FINANCING RURAL PUBLIC HEALTH ACTIVITIES IN PREVENTION AND HEALTH PROMOTION

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1. Executive Summary

Public health in rural areas has many distinctive features, often shaped by state-level infrastructure and the related organization and financing of public health activities. State-level decisions about infrastructure affect who carries out public health activities in rural areas (the state health department (SHD), local health departments (LHDs), non-governmental organizations (NGOs), and/or private-sector professionals and organizations), as well as how those activities are financed.

The goal of the study was to determine whether the flow of federal resources, from federal agencies, through states, and to communities, is influenced by state and local level public health infrastructure. Given our interest in the flow of federal resources, we selected specific CDC prevention funding lines for analysis that were likely to be accessed by a majority of states for local public health service provision. The CDC programs included in our analyses were: Cancer Prevention; Chronic Disease Prevention/Health Promotion; Diabetes Control; and the CDC Preventive Health and Human Services (PHHS) Block Grant.

Through this study we have conducted both quantitative and qualitative analyses to assess the relationship between public health infrastructure and the availability of these specific CDC funding streams to address rural community needs. Notably, CDC prevention funding streams make up a very small portion of LHDs' overall programmatic budgets; the intent of the study is not to imply that these are the only sources of prevention funding available to localities.

Quantitative analyses were conducted by examining CDC funding allocations for chronic disease prevention and health promotion activities across all 50 states, as well as data from the 2005 National Association of County and City Health Officials (NACCHO) survey. For the set of state-level analyses, rurality was based on the proportion of the state's population residing in a rural area. Categories of rurality then were defined by quartiles of the distribution of the proportion of the population residing in rural areas across states.

For the NACCHO survey analyses, rural was defined using Rural-Urban Commuting Area (RUCA) classifications based on LHD location; categories describing degrees of rurality were defined as follows: RUCA codes 1-3 represent urban areas; RUCA codes 4-6 represent micropolitan areas; and RUCA codes 7 and higher denote rural areas. Analyses also included comparisons of "aggregated rural" versus "urban," where RUCA codes 4 and higher were combined to form a single "aggregated rural" category. In order to adjust for variation in revenues due to population size served by LHDs, we examined per capita revenues defined as reported revenues divided by the reported size of population served by each LHD. Because the focus of our study is prevention funding and LHD clinical revenues are primarily used for health care delivery and not prevention, we included only non-clinical revenues in our comparisons of per capita expenditures.

Qualitative analyses were conducted through a structured interview process whereby CDC funding streams were "tracked" through successive interviews conducted within a sample of six states - Kentucky, Nebraska, New Mexico, Pennsylvania, South Carolina, and Wyoming – to determine the availability and use of these public health resources.

SUMMARY OF KEY FINDINGS

- Based on our qualitative analysis of CDC prevention funding for diabetes, cancer and injury prevention, states report that funds are too limited to distribute effectively to the local level. As a result, most of the funding is retained at the state level to develop statewide program initiatives.
- Respondents reported that local funding, when provided, tends to be allocated through competitive mini-grant processes that are often difficult for rural agencies to access due to infrastructural and staffing challenges. Further, there is a perception that funders are increasingly using evidence-based research models in making funding decisions. Since many LHDs and NGOs provide community outreach and service delivery activities (which typically have no data collection component) they are not able to "make the case" for their continued success by presenting analyses of the effectiveness and efficiency of their programs to their funders.
- Mini-grant amounts are reported to be too small to build local program capacities and are often awarded to communities with existing capacities rather than those with greater need. Awards are generally made on an annual basis and can not be counted on to sustain programmatic activities.
- Quantitative findings show that the average annual amount of CDC per capita funds for prevention activities varies widely across states. While the highest annual CDC per capita funds for prevention activities were among the most rural states, comparisons across categories of rurality showed no significant relationship between CDC per capita funds and the proportions of states' populations residing in rural areas.
- The per capita level of CDC funds for prevention activities does not appear to be related to states' public health infrastructure.
- Whether LHDs are classified as units of the state health agency or units of local government is not related to per capita non-clinical expenditures.
- Rural LHDs have higher per capita non-clinical expenditures than non-rural LHDs, possibly due to fixed infrastructure costs which are generally independent of population size served by an LHD.
- Compared to urban LHDs, rural LHDs receive a higher proportion of total revenues from state direct and federal pass through, and a lower proportion from local and federal direct sources. This affects the rural LHDs ability to access resources to address locally identified needs.

Not surprisingly, the extent and quality of public health services depend greatly on the resources available to conduct program activities and thereby address community needs. To the extent that rural communities are less able than non-rural communities to successfully access these resources, limited financial resources and uneven distribution of funding across and within states have the potential to lead to uneven health outcomes and a deepening of existing rural-urban health disparities.

<u>Finding 1</u>: Based on our qualitative analysis of CDC prevention funding for diabetes, cancer and injury prevention, states report that funds are too limited to distribute effectively to the local level. As a result, most of the funding is kept at the state level to develop statewide program initiatives.

Because the funding streams examined in this study were judged by most states to be too limited to distribute effectively to the local level and thus often were not made directly available to local communities, it was difficult to adequately assess how infrastructure affected local communities' abilities to access federal public health funds. Examination of more highly funded federal programs that are also intended to reach local communities, such as preparedness funding, may provide a better understanding of the relationship between public health infrastructure and financing.

<u>Finding 2</u>: Additional studies are needed to assess optimal methods for distributing limited resources to achieve a statewide impact. Current methods, developing statewide initiatives and mini-grant programs, should be evaluated to measure their impact on (and accessibility to) communities with greatest identified need. Studies should also assess the degree to which evidence-based research models create barriers for rural program development and sustainability.

Most funding appears to be used to establish statewide program initiatives and/or is distributed competitively through mini-grants. The effectiveness and responsiveness of statewide initiatives to address community-level needs is an important issue needing further study. Rural accessibility to mini-grant funds also needs further study. Local officials report that a robust infrastructure is required to secure most funds, a situation rarely evident among rural LHDs and NGOs. Optimal mini-grant funding amounts also should be studied as many local respondents reported that regardless of their capacities, mini-grant amounts are often too small to make them "worth the effort." Further, there is a perception that funders are increasingly using evidence-based research models in making funding decisions. While they support the use of evidence-based models in concept, rural LHDs and NGOs note that their focus on community outreach and service delivery activities (which typically have no data collection component) makes it difficult to present analyses of the effectiveness and efficiency of their programs to their funders. Studies are needed to assess the degree to which such models do in fact create barriers for rural program development and sustainability.

<u>Finding 3</u>: Technical assistance should be provided to LHDs and NGOs eligible for mini-grants to facilitate their identification of community needs and development of competitive proposals.

Respondents note that mini-grant programs tend to fund activities in communities with existing capacities so that communities without a robust infrastructure are rarely included. Technical assistance is needed in rural communities to engage in community health assessment activities and to develop strong funding proposals.

<u>Finding 4</u>: LHDs should be encouraged to conduct community needs assessments, and states should provide flexibility in the use of funding to allow communities to address identified needs.

Compared to urban LHDs, rural LHDs receive a higher proportion of total revenues from state direct, federal pass through, and clinical sources, and a lower proportion from local and federal direct sources. State level and federal pass through funds are likely to be tied to specific program activities and outcomes, which may or may not correspond to identified local needs. Rural LHDs' limited access to local funding may be a barrier to responding to locally identified public health concerns.

<u>Finding 5</u>: Efforts to develop an objective way of classifying state health department systems are encouraged in order to facilitate comparisons across states with inconsistent structural classifications.

Variability among state public health systems clearly affects decisions about the distribution of CDC funds to both rural and non-rural communities. Inconsistencies in prior efforts to classify state public health structures limit analyses designed to assess the impact of state-level structure on local public health funding. Efforts to develop an objective classification system, as opposed to current systems that generally rely on state-level self-report, are encouraged.

<u>Finding 6</u>: Additional effort should be placed on analyzing the delivery of public health services in areas not under the jurisdiction of a local health department.

Inasmuch as we rely on NACCHO profile data in our analyses, it is important to recognize that many rural areas are not served by LHDs. This does not necessarily mean that public health activities are neglected in these communities, but rather that these activities may be carried out by other public health system partners such as hospitals, community health centers, non-profit organizations, and others. While our qualitative analysis captures much of the activity of this "extended public health system," our analysis of the NACCHO profile was necessarily limited to LHDs. Additional study of areas not served by governmental public health agencies is needed in order to identify both the potential implications of not having a governmental system, as well as alternate methods to assuring access to public health services.

This report is organized around four major chapters. In Chapter one, we present a review of the current literature on rural health financing and infrastructure. The section covers infrastructure, workforce, organizational capacity, and background on public health financing in these systems. Chapter 2 presents data on of all 50 states describing public health systems' infrastructure characteristics, funding for prevention activities, degree of rurality and how these factors relate. In Chapter 3, we present a more detailed qualitative analysis of 6 states to examine in greater depth the funding streams and organizational mechanisms by which localities receive funding for selected population-based prevention and health promotion activities. Finally Chapter 4 summarizes the major findings and their implications for the entire study.

2. Overview of Rural Public Health Infrastructure and Financing

Introduction

Public health infrastructure mainly refers to the resources needed to deliver essential health-related services to the community that include: a) a competent public health workforce; b) adequate information and data systems; c) public health organizational capacity at the state and local levels; and d) financial resources.[1] A sound infrastructure ensures that a public health system is able to perform the ten essential services of public health. [2]

Ten Essential Services of Public Health

1. Monitor health status to identify and solve community health problems.
2. Diagnose and investigate health problems and hazards in the community.
3. Inform and educate people regarding health issues.
4. Mobilize community partnerships and take action to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure a competent public and personal health care workforce.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10. Research new insights and innovative solutions to health problems.

Source: Public Health in America, Public Health Functions Steering Committee, Public Health Service, 1994

Public health infrastructure has increasingly been the focus of both governmental and non-governmental initiatives in the last two decades. The Institute of Medicine's (IOM) 1988 report, *The Future of Public Health*, spearheaded a debate on the precarious state of the public health system and the critical need for the development of a strong public health infrastructure. In response to the report, several governmental agencies and large foundations launched initiatives to building and strengthening infrastructure.[3]

Some of the initiatives in the 1990s inspired by the IOM report included: the Public Health Training Network, established by CDC to provide distance learning opportunities for public health workers; the Management Academy for Public Health, which offered workforce development programs and training sessions for public health managers; and the Turning Point Initiative, which focused on local and state public health capacity-building.[4] The advent of significant preparedness funding in the early 2000s provided a further boost to infrastructure development initiatives. Activities included the development of the Health Alert Network, which aimed to improve access to information and overall organizational capacity in local health departments; the National Electronic Disease Surveillance System initiative, which monitors the health of the nation, detects outbreaks, and facilitates

[1] Quiram B; Meit M, Carpender K, Pennel C, Castillo G & Duchicela D. Rural Public Health Infrastructure. *Rural Healthy People 2010: A Companion Document to Healthy People 2010, Volume 3.* College Station, TX: The Texas A&M University System Health Science Center; 2004.
[2] Institute of Medicine. *The Future of Public Health.* Washington, DC: National Academy Press; 1988.
[3] Baker EL, Potter MA, Jones DL, Mercer SL, Cioffi JP, Green LW, Halverson PK, Lichtveld MY & Fleming DW. The Public Health Infrastructure and Our Nation's Health. *Annual Review of Public Health.* 2005; 26: 303- 18.
[4] Ibid.

information dissemination; and bioterrorism preparedness and response funds provided to assess and strengthen the capabilities of states and localities to respond effectively to emerging threats.[5]

The enormous investment from public and private sectors in infrastructure building has met with only limited success in bringing about improvement commensurate with the investment. The 2003 IOM report, *The Future of the Public's Health in the 21st Century*, contends that the public health infrastructure, which was described as being in "disarray" in 1988, has not changed much since.[6] The U.S public health system still lacks a sound infrastructure and faces a multitude of challenges related to infrastructure development including an inadequate workforce in terms of size and competency, gaps in information systems, and limited organizational capacity. The rest of this chapter will review public health infrastructure issues and challenges, with a focus on rural settings.

Rural Public Health Infrastructure

Very little systematic information is available on the current status of the rural public health infrastructure.[7] Rural public health systems differ considerably from those in urban areas with respect to scope of services and resources. Many rural areas do not have a local health department (LHD) to provide essential public health services, leading residents to instead rely on a patchwork of services provided by private physicians, rural hospitals and community-based organizations.[8]

Public health infrastructure was identified as a notable concern in a survey of rural health stakeholders.[9] This finding is significant because most LHDs are small and/or rural; 62 percent of the nation's LHDs serve populations of 50,000 people or less, while only 6 percent serve large metropolitan areas with populations over 500,000.[10] Infrastructure-related deficits among rural public health agencies may further decrease their ability to apply for and successfully obtain funding to counteract these deficits, creating a vicious cycle.

Public Health Workforce and Training

Public health workers are an integral part of the public health system and include all persons responsible for providing essential public health services, regardless of the nature of the employing agency.[11] An effort by the Health Services and Resources Administration (HRSA) to produce an inventory of the public health workforce estimated that there are currently 500,000

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[5] Ibid.
[6] Institute of Medicine. *The Future of Public's Health in the 21st Century.* Washington, DC: National Academy Press; 2003.
[7] University of Pittsburgh Center for Rural Health Practice. *Bridging the Health Divide: The Rural Public Health Research Agenda*. Bradford, PA: University of Pittsburgh at Bradford; 2004. Available at: http://www.upb.pitt.edu/crhp/Bridging%20the%20Health%20Divide.pdf. Accessed December 20, 2006.
[8] Rural Assistance Center. Public Health. Rural Assistance Center website. Undated. Available at http://www.raconline.org/info_guides/public_health/. Accessed December 22, 2006.
[9] Gamm L, Hitchison L, Bellamy G, et al. Rural Healthy People 2010: Identifying Rural Health Priorities and Models for Practice. *Journal of Rural Health.* 2001; 18(1): 9- 14.
[10] National Association of County and City Health Officials. *2005 National Profile of Local Health Departments*. Washington, DC; 2006. Available at http://www.naccho.org/topics/infrastructure/documents/NACCHO_report_final_000.pdf. Accessed January 8, 2007.
[11] Department of Health and Human Services. *The Public Health Workforce: An Agenda for the 21st Century*. Washington, DC: Department of Health and Human Services; 1997.

public health workers in the U.S. public health system,[12] only a small proportion of which have formal education in public health.[13] The study also found that most of the workforce relies on short courses and on-the-job training, which are inadequate means to meet the training needs of most LHDs. Furthermore, a 2003 survey of state public health agencies found that workforce vacancy rates exceeded 20 percent in some states. The study authors predicted that state and local public health agencies will experience severe shortages in public health personnel over the next 5-10 years due to a rapidly aging workforce and high turnover rates.[14]

Strengthening the workforce has been especially problematic for public health agencies in rural areas because of location, a lack of advanced education programs, and budget constraints. Rural public health agencies in most states have to depend heavily on the local labor market. These agencies experience more difficulty in recruiting educated, skilled public health workers than their urban or suburban counterparts.[15] Rural public health personnel are also more likely than their urban equivalents to be employed part-time, and they possess a much narrower range of public health skills in comparison.[16]

Information and Data Systems

An important element of public health infrastructure is the ability of LHDs to assess and monitor the health of their respective communities, to disseminate timely information, and to identify emerging threats.[17] Various studies show that, although improving, many LHDs, do not have access to adequate information technology. A 1999 survey found that only 45 percent of local health departments had the ability to send broadcast facsimile alerts and less than half had continuous high-speed Internet access.[18] This situation has changed substantially in the recent years as 98 percent of all local health departments now have internet access and 93 percent have high-speed internet access.[19] The *2005 National Profile of Local Health Departments* reported that a small, albeit increasing, fraction of LHD employees have cell phones and PDAs. In addition, 70 percent of all LHDs currently maintain websites that provide contact and service

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[12] Health Resources and Services Administration. *The Public Health Workforce: Enumeration, 2000.* Washington, DC: HRSA, Bureau of Health Professions, National Center for Health Workforce Analysis; 2000.

[13] Solloway M, Haack M, Evans L. *Assessing the Training and Education Needs of the Public Health Workforce in Five States*. Washington, DC: Center for Health Policy Research, Workforce Study Group, The George Washington University Medical Center; 1997.

[14] Health Resources and Services Administration Bureau of Health Professions. *Public Health Workforce.* Washington DC: HRSA; 2005. Available at ftp://ftp.hrsa.gov/bhpr/nationalcenter/publichealth2005.pdf . Accessed December 14,2006.

[15] Ibid.

[16] Rosenblatt R, Casey S, & Richardson M. *Rural-urban differences in the public health workforce: Findings from local health departments in three rural western states.* University of Washington: WWAMI Center for Health Workforce Studies, Working Paper. 2001; 61:1-27.

[17] Quiram B; Meit M, Carpender K, Pennel C, Castillo G & Duchicela D. Rural Public Health Infrastructure. *Rural Healthy People 2010: A Companion Document to Healthy People 2010, Volume 3.* College Station, TX: The Texas A&M University System Health Science Center; 2004.

[18] Center for Disease Control and Prevention. *Public Health's Infrastructure: A Status Report*. Washington, DC: Department of Health and Human Services/ Centers for Disease Control and Prevention; 2003. Available at *http://www.phppo.cdc.gov/documents/phireport2_16.pdf* . Accessed December 12, 2006.

[19] National Association of County and City Health Officials. *2005 National Profile of Local Health Departments*. Washington, DC; 2006. Available at http://www.naccho.org/topics/infrastructure/documents/NACCHO_report_final_000.pdf. Accessed January 8, 2007.

information, links with parenting tips, consumer health information, community-specific health information, etc.

While rural LHDs have shared in these technology advances, they remain behind their non-rural counterparts. Rural LHDs still have difficulties in receiving and integrating information, guidelines, and alerts due to inadequate information systems.[20] However, rural public health systems are also embracing newer technologies, and computer and internet access are nearly universal.[21]

Organizational Capacity

Organizational capacity refers to the ability of an LHD to create an environment that supports its mission to provide essential public health services to its community. Performance standards for essential public health services, health improvement plans, access to laboratory services, access to epidemiology services, and model statutes related to essential public health services can be taken into account when evaluating public health organizational capacities.[22]

First, performance standards are used to measure the capacity of the public health system and its ability to perform core functions and deliver essential public health services. It is often difficult to measure the performance of rural public health systems because they are often comprised of a patchwork of services derived from both private and public sector entities. Secondly, health improvement plans play a vital role in improving a community's health. Although more than half of the nation's LHDs have been involved in community health improvement planning, there are noticeable differences in actual implementation of these plans between metropolitan and small/rural jurisdictions. Only 41 percent of LHDs serving a population of less than 25,000 reported participating in health improvement planning, as compared to 76 percent of those serving areas with population greater than 25,000.[23]

Essential support services such as laboratory facilities and epidemiology services are vital to assessing and assuring community health, both routinely as well as in emergency situations. Rural areas have less access to laboratory facilities as compared to urban areas.[24] Likewise, small/rural LHDs have limited epidemiology and surveillance services. Only 74 percent of LHDs serving populations less than 25,000 versus 98 percent of LHDs serving populations of 500,000 or more provide surveillance services.[25]

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[20] Health Resources and Services Administration, National Advisory Committee on Rural Health. *Rural Public Health: Issues and Considerations: A Report to the Secretary.* Rockville, MD: U.S. Department of Health and Human Services; 2000.

[21] National Association of County and City Health Officials. *2005 National Profile of Local Health Departments*. Washington, DC; 2006. Available at http://www.naccho.org/topics/infrastructure/documents/NACCHO_report_final_000.pdf. Accessed January 8, 2007.

[22] Quiram B; Meit M, Carpender K, Pennel C, Castillo G & Duchicela D. Rural Public Health Infrastructure. *Rural Healthy People 2010: A Companion Document to Healthy People 2010, Volume 3.* College Station, TX: The Texas A&M University System Health Science Center; 2004.

[23] Hajat A, Brown C, and Fraser M. *Local Public Health Agency Infrasructure: A Chartbook.* Washington, DC: National Association of County and City Health Officials (NACCHO); 2001.

[24] Heinrich J. *Infectious Diseases: Gaps Remain in Surveillance Capabilities of State and Local Agencies*. U.S. General Accounting Office. Testimony before the Subcommittee on Emergency Preparedness and Response, Select Committee on Homeland Security, House of Representatives (GAP-03-1176T); 2003.

[25] Hajat A, Brown C, and Fraser M. *Local Public Health Agency Infrasructure: A Chartbook.* Washington, DC: National Association of County and City Health Officials (NACCHO); 2001.

Public Health Financing

Public health financing refers to the flow of resources that support public health agencies and programs.[26] Public health spending levels and funding sources play important roles in shaping system performance, as well as in the quantity and quality of essential public health services provided.[27] A continuous and steady source of financing is integral to assessing the infrastructure needs of a public health system and working toward meeting those needs.

For over 25 years, the Association of State and Territorial Health Officials (ASTHO) Reporting System, a voluntary public health expenditures reporting system, provided information on health department expenditures, revenues, functions and programs across the United States.[28] Currently, there is no such national data collection mechanism that can trace the country's investment in public health and subsequent outcomes. In the absence of such a reporting system, it is difficult to understand the extent of funding, how funding is used, and outcomes related to this funding. Quantifying public health financing is a critical component in documenting the public health infrastructure.[29]

Public health is generally understood to lack uniform investment across the states. A 2005 report by Trust for America's Health examined how federal public health dollars are spent. The report concluded that there has been limited new funding or strategies to bring about wide-scale change. [30] The report also noted that grants made available by the federal government are either based on set criteria, such as the population in the state, or through competitive processes where states apply for limited funds. The competitive process tends to favor the states with more established public health infrastructures, furthering the divide between the "haves" and "have nots".

This phenomenon is also seen at the local level with rural communities are likely to face additional barriers to securing competitive grants as they often lack grant writing expertise or the infrastructure necessary to achieve goals outlined in grant applications. Despite the presence of great need in the community, there may not be the organizational capacity to apply for funding and the programmatic capacity to initiate programs designed to implement grant activities.

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[26] Washington State Department of Health. Financing Public Health. In: *2002 Public Health Improvement Plan*. Olympia, WA: Washington State Department of Health; 2002: 23-26. Available at http://www.doh.wa.gov/PHIP/documents/PHIP2002/2002PHIP7.pdf. Accessed December 10, 2006.

[27] Mays GP, McHugh MC, Shim K, Lenaway D, Halverson P, Moonesinghe R and Honore P. Getting What You Pay for: Public Health Spending and the Performance of Essential Public Health Services. *Journal of Public Health Management Practice.* 2004; 10: 435- 443.

[28] Barry M and Bialek R. Tracking Our Investments in Public Health: What Have We Learned? *Journal of Public Health Management Practice.* 2004; 10: 383- 392.

[29] Barry MA, Centra L, Pratt, Jr. E, Brown C, and Giordano L. *Where Do the Dollars Go? Measuring Public Health Expenditures*. Washington, DC: Public Health Foundation; 1998. Available at http://www.phf.org/Reports/Expend1/loclexpn.pdf. Accessed January 3, 2007.

[30] Hearne S, Elliot K, Juliano C, and Segal L. *Shortchanging America's Health: A State-By-State Look At How Federal Public Health Dollars Are Spent*. Washington, DC: Trust For America's Health; 2005.

3. Quantitative Analysis (Data from Fifty States)

In this Chapter, we present findings from a fifty-state analysis designed to describe public health systems' infrastructure characteristics, funding for prevention activities, degree of rurality, and to examine how these factors relate. Two separate sets of analyses were used to examine these factors. First, we analyzed the distribution of CDC funds for prevention and health promotion activities and how funding levels relate to state public health infrastructure and to rurality. Second we examined local health department (LHD) expenditures and prevention services and investigated how each of these relate to public health infrastructure, rurality and size of population served.

3.1 Populations, Data Sources and Measures

3.1.1 Distribution of CDC Funds

State-specific data describing CDC funds for 2004 and 2005 were obtained from the CDC's Financial Management Office. Because we were interested in funding for chronic disease prevention and health promotion activities, we included only funding streams that clearly could be identified as primarily addressing chronic diseases. The CDC programs included in our analyses were: Cancer Prevention; Chronic Disease Prevention/Health Promotion; Diabetes Control; and the CDC Preventive Health and Human Services (PHHS) Block Grants. For the purposes of this report, we will refer to these sets of funding as "CDC funds for prevention activities." Relevant CDC funds for each state were averaged for the two study years to estimate annual funds. Per capita CDC funds were calculated for each state by dividing annual funds by the 2004 estimated population from the U.S. Census Bureau.

In a 1991 report, the CDC's Public Health Practice Program Office described how public health services are organized and delivered in each state and territory of the U.S.[31] The report offered indicators on population characteristics, county government structure, state health departments (SHDs) and their leadership, state and local boards of health, SHD regional offices, LHDs, and state budget expenditures. This report, which has not been updated, classified each state's organizational relationship between LHDs and SHDs as decentralized, mixed centralized, centralized, or shared. Others have described the local-state organizational relationship using similar categories[32] [33] [34]; however, there are limitations to these studies and a lack of agreement between them as to the classification of a substantial portion of the states. The most recent categorization of state public health infrastructure is from the *2005 National Profile of Local Health Departments* study conducted by the National Association of County and City Health Officials (NACCHO). For the 2005 Profile, NACCHO simplified the organizational typology into three categories: all LHDs are units of the state health agency; all LHDs are units of local

[31] Public Health Practice Program Office, Centers for Disease Control. *Profile of State and Territorial Public Health Systems*. Atlanta, Georgia: Centers for Disease Control; 1991.
[32] Association of State and Territorial Health Officials. *2005 SHO Salary and Agency Infrastructure Survey*. Washington, DC: ASTHO; 2005.
[33] Public Health Foundation. *Survey on Performance Management Practices in States* Washington, DC: PHF; 2002.
[34] National Association of County and City Health Officials. *Research Brief Number 2: NACCHO Survey Examines State/Local Health Department Relationships*. Washington, DC: NACCHO; 1998.

government (i.e., no LHDs are units of the state health agency); and some LHDs are units of the state health agency and some are units of local government (mixed).[35]

To classify states' public health infrastructures in our study, we used the categories from the 2005 NACCHO study. We chose this classification system primarily because it was the only data reflecting the infrastructures for the time period of interest, and to be consistent with our later analyses of LHD expenditures using data from the *2005 National Profile of Local Health Departments*.

For this set of state-level analyses we defined rural based on the proportion of the state's population residing in a rural area. Categories of rurality then were defined by quartiles of the distribution of the proportion of the population residing in rural areas across states. Based on this definition, states falling within the most rural quartile (with rural populations ranging from 39.8% to 61.8% of total population) include North Carolina, New Hampshire, North Dakota, Kentucky, Alabama, Montana, Arkansas, South Dakota, Mississippi, West Virginia, Maine and Vermont.

Finally, for this set of analyses, Washington, DC was excluded from our study population because its health department structure, population served, and services provided are more representative of a large city health department rather than a state public health agency.

3.1.2. Local Health Department Expenditures and Characteristics

Data from NACCHO's *2005 National Profile of Local Health Departments* study were used to examine LHD expenditures and prevention services and how each of these relates to public health infrastructure, rurality and size of population served. This study was the fourth such National Profile of Local Health Departments conducted by NACCHO. A detailed description of the National Profile Study can be found at: http://www.naccho.org/topics/infrastructure/2005Profile.cfm. In brief, NACCHO identified a total of 2,864 LHDs throughout the country. For the purposes of the National Profile Study, NACCHO defines an LHD as an "administrative or service unit of local or state government concerned with health, and carrying some responsibility for the health of a jurisdiction smaller than the state." All LHDs were contacted and asked to complete a questionnaire. The response rate for the questionnaire was 80 percent (2,300 LHDs).

For the LHD analysis, rural was defined by using the Rural-Urban Commuting Area (RUCA) classification of the LHD location (see Box 1). In our analyses of the NACCHO data set, categories describing degrees of rurality were defined as follows: RUCA codes 1-3 represent urban areas; RUCA codes 4-6 represent micropolitan areas; and RUCA codes 7 and higher denote rural areas. Analyses also included comparisons of "aggregated rural" versus "urban," where RUCA codes 4 and higher were combined to form a single "aggregated rural" category.

[35] National Association of County and City Health Officials. *2005 National Profile of Local Health Departments*. Washington, DC; 2006. Available at http://www.naccho.org/topics/infrastructure/documents/NACCHO_report_final_000.pdf. Accessed January 8, 2007.

Box 1

The Rural-Urban Commuting Area (RUCA) system is one of several ways to classify rural areas. RUCAs use the Census Bureau's definitions of Urbanized Areas and Urban Clusters combined with population work commuting information to characterize the rural and urban status of census tracts. The RUCA classification is, thus, based on the size and population density of cities and towns and their functional relationships as measured by work commuting flows.[36] RUCAs are coded from 1-10 based on the following definitions:

RUCA Definitions:[37]

1 Urban core Census tract (Urbanized Area/Metro>50,000)
2 Census tract strongly tied to urban core (primary flow to urban area >30%)
3 Census tract weakly tied to urban core (primary flow to urban area ~5-30%)
4 Large Town Census tract (primary flow within large Census Bureau defined Urban Place 10,000-49,999)
5 Census tract strongly tied to large town (primary flow to Census Bureau defined Urban Place >30%)
6 Census tract weakly tied to large town (primary flow to large Census Bureau defined Urban Place ~5-30%)
7 Small Town Census tract (primary flow within small Census Bureau defined Urban Place (>10,000)
8 Census tract strongly tied to small town (primary flow to a small Census Bureau defined Urban Place >30%)
9 Census tract weakly tied to small town (primary flow to a small Census Bureau defined Urban Place ~5-30%)
10 Isolated small rural Census tract (remaining tracts rural- no primary flows over 5% to defined Urbanized Area, large Urban Place, or small Urban Place)

LHDs serve a number of jurisdiction types (counties, cities, city-county, townships or towns, and larger regions) with a wide range of population sizes. As a result, an LHD classified as "rural" may serve the same size or an even larger population than an LHD classified as "micropolitan" or "urban." Because expenditures and infrastructure are also a function of the size of an LHD's jurisdiction, LHDs were further classified by the size of the population they serve. Categories of population size served include: small (less than 50,000); midsize (50,000 to 499,999); and large (500,000 and greater).

[36] Economic Research Service. Measuring Rurality: Rural- Urban Commuting Area Codes. United States Department of Agriculture Economic Research Group website. 2005. Available at http://www.ers.usda.gov/briefing/Rurality/RuralUrbanCommutingAreas/. Accessed February 7, 2007.
[37] http://depts.washington.edu/ruca1/ruca_definintionschart.html

LHD expenditures were defined as total expenditures for the most recently completed fiscal year. In order to adjust for variation in revenues due to population size served by LHDs, we examined per capita revenues defined as reported revenues divided by the reported size of population served by each LHD. Because the focus of our study is prevention funding and LHD clinical revenues are primarily used for health care delivery and not prevention, we included only non-clinical revenues in our comparisons of per capita expenditures.

We were particularly interested in federal funds reaching LHDs. To examine how this differs by rurality and infrastructure, we examined the proportion of funds from: (1) federal sources – direct and passed through by state; (2) local sources; (3) state sources (excluding federal pass-through dollars); (4) clinical sources – patient fees, private health insurance, Medicare and Medicaid; and (5) other sources – regulatory fees, private foundations, tribal sources and other sources not defined elsewhere.

Public health infrastructure in this data set relates to the type of LHD governance; primarily whether the LHD is a unit of the state health agency or a unit of the local government. We defined each LHD's unit of governance as either a "unit of the state health agency" or "unit of local government."

An important aim of our study was to describe how funds for chronic disease prevention and health promotion are distributed at the local level. Although information describing the amount of funding LHDs receive for chronic disease prevention and health promotion activities is not available in the NACCHO dataset, LHDs did report on the types of activities their agency performs. Funding for these activities could be from any source; whether an LHD performs these activities is an important indicator of its ability to access funds for these activities. Activities included in the analysis met the following criteria: (1) they are related to the funding streams of interest for our entire study (cancer, diabetes and chronic diseases in general as well as injury, excluding violence-related injury); and (2) they are primary prevention, including screening for diseases and conditions. Epidemiology and surveillance activities were excluded, as were comprehensive primary care and other health services. Additionally, only those activities reported by LHDs as being performed directly by the LHD were included in our analyses. Activities performed by another organization, even if they were contracted by the LHD, were not considered activities of the LHD. The following activities described in the NACCHO dataset were included in our analyses: cancer screening; diabetes screening; cardiovascular disease (CVD) screening; high blood pressure (HBP) screening; and primary prevention of tobacco use, obesity, and injury.

3.2 Analyses

Analyses are separated into two sections. Section 3.2.1 describes analyses based on the distribution of CDC funding to states, and section 3.2.2 describes analyses based on NACCHO profile data on LHD expenditures and characteristics.

3.2.1 Distribution of CDC Funds

Annual CDC funds and per capita funds were described as means, standard deviations, and medians. These data also were described for states by classification of public health infrastructure and by category of rurality.

Per capita funds were compared across classification of infrastructure and category of rurality using analysis of variance (ANOVA). The Bonferroni adjustment was used for multiple comparisons. P-values were 2-sided. A p-value less than or equal to 0.05 was considered significant.

3.2.2 Local Health Department Expenditures and Characteristics

Total LHD revenues, non-clinical LHD revenues, and per capita non-clinical LHD revenues were described as means, quartiles, and minimum and maximum values for all LHDs reporting expenditures (n=2021). These data also were described within subgroups by classifications of governance type, degree of rurality, and size of population served.

Per capita non-clinical revenues were not normally distributed; therefore, the Median and Mann Whitney U tests were used to compare per capita revenues across classifications of governance type, degree of rurality, and size of population served. A p-values less than or equal to 0.05 was considered significant.

The size of population served is an important confounding factor in analyses comparing LHDs serving areas with different population densities. To account for this, subgroup analyses were completed for LHDs serving populations less than 50,000.

Statistical analyses were performed using SPSS version 15.0 and Stata version 8.0.

3.3 Results

Results are also separated into two sections. Section 3.3.1 describes results based on our analysis of the distribution of CDC funding to states, and section 3.3.2 describes results based on our analysis of NACCHO profile data on LHD expenditures and characteristics.

3.3.1 Distribution of CDC Funds

Average annual CDC funds for prevention activities, including Cancer Prevention, Chronic Disease Prevention/Health Promotion, Diabetes Control, and the CDC Preventive Health and Human Services (PHHS) Block Grants, varied widely across states, from approximately $3.4 million in Delaware to $48.5 million in New York. On average, states received approximately $15,367,982 in CDC prevention funds (SD: $10,258,892; median: $12,624,401) (Table 1). After adjusting for state population, CDC funds still varied greatly, from $1.23 per person in California to $19.33 per person in Alaska (Table 2). Per capita CDC funds for prevention activities were compared using ANOVA across state and local distribution of public health functions (i.e., state public health infrastructure). NACCHO's *2005 National Profile of Local Health Departments* described the type of LHD governance by state using three categories: 1) all "LHDs are units of the state health agency"; 2) all "LHDs are units of local government"; and 3) some LHDs are units of the state health agency and some are units of local government (i.e., "mixed"). The majority of states (63%) were classified as belonging to the second of these categories and a much smaller proportion of states (14%) fell into the first.

Table 1. Average annual CDC funds for prevention activities* by classification of states by Local Public Health Governance, 2004-2005.

	All states (n=50)	Unit of state health agency (n=7)**	Unit of local government (n=31)**	Mixed (n=11)**
Median	$12,624,401	$7,901,873	$12,733,021	$13,032,640
Mean ± SD	$15,367,982 ± $10,258,892	$10,252,194 ± $6,726,728	$17,239,531 ± $11,498,927	$14,097,054 ± $7,358,717
Minimum-maximum	$3,435,503 - $48,506,098	$3,435,503 - $23,140,942	$3,548,738 - $48,506,098	$5,103,970 - $32,148,741

*Includes the following categories of funds: Cancer Prevention, Chronic Disease Prevention/Health Promotion, Diabetes Control, and PHHS Block Grant.

** RI is not included in the latter three columns because it is not classified in the NACCHO data set.

There was no difference across classifications of infrastructure with respect to CDC funds for prevention activities (Table 2).

Table 2. Per capita CDC funds for prevention activities* by classification of states by Local Public Health Governance, 2004-2005.

	All states (n=50)	Unit of state health agency (n=7)**	Unit of local government (n=31)**	Mixed (n=11)**
Median	$3.42	$3.56	$3.41	$3.08
Mean ± SD	$4.19 ± $2.98	$4.28 ± $2.49	$3.90 ± $1.97	$4.76 ± $5.20
Minimum-maximum	$1.23 - $19.33	$1.33 - $9.07	$1.23 - $8.04	$1.43 - $19.33
95% confidence interval	$3.29 - $5.00	$1.98 - $6.58	$3.18 - $4.62	$1.27 - $8.25

*Includes the following categories of funds: Cancer Prevention, Chronic Disease Prevention/Health Promotion, Diabetes Control, and PHHS Block Grant.

** RI is not included in the latter three columns because it is not classified in the NACCHO data set.

The proportion of states' populations residing in rural areas ranged from 5.6% of California's residents to 61.8% of Vermont's. Quartile groupings for this distribution were: 5.6% to 12.5% (n=12); 13.9% to 28.4% (n=13); 28.6% to 39.5% (n=13); and 39.8% to 61.8% (n=12). Although average annual CDC funds for prevention activities appeared highest for the least rural states (Table 3), this difference was not statistically significant. Furthermore, after accounting for state population size, the highest per capita annual CDC funds for prevention activities were among the most rural states, although this relationship also was not statistically significant (Table 4).

Table 3. Average annual CDC funds for prevention activities* by proportion of state's population residing in rural areas, 2004-2005.

	5.6% to 12.5% (n=12)	13.9% to 28.4% (n=13)	28.6% to 39.5% (n=13)	39.8% to 61.8% (n=12)
Median	$11,046,805	$17,710,701	$12,579,347	$7,906,618
Mean ± SD	$19,695,516 ± $14,991,295	$19,199,185 ± $8,688,084	$11,485,366 ± $4,480,527	$11,096,144 ± $8,020,852
Minimum-maximum	$7,117,448 - $48,506,098	$3,435,503 - $32,148,741	$3,548,738 - $19,011,488	$4,814,293 - $33,711,326

*Includes the following categories of funds: Cancer Prevention, Chronic Disease Prevention/Health Promotion, Diabetes Control, and PHHS Block Grant.

Table 4. Per capita annual CDC funds for prevention activities* by proportion of state's population residing in rural areas, 2004-2005.

	5.6% to 12.5% (n=12)	13.9% to 28.4% (n=13)	28.6% to 39.5% (n=13)	39.8% to 61.8% (n=12)
Median	$2.71	$3.03	$3.48	$5.86
Mean ± SD	$3.07 ± $1.75	$3.20 ± $1.51	$4.89 ± $4.68	$5.63 ± $2.18
Minimum-maximum	$1.23 - $6.61	$1.43 - $6.85	$1.42 - $19.33	$2.72 - $9.07
95% confidence interval	$1.96 - $4.18	$2.29 - $4.12	$2.06 - $7.72	$4.25 - $7.01

*Includes the following categories of funds: Cancer Prevention, Chronic Disease Prevention/Health Promotion, Diabetes Control, and PHHS Block Grant.

3.3.2 Local Health Department Expenditures and Characteristics

Total expenditures for the most recently completed fiscal year were reported by 2,108 of the respondents surveyed (92 percent of survey respondents) for the NACCHO Profile. LHD annual expenditures ranged from less than $10,000 to over $1 billion. Half of LHDs reported total annual expenditures less than $1 million, and 11 percent have expenditures totaling more than $10 million per year.

Table 5 describes total annual LHD expenditures by selected LHD characteristics. Mean total annual revenues were $6,864,566 (median: $1,017,553), and mean non-clinical revenues were $5,890,744 (median: $779,646). Not surprisingly, revenues increase with increases in population size served. Given that degree of rurality correlates to a degree with population size served (although this is not always the case), it is also not surprising that LHDs located in rural areas, on average, reported lower annual revenues than LHDs in micropolitan and urban areas.

Table 5. Mean and median LHD expenditures by LHD characteristics.

	Non-clinical revenues (n=1939)		All revenues (n=2021)	
LHD characteristics	**Median**	**Mean**	**Median**	**Mean**
All LHDs	$779,646	$5,890,744	$1,017,553	$6,864,566
Size of population served (n=1936)				
<50,000	$367,401	$616,547	$474,790	$828,448
50,000-499,999	$2,798,335	$4,964,494	$3,793,586	$6,232,702
≥ 500,000	$29,013,815	$67,813,481	$32,237,572	$75,532,452
Degree of rurality* (n=1937)				
Rural (n=736)	$380,089	$704,512	$511,651	$1,092,121
Micropolitan (n=387)	$1,029,792	$2,281,449	$1,392,328	$3,148,689
Urban (n=814)	$2,033,864	$12,309,650	$2,449,389	$13,987,787
Aggregated Rural – Urban comparison** (n=1937)				
Aggregated Rural (n=1123)	$542,813	$1,247,944	$733,158	$1,800,320
Urban (n=814)	$2,033,864	$12,309,650	$2,449,389	$13,987,787
Governance unit (n=1939)				
Unit of state health agency (n=397)	$873,128	$3,705,519	$1,185,000	$4,497,053
Unit of local government (n=1542)	$750,000	$6,453,347	$981,242	$7,472,640

*"Degree of rurality" categories were defined as: RUCA codes 1-3 = "Urban"; RUCA codes 4-6 = "Micropolitan"; and RUCA codes 7 and higher = "Rural"

**"Aggregated Rural – Urban comparison" categories were defined as: RUCA codes 1-3 = "Urban" and RUCA codes 4 and higher = "Aggregated Rural"

Of note is the greater difference between all revenues and non-clinical revenues for rural LHDs compared to micropolitan and urban LHDs. Examination of per capita revenues adjusts for variation in revenues due to differences in the size of population served by LHDs. Mean annual per capita non-clinical revenues among all LHDs was $32 (median: $23.30). Per capita non-clinical revenues were compared within several subgroups (Table 6). LHDs serving larger populations had higher per capita non-clinical revenues than those serving smaller populations. Per capita non-clinical revenues were significantly higher for the following: LHDs serving ≥500,000 compared to LHDs serving <50,000; LHDs serving ≥500,000 compared to LHDs serving 50,000 to 499,999; and LHDs serving 50,000 to 499,000 compared to LHDs serving <50,000 ($p<0.001$, $p=0.006$, and $p=0.012$, respectively, Mann-Whitney test). LHDs classified as urban had significantly lower per capita non-clinical revenues compared to LHDs classified as rural ($p<0.001$, Mann-Whitney test) or micropolitan ($p=0.006$, Mann-Whitney test). Similarly,

LHDs classified as urban had significantly lower per capita non-clinical revenues compared to LHDs classified as aggregated rural ($p<0.001$, Mann-Whitney test). There was no difference between rural and micropolitan LHDs with respect to per capita non-clinical revenues. Type of LHD governance was not related to per capita non-clinical revenues.

Table 6. Per capita LHD non-clinical revenues by LHD characteristics.*

	Mean	Median	Minimum-maximum	25th percentile	75th percentile
All LHDs (n=1936)	$32.07	$23.30	$0 - $2,889.08	$14.02	$36.46
Size of population served					
<50,000 (n=1160)	$29.10	$22.15	$0.51 - $423.91	$13.43	$35.10
50,000-499,999 (n=667)	$34.24	$24.33	$0 - $2,889.08	$14.94	$37.20
≥500,000 (n=109)	$50.35	$31.26	$0.95 - $659.63	$18.95	$49.46
Degree of rurality** (n=1934)					
Rural (n=736)	$31.80	$25.06	$0 - $244.77	$16.36	$37.54
Micropolitan (n=386)	$39.10	$23.81	$0.67 - $2,889.08	$14.27	$37.80
Urban (n=812)	$29.01	$21.07	$0 - $659.63	$11.62	$35.09
Aggregated Rural – Urban comparison** (n=1934)					
Aggregated Rural (n=1122)	$34.31	$24.79	$0 - $2,889.08	$15.65	$37.72
Urban (n=812)	$29.07	$21.07	$0 - $659.63	$11.62	$35.09
Governance unit					
Unit of state health agency (n=396)	$31.62	$23.62	$0 - $257.18	$15.50	$37.36
Unit of local government (n=1540)	$32.18	$23.14	$0 - $2,889.08	$13.80	$36.35

* Because the focus of our study is prevention funding and LHD clinical revenues are primarily used for health care delivery and not prevention, we included only non-clinical revenues in our comparisons of per capita expenditures.

**"Degree of rurality" categories were defined as: RUCA codes 1-3 = "Urban"; RUCA codes 4-6 = "Micropolitan"; and RUCA codes 7 and higher = "Rural"

**"Aggregated Rural – Urban comparison" categories were defined as: RUCA codes 1-3 = "Urban" and RUCA codes 4 and higher = "Aggregated Rural"

Size of population served may impact LHD expenditures in a non-linear fashion. For example, many infrastructure-related costs may be largely independent of the population size served by an LHD – a "fixed cost" of doing business. To the extent that this is so, per capita expenditures for smaller populations, such as the majority of rural LHDs, would be higher – due to fixed costs – relative to expenditures for larger urban LHDs. To examine this possible relationship between

population size served and LHD expenditures, further analysis across classification of degree of rurality was performed for LHDs serving populations less than 50,000 (n=1158). As was observed with LHDs serving any size population, LHDs classified as urban had significantly lower per capita non-clinical revenues compared to rural, micropolitan, and aggregated rural LHDs ($p<0.001$, Mann-Whitney test for all comparisons) (Table 7).

Table 7. Per capita LHD non-clinical revenues, LHDs serving populations <50,000, by degree of rurality (n=1158).*

	Mean	**Median**	**Minimum-maximum**	**25th percentile**	**75th percentile**
All LHDs	$29.13	$22.19	$0.51 - $423.91	$13.43	$35.10
Rural	$32.20	$25.11	$0.56 - $244.77	$16.42	$37.75
Micropolitan	$31.98	$22.91	$1.14 - $423.91	$13.07	$37.85
Urban (n=259)	$18.66	$13.96	$0.51 - $122.33	$8.53	$22.01
Aggregated Rural (n=899)**	$32.14	$24.84	$0.56 - $423.91	$15.63	$37.79

* Because the focus of our study is prevention funding and LHD clinical revenues are primarily used for health care delivery and not prevention, we included only non-clinical revenues in our comparisons of per capita expenditures.

**"Aggregated Rural" = RUCA codes 4 and higher.

Figures 1 through 3 illustrate the mean percentage of LHD revenues from selected sources by governance unit, degree of rurality, and size of population served, respectively. Significant differences are observed when examining revenue sources by LHD governance unit (Figure 1). Only the mean percentage of LHD revenues from clinical sources does not differ between categories of governance unit. Not surprisingly, local sources of revenue are a major source of funding for LHDs that are units of local government, and direct state funds are a major revenue source for LHDs that are units of state health agencies.

Sources of revenue also differ significantly between rural and urban LHDs (Figure 2). Whereas urban LHDs receive a significantly higher proportion of their revenues from local and federal direct sources, rural LHDs receive a higher proportion of total revenues from state direct, federal pass through, and clinical sources ($p<0.001$, Mann-Whitney test for all comparisons). Similar significant differences were observed between micropolitan and urban LHDs. Sources of revenues for rural and micropolitan LHDs were similarly distributed except for a slightly higher proportion of revenues from local sources reported for micropolitan LHDs ($p=0.039$, Mann-Whitney test).

Figure 1. Mean Percentage of LHD Revenues from Selected Sources, by Governance Unit (n=2,079)

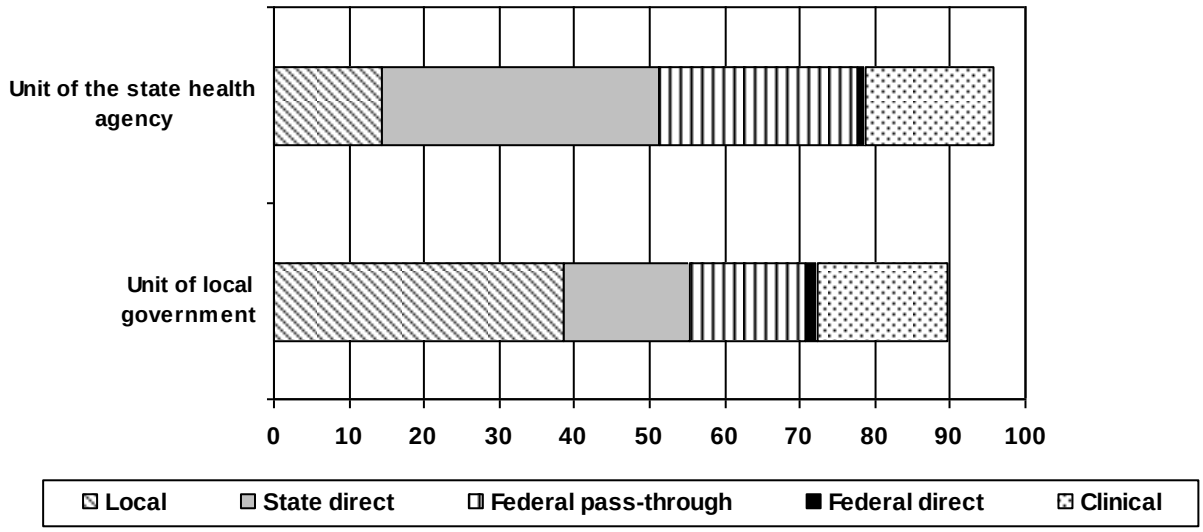
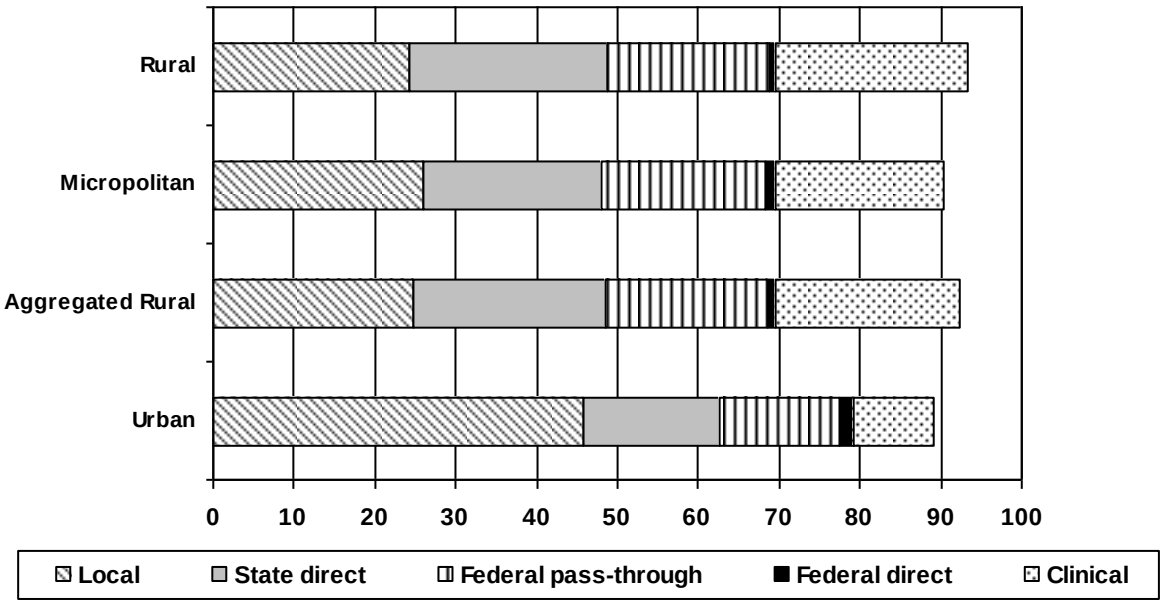


Figure 2. Mean Percentage of LHD Revenues from Selected Sources, by Degree of Rurality (n=2,077)



The proportion of revenues from state direct and federal direct sources both increase with the size of the population served and were significantly different in all comparisons across population size groups (Figure 3). The percentage of revenues from federal pass-through dollars was significantly smaller for LHDs serving small jurisdictions compared to those serving midsize (p=.001, Mann-Whitney test) or large jurisdictions (p=0.005, Mann-Whitney test).

Compared to LHDs serving large jurisdictions, LHDs serving small jurisdictions (<50,000) also received significantly larger proportions of funds from local sources (p=0.019, Mann-Whitney test). The percentage of revenues from clinical sources was significantly greater for LHDs serving midsize populations compared to LHDs serving large populations (p=0.004, Mann-Whitney test).

Figure 3. Mean Percentage of LHD Revenues from Selected Sources, by Size of Population Served (n=2,076)

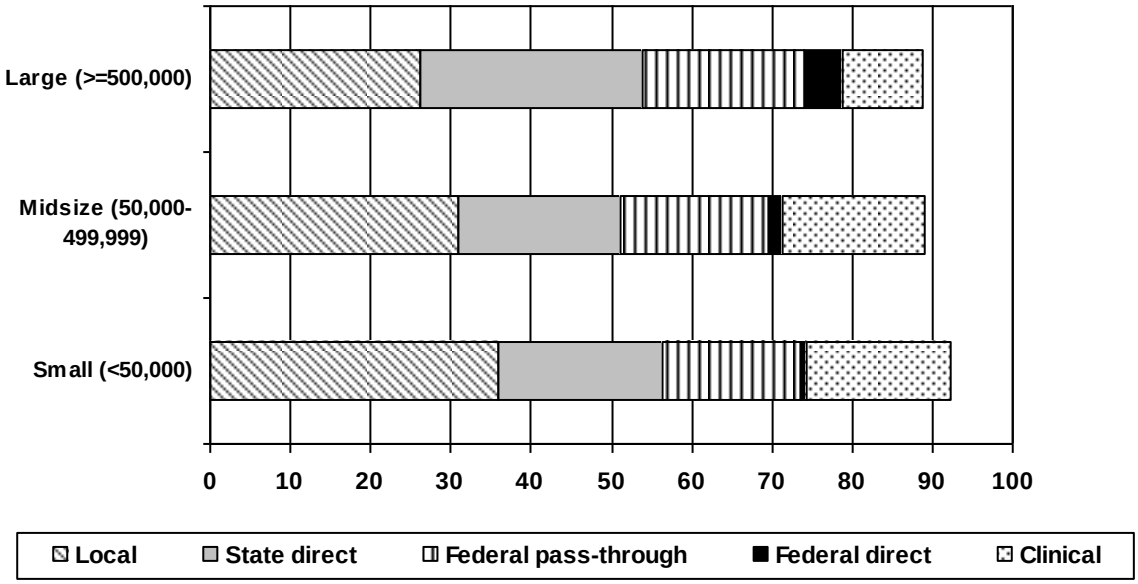
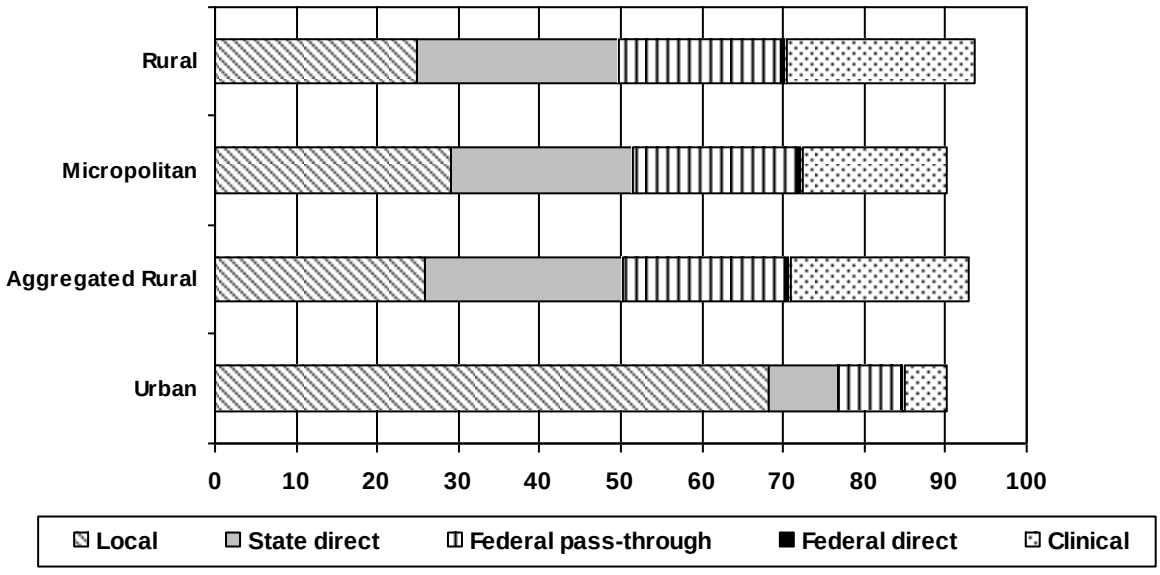
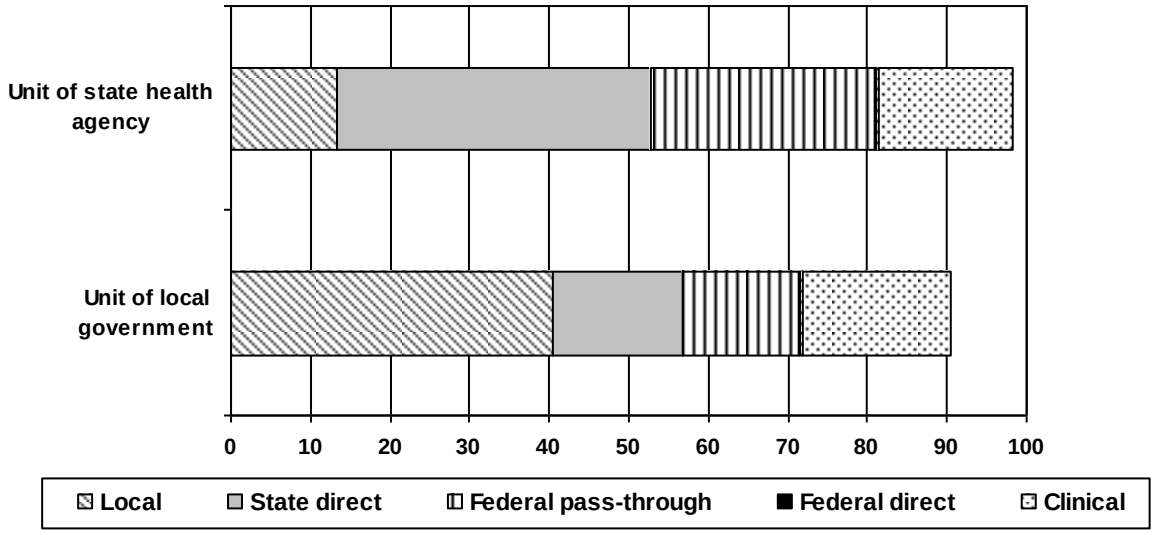


Figure 4. Mean Percentage of LHD Revenues from Selected Sources for LHDs Serving Populations <50,000, by Degree of Urbanization (n=1,250).



Similar analysis was completed for the subgroup of LHDs serving populations <50,000, the results of which are presented in Figures 4 and 5. The difference in distribution of funding sources for rural compared to urban LHDs (Figure 4) remains significant ($p<0.001$, Mann-Whitney test for all comparisons) and is more striking than that for all LHDs. Differences between rural and micropolitan LHDs are slightly more pronounced than in Figure 2; most notably, the proportion of fees from clinical sources slightly increased for rural LHDs and decreased for micropolitan LHDs, resulting in a significant difference between rural and micropolitan LHDs ($p=0.013$, Mann-Whitney test). Limiting the population served size to <50,000 does not noticeably alter the distribution of funding sources by LHD governance unit (Figure 5).

Figure 5. Mean Percentage of LHD Revenues from Selected Sources for LHDs Serving Populations <50,000, by Governance Unit (n=1,160).



3.4 Discussion

The 50-state analysis attempts to describe the distribution of public health funds at the state and local levels and explore how public health infrastructure relates to financing of public health activities. While these data did not show a relationship between public health infrastructure and amount of funds received, differences were observed across the types and sizes of populations served. Key findings include:

- Average annual CDC per capita funds for prevention activities varied widely across states.
- CDC per capita funds for prevention activities do not appear to be related to states' public health infrastructure.
- While the highest annual CDC per capita funds for prevention activities were among the most rural states, comparisons across categories of rurality showed no significant relationship between CDC per capita funds and the proportions of states' populations residing in rural areas.

- Classification of LHDs as units of the state health agency or units of local government was not related to per capita non-clinical expenditures.
- Rural LHDs have higher per capita non-clinical expenditures than non-rural LHDs.
- Compared to urban LHDs, rural LHDs receive a higher proportion of total revenues from state direct, federal pass through, and clinical sources, and a lower proportion from local and federal direct sources.

One important association suggested by these analyses is that funding levels are related to rurality. Although there was no significant relationship between CDC per capita funds for chronic disease prevention and health promotion activities and state's degree of rurality, examination of the distribution of CDC funds showed that some of the most rural states had some of the highest levels of annual CDC per capita funds. At the local level, rural LHDs had higher per capita expenditures than non-rural LHDs, even among only those LHDs serving small jurisdictions of less than 50,000.

While at first glance these relationships may suggest that rural LHDs have at least a similar capacity to access funds as do non-rural LHDs, there are several reasons that this argument may not be supported strongly by our analyses. For the vast majority of public health programs there is a "fixed cost" that is independent of the size of the target population served. Thus, per capita expenditures for smaller populations, such as most rural LHDs, may appear higher relative to expenditures for larger urban LHDs. We only were able to account for this in our subgroup analysis of LHDs serving small jurisdictions.

It is interesting to note that some of the earliest studies of rural public health financing showed similar results. Data from the U.S. Public Health Service (PHS) demonstrate that in 1941, for example, PHS grants to states with 70 percent or greater urban population averaged six cents per capita, while grants to states with 70 percent or greater rural population averaged 12 cents per capita.[38] As noted by Mott and Roemer in 1948, "Encouraging as this is, it is a long way from meeting true needs. There is a natural tendency for funds to go to the states and get funneled to the LHDs with existing public health organization and infrastructure that can absorb the money. LHDs lacking the organization tend to be bypassed by these federal dollars due to limited organizational support. Hundreds of rural counties, therefore, have never enjoyed the benefits of this federal aid except in so far as state-sponsored programs have reached local residents."[39]

Limitations of NACCHO's 2005 Profile study also may also help to explain the relationship observed between rural LHDs and per capita expenditures. First, although the overall response rate for NACCHO's 2005 Profile study was high, response rates varied by size of population served by LHDs, with lower response rates for LHDs serving smaller populations.[40] This response pattern biases our results to the extent that these non-responders were rural LHDs and differed from those rural LHDs responding to the survey. It is likely that it was the LHDs with the most limited capacities for accessing public health funds that did not respond to the

[38] U.S. Public Health Service, *Annual Report, 1941*. Washington: Government Printing Office, 1942.
[39] Mott, F.D and Roemer, M.I. *Rural Health and Medical Care*. New York: McGraw-Hill Book Company, 1948.
[40] National Association of County and City Health Officials. *2005 National Profile of Local Health Departments.* Washington, DC; 2006. Available at http://www.naccho.org/topics/infrastructure/documents/NACCHO_report_final_000.pdf. Accessed January 8, 2007.

NACCHO 2005 Profile survey. If so, our results likely overestimate per capita expenditures for rural LHDs. Second, given that state-local public health systems differ so widely, applying the Profile definition of LHDs was complex and varied by state. In states with local units and district or regional offices that support these units, either the local or regional units were included in the study population, but not both. In these instances NACCHO consulted with state health officials to determine which units could best respond to the survey. It is plausible that among the local units not included in the study population were those in rural areas with the most limited infrastructure. To the extent that this was so, our results may again overestimate rural LHDs' per capita expenditures.

While the results of these exploratory analyses provide a unique look at public health financing as it relates to LHDs' characteristics, it is important to remember what cannot be assessed with the available data. In the 2005 NACCHO Profile study, LHDs were classified as rural, micropolitan, or urban based on the RUCA classification of the zip code where the LHD was located. Many LHDs serve rural and non-rural areas, and many that were not classified as rural in fact serve rural areas. We therefore cannot assess rural areas' access to public health funding or the degree to which public health services supported by this funding reaches rural areas. Additionally, many rural areas do not have a LHD and rely on a mix of professionals and organizations to provide public health services.[41] Lacking the organizational abilities of a LHD, these rural areas have the weakest public health infrastructure and face greater difficulties accessing public health funds.

This study also cannot assess the extent to which LHDs are financed to build and sustain an adequate public health infrastructure. NACCHO's 2005 Profile study included data on reported revenues and revenues by source, but it did not describe finances by program or purpose.

Finally, our study cannot assess the extent to which states or LHDs can meet the public health needs of communities they serve, or whether this differs between rural and non-rural LHDs or by type of infrastructure.

[41] University of Pittsburgh Center for Rural Health Practice. *Bridging the Health Divide: The Rural Public Health Research Agenda*. Bradford, PA: University of Pittsburgh at Bradford; 2004; 7-10. Available at: http://www.upb.pitt.edu/crhp/Bridging%20the%20Health%20Divide.pdf. Accessed December 20, 2006.

4. Qualitative Analysis (Data from Six States)

To provide further understanding on rural community-level access to public health resources and challenges communities may face in securing these resources, an in-depth qualitative analysis was conducted to track and analyze the flow of public heath resources from the federal level, through the states, and down to communities. The intent of this study component was to examine in greater depth the funding streams and organizational mechanisms by which localities receive funding for selected population-based prevention and health promotion activities.

Public health systems in rural areas differ from those in urban areas in terms of scope of services and functions, in part due to differences in the level of resources available and in part based on geographic isolation and the corresponding size of the population served. How these distinctly rural features affect the state-level public health governance and support of local public health districts is not well understood. Additionally, a good portion of prevention funding is being funneled through non-governmental community-based organizations, and rural areas have far fewer of these organizations than their densely populated counterparts. Many 'public health' functions are conducted, at least in part, by hospitals, private practice physicians, and other community-based organizations as well as a variety of entities that are not focused strictly on health. Moreover, many rural areas have no local governmental public health infrastructure at all.[42] In these instances, hospitals and community health providers are likely to fill, at least partially, the gaps in the public health infrastructure through implementation of community health initiatives.

Given our interest in the flow of federal resources, and to ensure consistent and comparable findings with our quantitative analysis, interviews focused specifically on CDC prevention funding lines that were likely to be accessed by a majority of states for local public health service provision. Interviews were conducted within six states—Kentucky, Nebraska, New Mexico, Pennsylvania, South Carolina, and Wyoming—through which we tracked CDC prevention funding beginning at the state level through to the organization at which the funds were directly utilized. In all, we interviewed 30 persons involved in the distribution of the CDC funds at the state, regional, and local public health system levels across the six states.

The purpose of the six state analyses was to develop a more thorough understanding of how public health financing is affected by state and local public health structure and organization, and how this, in turn, influences the strategies adopted to address community public health needs in rural areas. Through a series of key informant interviews the project team sought to:

- Describe how CDC funds for prevention and health promotion activities are used by states with different public health infrastructures;
- Identify infrastructure-related barriers that rural LHDs and NGOs may face in securing and using funds for chronic disease prevention and health promotion; and
- Identify how CDC funding fits into the overall activities of local agencies providing public health services.

[42] University of Pittsburgh Center for Rural Health Practice. *Bridging the Health Divide: The Rural Public Health Research Agenda.* Bradford, PA: University of Pittsburgh at Bradford; 2004; 7-10. Available at: http://www.upb.pitt.edu/crhp/Bridging%20the%20Health%20Divide.pdf. Accessed December 20, 2006.

All of the results reported here derive from the responses of our 30 key informants and are based on their opinions and experiences. It was infeasible and beyond the scope of the study to verify objectively the information reported by our respondents, and as such results should be interpreted as our respondents' understanding of the realities of public health funding in their states and jurisdictions.

4.1 Project Approach

For each of the six states, semi-structured telephone interviews were conducted with informants at the state, regional, and local levels who were either directly involved in and/or knowledgeable about the public health system. The study concentrated on tracking the funding for three CDC prevention and health promotion activities: comprehensive cancer control; diabetes; and injury prevention. These particular activities were chosen because data from the 50-state analysis showed that these were areas in which all six states received CDC funds. We then explored how elements of public health infrastructure affect how these funds are accessed and used in each of these program areas and how they further influence the resources that are available to rural communities. The study focused on three specific thematic areas:

- Public health funding for localities. We asked respondents to list sources of funding for local public health activities and to detail LHD and NGO flexibility in deciding how to apply public health dollars to address community prevention needs.

- Lines of reporting and accountability. We asked respondents to characterize the reporting relationships between the state and the local entities for these program activities. In addition, we gathered information on how various entities outside of the traditional public health system report their use of funds to direct the local prevention activities.

- Provision of public health services. We asked how CDC funds were received and used, with a particular focus on local governmental and non-governmental organizations in rural areas. Additionally, we sought to identify barriers to service provision reported by public health personnel at the different levels within the state's public health infrastructure.

4.1.1 Research Questionnaire

A semi-structured telephone discussion guide was developed based on these objectives. Most of the questions were open-ended, designed to guide the discussion in a conversational manner. While this approach tends to elicit responses that are fairly subjective, it can be quite useful as a tool for identifying themes within broader topic areas. The questionnaire also included specific questions on the levels of funding and the use or redistribution of the funding to other entities beyond the informant's organization. When funds were distributed beyond the key informant's organization, further interviews were conducted to track funding to its ultimate use.

4.1.2 State Selection

States were selected based upon inclusion in a prior Walsh Center study that analyzed public health infrastructure and systems in rural states. Specific criteria were used for that study to select a sample consisting of six states, with special consideration for rurality, population

density, and state public health infrastructure. The current study provides additional analysis among these states to assess the impact of rurality and organization of the public health system on available funding and services provided in rural areas. These states all have a rural population above the U.S. average (21 percent), and a population density ranging from 5.1 persons per square mile to 274 persons per square mile.[43]

Table 8. State Characteristics by Selection Criteria[44]

State	Degree of Centralization	Census Region	% Rural	Persons per Square Mile	% Below Poverty Level
Kentucky	Shared	South/ East S. Central	44.2	101.7	15.8
Nebraska	Mixed	Midwest/ West N. Central	30.2	137.8	6.5
New Mexico	Centralized	West/ Mountain	25.0	15.0	18.4
Pennsylvania	Decentralized	Northeast/Mid Atlantic	22.9	274.0	11.0
South Carolina	Centralized	South/S. Atlantic	39.5	133.2	14.1
Wyoming	Decentralized	West/ Mountain	34.9	5.1	11.4

States included in this study represent the greatest possible range of public health system organizational structures as categorized by NACCHO and the CDC. States also represent regional diversity and varying degrees of rurality, with at least one state having a substantial frontier area (Wyoming), and at least one state having significant urban populations (Pennsylvania). The six states also offer public health systems operating across a range of state poverty levels. Three of the selected states have poverty rates above, and three below, the U.S. average of 12.4 percent.[45] Key variables describing the states included in this study are included in Table 8.

4.1.3 Selection of Key Informants

Key informants were selected based on each state's CDC funding hierarchy, starting with the state health department, as it was necessary to speak with those involved at all levels within each state to assess the relationship between public health structure and service provision. The informants were identified through requests to the state health officer for information on who is responsible for each of the prevention areas the study was tracking (e.g., diabetes, injury prevention, and cancer). Additional contacts were also sought from the CDC project directors responsible for each of the three funding streams. For each of the six states, we spoke to

[43] United States Census Bureau. *State & County QuickFacts*. U.S. Census Bureau Website. 2000. Available at http://quickfacts.census.gov/qfd/ . Accessed February 8, 2007.
[44] White LA & Silver L. *Rural Public Health Infrastructure: Case Studies to Assess the Impact of Structure on Service Delivery.* Bethesda, MD: Walsh Center for Rural Health Analysis, NORC; 2006.
[45] United States Census Bureau. Census 2000 Summary File 3 Sample Data; P87- Poverty Status in 1999 of Individuals. U.S. Census Bureau FactFinder website. 2000. Available at http://factfinder.census.gov/servlet/MetadataBrowserServlet?type=dataset&id=DEC_2000_SF3_U&lang=en . Accessed January 16, 2007..

informants from the state public health department, local health departments, and local non-governmental organizations managing funds for prevention programs in order to integrate a comprehensive mix of perspectives. During these interviews, the participants were asked to identify any additional persons who received funds or were involved in the management of funds for each of the three chronic disease prevention areas. Interviews were conducted independently for each funding stream, tracking public health finances through the various levels of the state public health system to its ultimate use. Many of the interviews terminated at the state level due to a lack of funds distribution at the local communities level. However, we conducted as many interviews as possible to obtain the widest perspective possible.

4.2 Findings and Implications

The impetus for this study came from observations and recommendations from a prior Walsh Center report assessing the impact of infrastructure on service delivery. That report concluded that limited resources and smaller population sizes in rural public health districts means less infrastructure is available to the local community.[46] In synthesizing the results from the interviews conducted for this study, we classified responses to identify challenges and facilitating factors to providing public health services in rural areas and, where possible, identified commonly reported issues related to federal funding of prevention programs.

4.2.1 Distribution of Funds

The distribution of funds to localities varied widely among the six states in the study. The ability of a state to distribute CDC funding to localities was reported to be dependent on the amount of total funding available and the particular needs of the state and the localities within its jurisdiction. In many cases the funding was used completely at the state level for public health activities and was not further distributed. This was mainly the case in those states receiving limited funding amounts, which led to the decision to restrict the use of funds to state public health capacity building. Further, states reported that federal funds often have a cap on the administrative costs that are allowed in a grant, which can be easily used entirely by the state agency, leaving none for the local agencies. Other primary uses for the money by the state offices included the establishment of statewide registries, providing technical assistance to localities, and the promotion of collaborative efforts among localities to increase their ability to maximize available resources.

The mode for transmission of funds to localities, when it did occur, was generally through the use of mini grants or contracts usually awarded as a result of a competitive request for proposal (RFP) process. While some state public health offices reported that there was consideration for population needs, the majority of those contacted reported no such consideration. This competitive bidding format is used primarily because the states feel that their funding is too limited to distribute evenly to every locality in the state and therefore deem it more effective to allocate useable amounts to those who can best utilize the funding. This format for funds distribution has one real limitation: the distribution of funds relies on the recipient organization having the capacity to identify the available grants and staff with sufficient experience to write a

[46] White LA & Silver L. *Rural Public Health Infrastructure: Case Studies to Assess the Impact of Structure on Service Delivery.* Bethesda, MD: Walsh Center for Rural Health Analysis, NORC; 2006.

successful proposal. Rural LHDs and NGOs often struggle with hiring and retaining staff with these capabilities, who often find better pay and benefits in an inpatient or physician practice setting.[47] Since the amounts that are generally awarded through these processes are small (ranging from $14,160 to $65,486 among LHDs and NGOs interviewed), the time and effort to apply for funding must be weighed against the greater organizational needs of the recipient organization.

4.2.2 Flexibility

Local funding often relies disproportionately on state (and federal pass through) funds that are tied to specific programs or requirements, thus spending can sometimes be less responsive to local needs.[48] The amounts of funds distributed to the local agencies contacted as a part of this study were reportedly too small to accomplish individual programs so were often combined as a part of an overall programmatic budget. While even the relatively limited amount of funding was always mentioned by respondents as being beneficial, some find it difficult to meet broader community needs with resources marked for certain programs. The pooling of funds made specific outcome requirements difficult to measure and therefore specific outcomes and goals were generally linked to the overall activity. In the rare instance where such goals were specifically stated, they remained fairly general in scope (e.g., increasing screening activities, reducing morbidity from diabetes) which were viewed as reasonable by the respondents. Local respondents often noted that the rigidity of particular funding streams made it difficult for them to manage their already limited resources.

Many of these findings were confirmed by local health officials participating in a session at the 2006 NACCHO annual meeting. These officials highlighted with concern that rural funding is often based on inflexible state funds obtained through "siloed" federal grants. The dollars received are usually too small to support one FTE, yet the LHDs are limited in their ability to hire part-time personnel. As a result, health officers said that they often decline grant opportunities because they are not able to staff the project. Another issue raised by the health officers was the frequent requirement for collaborations. Collaborative relationships are harder to achieve successfully among rural organizations, mostly due to a lack of available partners. These concerns were supported by the local informants who were frustrated by grant requirements tied to relatively small amounts of funding, thereby limiting their ability to obtain infrastructure funding from federal sources.

4.2.3 Reported Barriers

Financial resource limitations were most often mentioned as a major barrier to undertaking public health activities effectively. Rural agencies in particular require a greater proportion of funding for transportation and advertising their activities because the populations they serve are relatively isolated and spread over a larger geographic area than most public health jurisdictions in non-rural areas. Distance was a major barrier mentioned by all local respondents, as was a

[47] Health Resources and Services Administration Bureau of Health Professions. *Public Health Workforce.* Washington DC: HRSA; 2005. Available at ftp://ftp.hrsa.gov/bhpr/nationalcenter/publichealth2005.pdf. Accessed December 14, 2006.

[48] Hajat A, Brown C, & Fraser M. *Local public health agency infrastructure: A chartbook.* Washington, DC: National Association of County and City Health Officials (NACCHO) and the Robert Wood Johnson Foundation; 2001.

lack of partners such as non-profit organizations or universities that could assist with service provision. Promotion of the organization's activities and performing needs assessments within the community were reported to be extremely difficult with limited funding and a diffuse population. Many rural agencies had few resources to devote to community needs assessment activities, though many said that they would undertake these activities if given additional resources.

Another specific barrier was the perception that funders are increasingly using evidence-based research models in making funding decisions. While they support the use of evidence-based models in concept, rural LHDs and NGOs note that their focus on community outreach and service delivery activities (which typically have no data collection component) makes it difficult to present analyses of the effectiveness and efficiency of their programs to their funders. Respondents suggested that additional resources may be needed to assist LHDs and NGOs in collecting and analyzing data to demonstrate program effectiveness.

4.3 Discussion

The nature of the case study approach created some limitations on our ability to compare how rural communities fared within their states. The study examined only CDC prevention funding streams, which make up a very small portion of LHDs' overall programmatic infrastructure. Restricting the study to six states gives only a snapshot of local programs tied to CDC funds, and findings may not be fully representative of the activities of local agencies across the remaining forty-four states. In addition, many of the interviews terminated at the state level due to a lack of funds distribution at the local communities level. All of the results reported here derive from the responses of 30 key informants and are based on their opinions and experiences. It was infeasible and beyond the scope of the study to verify objectively the information reported by our respondents, and as such results should be interpreted as our respondents' understanding of the realities of public health funding in their states and jurisdictions.

The following are the major issues identified regarding rural access to CDC prevention funding:

- Based on our qualitative analysis of CDC prevention funding for diabetes, cancer and injury, states report that funds are too limited to distribute effectively at the local level. As a result, most of the funding is kept at the state level to develop statewide program initiatives;
- Further, local funding, when provided, tends to be allocated through competitive mini grant processes that are often difficult for rural agencies to access due to infrastructural and staffing challenges;
- Mini-grant amounts are reported to be too small to build local program capacities and are often awarded to communities with existing capacities rather than those with greater need -- many agencies report that award amounts are "not worth the trouble" given that they are awarded annually and can not be counted on to sustain programmatic activities; and
- Rural public health infrastructure does not appear to be strongly related to local community ability to access CDC prevention funding. The primary reason for this finding, however, appears to be related to the limited levels of funding provided to states and consequent decisions to retain funds at the state level. Were funding levels high

enough to effectively allocate to the local level, infrastructure related differences in accessing funding may have become apparent.

The study was not comprehensive in scope, but rather provides a starting point for identifying potential characteristics of state and local public health infrastructure and funding that could be important factors influencing public health services in rural areas. Outside funding appeared to be invaluable to both the state and local agencies for increasing capacity and for enhancing the services that public health agencies were able to provide to communities. Limited funding remains the most often stated barrier across the entire spectrum of officials from the state level through to the local level. Rural agencies are disproportionately affected with regard to the amount of funding they receive and it may be necessary to re-examine the criteria by which these funds are allocated to rural communities.

Finally, we must also note the critical issue of geographic isolation faced by rural LHDs and NGOs in their efforts to develop and implement initiatives. Rural respondents report needing a disproportionate amount of money for advertising of programs and enabling participants to attend programmatic activities not served by any publicly funded transportation.

5. Conclusions and Overall Findings

In addition to its traditional functions, the public health system has taken on new roles as demanded by emerging challenges such as bioterrorism, a surge in chronic conditions such as obesity, and persistent health disparities. Reinforcing traditional roles and embracing newer challenges demands sizeable infrastructure-related investments.

The efforts from the public as well as the private sectors in strengthening the public health infrastructure in the recent years have been noteworthy. There are, however, numerous gaps such as workforce shortages, lack of uniform performance standards for public health organizations, and a digital divide which threaten an already weak infrastructure. While all rural jurisdictions face these challenges, infrastructure-related problems are more pronounced in rural communities than urban ones.

Through this study we have conducted both quantitative and qualitative analyses to assess the relationship between state and local-level public health infrastructure and the availability of specific CDC funding streams to address rural community needs. Notably, CDC prevention funding streams make up a very small portion of LHDs' overall programmatic infrastructure; the intent of the study is not to imply that these are the only sources of prevention funding available to localities.

From the analyses detailed in this report, we present the following conclusions with regard to rural public health financing:

Conclusions:

- The extent and quality of public health services depend greatly on the resources available to address the needs of communities. Average annual CDC funds for prevention activities varied widely across states, from approximately $3.4 million in Delaware to $48.5 million in New York. On average, states received approximately $15,367,982 in CDC prevention funds. Although average annual CDC funds for prevention activities appeared highest for the least rural states, this difference was not statistically significant.
- Size of population served may impact LHD expenditures in a non-linear fashion. For example, many infrastructure-related costs may be largely independent of the population size served by an LHD – a "fixed cost" of doing business. To the extent that this is so, per capita expenditures for smaller populations, such as the majority of rural LHDs, may appear high relative to expenditures for larger urban LHDs.
- Sources of revenue differ significantly between rural and urban LHDs. Whereas urban LHDs receive a significantly higher proportion of their revenues from local and federal direct sources, rural LHDs receive a higher proportion of total revenues from state direct, federal pass through, and clinical sources. The proportion of revenues from state direct and federal direct sources increases as population size served increases, and was significantly different in all comparisons across population size groups.
- State-level officials report that their ability to distribute CDC funding to localities was entirely dependent on the amount of total funding available and the particular needs of the state and the localities within their jurisdiction. The mode for transmission of funds to

localities, when it did occur, was generally through the use of mini grants or contracts, usually awarded as a result of a competitive request for proposal (RFP) process.

- The amounts of funds distributed to the local agencies contacted as a part of this study were reportedly too small to accomplish individual programs so were often combined as a part of an overall programmatic budget. Often dollars are too limited to support one FTE, and local agencies are often restricted in their ability to hire part-time personnel. As a result, LHDs and NGOs may decline grant opportunities because they are not able to staff the project.
- Financial resource limitations were most often mentioned as a major barrier to effectively undertaking public health activities. A lack of partners, such as non-profit organizations or universities that could assist with service provision, was also frequently cited as a barrier.
- The perception that funders are increasingly using evidence-based research models in making funding decisions was yet another barrier. While they support the use of evidence-based models in concept, rural LHDs and NGOs note that their focus on community outreach and service delivery activities (which typically have no data collection component) makes it difficult to present analyses of the effectiveness and efficiency of their programs to their funders.

Overall Findings:

<u>Finding 1</u>: Based on our qualitative analysis of CDC prevention funding for diabetes, cancer and injury prevention, states report that funds are too limited to distribute effectively to the local level. As a result, most of the funding is kept at the state level to develop statewide program initiatives.

Because the funding streams examined in this study were judged by most states to be too limited to distribute effectively to the local level and thus often were not made directly available to local communities, it was difficult to adequately assess how infrastructure affected local communities' abilities to access federal public health funds. Examination of more highly funded federal programs that are also intended to reach local communities, such as preparedness funding, may provide a better understanding of the relationship between public health infrastructure and financing.

<u>Finding 2</u>: Additional studies are needed to assess optimal methods for distributing limited resources to achieve a statewide impact. Current methods, developing statewide initiatives and mini-grant programs, should be evaluated to measure their impact on (and accessibility to) communities with greatest identified need. Studies should also assess the degree to which evidence-based research models create barriers for rural program development and sustainability.

Most funding appears to be used to establish statewide program initiatives and/or is distributed competitively through mini-grants. The effectiveness and responsiveness of statewide initiatives to address community-level needs is an important issue needing further study. Rural accessibility to mini-grant funds also needs further study. Local officials report that a robust

infrastructure is required to secure most funds, a situation rarely evident among rural LHDs and NGOs. Optimal mini-grant funding amounts also should be studied as many local respondents reported that regardless of their capacities, mini-grant amounts are often too small to make them "worth the effort." Further, there is a perception that funders are increasingly using evidence-based research models in making funding decisions. While they support the use of evidence-based models in concept, rural LHDs and NGOs note that their focus on community outreach and service delivery activities (which typically have no data collection component) makes it difficult to present analyses of the effectiveness and efficiency of their programs to their funders. Studies are needed to assess the degree to which such models do in fact create barriers for rural program development and sustainability.

Finding 3: Technical assistance should be provided to LHDs and NGOs eligible for mini-grants to facilitate their identification of community needs and development of competitive proposals.

Respondents note that mini-grant programs tend to fund activities in communities with existing capacities so that communities without a robust infrastructure are rarely included. Technical assistance is needed in rural communities to engage in community health assessment activities and to develop strong funding proposals.

Finding 4: LHDs should be encouraged to conduct community needs assessments, and states should provide flexibility in the use of funding to allow communities to address identified needs.

Compared to urban LHDs, rural LHDs receive a higher proportion of total revenues from state direct, federal pass through, and clinical sources, and a lower proportion from local and federal direct sources. State level and federal pass through funds are likely to be tied to specific program activities and outcomes, which may or may not correspond to identified local needs. Rural LHDs' limited access to local funding may be a barrier to responding to locally identified public health concerns.

Finding 5: Efforts to develop an objective way of classifying state health department systems are encouraged in order to facilitate comparisons across states with inconsistent structural classifications.

Variability among state public health systems clearly affects decisions about the distribution of CDC funds to both rural and non-rural communities. Inconsistencies in prior efforts to classify state public health structures limit analyses designed to assess the impact of state-level structure on local public health funding. Efforts to develop an objective classification system, as opposed to current systems that generally rely on state-level self-report, are encouraged.

Finding 6: Additional effort should be placed on analyzing the delivery of public health services in areas not under the jurisdiction of a local health department.

Inasmuch as we rely on NACCHO profile data in our analyses, it is important to recognize that many rural areas are not served by LHDs. This does not necessarily mean that public health activities are neglected in these communities, but rather that these activities may be carried out by other public health system partners such as hospitals, community health centers, non-profit organizations, and others. While our qualitative analysis captures much of the activity of this

"extended public health system," our analysis of the NACCHO profile was necessarily limited to LHDs. Additional study of areas not served by governmental public health agencies is needed in order to identify both the potential implications of not having a governmental system, as well as alternate methods to assuring access to public health services.

With regard to the specific issue of financing public health activities, the extent and quality of public health services depend greatly on the resources available to deliver those services and address the needs of communities. Inadequate financial resources and uneven distribution of funding across and within states have the potential to lead to uneven health outcomes and a deepening of rural-urban health disparities. While funding is clearly needed to build and strengthen public health infrastructure, an established infrastructure is required to secure most funds, thus creating a "Catch-22" situation for rural public health systems.

A more thorough understanding of the public health financing streams from all sectors and across the range of other organizations providing services would enhance the understanding of the role that LHDs and NGOs play in the health of rural communities. The division of responsibilities across multiple organizations and the very nature of funding streams supporting prevention activities may contribute to the wide disparity in health status among many rural communities. A comprehensive study comparing all funding streams arriving at the local level and a qualitative examination of the effects that funding has on the health status of rural communities is needed to properly comprehend the effectiveness of this service delivery in relation to infrastructure constraints.