funding source per identified need has unintentionally placed an enormous burden upon public health structures at the state and local levels due to reliance on federal budget allocations specific to public health preparedness and response grants. An annual report by ASTHO identifies that a continued decrease in public health full-time staff positions since 2012 is a result of declining federal preparedness grant dollars.[120] With billions in initial preparedness and response funding, state and local public health departments' preparedness and response activities became overly reliant on these individual programs because they operated solely on federal funding. The combination of decreases in federal grant funds and the inability to provide additional funds has led to forty-eight states reporting position decreases since 2008.[121]

The next chapter focuses on the consequences of silos that result from program creation following grant funding. Most public health grants awarded to state and local public health agencies result in little uniformity or collaboration between different programs due to grant rules and requirements. Federal legislation focusing on one specific public health threat at a time results in a disease control program, surveillance program for a chronic illness, or a specific health education program. This is visible in the multitude of sections or public health programs in the 2019 PHSA.[122] This constant modification cycle consequently has driven the mission and structure of state and local public health

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[120] Association of State and Territorial Health Officials, "ASTHO Profile of State and Territorial Public Health," 10.

[121] Katie Sellers, "Budget Cuts Continue to Affect the Health of Americans," The Association of State and Territorial Health Officers, September 2014, https://www.astho.org/budget-cuts-Sept-2014/.

[122] Public Health Service Act of 2019.

organizations because these grants and their subsequent funding have no collective spirit to improve the public health system holistically.

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V. INFLUENCE OF FUNDING CHANGES ON STATE AND LOCAL PUBLIC HEALTH DEPARTMENTS

Prior chapters document the interrelationship between federal funding and the structure of state and local public health departments. Examples from previous chapters depict the piecemeal growth of public health programs over time. This chapter explores the lack of a standardized approach for state or local jurisdictions to fund public health programs, and further, how this is leading to jurisdictions losing services as federal grant funding is decreasing. In addition, the chapter explores how state and local public health leaders' reliance on federal funding led to quasi-independent program silos. This is due to the historic federal funding patterns which ultimately gives a false sense that the federal government will always provide proper funding. This chapter explores the impact of low funding levels and grant restrictions on staffing levels that are spread thin across all public health programs, decreasing the ability to conduct proper surveillance for infectious disease, promote regional health education needs, and respond properly to a public health emergency.

A. CHANGES IN PUBLIC HEALTH FUNDING

The grant names and federal funding tables in Chapter IV show the beginning of state and local departments relying on federal grant money. They depend on this funding to establish the direction and focus through grant guidance. Although the majority of public health funding is derived from the federal government, up to 76% as seen in Arizona (see Table 3) comes with restrictions and requirements that state and local governments have become accustomed to or unaware of, and hence, unconcerned by. This document has highlighted the standard of practice that new federal programs are providing funding to state and local health departments. The question remains is if the funding and guidance are adequate to support the requirements and lead to long-term improvements to public health.

There are three different forms of state and local public health grant funding: categorical grants, block grants, and general revenue sharing.[123] State and local health departments most commonly receive categorical grants, also known as discretionary grants, and block grants. A categorical or discretionary grant is for an individual program and narrowly defines the approved activities. A block grant is less stringent and allows for departments to pass federal grant money on to other community groups, non-profits, or other social service providers based on rules designed by the state or local jurisdiction. Today, of the 1,274 total available federal grants, only twenty-one are block grants.[124] Since the majority are categorical grants, over time the public health department programs receiving grant funding have become hyper-focused on the grant's narrow mission.

By accepting the grant funding, state and local jurisdictions are agreeing to the assumption the funding supports a majority of public health activities and little funding responsibility is placed on the jurisdiction to support the program going forward. Federal grants provide new policies to state and local governments that expand public health's effort in meeting the national priorities identified by Congress, a true top- down approach.[125] State and local departments support the national priorities as set forth in PHS Act (by receiving the federal funding), but it appears that state and local jurisdictions are failing to recognize these priorities as their own. Data from an ASTHO survey reveal that, on average, a state's budget contains 51% federal funds, 21% from the state general fund, and the remaining 28% from other sources such as fees and fines. Table 3 shows standards are lacking for how states' general funds support a jurisdiction's public health department.[126] The federal composition of a state's budget for those sampled in this thesis ranges from 29% to 76%.

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[123] Robert Jay Dilger and Michael H Cecire, *Federal Grants to State and Local Governments: A Historical Perspective on Contemporary Issues*, CRS Report No R40638 (Washington, DC: Congressional Research Service, 2019), 5.

[124] Dilger and Cecire, 25.

[125] Dilger and Cecire, 25.

[126] Association of State and Territorial Health Officials, "ASTHO Profile of State and Territorial Public Health" (ASTHO, November 2017), 127–83, www.astho.org/profile.

Table 3. Association of State and Territorial Health Officers Funding Sources Survey.[127]

Table 3: ASTHO Percentage of State Funding Sources Survey			
State	Federal	State	Other
Arizona	76.5	6.6	16.9
California	37.2	8.5	54.3
Colorado	39.9	7.1	53
Connecticut	38.3	36.3	25.4
Illinois	44	27.4	28.6
Indiana	72.3	8.5	19.2
Kansas	68.2	13.2	18.6
Massachusetts	29	56.6	14.4
Michigan	47.8	36.2	16
Minnesota	43.7	15.3	41
Nebraska	-	-	-
New Jersey	36.1	19.3	44.6
Ohio	62.2	14.8	23
Oregon	63.1	8.5	28.4
Tennessee	40.3	35.7	24
Utah	59.9	18.5	21.6
Washington	50.1	11.8	38.1
West Virginia	55.3	30.5	14.2
Average	50.8	20.9	28.3

The consequences of greater reliance on federal funding are that changes to the federal public health budget allocation will have deeper impacts. Those states with the highest federal funding reliance, such as Arizona, Kansas, Ohio, Oregon, and Utah, are more vulnerable to the impacts of federal budget cuts. Further instability may occur when other funding sources, such as fee collections, fluctuate with the levels of economic activity. In terms of grant development, funding should have been used to make states more self-reliant given the responsibility they took on. States have not fully determined how to make programs sustainable without federal funding. Against the rules of federal mandates,

[127] Adapted from Association of State and Territorial Health Officials, 127–83.

many states cut their share of public health funding once they receive federal grants.[128] State and local jurisdictions' budget controllers are not recognizing that public health is a shared mission, and jurisdictions need to shift to an approach that federal funding should support and enhance, not fund entirely, programs.

Federal grant programs are to enhance state and local systems by passing the authority, responsibility, and capacity to operate the day-to-day public health activities and handle local outbreaks with minimal CDC support. The state general fund provided to public health varies greatly from state to state with no established norms or consideration of the community's public health needs. For example, compare two similarly sized states, Arizona and Washington, which have populations of seven million and 7.4 million, respectively. Table 1 in Chapter IV breaks down the grants and federal funding each state receives, with Washington being awarded $81 million and Arizona $62 million. The difference in funding comes from two grants: Emerging Infectious Disease and Chronic Disease Prevention and Health's cancer research. Although Washington receives $20 million federal dollars more than Arizona, the major difference in state funding ideology appears to be that Arizona's public health budget consists of 76.5% federal dollars compared to Washington's 50.1%. The Arizona Department of Health Services has a budget of $481 million including federal money, fee revenue, and general fund allocation compared to Washington's Department of Health's total budget of $1.175 billion.

Stagnant or decreasing public health funding at the federal level and an over-reliance by states on federal funding cause state and local public health departments to lose capacity and programs. The established structure is not robust enough throughout the entire system to sustain such changes. In 2011, and then again in 2012, approximately 50% of the local health departments reported eliminating or reducing at least one program each budget year.[129] One example found in Chapter IV Table 1 shows that the state of Arizona received $935,500 in funding from the Birth Defects, Developmental Disabilities, Disability, and

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[128] Denise Santiago and Anke Richter, "Assessment of Public Health Infrastructure to Determine Public Health Preparedness," *Homeland Security Affairs* 2, no. 3 (October 2006): 3.

[129] Sarah Newman, "Local Health Department Job Losses and Program Cuts: Findings from the 2013 Profile Study," National Association of County & City Health Officials, July 2013, www.naccho.org.

Health grant in 2017 to accomplish grant goals. In review of CDC 2012 funding profiles, Arizona's award was significantly more at $1.73 million and raises the question of how can a program maintain operations with this steep of a funding decrease with no additional support coming from the jurisdiction.[130] These budget changes over the years and data from public health survey results appear to show that some state and local jurisdiction funding does not make up the difference in funding

The 2017 Trust for America's Health report shows that CDC's budget is lower today than ten years ago, and state funding for public health is lower today than in 2008.[131] One example of a decreasing budget consequence is the CDC PHEP program $273 million reduction in payouts since 2002.[132] Using the same example, if operating at the same level, a grant program receiving $1.67 million in 2012 should be receiving approximately $1.81 million in 2017 according to the inflation Bureau of Labor Statistics Consumer Price Calculator.[133] When budgets are curtailed or become stagnant, the mandatory fixed costs remain and result in employees and activities being cut.

The data demonstrate that changes in federal funding have a great influence on the public health structure and workforce. A decrease in staffing follows the decreased level of federal grant allocations. NACCHO's 2013 National Profile of Local Health Departments found the public health department workforce is 12% smaller than in 2008.[134] In 2016, NACCHO reported that 27% of local health departments have not recovered and suffer continual public health job losses. Since 2008, a total of 55,590 public health positions have been lost due to layoff, hiring freezes, and attrition caused by budget

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[130] Centers for Disease Control and Prevention, "Grant Funding Profile Funding Category View."

[131] Albert Lang et al., "A Funding Crisis for Public Health and Safety: State-by-State Funding and Key Health Facts 2018." (Trust for America's Health, March 2018), 5,14, https://www.tfah.org/report-details/a-funding-crisis-for-public-health-and-safety-state-by-state-and-federal-public-health-funding-facts-and-recommendations/.

[132] Albert Lang et al. "A Funding Crisis for Public Health," 8.

[133] "Consumer Price Index (CPI) Inflation Calculator," U.S. Bureau of Labor Statistics, November 3, 2019, https://data.bls.gov/cgi-bin/cpicalc.pl.

[134] National Association of County & City Health Officers, "2013 National Profile of Local Health Departments" (NACCHO, January 2014), 25, www.naccho.org.

reductions.[135] The size of the public health workforce has not returned to numbers achieved following the passage of the 2006 PAHPRA, which was based on the poor response to Hurricane Katrina.

B. CHANGES IN THE PUBLIC HEALTH WORKFORCE

As public health is attempting to rebuild a 10-year workforce gap, many factors challenge those smaller operating budgets that do not rise at the rate of inflation. Jurisdictions that can add and fill staff positions are reporting difficulties replacing individuals with the desired public health experience. Smaller budgets are making it more difficult to be competitive when recruiting experienced public health professionals.[136] Therefore, positions either remain vacant, thereby continuing the manpower shortage, or are filled with inexperienced, more junior individuals.

Replacing years of knowledge and skills are silent threats to the public health system because new employees lack the awareness of how different grant programs relate. Consider when a person graduates with an undergraduate or higher-level degree and enters into the workforce for the first time. Everyone struggles with the transition of applying academic knowledge into real-world operations. The less experienced employee coming into an established public health program may not be aware of how federal funding or grant legislation applies to his or her position and the entire department. Due to the limited size of the workforce, new employees cannot easily be trained on the depth of the entire public health system, and therefore receive training only on the single grant program for which they were hired. Essentially, a person is hired and trained to complete a specific task within one grant. As a result of the current structure and low staff numbers, the inability to train inexperienced public health professionals on the interconnectivity of the entire public health system deepens the silos.

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[135] National Association of County & City Health Officers, "The Changing Public Health Landscape Findings from the 2017 Forces of Change Survey" (NACCHO, November 2017), 7, http://www.naccho.org.

[136] National Association of County & City Health Officers, 37.

Employee turnover and workforce gaps greatly reduce institutional knowledge. For such knowledge to be retained, employees must have more opportunities to work together across multiple areas.[137] However, such cross-training cannot happen in the grant-driven funding relied on by public health. Grant language, such as that contained in the Epidemiology and Laboratory Capacity for Infectious Disease (ELC) grant, typically restricts required activities to be in alignment with specific grant outcomes, making cross-training for non-grant activities non-reimbursable and therefore not considered.[138] For that matter, federal agencies assume broader public health activities will be funded by state and local sources as part of the Federal Code of Regulation compensation requirements.[139] As such, learning opportunities need to be funded by state and local budget sources, which are profoundly lacking in many states.

Eventually, the knowledge depreciation within an organization will disrupt the work force and its ability to execute its required activities.[140] In particular, the decrease in department size and the overall experiences of today's public health workforce are contributing to a loss of emergency response capacity. The staffing needs for any public health emergency and response will depend on the severity of the disease, the ability for the disease to spread, and the likelihood of death. A public health outbreak typically will require assigning response roles to multiple epidemiologists, nurses, preparedness staff, laboratory technicians, administrative support, and key leadership positions.[141] Epidemiologists follow a thirteen-step investigation process that drives different public

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[137] Linda Argote, *Organizational Learning: Creating, Retaining and Transferring Knowledge*, 2nd ed (New York, NY: Springer, 2013), 72.

[138] Center for Disease Control and Prevention, "2019 Epidemiology and Laboratory Capacity for Prevention and Control of Emerging Infectious Diseases (ELC)CDC-RFA-CK19-1904," May 17, 2019, 13, https://apply07.grants.gov/apply/opportunities/instructions/PKG00248701-instructions.pdf.

[139] "Grants and Agreements," Office of the Federal Register National Archives and Records Administration, *Code of Federal Regulations*, title 2 (January 1, 2019):100, http://bookstore.gbp.gov.

[140] Linda Argote, *Organizational Learning*, 73,95.

[141] Centers for Disease Control and Prevention, "Public Health Emergency Response Guide for State, Local, and Tribal Public Health Directors" (U.S. Department of Health and Human Services, April 2011), 13, https://emergency.cdc.gov/planning/pdf/cdcresponseguide.pdf.

health activities, such as providing post-exposure prophylaxis, coordinating hospital care, or calming an individual's fear by determining exposure did not occur.[142] Ideally, an experienced individual will know all of the roles needed for a given response and can staff positions with appropriately-matched public health professionals.

Local public health departments need staff who can adjust from daily activities to the needs of a health crisis. In an ideal situation, these individuals would have been trained on many different public health activities and know -how their individual public health knowledge and experience best support a public health response. Unfortunately, either the staff is missing or his or her position has been eliminated due to reduced grant funding. Also, given the difficulty of hiring experienced professionals due to limited budgets, new staff are inexperienced and unaware of their role in a greater response effort. Staff are tied to restrictive grants and limited possible activities under their grant-funded positions. Based on the employees' grant source and funding restrictions, individuals may not even be available for use in a public health emergency. Currently, using grant funds for activities not specifically identified in the grant funding documentation is prohibited. So, identifying and guaranteeing another source of funding would delay the individuals working on an emergency response.

C. CONFUSING GRANT LANGUAGE

Although a lack of training across the public health system and low institutional knowledge leads to workforce silos, other factors contribute, too. As emphasized in previous chapters, a state may receive many multiple, but similarly-focused federal grants. This causes additional confusion and silos within the various public health departments. As an example, HRSA awards the Zika Maternal and Child Health Services Program to ensure access to medical services for women, children, and infants affected by the Zika

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142 "Principles of Epidemiology in Public Health Practice, Third Edition an Introduction to Applied Epidemiology and Biostatistics," Centers for Disease Control and Prevention, October 23, 2019, https://www.cdc.gov/csels/dsepd/ss1978/lesson6/section2.html#step1.

Virus.[143] Similarly, the PHEP Cooperative Agreement receives CDC funding to rapidly identify Zika outbreaks and the families impacted, and then connect them to necessary community services.[144] Thus, HRSA and CDC are two separate federal agencies under the DHHS that each can provide funding for two different programs within a state or local public health department for the purposes of identifying and responding to the Zika virus. Taking into consideration that the grant award language is directly tied to its outcomes, they now have two separate programs working on similar activities without considering how to better align activities between them. Chapter V addresses the inefficient and costly processes set up in these two separate divisions within DHHS. The competing grants influence organizational structure and staffing needs based on one disease threat versus a broader focus on protecting the community from any disease.

This example is only one of many federal grant award scenarios resulting in multiple state and local public health single-focused programs. Another example lies in the purpose of the CDC's ELC and PHEP grants. The goal of the ELC grant is to strengthen the epidemiological and laboratory capacity for rapid detection and response to outbreaks.[145] The PHEP grant supports 15 capabilities for state and local public health departments to implement. Of these, one capability is dedicated to Public Health Surveillance and Epidemiological Investigations and another to Public Health Laboratory Testing to advance public health activities. Again, as shown in previous chapters, the ELC and PHEP federal awards lead to two different programs rather than a single effort that must align based on global outcomes versus the individual grant requirements.

The same confusion-causing practice found with the ELC and PHEP grants can be seen in HRSA funding awards. Three HRSA grants (the Maternal and Child Health

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143 "Zika Maternal and Child Health Service Program," Health Resources & Services Administration, accessed July 5, 2019, https://www.hrsa.gov/grants/fundingopportunities/default.aspx?id=e26daf4b-854a-456c-abf9-82040ab351b2.

144 "PHPR Funding for Zika Preparedness and Response Activities," Centers for Disease Control and Prevention, accessed July 5, 2019, https://www.cdc.gov/cpr/readiness/funding-zika.htm.

145 "ELC Program Essential Funding For Public Health Lab Response," Association of Public Health Laboratories, accessed July 5, 2019, https://www.aphl.org/policy/Pages/ELC.aspx.

Services, the State Maternal Health Innovation Program, and the Supporting Maternal Health Innovation Program) all share the same overarching goals of improving access to healthcare during and after pregnancy, supporting women and children's unmet health needs, and strengthening community partnerships. One difference between the three grants is the agencies eligible to receive the grant funds. Thus, similar goals are spread across different programs and/or partners, but the silos generated by the grant language cripples the grant awardees' ability to improve collaboration. Therefore, overall effectiveness of three grants is decreased.

Silos and confusing grant language lead to not knowing which public health program or department is responsible for specific health activities. Ironically, it can also mean duplication of some work in a time of reduced funds caused by the constraints of grant language. Furthermore, due to the lack of federal or state funding, programmatic gaps may exist within an individually-siloed department with no support possible. Currently, there is no mechanism to allow the sharing of capabilities across different grants and funding sources as the U.S. Code of Federal Regulations limits activities to what the federal grant award directs.

Response planners for a public health outbreak may assume certain capabilities exist within specific silos of their public health department. However, several issues may arise that prove these assumptions to be false. First, who in the public health department has the knowledge of the capabilities or experience within each silo and how will that person gain this knowledge? Second, what happens if a grant-funded program chooses to drop an area of expertise or capability because of funding decreases? The decision to cut an activity is based upon available funding and the public health system is not accounting for how this affects the overall response capacity since only program insiders know of the program's importance. Can this capacity be replaced somewhere else within the public health organization? If it cannot be replaced and the need subsides, can public health regain the capacity in time to mitigate a threat when the need emerges? In all of these cases, the public health department may experience this major capability gap as it is unaware and can do nothing to back-fill these positions.

Funding decreases, restrictive grant language, and the loss of experience over the past decade have diminished the ability of public health to efficiently and effectively respond to a major public health emergency. The United States is experiencing an unusual time with the reoccurrence of infectious diseases such as measles and mumps, the resurgence of the Ebola virus, and the potential for a pandemic influenza beyond the current public health system's ability to handle. The overall experience level of public health is declining and the departments most impacted have not considered how these losses are decreasing the nation's capacity. Trying to maintain the current standard in which one public health initiative or threat response receives a single grant needs to be modified by moving to an all-inclusive approach.

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VI. CONCLUSION AND RECOMMENDATIONS

This thesis demonstrates how the century-old foundation and current organizational structure of state and local public health departments have become weak and are on the verge of collapse. Although the U.S. public health system of federal, state, and local departments continues to fight multiple public health threats such as anthrax, hurricanes, superstorms, infectious diseases, decreased immunization rates, and increases in chronic illness, each battle has taken its toll. The current strategy is not to fund PHEP programs to effectively and efficiently battle an outbreak, but rather to provide funding band-aids to combat outbreaks as with Zika, the Opioid Crisis and Ebola. Given its dependence on federal grants with narrow program focus and organizations' additional unrestricted funding needs, improving the overall structure of public health to sustain a higher level of public health activities needs to be addressed before a system failure at next outbreak.

As with many public health practices, uncovering the source of the issue requires a mountain of data. Ironically, the effect of collecting individual public health threat data is slowly killing state and local public health departments. This thesis shows that public health continues to operate on the same foundation and principles used since the late 1800s, knocking out one disease at a time. The public health efforts began with the need to fight off an individual disease. Over time, with each newly identified threat came the passage of federal legislation leading to a new program with new funding to support a singular mission. Sometimes, having the mindset of "if it isn't broke, don't fix it" can lead to an organization's demise. As many early public health employees in the preparedness world can remember, the Blackberry phone was the hottest item but lacked progressive thinking when competing with advancing technology.

Similarly, state and local public health departments are confronting the consequences of the public health structure's lack of evolution. Chapters III and IV document that these departments' structure and programs match the federal grant programs and funding received. Graphs in Chapter 3 show this as a historic problem because some federal grant program names and funding have been around for half a century without change. The public health structure is similar across the United States, no matter whether

comparing one state to another, a local to a local department, or even a state to a local department. Clearly, public health system programs are based upon the federal monies received. As funding remains level, or in some areas is decreasing, reliance on federal grant funding and narrow allowable activities are adding pressure to state and local jurisdictions. As demonstrated in Chapters IV and V, complacency over the need for funding other than from federal grants is limiting priority activities.

As shown in Chapter V Table 3, state and local public health departments rely on federal funding that composes an average of 51% of their budgets and, in some jurisdictions, it can be as high as 76% of the total public health budget. State and local jurisdictions have not accepted greater responsibility in accomplishing the national public health priorities within their jurisdiction as they contribute only 21% to the overall budget.[146] Funding is only one part of the toxic mixture. The types of grants that are awarded to the states and locals are for a specific public health mission with limited to no flexibility to complete non-grant activities within other public health missions. Over the years, to protect programs and funding and ensure legal compliance with grant requirements, it has become safer to operate in silos focusing on the grant needs rather than address what the public health mission demands. Over the centuries, the collective public health mission has been lost and replaced by a focus on individual grant-siloed activities.

The public health mission occasionally changes due to human and natural-caused emergencies and threats from emerging infectious diseases, leading to new sources of money. For a period of time, the surge of funding provides a small improvement for a singular and narrow focus, but the impact does not spill over into other public health programs. One recent example is federal money in support to end the opioid epidemic, where many jurisdictions do not have the staff or resources to accomplish this task on their own due to their small and restricted budgets. The bump in funding is significant, and a new program with a new team was established. This gives the illusion of added personnel available during a crisis because these individuals have not been trained in the broader

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[146] Santiago and Richter, "Assessment of Public Health Infrastructure to Determine Public Health Preparedness," 2–11.

public health activities, and will not know where they can fit in a crisis situation. Further, they will need to be funded by a different source during a non-opioid crisis since it is illegal for grant-funded personnel to do non-grant work. The illusion of an extra workforce will fade when the funding line is slowly cut as the opioid epidemic fades from the headlines. Once the funding is exhausted, the activities that had been performed by the grant-funded personnel will be difficult or nearly impossible for the public health agency to maintain. Although new sources of much-needed revenue will eventually become available to public health—since the paradigm of creating new legislation and funding targeted to a specific threat will continue—the overall public health capabilities and capacity will have been bastardized.

State and local governments have become too reliant on the federal government to provide funding and are not stepping up to cover funding gaps. Undoubtedly, this creates capability gaps. Federal grants, the source of much of today's public health financing, however, are much lower than fifteen years ago. Agency funding remains stagnant, and jurisdictions not covering budgets to the former funding levels are experiencing decreases in public health capability. One indication that public health can no longer sustain a high level of activities is the 10-year reduction in workforce size.[147] As the system is attempting to recover, inadequate funding and low staffing numbers are contributing to yet another source of failure—poor institutional knowledge throughout all public health domains. The reductions in the workforce and resulting inexperience have left many departments vulnerable and struggling to find a fix.

Currently, one of the leading solutions to an unstable funding model and a department's struggle to increase staff is to close a program.[148] A program closure reduces the number and quality of services provided to the general public, but the impact expands beyond the program itself. Responding to a significant public health event requires resources that are distributed across multiple applications. Therefore, one program closure

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[147] National Association of County & City Health Officers, "The Changing Public Health Landscape Findings from the 2017 Forces of Change Survey."

[148] National Association of County & City Health Officers, 11–13.

can create an unrealized capability gap that will be hidden until an emergency reveals it. The primary concern is the loss of response capacity, and such a gap will prolong a significant public health emergency. Last, the type of program lost can make the community more vulnerable to disease spread such as influenza or dilute the public health's message on topics such as vaccine efficacy.

During the next major public health event, natural or manmade, affecting the entire nation, the same historical pattern likely will occur. After action reports will show that the public health system has less capacity than ten years ago, and urgently require more staff and replacement of old equipment. The identified gap will lead to a new program to deal with the threat, and an increase in federal funding to fix the issues associated with the event. As time progresses, funding will not be sustained, and in a few years, the cycle will repeat itself again with another named disaster.

What is needed instead is a more holistic approach to public health. Public health needs to be viewed as an entity in and of itself rather than as a motley collection of grant-funded programs. Public health needs to be strengthened at its core.

A. RECOMMENDATIONS

The public health system, including federal, state and local government agencies, has an opportunity and responsibility to improve the public health system, to rebuild the foundation, and to strengthen the ability to effectively and efficiently respond to a significant public health emergency. Rather than follow the same band-aid approach of increasing federal and state funding only after a specific event, the need for a better public health foundation should be the priority. The following recommendations are some possibilities to move toward this ideology. They can be implemented separately or together, depending on the appetite for change. They include organizational realignments and proposals to amend federal grant language which would increase the public health system as a whole rather than for a unique purpose.

1. Recommendation #1: Amendments to Grant Language

The purpose of the public health enterprise is to improve the health and well-being of people. When reviewing state and local health departments' grants, the narrow language limits the ability of a department to operate as a whole inclusive team. The federal grant language is inadvertently restricting the state and health departments' program activities into a singular need in order to maintain the funding without consideration of the needs of entire health department. While large organizations and teams are successful based on the sum of the whole working in collaboration, this isn't true for public health as successful activities come from one program at a time.

If DHHS could modify the grant language to promote the integration of a new requirement into an established program, versus creating a new program, the whole system can see an improvement. For a change of this type to work, public health organizations will need to conduct program and office evaluations for the goal of restructuring into public health domains, categories based on capability, or concurrent activities. The overall strength of a state or local public health department will increase given this more inclusive approach, combining multiple program efforts into one assembled group.

Evaluating similar public health grants' goals, it is possible to find overlap and the areas that include cross-collaboration are likely candidates for incorporation. Comparing PHEP to any one of the epidemiological grants, for example, shows duplication of effort and silo activities. One grant is responsible to support planning for major outbreaks of an infectious disease and one group is responsible for routine surveillance and mitigation of a disease less than outbreak size. With an emergency response requiring vaccines, certified vaccinators are within public health, but depending on who their grant services or the kind of vaccine provided, allows them to support the overall public health response.

The initiative to change structure can come from the state and local health departments themselves or can come top- down as would happen with Recommendation #1. Ideally, both initiatives would happen, thereby making change more likely. To begin, state and local public health departments need to carefully review federal legislation and the subsequent grant language in detail for the purpose of identifying the programs with

similar activities and goals which are good candidates to become united. This will require a major shift from historic public health thinking of focusing on the grant's disease or chronic illness to growing a public health program that best suits grant activities.

One major foundation to global and United States public health action is surveillance activities. The CDC Field Epidemiology Guide defines public health surveillance as "the ongoing, systematic collection, analysis and interpretation of health-related data essential to planning" without mention of a specific public health threat.[149] Chapter IV includes some federal grants that contain surveillance activity for the program's specific disease of choice. Modification of the grant language to focus on surveillance activity, not including a disease, or allow surveillance activity of one grant to support all other events, will permit multiple grant migration into one domain that is supported by all multiple funding sources.

This change would provide a more robust and overall stable surveillance capability. The federal grants can add language that includes a percentage of this grant for surveillance capability and capacity and not narrow it to a specific disease. This recommendation does not dampen the oversight of funding or bring action against those that are not proving to be good stewards of funding. Rather, it favors the creation of foundational instead of narrow disease-specific capabilities. This change in grant language would require state and local public health departments to modify their current structure away from silo grant programs such as disease surveillance, chronic disease prevention, emerging infectious disease, or public health preparedness into programs that can support each other day to day without having to request permission from CDC.

Public Health has become accustomed to operating in these different silos, rather than working collaboratively on a routine basis. A low-hanging fruit for change starting point may be found within the ELC and PHEP grants. ELC is under the Prevention and Public Health Fund and aims to improve epidemiologic and laboratory capacity to respond

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149 "Introduction to Public Health Surveillance," Centers for Disease Control and Prevention Public Health 101 Series, November 15, 2018, https://www.cdc.gov/publichealth101/surveillance.html.

to Zika or Ebola Virus outbreaks.[150] PHEP has similar goals for the development, training, and implementation of response plans for outbreaks and provides funding for epidemiology and laboratory analysis.[151] Removing the current grant language, it is easy to see these grants are specific to building routine activities with emphasis on greater response capacity during an emergency, yet they currently operate independently. Depending on the public health jurisdiction, different levels of collaboration are possible based on activity needs and current capacity. By changing the public health language of two grants, departments can focus on the main capability of detection, conformation testing, and diagnosis as unified requirements versus today's mentality of doubling work and grant reporting requirements.

2. Recommendation #2: State and Local Department Restructuring

Considering that state and local public health departments' organizational structure follows federal public health grant missions, an easier path to restructuring is possible. The ability to restructure public health departments may be faster and less complicated with modifications to federal grant language and guidelines, but not impossible to make changes today. Today's federal grant language and the funding provide guidelines as to what activities are allowable for state and local public health for threat study and/or mitigation. Configuring activities into domains or categories is not a new concept. For example, the public health enterprise is taking massive steps to align with the national Public Health Accreditation Board (PHAB) standards and measurements.[152]

For jurisdictions that have yet to receive PHAB accreditation, data from Chapter IV reveal many state and local public health programs participate within the CDC PHEP grant. Before considering that reorganization is two difficult or obtaining PHAB

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[150] "ELC Program Essential Funding For Public Health Lab Response."

[151] Centers for Disease Control and Prevention Center for Preparedness and Response, "Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health," 120–36.

[152] Valeria Carlson et al., "Defining the Functions of Public Health Governance," *American Journal of Public Health* 105, no. S2 (April 2015): 1–4, https://doi.org/10.2105/AJPH.2014.302198.

accreditation is too costly, those jurisdictions with a PHEP program have established knowledge and have already been working collaboratively within different domains, as defined in the PHEP Cooperative Agreement Public Health Capabilities.[153]

The important ideology of PHAB and PHEP is the focus of multiple activities conducted under one domain for the greater good. The domain concept is to structure the public health system for protecting the whole community from daily threats through a major public health emergency. Domain goals included within PHEP and PHAB are to improve all public health departments using the same national standards, thus improving the entire system, and most importantly, creating collaboration within and across departments. The PHEP grant containing six domains with fifteen capabilities supports state and local public health departments to improve the capability and capacity for emergency response through the development of day-to-day activities such as Community Wellness, Communications, Public Health Surveillance, and Epidemiological Investigations, and Public Health Laboratory Testing.[154] The process and procedures within PHEP grant parameters can be applied across all public health, but currently limited because of the narrow grant language and singular program focus. The PHAB standards and performance measures include twelve domains that are inclusive to all departments, offices, or programs within the health department.[155]

These two programs offer the most complete template to structure realignment. PHEP and PHAB include the public health actions of identifying the population in need of health interventions. PHEP Domain 1 Community Resilience, PHAB Domain 3 Inform and Educate the Public, and Domain 4 Engage with Community to Address Health Problems focus on chronic health issues or disease threats and on educating and

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[153] Centers for Disease Control and Prevention Center for Preparedness and Response, "Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health," 5–10.

[154] Centers for Disease Control and Prevention Center for Preparedness and Response, 120–36.

[155] Public Health Accreditation Board, "Public Health Accreditation Board Standards: An Overview" (PHAB, December 2013), 2, https://www.phaboard.org/wp-content/uploads/2019/01/PHAB-Standards-Overview-Version-1.5.pdf.

encouraging improved health practices for increasing the community's resiliency during an emergency. Therefore, the activities under these domains may become one program in public health that includes funding from multiple grants to allow for more structural resiliency. This new program may receive funding from multiple grants. If funding decreases in one, the entire activity suffers.

Creating a new structural domain out of PHEP and PHAB called, the Detection and Response Domain, will include all detection, monitoring, and surveillance activities. An outbreak activates the PHEP process and procedures, no matter which grants govern at the time. During an emergency, although the current structure and funding have limited the number of staff and knowledge, any epidemiologist through any grant will be deployed to respond. Under this restructure, having a greater number of staff is possible by pooling different grant resources. The PHEP grant activity and training requirement will create a more knowledgeable response workforce and therefore increase response capabilities if the organization aggregated resources in one domain. Increasing the number of trained and available response staff eliminates the fear that working outside the scope of a grant will jeopardize future funding.

Having this type of realignment without requiring grant language changes is entirely feasible. No rules forbid this realignment from happening now, but it would require programs to demonstrate support of the grant-specific requirements and likely require additional staff to manage grant reporting. Grant rules requiring a public health worker to document his or her time to a specific grant fund and activity mandate this change. Today, if a public health department would like to restructure, all staff would be funded through two, three, or maybe four different grants, and each one requires documentation to justify relevance to a specific grant. This onerous documentation creates complacency and silos. Although the easiest federal language change would be to decrease the reporting requirements of grants the staff works under, it is also highly unlikely. Making the grant language broader is a more realistic goal. Additionally, making this change is extremely logical: an epidemiologist's or public health professional's job description does not change by disease or threat but is a core competency.

Changing an almost two-centuries-old process to this structural or organizational change will be challenging with different levels of disruption along the way. Conflicts may arise as someone loses a leadership position title or has an increase in supervisory responsibilities. Personality conflicts will arise and lengthy discussions on which method is more successful will challenge loyalties. These will arise due to disease-based practices rather than activity based. Due to funding and position losses, the need to change is apparent. Also, there is no apparent increase in funding sufficient enough to address all individual public health grants.

3. Recommendation #3: Change Grant Types Awarded

A recommendation to the federal government that would be needed to further support the structural modifications in #2 is to change the grants to block type, rather than categorical. This would reduce the number of narrowly focused grants. The rules of block grants make such responses more flexible and can support changing to domains over program-specific grants. Block grant language may maintain specific language on funding use to be in alignment of domain activities within PHAB categories.

4. Recommendation #4: Responsible Funding To Maintain a Response Workforce

As expressed in Chapter V, public health is at a critical funding crossroads. NACCHO and ASTHO reports programs being shut down due to funding and a weakening workforce. This is decreasing the entire public health capability. The fourth and most difficult recommendation is for state and local jurisdictions to increase budgets to support a more efficient response structure. The public health workforce become first responders during an emergency, and like other responders, should be expected to maintain standard response times. A simple increase in funding, without a fundamental change to the operation of public health as a response entity, will not support the improvements to the public health system. A reorganization could include the analysis of the funding needed to maintain a response capacity with the assumption that eliminating the duplication of effort caused by multiple grant languages would allow the day-to-day activities to distributed among more employees.

The risk jurisdictions are playing with the unbalanced funding ratio of federal to jurisdiction is the assumption that this can support an effective public health response. To promote the need for more funding support and organizational restructuring, public health jurisdictions need to use a response cost tracking tool to document the personnel needed for a public health outbreak. The recommendation is to institutionalize a requirement for state and local jurisdictions to identify and maintain a staffing level that supports the response, including jurisdictional funding closing the staff gap.

Although states may claim the need to exponentially increase funding, requiring a small increase in jurisdictional funding may be achievable if the previous reorganization recommendations are put into place. For example, the following federal-funded programs Vaccines for Children, ELC, PHEP, HIV/AIDS, and Tuberculosis each have three employees employing federal grant dollars. Currently, if the recommendation is to maintain fifteen staff, the jurisdiction will panic over how to increase PHEP funding for twelve more positions. Under today's public health process, the choice to fund or not creates problems. If the jurisdiction funds, twelve more staff will be added to PHEP, leaving the other programs with three with no increase to the overall public health mission. The choice to fund, as outlined in Chapter V, may close programs in order to redirect funding. No one choice improves public health, making restructuring the most viable and attractive option.

The first step is for public health to identify and group similar grants of disease identification, epidemiological surveillance, and response mitigation through the use of medical countermeasures into a new domain called Detection and Response as an example. Including recommendations 1 and 2, this restructuring would allow public health departments to move away from individual disease programs to an expanded program that has merged all staff focusing on outcomes for the community, not one disease. Now, the four programs which independently included three staff becomes the new Detection and Response domain, including twelve federally funded response workers.

Under the restructuring, the jurisdiction will need to fund three new positions and not the previously feared twelve to meet the requirements. Most importantly, these new positions can be assigned to the greatest need within the domain and not a specific disease.

Overall, this example reveals how a restructuring, with a jurisdictional funding requirement, has a more effective, efficient, and properly staffed response group in place.

B. LIMITATIONS AND FUTURE RESEARCH

The research in this thesis has limitations as do the recommendations. This document includes a small sample size of state and local health departments. The health department divisions, office, and program names found through open-source data may not reflect the entire health departments' structure and culture. The federal grants included for comparison cover only those received through the CDC, and although the report does mention the WIC program and HRSA grant, their language and impact on structuring have not been examined.

Future research should examine all state and local public health department structures based upon all federal and jurisdictional funding received. A complete comparison of programs across the United States including all jurisdictions with a list of activities each program accomplishes based upon the grant funding would address these limitations. In addition, this representative sample would show the CDC how grant language and funding translates at the local level with direct impacts on the community.

Another avenue of future research would be for NACCHO and ASTHO to survey the public health workforce to gain a better understanding of public health professionals' understanding of their positions, program funding, and how they and their programs support the overall public health system. The results of this survey would allow for more thorough suggestions in improving funding language and for greater detail to the findings suggested in this thesis.

C. CONCLUDING REMARKS

This thesis demonstrated that the organizational integrity of the state and local public health system has become overly reliant on multiple federal grant funding, leading to program closures and a decrease in emergency response capabilities. The data included in this document stress that the historical status quo of the public health system is slowly

leading to the dismantling of public health programs. If change does not occur, public health will not be stable enough to support the health of our communities.

The public health system needs to evolve away from the cycle of a national public health priority becoming an individual state or local program. Changing this process creation approach can protect departments during funding changes and remove silos. The perception of one grant to one program per one disease threat has stretched the health departments thin resulting in the duplication of effort and confusion. Although they share the same goal of stopping the virus, diseases such as Ebola and Zika have created multiple programs to accomplish different activities. Currently, health departments are maintaining programs based on disease activities, while this report provides suggestions to make structural changes based on domains.

Public health departments need to explore their organizational structure and current grant funding to recognize how the grants are driving the public health mission on an individual basis. A cultural change shifting the current structure to a domain focus will allow the health departments to utilize multiple grants following a similar process, rather than the diseases. With a new structure, it is possible that staff may be utilized for multiple public health activities rather than for what is currently limited within these grants. For example, surveillance and investigation of the diseases tuberculosis and measles follow a very similar process. However, they have different programs and grants. Then, in the event of an outbreak, preparedness and response come in to support the mitigation. All three programs have a similar broader mission, yet all three have different grant funding and goals. A more efficient and stable health department should organize in a way to utilize all funding for this one goal.

Events such as the anthrax attacks and Hurricane Katrina are examples of what occurs when a workforce is underprepared and inexperienced. The cycle of funding to public health has created a ten year low in the workforce, where knowledgeable staff cannot be replaced. This results in a further decrease in capacity. In the event of the next major emergency, public health will struggle and gaps will be undoubtedly again identified. New funding will be awarded to an individual program for a period of time. Alternatively, a newly structured organization can support an increase in readiness today, leading to a more

successful response. Then, later if more funding is awarded, it may help improve the overall public health system rather than one individual program.

The federal government can support the changes of the public health system through grant language modification for national priorities. The grants should be changed to block grants which will allow for more operational flexibility within health departments. Additionally, change the grants to remove narrowly-focused and individual disease language to support a specific process such as the investigation and response to an outbreak. Now is the time to bolster the public health system with more modern and efficient programs. Programs where federal, state, and local health departments are working in collaboration to make operational improvements and ultimately, protect the health of our communities.

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