

Bridging the Health Divide
The Rural Public Health Research Agenda

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University of Pittsburgh
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About the cover: The Kinzua Bridge, located in McKean County, Pennsylvania, was built in 1882. At the time of its construction, it was the highest railroad bridge in the world. Rebuilt in 1900 for use by heavier trains, the bridge was destroyed on Monday, July 21, 2003, by an F1 tornado (wind speed 73–112 mph). At 2,053 feet long and standing 301 feet high, the bridge was believed to still be the second-highest railroad viaduct in the United States, and fourth-highest in the world, at the time of its collapse.

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Introduction

THIS MONOGRAPH REPORTS the results of the *Rural Public Health Research Agenda Setting Meeting* held September 22-23, 2003, in Pittsburgh, PA. Fifty-seven rural public health experts from throughout the U.S. participated in the identification and refinement of the most important rural public health research issues. The participants were comprised of 30 representatives from academia, 12 from practice-based agencies such as state and local health departments, 8 from national organizations, and 7 from federal agencies

Background and Agenda Setting Process

In August, 2001, the National Center for Health Statistics at the Centers for Disease Control and Prevention released the 25th annual statistical report on the Nation's health. The release of this report was a watershed event in efforts to address issues of rural public health in that it presented the first look at the nation's health status relative to community urbanization level. Specific findings demonstrated a number of disparities in health status between rural and non-rural citizens including: teenagers and adults in rural counties were the most likely to smoke; residents of rural communities had the fewest dental care visits; death rates for working-age adults were highest in the most rural and most urban areas; rural areas had a high percentage of residents without health insurance; and residents of rural areas had the highest death rates for unintentional injuries in general, and for motor-vehicle injuries specifically.¹

While it is clear that rural citizens experience significant health disparities, the vast majority of health-related research and practice efforts in rural communities focus on assuring access to health care services. Undoubtedly access to care is an issue critical to improving health status throughout rural America, but equal in importance are issues such as health behavior, environmental health, infectious disease surveillance, and other issues of public health interest. These areas are largely unstudied relative to their impact on rural health status, leading to the conclusion that a research agenda focused on rural public health issues was needed to encourage researchers and funders to consider rural populations as they design and implement studies. By encouraging a broader focus on *all* of the factors that contribute to the health status of rural populations, the goal of the *Rural Public Health Research Agenda* is to create opportunities for public health researchers to address issues of geographic health disparities and ultimately improve the health status of rural Americans.

The impetus for the research agenda emerged from earlier work of the Health Resources and Services Administration's Office of Rural Health Policy in support of The National Advisory Committee on Rural Health and its report entitled, *Rural Public Health: Issues and Considerations: A Report to the Secretary, U.S. Department of Health and Human Services*,² issued in February, 2000. In order to assure that the research agenda informed practice, the Public Health Training Centers' Rural Public Health Interest Group was utilized to help identify participants. The final roster of 57 participants included 30 from academia (mostly the training centers), 12 from practice-based agencies such as state and local health departments, 8 from national organizations, and 7 from federal agencies.

¹ *Health, United States, 2001 With Rural and Urban Health Chartbook*. Hyattsville, MD: Centers for Disease Control and Prevention, National Center for Health Statistics; 2001.

² *Rural Public Health: Issues and Considerations: A Report to the Secretary, U.S. Department of Health and Human Services*, Rockville, MD: Health Resources and Services Administration, National Advisory Committee on Rural Health; February, 2000.

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A steering group was formed from a subset of the rural public health interest group to provide a framework for the research agenda and assist with meeting planning. The group identified six broad topic areas: *Rural Public Health Infrastructure; Workforce Development and Competency Enhancement; Rural Health Disparities; Access to Care/ Safety Net Support; Rural Public Health Preparedness; and Environmental Health Issues.*

In preparation for the meeting, “working papers” were developed on each of these topics to provide background information and data supporting the need for additional research in these areas, as well as beginning thoughts on research questions and opportunities. Papers were sent to participants prior to the meeting for consideration and review. The *Rural Public Health Research Agenda Setting Meeting* took place September 22-23, 2003, in Pittsburgh, PA, during which time participants were divided into groups for facilitated discussions of the topical areas and worked to refine the papers and to develop and prioritize the specific research questions for each topic.

Following the meeting, working papers and prioritized research questions were revised according to participants’ recommendations and are included in this publication. Among the participants were two individuals who were given the charge of moving between breakout groups to identify core, crosscutting themes. The themes, which underpin many of the recommendations and research questions that have emerged from this process, are included as a seventh working paper, drafted after the research agenda setting meeting.

The *Rural Public Health Research Agenda* is the culmination of these efforts, framed by six broad topic areas and summarized in the seven working papers included here.

Rural Health Research Centers³

ONE PARTICULAR RESOURCE that should be noted in any discussion of rural research priorities is the Rural Health Research Center (RHRC) Program. The RHRC Program objective is to increase the amount of high quality, policy-relevant, rural health services research being conducted in the nation. Initiated in 1988, this program is administered by the Office of Rural Health Policy, Health Resources and Services Administration, U.S. Department of Health and Human Services. The centers study critical concerns facing rural communities in their quest to secure adequate, affordable, high quality health services. The Office uses the centers’ research findings to educate a wide audience of national, state, and local decision-makers concerned with rural health issues. Research findings have been instrumental in bridging gaps between policy and program needs and have assisted in educating legislators and policymakers. In addition, the research centers have trained many health services researchers in rural issues.

Six centers have cooperative agreements in this Program for FY2001-2004. The awards were made to three General Rural Health Research Centers and three Analytic Centers. The General Centers concentrate on health services research issues, while the Analytic Centers focus on studies, usually of national data sets, which will be immediately useful in informing national policy development. Research on health disparities of rural minorities is a particular focus of several awards. See Appendix B for information on the 2003 RHRC Program Research Agenda and for Research Center contact information.

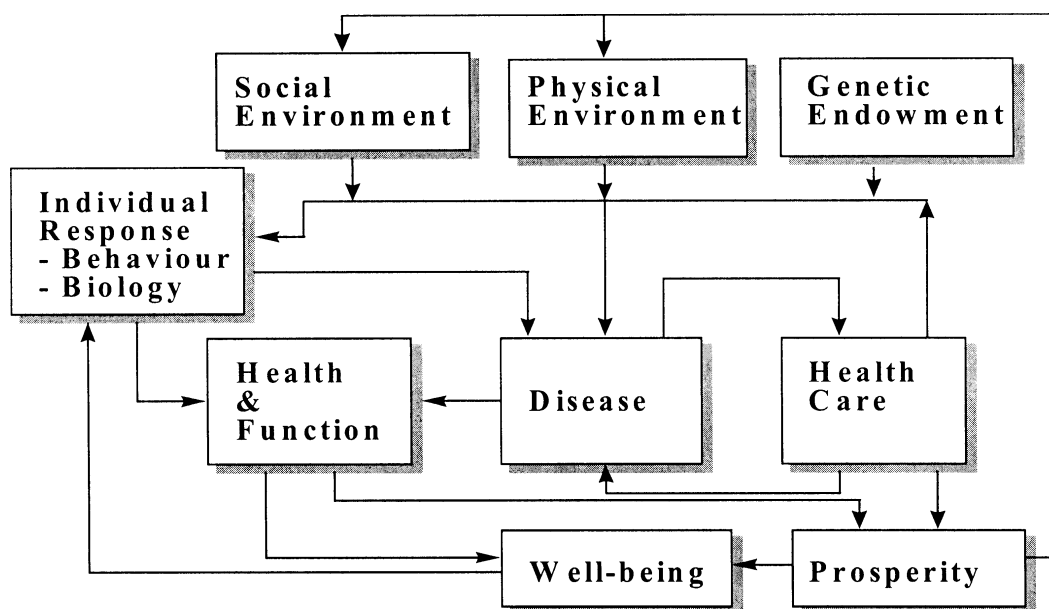
³ Information available at <http://ruralhealth.hrsa.gov/policy/rhrccoop.htm>

Cross Cutting Themes

Prepared by: Gail Bellamy, Ph.D., West Virginia University Institute for Health Policy and Research and Lyle Snider, Ph.D., University of Kentucky Center for Excellence in Rural Health

AS THE MEETING opened, rural public health activities were placed within the context of improving overall population health and eliminating health disparities. To achieve these goals requires consideration of the full range of health determinants including the social, economic, and physical environments in rural communities, as outlined in Figure 1.

Figure 1: Determinants of Health



Source: Evans and Stoddart (1990). Used with permission from Elsevier Science.⁴

Local, state, and national leaders must balance the benefits of investing in public health and health care services against the benefits of other public and social investments that affect population health outcomes (income support, food support, shelter support, education, reduction in economic disparity, etc.). Public resources are scarce and dwindling, and leaders must carefully determine their optimal allocation.⁵ This wide array of factors influencing health outcomes highlights the importance of collaboration between public health agencies, public and non-profit social service providers, traditional health care providers, and other contributors to community-wide health and well-being. One essential area of collaborative activity must be the development, improvement, and/or strengthening of social capital in small rural communities.

⁴ Evans RG, Stoddart GL. 1990. *Producing health, consuming healthcare*. *Social Science and Medicine* 31:1347-1363.

⁵ Kindig D. *Purchasing Population Health: Paying for Results*. University of Michigan Press, 1997.

Break-Out Groups

For most of the *Research Agenda Setting Meeting*, the 57 meeting participants were divided into facilitated discussion groups addressing the six topical areas: 1) Rural public Health Infrastructure; 2) Workforce Development and Competency Enhancement; 3) Rural Health Disparities; 4) Access to Care/Safety Net Support; 5) Rural Public Health Preparedness; and 6) Environmental Issues. The authors of this section were designated as “floaters,” moving through each of the six groups, listening for major themes, and identifying core issues that cut across groups.

Themes

Three core themes were identified:

1) The Diversity of Rural Communities Necessitates Local Solutions to Local Challenges

Rural communities differ significantly across geographic regions and even within regions. Key areas of community diversity include economic factors, demographic make-up, population density, terrain, distance from urban areas, community resources, and public health presence, each of which is discussed briefly.

Rural communities differ in terms of the economies that support them, e.g., agriculture, tourism, manufacturing, mining, energy, etc. These economic underpinnings impact socioeconomic status, environmental health, land use decision making, and other factors that have significant impact on the population’s health.

Rural communities also differ in terms of their demographic make-up. Although most of rural America is Caucasian, the migrant stream of Hispanics from Mexico passes through the rural Midwest, African Americans live in the South, Asian immigrants can be found in the rural Valleys of California and meatpacking communities in Kansas, etc. The median age of rural America is older but the reasons differ across communities (out-migration of youth vs. in-migration of retirees). Although both affect the median age of a community, the residents of those areas where young people are leaving are more likely to live at or below poverty, have lower levels of educational attainment, and be supported by public payers.

Rural communities differ in the density of their populations, resulting in rural “frontier” communities defined as six people per square mile, or rural “wilderness” with even fewer people. The availability of services may depend upon having a “critical mass” which is simply not attainable in low-density areas.

Rural America is also quite diverse in terms of terrain. Although distance is a factor often considered when assessing access to services, distances across open plains are quite different from distances cutting across mountain ranges. Further complicating this issue is the adequacy of road and transportation networks and regional weather patterns which may make areas inaccessible during winter months.

Proximity to urban areas is another critical factor when considering resources available to a community. Rural communities in close proximity to urban areas simply have greater access to the resources of that urban community. This proximity also has significant implications to rural economies (e.g., the growth of bedroom communities as large urban areas expand or as the price of housing in the urban area rises).

Communities also differ in terms of available resources, whether this is measured in terms of “social capital,” access to technology, the availability of education and training opportunities, affordable housing, good schools, or a trained workforce.

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Finally, rural communities differ in terms of local public health presence. A local public health presence can be a function of local governmental policy, coordinated effort between public and private partners, or a function of state policy or regulation.

All of these factors and more contribute to the diversity of rural America. Each community has unique resources and challenges, making it difficult to describe rural America in a comprehensive manner and, in turn, to identify research questions appropriate across communities, states and regions.

2) The Work of Public Health Requires a Trained, Qualified Workforce

This theme resonated with participants based on the fact that the vast majority of rural public health workers have no formal public health training. Most rural public health nurses, the discipline with the largest number of public health workers, were trained in two-year associate degree programs with curricula absent of public health concepts and principles. Local boards of health are often the policy-making component of rural public health and they likewise receive no formal public health training. The ability of these local boards to strengthen the connection between rural health departments and their communities is diminished by their lack of knowledge and awareness of public health concepts.

Participants in the environmental, infrastructure, and preparedness groups identified the need for professionals (epidemiologists, environmental health scientists, sanitarians, etc.) that are certified or credentialed to do the technical work required, along with the need for continuing education opportunities to enable professionals to stay current in their fields. The health disparities group echoed the need for education adding a concern about the need for a workforce that is culturally qualified or culturally competent to address the needs and concerns of racial and ethnic minorities.

One important strategy in upgrading the public health knowledge and understanding of rural public health workers is to provide training in their rural home communities rather than requiring them to travel long distances to urban universities or state capitals. Distance education technologies, including internet-based instruction and interactive video, are important resources for rural place-based public health instruction; however, there remains a need for substantial on-site, in-person instruction to achieve the desired educational objectives.

Rural public health workers serving low income and/or racial and ethnic minority populations face major public health challenges and have great need for education and training. These workers also face major barriers to access that training and education, including the inability to take time away from often severely understaffed local health departments. Few public health workers in these high-need communities will ever be able to participate in the full range of public health training and continuing education opportunities unless programs are developed that address specific barriers to training.

3) Disease Surveillance Systems Must Be Sensitive Enough to Address Small Numbers Issues and Broad Enough to Track Emerging Infections

The adequacy of surveillance systems (infectious disease, health disparities, environmental hazards) was noted by several groups. With the enhanced focus on emergency, bioterrorism, and disaster preparedness, the relevance of this issue is even greater. With respect to the latter, the need for systems that communicate across county or at state lines was of particular interest.

The spread of infectious diseases like SARS and avian flu, or bioterrorist agents such as smallpox, does not stop at arbitrary boundaries. It is critical to enhance the sensitivity of surveillance systems to identify small, unexpected increases and to monitor and track agents across borders. Questions arose among several groups such as what constitutes a critical mass (a detectable amount) in a small population, and how does one measure what is both statistically and clinically significant in small communities?

Similarly, suspected rural cancer clusters often generate substantial passion and energy in the affected communities. How can public health investigators report the results of these rural cancer cluster investigations to appropriately communicate risk while still harnessing this passion and energy towards the improvement of health and social conditions in their community?

Additional Areas Identified by Authors

The steering committee for this important effort worked very hard up-front to make this a productive day and a half, and the participants in this meeting were enormously creative in applying their extensive knowledge to rural public health issues. Nevertheless, with a field as expansive as public health, it was not possible to cover all issues in such a short time. Two areas of research that the authors consider important to include in this document are noted below.

Oral Health

Significant disparities exist between rural and non-rural residents with regards to oral health indicators and the delivery of oral health care services. Barriers to care include financial, geographic, social, and cultural factors, as well as provider shortages and acceptance of Medicaid by providers. Further, access to fluoridated water is minimal due to the predominant use of well water in rural areas; community water supplies, where they exist, tend to not be fluoridated in rural areas. The identification of effective models for oral health surveillance and prevention to eradicate dental caries in rural children should be a priority.

Quality Assurance

Public health's role in quality assurance (i.e., assessing the performance of local health care systems) was also not considered during the brief meeting. With the nation's attention increasingly being drawn to dangerous lapses in the quality of health care (the Institute of Medicine's *To Err is Human: Building a Safer Health System*⁶, and *Crossing the Quality Chasm: A New Health System for the 21st Century*⁷), the assessment of local health care systems should be an important component of local community-wide public health strategic planning initiatives. The recent Centers for Medicare and Medicaid Services initiative to publish and disseminate ten quality indicators for every hospital in the U.S. is an important complement to this activity. The Office of Rural Health Policy, the Agency for Health Quality and Research, the Institute on Medicine, and the Leapfrog Group, have begun separately and together to promote research activity in this area. Efforts to support and supplement these initiatives should be encouraged among rural public health researchers.

⁶ *To Err Is Human: Building a Safer Health System*. Institute of Medicine. Washington, DC. 2000

⁷ *Crossing the Quality Chasm: A New Health System for the 21st Century*. Institute of Medicine, Washington, DC. 2001

Rural Public Health Infrastructure

Prepared by: Claudia L. Schur, Ph.D., NORC Walsh Center for Rural Health Analysis

Defining Public Health Infrastructure

Defining the composition of the public health infrastructure is a significant challenge. Even a brief review of the literature reveals a variety of approaches as shown below:

| Public Health Infrastructure Selected Perspectives | |
|---|---|
| Main Features | Sources |
| <ul style="list-style-type: none"> • Workforce capacity and competence • Information and data systems • Organizational capacity | Centers for Disease Control ⁸ |
| Systems, competencies, relationships and resources enabling performance of 10 essential public health functions | Report by The Lewin Group for US DHHS ⁹ |
| <ul style="list-style-type: none"> • Partnerships or relationship building • Workforce training and education issues • Information management, surveillance, and research • Finances and expenditures | <i>Local Public Health Agency Infrastructure: A Chartbook</i> , NACCHO/RWJF ¹⁰ |
| Human information, financial, and organizational resources that make the provision of public health services in a community possible | Turnock, 1997 ¹¹ |

These definitions overlap substantially and differ primarily in terms of emphasis. Most include some reference to the size and training of the public health workforce and systems for communication within the local public health structure and with other entities. Some mention relationships or partnerships and financial resources required to assemble and maintain the infrastructure. In general, public health infrastructure appears to refer to whatever is needed in terms of capacity and resources to allow a community to provide the ten essential public health services (listed on the following page).

⁸ *Public Health's Infrastructure: A Status Report*, Prepared for The Appropriations Committee of the US Senate by the Department of Health and Human Services, Centers for Disease Control.

⁹ Lewin Group, 1997. *Strategies for Obtaining Public Health Infrastructure Data at Federal, State, and Local Levels: Final Report*. Report prepared for the US Department of Health and Human Services, Fairfax, VA.

¹⁰ National Association of County & City Health Officials, *Local Public Health Agency Infrastructure: A Chartbook*, October 2001.

¹¹ Turnock, BJ. 1997. *Public Health: What It Is and How It Works*. Aspen Publications, Inc.: Gaithersburg, MD.

What is the Status of Rural Public Health Infrastructure?

Surprisingly little is known on a systematic basis about the current status of rural public health infrastructure. There is a dearth of information about the types of personnel and organizations that are providing public health services and the structure of governance dictating how services are delivered. Much of the information that has been collected focuses exclusively on local public health agencies (LPHAs). Without a doubt, LPHAs play a critical role in providing a variety of services and programs in communities across the country. It is also widely recognized that the health of a community is dependent upon a range of organizations and activities, not all of which are directed by public health agencies. Many 'public health' functions are conducted, at least in part, by hospitals, private practice physicians, and community groups as well as an array of entities that are not focused strictly on health. The division of responsibilities in a community may result from state regulation, historical practice, local political dynamics, or other factors. As a result, an exclusive focus on LPHAs leaves out many communities entirely and gives short shrift to the full complement of public health services in other localities. Because of this lack of broad and complete knowledge about the status of rural public health infrastructure, the following discussion is largely limited, by necessity, to what we know about LPHAs.

A study of local public health agencies conducted by the National Association of County and City Health Officials (NACCHO) identifies some of the distinctive features of agencies serving smaller or more isolated communities and how they differ from their urban counterparts (Hajat, Brown, and Fraser, 2001). Overall, 69% of LPHAs serve jurisdictions with populations less than 50,000 and 50% of all agencies serve jurisdictions with populations less than 25,000. In contrast, only 4% of all LPHAs serve large metropolitan areas with populations over 500,000. These categorizations are based on county population size, which can be problematic given that LPHAs serve a variety of jurisdictional levels. In a more recent effort where rural was defined using Rural Urban Commuting Area Codes (RUCAs), 48% of LPHAs were classified as rural.¹²

LPHAs also vary with respect to the jurisdiction served and to the required reporting relationships. A recent survey found that 60% are county-based, 10% serve a city or municipality, 7% serve a city/county, 15% a township, and 8% are multi-county.¹³ Different reporting relationships might include a local board of health, a city or county council, and/or direct reporting to a regional or state health director.

The scale of resources available to LPHAs varies greatly; mean annual expenditures were \$8.9 million for metropolitan agencies compared to \$1.2 million for non-metropolitan agencies (median expenditures were \$1.2m and \$0.5m, respectively). For the smallest jurisdictions (less than 25,000 population), LPHA expenditures

Essential Public Health Services

- Monitor health status to identify community health problems
- Diagnose and investigate health problems and health hazards in the community
- Inform, educate, and empower people about health issues
- Mobilize community partnerships to identify and solve health problems
- Develop policies and plans that support individual and community health efforts
- Enforce laws and regulations that protect health and ensure safety
- Link people to needed personal health services and assure the provision of health care when otherwise unavailable
- Assure a competent public health and personal health care workforce
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- Research for new insights and innovative solutions to health problems

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

¹² Hajat A, Stewart K, and Hayes K. *The Local Public Health Workforce in Rural Communities*. Presentation at the 2002 annual meetings of the American Public Health Association.

¹³ National Association of County & City Health Officials, *Local Public Health Agency Infrastructure: A Chartbook*, October 2001.

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averaged \$438,000 annually compared to the largest jurisdictions (500,000+ population) where expenditures were, on average, \$66 million. Differences in the source of funding are also found, with non-metropolitan LPHAs deriving a smaller proportion of their overall resources from local government and a larger proportion from reimbursement for services.

Workforce differences are also substantial. A recent survey of 1,100 LPHAs found that rural LPHAs had fewer staff compared with either metropolitan or suburban agencies (median number was 31 in metro LPHAs, 18 in suburban, and 12 in rural).¹⁴ In terms of the workforce composition, rural LPHAs had a higher proportion of nurses and a lower proportion of public health specialists. The authors suggest that nurses in rural LPHAs may by necessity perform a host of functions for which they may not have appropriate training.

As reported by the National Advisory Committee on Rural Health,¹⁵ fewer than half of public health agencies have adequate communications and infrastructure systems. In Hawaii, for example, less than one-third of rural health workers had modems or access to on-line health resources. Unpublished data from a 1999 NACCHO survey showed that half of LPHA directors did not have continuous, high-speed access to the Internet at work. Further, almost 20% of LPHAs had no staff members who could search for and access public information on the Internet.¹⁶ During the anthrax scare, when good communication was critical, the Internet connections of one of the local facilities in a particular state were insufficient to receive files from the CDC and the only way to ensure that the files were received was to deliver them by automobile.¹⁷

Some variation has been found across jurisdictions with respect to the priorities given to the provision of various services and the range of services provided. LPHAs in non-metropolitan areas were more likely to assign a higher priority to service delivery (home health, family planning, and behavioral/mental health) than were LPHAs in metropolitan areas. Despite the relative emphasis on service delivery, LPHAs in the smallest jurisdictions (< 25,000 population) were still less likely to provide specific adult and childhood immunizations, dental care, or prenatal care when compared to LPHAs serving larger areas.

Issues Related to Rural Public Health Infrastructure

Public health infrastructure in rural communities has many distinctive features shaped by population size and demographics, population density, and geographic isolation. Some of the issues that may be of most concern to rural communities with respect to public health infrastructure are:

- Public health workforce
 - Recruitment and retention of qualified public health personnel is exacerbated by historic health personnel shortages in rural areas.
 - Limited resources may result in lower staffing levels.
 - Lower volume of work may not warrant hiring persons with specialized training.
 - Geographic isolation or distance from educational institutions may present obstacles to continuing education.

¹⁴ Hajat, Stewart, and Hayes, 2002.

¹⁵ *Rural Public Health: Issues and Considerations*, A Report to the Secretary, US Department of Health and Human Services. The National Advisory Committee on Rural Health, February 2000.

¹⁶ Chapter 23 of Healthy People 2010.

¹⁷ US General Accounting Office. *Bioterrorism: Preparedness Varied across State and Local Jurisdictions*, GAO-03-373, April 2003, page 23.

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- Funding
 - Local public health agencies must attempt to manage a large number of funding streams.
 - Funding in rural communities may rely more heavily on state tax revenues than in urban areas; when these dollars are tied to specific issues/programs, spending is less responsive to local priorities.
 - Funding in rural communities is also more dependent on service reimbursement than in urban areas; this may adversely impact low-income populations in need of health care services.
 - Expansion of Medicaid managed care in rural areas (and the failure of managed care organizations to contract with public health departments) has threatened the ability to provide services to low-income residents.

- Information and data systems
 - Electronic access to public health information, guidelines, and alerts is less pervasive in rural areas.
 - Telehealth can provide public health expertise on an as-needed basis but many rural communities do not have the communications infrastructure to take advantage of the technology.

It should be noted, moreover, that not all communities are part of a local public health system. These communities are likely to be disproportionately rural and face more serious problems of access to public health services.

Priority Research Questions

1. What is the mix of resources and services that make up rural public health infrastructure?
2. What agencies comprise the full range of providers of public health services in rural communities? (e.g., LPHAs, Community Health Centers, hospitals, community coalitions, cooperative extensions)
3. What are the characteristics and components of communities—including legal authority and governance, role of community health coalitions, and community demographics—that allow them to develop and sustain public health?
4. How do differences in infrastructure across rural and urban areas affect the provision of the ten essential public health functions?
5. What is the relationship between the level of funding and different sources of funding and rural public health infrastructure? Which public health needs are not met by categorical funding? How does dependence on service reimbursement as a funding source affect rural residents? Do rural public health agencies charge more for services provided?

Workforce Development and Competency Enhancement

Prepared by: Janet L. Place, MPH, Southeast Public Health Training Center, UNC School of Public Health

H *Healthy People 2010*¹⁸, *The Future of Public Health*¹⁹ and numerous other public health reports have identified the need for strengthening the public health workforce as a critical part of infrastructure development. Specific challenges that have been identified with regard to the strengthening the public health workforce are²⁰:

- Four out of five public health employees have no formal public health training;
- Loss of disease surveillance capacity and sanitation oversight are behind recent national outbreaks of preventable disease;
- Rural health departments face a continuing problem attracting and retaining the proper mix of public health professionals; and
- Strategies are needed to attract a diverse team of skilled personnel to rural areas, including training programs.

The public health workforce, defined as those making up the public health system, not just health departments, is made up of many diverse professions that include physicians, nurses, environmental health specialists, mental health professionals, administrators, health educators, and many others. Not all agencies define these positions in the same way. Enumeration efforts²¹, however, have found the following to be true:

- The public health workforce is aging and retiring, especially within public health nursing;
- The largest professions within public health are nursing and environmental health;
- Metropolitan health departments have larger and more diverse workforces than non-metropolitan health departments;
- Public health nurses, environmental health specialists, health educators, epidemiologist and administrators are in greatest demand; and
- In many rural areas, public health nurses provide the majority of care.

The challenge of the public health workforce shortage is greater in rural areas as location, local educational opportunities, and a shortage of financial resources make recruitment and retention very difficult. While this is especially true for public health nurses, who play an essential role in providing rural public health services, rural areas also suffer from a shortage of dental, mental health and other critical services. The shortage of mental health professionals is especially critical as rural areas continue to grapple with the loss of factory and agricultural jobs and the subsequent stress this places on families.

In addition to the standard public health occupations, rural public health encompasses additional and diverse providers including:

- Head start personnel;
- School nurses;

¹⁸ Centers for Disease Control and Prevention, *Healthy People 2010*, January 2000.

¹⁹ Institute of Medicine, *"The Future of Public Health"*, The National Academy Press, Washington, DC, 1988.

²⁰ Centers for Disease Control and Prevention, *Public Health's Infrastructure: a Status Report*, 2001.

²¹ Health Resources and Services Administration, National Center for Health Workforce Information and Analysis, *Public Health Workforce Enumeration 2000*, December 2000.

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- Zoning and planning personnel;
- Community health center staff;
- Community hospital workers;
- Veterinarians;
- Dentists;
- Social workers;
- Tribal council members;
- Long term care workers;
- Home health personnel;
- Agency on aging staff;
- Community action group members;
- Cooperative extension personnel; and
- Church members and employees.

In October 2001, The National Association of City and County Health Officials (NACCHO) published a report entitled *Local Public Health Agency Infrastructure: a Chartbook*²² which looked at workforce differentials between metropolitan and non-metropolitan (rural) jurisdictions. Table 1 outlines the mean and median direct and contracted FTEs by selected occupational classifications. This clearly shows the FTE differential between metropolitan and non-metropolitan local public health agencies (LPHAs). Overall metropolitan LPHAs have an average of 108 FTEs vs. 31 FTEs in non-metropolitan LPHAs. While one could argue that metropolitan areas serve 75% of the overall population (NACCHO), local health departments in rural areas are often the only source of public health services in those communities.

Rural public health employees must wear many hats. As rural local health departments are likely to be the only source of public health services they are more likely to be delivering primary care services, such as child health care, in addition to essential public health services. In essence rural public health employees must do more with less—less training, less staff, less technology and less training opportunities.

A 2000 report by the National Advisory Committee on Rural Health, “Stabilizing the Rural Public Health Infrastructure²³,” clearly outlined the workforce challenges in rural areas. The movement away from delivering personal healthcare services reduces Medicaid resources needed to provide essential public health services. In addition, the loss of personal healthcare services erodes the already crumbling safety net. The report further notes, “The loss of community disease surveillance capacity, lack of oversight over local sanitation, and inadequate assurance of safe food and water supplies are behind many recent, nationally publicized outbreaks of preventable disease, such as hepatitis A and E-coli induced food poisoning and new outbreaks of tuberculosis. The growing prevalence of hepatitis C has put further burden on public health agencies as the number of people affected continues to multiply and practitioners struggle with diagnosing and treating the disease.” This report preceded the events of September 11, 2001. Now there are even greater demands for a strong and prepared public health workforce. In addition, “Rural Healthy People 2010²⁴” lists 12 rural health priorities, the majority of which must be addressed through public health programs and services.

²² National Association of County and City Health Officials, *Local Public Health Agency Infrastructure: A Chartbook*, October 2001.

²³ National Advisory Committee on Rural Health, *Stabilizing the Rural Public Health Infrastructure*, 2000.

²⁴ Southwest Rural Health Research Center, *Rural Healthy People 2010*, Larry Gamm, et. al, editors, 2003.

Table 1. Mean and Median Direct and Contracted FTEs by Selected Occupational Classifications

| Occupational Classification | Metropolitan LPHAs | | Non-Metropolitan LPHAs | |
|---|--------------------|---------------------|------------------------|---------------------|
| | Mean, Median FTEs | FTEs Range and n | Mean, Median FTEs | FTEs Range and n |
| All Direct and Contract FTEs | 107.9, 28 | 0 to 5600 n=326 | 31.2 13 | 0 to 394 n=267 |
| Administrative or Clerical Staff | 29.5, 5.5 | 0 to 1233 n=332 | 7.2 4 | 0.3 to 121 n=250 |
| Alcohol and Substance Abuse Counselors | 13.4, 4 | 0 to 250 n=56 | 4.3 1 | 0 to 25.2 n=13 |
| Allied Health Professionals, not specified | 9.4, 2 | 0 to 194 n=106 | 3.0 1 | 0 to 72 n=62 |
| Biostatistician | 1.4, 1 | 0.5 to 11.2 n=42 | 1.8 1 | 0.1 to 4 n=7 |
| Environmental Engineer | 2.9, 2 | 0.2 to 30 n=79 | 1.0 1 | 0 to 4 n=34 |
| Environmental Scientist and Specialist | 10.2, 4 | 0 to 535 n=323 | 2.8 1 | 0.1 to 32 n=205 |
| Environmental Science Technician and Technologist | 4.8, 2 | 0 to 130 n=118 | 1.7 1 | 0.3 to 13 n=39 |
| Epidemiologist | 3.1, 1 | 0.1 to 85 n=144 | 1.0 1 | 0.1 to 7 n=46 |
| Health Educator with CHES certification | 3.2, 1 | 0 to 100 n=136 | 1.2 1 | 0.2 to 5 n=45 |
| Health Educator without CHES certification | 4.1, 2 | 0 to 101 n=183 | 1.7 1 | 0.2 to 17 n=112 |
| Health Service Managers, Administrators, Health Director | 3.2, 1 | 0 to 109 n=339 | 1.2 1 | 0 to 15 n=246 |
| Health Information Systems Specialists | 4.9, 2 | 0 to 219 n=160 | 1.4 1 | 0 to 5 n=55 |
| Mental Health Counselor | 18, 1 | 0 to 175 n=29 | 0.3 0.2 | 0.1 to 1 n=5 |
| Mental Health and Substance Abuse Social Worker | 9.1, 3 | 0 to 61.2 n=51 | 2.9 0.5 | 0.1 to 24.2 n=20 |
| Public Health Attorney or Hearing Official | 1.4, 1 | 0 to 50 n=56 | 0.9 0.2 | 0 to 5 n=15 |
| Public Health Dentist | 2, 1 | 0.1 to 19 n=99 | 0.8 0.8 | 0.2 to 6 n=23 |
| Public Health Dental Worker | 3.3, 2 | 0 to 34.3 n=126 | 0.9 0.5 | 0 to 7 n=44 |
| Public Health Laboratory Scientist | 7.6, 2.1 | 0 to 235 n=82 | 2.0 1 | 0.3 to 6 n=11 |
| Public Health Laboratory Technician or Technologist | 3.6, 2 | 0 to 105 n=147 | 1.6 1 | 0 to 8 n=38 |
| Public Health Nurse | 25.6, 8.5 | 0 to 999 n=345 | 7.8 .4 | 0 to 152 n=284 |
| Public Health Nutritionist | 5.3, 3 | 0 to 56 n=209 | 1.7 1 | 0 to 20.6 n=174 |
| Public Health Physician | 4.4, 1 | 0.1 to 440 n=219 | 0.8 0.5 | 0 to 6 n=96 |
| Public Health Policy Analyst | 5.8, 1 | 0.2 to 194 n=90 | 1.2 1 | 0.1 to 6 n=26 |
| Public Health Social Worker | 14.1, 4 | 0 to 991 n=202 | 2.6 1 | 0 to 51.3 n=119 |
| Psychologist, Mental Health Provider | 9.5, 2 | 0 to 223 n=31 | 1.9 1 | 0.2 to 6 n=12 |
| Occupational Safety and Health Specialist | 5.2, 1 | 0.2 to 69 n=39 | 1 1 | 1 to 1 n=1 |
| Occupational Safety and Health Technician or Technologist | 1.6, 1 | 0.5 to 10 n=11 | 0.2 0.2 | 0.2 to 0.2 n=2 |

* Total observations n=694, however, number of observations may be smaller due to missing observations and responses of "0" which were not included in the analysis.

Source: National Association of County and City Health Officials, *Local Public Health Agency Infrastructure: A Chartbook*, October 2001.

Recruitment and Retention

At the present time, the rate of retirement of public health employees exceeds the numbers entering the field. As already noted, location and limited resources hamper recruitment in rural areas. In addition, rural health departments have even less access to MPH graduates than urban health departments. Schools and programs, for the most part, are located in urban areas. Not enough opportunities exist to expose MPH students to traditional public health in general and rural public health specifically. The greatest reason for this is a lack of resources for field placements in these settings. Similarly, while BSN programs generally offer some training in community and public health, two and three year nursing programs do not. Another challenge is the migration of staff from smaller to larger health departments. The more training an employee gets the greater the likelihood that he/she will leave to take a job with another, typically larger agency.

Training and Education

*Healthy People 2010*²⁵ outlined the goals for public health workforce development within the infrastructure objectives:

- Increase the proportion of Federal, Tribal, State and local agencies that incorporate specific competencies into personnel systems;
- Increase the proportion of schools for public health workers that integrate into their curricula specific content to develop competency in the essential services;
- Increase the proportion of Federal, Tribal, State and local public health agencies that provide continuing education to develop competency in essential public health services for their employees

As a result of the establishment of these goals, work began with CDC and academic partners to develop performance standards for agencies and core public health competencies for the public health workforce. When it comes to the rural vs. urban public health workforce, does one size really fit all? The CDC's performance standards call for a skilled and competent workforce. The aftermath of September 11th has added a new taxonomy of preparedness competencies to the core competencies. A rural health department might well go through the process of applying performance standards to the agency, but where do the resources come from to make necessary agency and workforce modifications? Likewise if rural public health employees must play multiple roles, are the demands placed on them to achieve certain levels of competency even greater? To hold small resource-poor rural health departments to the same standards as their better-resourced urban counterparts, there needs to be greater access to financial, human and educational resources.

In NACCHO's report, *Local Public Health Agency Infrastructure: A Chartbook*²⁶, the authors surveyed health departments about continuing education needs and priorities. Eighty percent of agencies serving metropolitan areas and 70% of non-metropolitan agencies indicated that they had a line item for staff training. On average, the greatest continuing education need was to refresh clinical skills for the purpose of keeping medical and nursing credentials up to date. The remaining funds must cover competency-based skills training. While significant resources have come to public health in the wake of September 11th, a common complaint among local health directors is that the money is not reaching them. At the same time there are continual national policy initiatives to strongly encourage core and preparedness competency training.

²⁵ Centers for Disease Control and Prevention, *Healthy People 2010*, January 2000.

²⁶ National Association of County and City Health Officials, *Local Public Health Agency Infrastructure: A Chartbook*, October 2001.

Technology

While technology has been instrumental in increasing access to information and training, the rural areas most in need are the least likely to have access to the Internet and computers. A recent article in the *Journal of the Medical Library Association*²⁷ outlined efforts to benchmark information needs in the Tennessee public health community. In a self-ranking of computer expertise, the researchers found the following disparities between rural and urban workers. Forty one percent of rural employees rated themselves beginners vs. 27% of urban workers. Fifty five percent of rural workers rated themselves as intermediate vs. 57% of urban workers. Finally, only 3% of rural workers rated themselves as advanced vs. 15% of urban workers. The only professions reporting 100% access to computers at work were environmental engineers, epidemiologists and physicians — all professions in short supply in rural areas. Only 66% of public health nurses reported access to computers at work. These results are very similar to those seen in other states. Complete access to either computers or the Internet, which could provide a significant resource for training and information, is not available.

Need for New Strategies

Efforts to strengthen the public health workforce are well underway, but challenges remain. Technology is bringing new opportunities for training and advance education, but it must be accessible everywhere. Graduate students need greater exposure to rural public health. This could be accomplished through the establishment of traineeships and a public health service corps that place recent graduates in rural areas. In addition, if four out of five public health workers have no formal public health training, what is their training? Community colleges and undergraduate universities could become sources of public health training to increase access to formal public health education. Overall there is a need to identify best practices for rural public health workforce development and replicate them. One thing has become clear, rural public health relies heavily on partnerships within the community; workforce development must include the skills necessary for promoting and maintaining such partnerships.

Priority Research Questions

1. What are the needs for rural public health practice in terms of workers and competencies? What are the necessary basic services and are there any standards for community by size (i.e., workforce ratios)?
2. What are best practices for the rural public health workforce? Are they replicable?
3. How does the current educational structure contribute to the workforce difficulties faced by rural public health? What are the alternatives—non-traditional models, experiential learning, etc.
4. What are the future workforce needs in rural public health? What are the existing data and where is new data necessary?
5. Has distance education affected the rural public health workforce? If so, what are the components for success?

²⁷ Lee, P, et. al, Benchmarking Information Needs and Use in the Tennessee Public Health Community, *Journal of the Medical Library Association* 91 (13) July 2003.

Rural Health Disparities

Prepared by: Jeff Oxendine, MBA, MPH, and Emily Elman, MPH, Pacific Public Health Training Center

THE PURPOSE OF this paper is to provide some background, facts and insights into rural health disparities and identify priority research questions. Based on a literature review, it is clear that while rural health disparities and many contributing factors are well documented, there are ample opportunities for further practice-based research.

Disparities and Risk Factors

Disparities in health among rural residents are well documented. Living in a rural area is in itself a health risk factor due to numerous associated factors that can adversely influence health and access to healthcare. The following section provides data regarding disparities in both health status and health risk factors among rural residents:

Rural Health — Disparities in Health Status²⁸

- Death rates for children and young adults (ages 1-24 years) are highest in the most rural counties;
- In the South, ischemic heart disease (IHD) death rates were lowest in fringe counties of large metro areas and over 20% higher in the most rural counties;
- For men 20 years and over, death rates for chronic obstructive pulmonary diseases (COPD) are lowest in large metro counties and highest in non-metro (rural) counties;
- Nationally and within each region, death rates from unintentional injuries increase greatly as counties become less urban;
- Death rates for motor vehicle-related injuries in most rural counties are over twice as high as the rates in central counties of large metro areas;
- Nationally and within each region, suicide rates for males 15 years and over are lowest in large metro counties and increase steadily as counties become less urban;
- Rural residents are more likely to describe their overall health status as fair/poor than urban residents;
- Chronic illnesses are more prevalent in rural areas; and
- For the United States as a whole, limitation in activity due to chronic health conditions among adults is more common in rural counties than in large metro counties.

Rural Health — Disparities in Risk Factors²⁹

- Nationally, adolescents living in the most rural counties are most likely to smoke and those living in large metro counties are least likely to smoke. In 1999 for the United States as a whole, 19% of adolescents in the most rural counties smoked compared with 11% in metro counties;
- Nationally, adults living in the most rural counties are most likely to smoke and those living in large metro counties are least likely to smoke (27% compared with 20% of women and 31% compared with 25% of men);
- Adults in rural areas are more likely to consume alcohol than those living in other areas; and
- Both men and women in rural areas have higher rates of self-reported obesity than men and women in other areas.

^{28,29} *Health, United States, 2001 With Rural and Urban Health Chartbook*. Hyattsville, MD: Centers for Disease Control and Prevention, National Center for Health Statistics; 2001.

Rural Health—Other Contributing Factors

- Limited access to health care services (remote, isolated areas);
- Limited access to health care providers. In 1998, there were six times as many general pediatricians per 100,000 population in central counties of large metro areas as in the most rural counties (24 compared with 4 per 100,000) and five times as many general internists (52 compared with 10 per 100,000)³⁰;
- Lower rates of health insurance. Less likely to have employer-provided health care coverage and tend to be poorer (per capita income is on an average, \$7,417 lower than in urban areas). Residents of fringe counties of large metro areas are least likely to lack coverage (12 percent in 1997-98) and central and non-metro county residents most likely (18-21 percent)³¹;
- Rural population is typically more elderly;
- Lack of recognition and priority by legislators for rural health concerns;
- Lower socioeconomic and educational status; and cultural and social differences; and
- Less likely to receive routine dental care. Nationally in 1997-98, 71 percent of adults ages 18-64 years living in fringe counties of large metro areas reported a dental visit in the past year compared with 57 percent in the most rural counties³².

Another important contributing factor is that major sources of employment in rural areas generally include agriculture, mining, and forestry, with a high potential for work-related injuries. Fewer employees in these professions are offered and/or able to afford health insurance through their employers, limiting their access to health care. Larger businesses are found primarily in suburban and urban areas, while businesses in rural areas tend to be smaller. The fixed cost of providing employees with health insurance can be prohibitively high for small businesses.

Health Disparities Among Rural Minorities

Minorities living in rural areas face the double burden of experiencing health risk factors based on rurality, in addition to health disparities related to race and ethnicity. Low-income rural minority populations face yet another challenge based on economic factors, further compounding health disparities concerns. Racial and ethnic disparities in health across the general U.S. population are well documented. However, little research has been conducted on the disparate health status of rural minorities.

Rural minorities face many health and medical care challenges that lead to disparities in health status. These may be compounded by cultural values, beliefs, and behaviors related to health, language barriers and challenges of interactions with public health and healthcare providers that may not know how to effectively address their needs, leading to inadequate access to care and differential treatment. Many rural minority group members are employed in occupations that involve exposure to environmental hazards and injury. These problems are compounded by a shortage of health care providers and limited access to health care. Research has documented expected patterns of minority and rural disadvantage. For example, African-Americans and Hispanics tend to have limited access to healthcare services, lower healthcare utilization rates, and higher rates of un-insurance than whites. The consequences of differential access are reflected in disproportionately high rates of certain kinds of illnesses among rural minorities. Higher rates of certain diseases and disabling conditions, such as heart disease, asthma, obesity, and infant mortality are most common in low-income communities and communities of color. With respect to health status, African Americans, Latinos, and Native Americans suffer from poorer health status in comparison to whites. Racial and ethnic minorities also tend to receive a lower quality of healthcare than non-minorities and experience barriers (such as language, geography, and cultural familiarity) to accessing health care. Indian/Alaska Natives, African Americans,

^{30,31,32} *Health, United States, 2001 With Rural and Urban Health Chartbook*. Hyattsville, MD: Centers for Disease Control and Prevention, National Center for Health Statistics; 2001.

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and Latinos are more likely to rate their health as fair or poor than are whites and Asians. Some compelling examples of health disparities among racial and ethnic groups and some of the contributing risk factors are³³:

- Heart disease is the leading cause of death for all racial and ethnic groups in the United States. In 1999, rates of death from cardiovascular disease were about 30 percent higher among African American adults than among white adults;
- In women, overweight and obesity are higher among members of racial and ethnic minority populations than in non-Hispanic white women. In men, Mexican-Americans have a higher prevalence of overweight and obesity than non-Hispanic men, while non-Hispanic white men have a greater prevalence than non-Hispanic black men. Approximately 300,000 U.S. deaths a year currently are associated with obesity and overweight. The total direct and indirect costs attributed to overweight and obesity amounted to \$117 billion in the year 2000;
- The incidence of diabetes among American Indians and Alaska Natives is more than twice that of the total population, and the Pima Indians of Arizona have the highest known prevalence of diabetes in the world. The prevalence of diabetes is 70 percent higher among African Americans and nearly 100 percent higher among Hispanics than among whites;
- As recently as 2000, African Americans and Hispanics accounted for roughly 75 percent of all adult AIDS cases, although they only comprise 25 percent of the U.S. population. African American and Hispanics also make up 81 percent of all pediatric AIDS cases; and
- In 2000, 67 percent of older white persons received influenza vaccination, compared to only 48 percent and 56 percent of older African American and Hispanic persons, respectively. Disparities for pneumococcal vaccination coverage were even wider, with 57 percent for whites, 31 percent for African-Americans and 30 percent for Hispanics

Issues of health status and health care are complex as rural minorities and, in particular, poor minorities are geographically concentrated in different regions. The concentration of rural minorities in specific geographic regions, with distinctive histories, cultural backgrounds, resources, occupations and state-level policies, make it difficult to develop uniform recommendations and policies. Issues for specific population groups such as migrant workers and Native Americans require special study and merit greater research.

Priority Research Questions

1. What are the social determinants of health in rural populations (economic, environmental, social)?
2. How has/can technology solutions (such as telemedicine) be used to identify and address rural health problems?
3. How do we effectively prepare students, leaders and practitioners to possess the knowledge, skills and motivation to address rural disparity issues (such as interventions, cultural competency, effective practices, evaluation, community capacity building)?
4. To what extent do our existing surveillance systems (CDC, NIH, State) enable us to assess and monitor health disparities in rural areas?
5. How can community based participatory research be used to address health disparities through capacity building, establishing trust and information dissemination?

³³ U.S. Department of Health and Human Services, Health Disparities Initiative. *Fact Sheet: Protecting the Health of Minority Communities*. September 24, 2002.

Access to Care/Safety Net Support

Prepared by: Brent Ewig, MHS, Association of State and Territorial Health Officials

THERE IS WIDESPREAD acknowledgment that rural health research has traditionally focused on access to care issues. This is understandable given the persistent and well-documented challenges rural communities face in sustaining functional health care systems. Indeed, the fragile nature of rural health safety net systems was thoroughly examined in the 2000 Institute of Medicine Report entitled “America’s Health Care Safety Net: Intact but Endangered,” and also in the more recent HHS Secretary’s Initiative on Rural Health.^{34 35}

Improving access to comprehensive, high quality health care services is the first listed goal of Healthy People 2010³⁶ and access to quality health services was rated as the top ranking rural health priority according to the Rural Healthy People 2010 survey.³⁷ Additionally, the first goal of the Rural Task Force advising the Secretary’s Rural Health Initiative was to improve rural communities’ access to quality health and human services.

Fortunately, retrieving the body of rural health research on access issues is relatively easy. Between the websites of the six rural health research centers funded by the Federal Office of Rural Health Policy, the recently created Rural Assistance Center (RAC) and the literature reviews included in the Rural Healthy People 2010 companion document, access to the existing body of research is readily available to anyone with Internet access.

What is less clear, however, is whether the existing research indicates just how effective assuring access to care is in affecting the health status of rural populations. While there is substantial research indicating that persons without health insurance are less likely to have a “regular” or usual health provider, less likely to obtain preventive care, or to obtain needed tests and prescriptions,³⁸ there continues to be a simmering debate within public health circles about the importance of access to care is in improving overall population health.

The seminal research conducted by Foegen and McGinnis, for instance, found that most of the actual causes of death in the United States were related to human behaviors such as tobacco use, poor diet, and lack of exercise. Lack of access to medical care did not even rank in the top ten actual causes of death in their analysis.³⁹

Also open to debate is the question of the appropriate role of governmental public health agencies in delivering personal health care services. The crux of this debate is summarized in the following passage from a 1994 article published in JAMA by a group of public health leaders:

Notwithstanding mandates and historical successes, the vitality of the public health system has been undermined in the last two decades by escalating pressures on state and local governments to provide medical care for the poor and uninsured... In

³⁴ Lewin, M.E. and Altman, Stuart, eds. *America’s Health Care Safety Net: Intact but Endangered*. Institute of Medicine, National Academy Press. Washington, DC, 2000.

³⁵ U.S. Department of Health and Human Services, Office of Rural Health Policy. *One Department Serving Rural America: HHS Rural Task Force Report to the Secretary*. Rockville, MD, 2002.

³⁶ U.S. Department of Health and Human Services, *Healthy People 2010. 2nd ed.* Washington, DC: U.S. Government Printing Office, November 2000.

³⁷ Gamm, Larry D., Hutchison, Linnae L., Dabney, Betty J. and Dorsey, Alicia M., eds. (2003). *Rural Healthy People 2010: A Companion Document to Healthy People 2010. Volume 1*. College Station, Texas: The Texas A&M University System Health Science Center, School of Rural Public Health, Southwest Rural Health Research Center.

³⁸ Gamm.

³⁹ McGinnis JM, Foegen WH. *Actual causes of death in the United States*. JAMA 1993; 270(18):2207-12.

short, the support for indigent medical care has exacted a huge toll in lost opportunities for preventing morbidity and mortality in vulnerable populations and for promoting optimum health conditions for the entire community.⁴⁰

Whether or not one accepts this premise, it does suggest several research questions that might help shape the future rural health research agenda around public health and access to care.

Priority Research Questions

1. What is the prevalence of various models of service delivery in rural areas? To what extent does each involve public health agencies, public health activities and/or functions?
2. To what extent are various assessment models used—e.g., PATCH, MAPP? Who uses them? Who administers them? How are they used? To what degree are they modified?
3. What health outcomes are associated with various service delivery models and public health models? What are the outcomes associated with major medical diagnoses—e.g., diabetes, cardiovascular disease?
4. What effect do state/governmental policies have on access to care/safety net issues (e.g., scope of practice issues, state budget cuts, welfare reform, etc.)?
5. What capacities exist within the safety net system to support public health and safety services in rural areas?

³⁹ Baker, Edward, et al. *Health Reform and the Health of the Public: Forging Community Health Partnerships*, JAMA, Vol. 272, no. 16, October 26, 1994. P. 1277.

Rural Public Health Preparedness

Prepared by: Michael Meit, MA, MPH, University of Pittsburgh Center for Rural Health Practice, University of Pittsburgh at Bradford

Rural Preparedness Concerns

- Rural communities are home to many potential terrorist targets including nuclear power facilities, uranium and plutonium storage facilities, military installations, U.S. Air Force missile launch facilities, agricultural chemical plants, and petroleum refineries;
- Rural areas are the locus of agricultural production which could be key in targeting the food supply, as well as accessing agricultural chemicals;
- Rural economies often rely heavily on single industries or employers, making them economically vulnerable to terrorist threats. The local economy may or may not be the direct target of the terrorist activity, but impacted regardless;
- The headwaters for much of the urban water supply are found in rural areas;
- Mass exodus of urban communities will require a strong rural public health infrastructure. Rural hospitals do not have the capacity to handle large numbers of individuals seeking care, and rural communities often lack access to HAZMAT units and lack sufficient decontamination training;
- The proliferation of hate groups in rural America is a significant concern in terms of “home grown” terrorism. Early identification of terrorist threats will require a strong rural public health infrastructure, including training to recognize early signs of biological and chemical experimentation;
- Infectious disease agents may be targeted towards smaller communities with less ability to recognize and track bioterrorist threats. To prevent spread of these agents, a strong infrastructure and adequate training will be necessary; and
- Many interstate transport companies are located in rural communities and provide transit of hazardous materials via routes that intersect rural America.

Rural Preparedness Capacities and Needs

Public Health Preparedness, with its focus on bioterrorism rather than an all-hazards approach, has, to this point, concentrated mostly on larger communities where the threat is perceived to be greater. There are clearly reasons for concern in rural communities as well, and preparedness efforts need assure adequate response regardless of community size. The reality is that rural response is in many ways a more complex issue. Rural communities must be prepared not only to respond to unique local threats, but also to the threat posed by urban citizens fleeing to the perceived safety of rural areas. Given this dual nature of the potential threat in rural communities, and their weaker and often non-existent public health infrastructures, the challenge posed in assuring rural preparedness is daunting.

Rural communities, historically, have had to be creative in addressing community public health needs, especially in areas without a local governmental public health infrastructure. The lack of local governmental accountability, in conjunction with a related lack of community health resources in general, creates a situation whereby each community has had to tap into unique and often non-traditional resources to address community needs. As a result, a variety of resources have been developed with little uniformity across communities. These are the

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resources that will likely need to be tapped for effective bioterrorism/emergency response, and we must know the resources available in each community before we can consider issues such as resource sharing and cross-community collaboration. Many of the bioterrorism response tools that have been developed to this point, such as *Project Public Health Ready*⁴¹ and the CDC's *Local Public Health Preparedness and Response Capacity Inventory*⁴², have focused upon the existence of strong local public health capacities. Applying these tools to areas without a strong local public health infrastructure and ensuring that they capture other community resources is difficult given their current focus.

Issues related to surge capacity are particularly difficult for rural areas with fewer public health and healthcare personnel. The shortage of healthcare providers throughout rural America and the lack of accessibility to healthcare facilities have a direct impact on response planning. Even where health facilities exist, rural emergency rooms tend to be staffed by a single physician who would simply not have the capacity to handle multiple cases. Because rural communities need to address preparedness issues from both the perspective of being a direct target as well as a destination for affected citizens from urban areas, the response plan will necessarily be more complex. Identifying a network of qualified surge responders and ensuring proper training must be a priority.

The issue of surveillance capacity is also particularly challenging for rural areas. Because the numbers of affected individuals in rural areas will likely be small, it will be difficult for these systems to identify an unexpected increase in cases prior to a larger outbreak. Small numbers issues have always made public health surveillance and planning difficult in rural communities; with the added threat of bioterrorism there is a significant need to refine our surveillance efforts to increase their sensitivity to small, unexpected increases. As states develop statewide syndromic surveillance systems they too must assure their effectiveness in rural areas.

Equal in importance to assuring a strong public health response system is the issue of ensuring that our focus on bioterrorism response does not come at the expense of existing public health services and capacities. Recognizing that rural public health is already stretched thin, added responsibility for bioterrorism and emergency response has the potential to pull staffing from other critical public health functions. The National Association of County and City Health Officials recently conducted a survey of local health departments throughout the nation in which they asked the following question: "What has been the impact of smallpox and bioterrorism planning on other local public health services?" Fifty-three percent of the respondents said that it has taken away from their other public health activities and 37% said that it strengthened them. As we strengthen our public health response for bioterrorism, we must maintain our focus on those issues that we know have a positive impact on the health of our citizens. Further, we must capitalize on the opportunity to utilize resources and capacities developed in the name of bioterrorism to strengthen other aspects of our public health system. This "dual use" of bioterrorism funding presents an unparalleled opportunity to strengthen our rural public health infrastructure.

Compounding all of these concerns is the simple reality that rural areas often have less access to technology and training resources. Assuring adequate response capacity in rural areas will require investments in basic rural infrastructure to ensure that responders have access to high quality information. Regional approaches to building these capacities both within and between states will be necessary to enhance overall response capacity in areas with thin public health resources in a cost efficient and effective manner.

⁴¹ Center for Health Policy, Columbia University School of Nursing and the National Association of County and City Health Officials, Information available at <http://www.naccho.org/project83.cfm>

⁴² Centers for Disease Control and Prevention. *Local Public Health Preparedness and Response Capacity Inventory*. December 2002; Version 1.1

Priority Research Questions

1. How is government organized (i.e., different state/regional/local models) across the U.S. to assure accountability for preparedness in rural areas and what are the implications for incident command, allocation of funding, cross-jurisdictional response, etc.?
2. What components/functions of preparedness are currently and should be provided by rural communities? How are rural communities mobilizing and organizing resources (including people to fulfill those roles and responsibilities)?
3. Who comprises the response network and what competencies are necessary for readiness? What are the most effective training methods?
4. Is the perception of the likelihood of bioterrorist and other public health emergency threats different in rural vs. non-rural (urban, suburban) areas? Between rural areas? Does the perception of threat affect the level of preparedness?
5. What lessons have been learned from previous public health response experiences/events that are applicable to our current efforts to strengthen rural preparedness? How can those lessons influence/inform models of preparedness, readiness evaluation tools, training strategies, etc?

Environmental Health Issues

Prepared by: Charles D. Treser, MPH, University of Washington, Department of Environmental and Occupational Health Sciences

Rural Environmental Concerns

Many people perceive rural America as a pristine environment, relatively untouched by the stresses and pollution facing urban and suburban communities. The reality, however, is that rural areas face most of the same environmental problems affecting urban populations. In addition there are some unique environmental challenges, involving both structural and programmatic issues.

A review of the traditional environmental health program areas reveals significant problems and concerns faced by the residents of rural America in addition to those faced by urban and suburban inhabitants.

Air Quality

Rural communities are frequently thought of as areas of clean, fresh air. In many cases, however, air pollution from urban areas may have a greater impact on people in rural areas than in the urban centers in which it is generated. The people most often adversely affected by air contaminants from industrial and/or urban sources are not the people living or working immediately surrounding the source, but those down wind. Moreover, air pollutants from vehicle use remain a concern in many urban areas. These contaminants are likewise blown and potentially affect people many miles away from the city in which they were generated. Even with the considerable advances in air pollution control technology (for both stationary and mobile sources), emissions are still generated and settle miles from the source, potentially exposing people in rural communities. In many cases, atmospheric transformation of pollutants also occurs downwind of urban sources (e.g., sulfur dioxide transformed into sulfuric acid and particulate sulfates; automobile emissions transformed into ozone, etc.).

A second area of concern is the potential health effects of breathing smoke. Burning wood as an inexpensive heat source may add to rural communities' health issues, particularly in valleys where particulate matter accumulates. While leaf and trash burning are generally banned in most urban areas, it continues to be a common method of disposal in many rural areas. Add to this the annual outbreak of forest and brush fires (especially in the Western United States), and the potential exists for people to be impacted by smoke for brief or extended periods.

Indoor air quality issues may also be a problem in rural areas. Environmental tobacco smoke and contaminants such as radon can accumulate in rural homes. This is especially true in mobile homes that have become an increasingly popular alternative to new home construction for new or replacement rural housing. Given the extremely tight construction of these homes, smoke, gases and fumes tend to accumulate in these homes at unhealthy levels. Additionally, manufactured homes are built using materials such as particle board and carpet glue that are likely to contain urea and formaldehyde which can produce noxious and potentially toxic fumes for years. Homes in rural areas are also more likely than homes in urban or suburban areas to use wood stoves, and fireplaces, and kerosene for heating, resulting in potentially higher levels of indoor pollutants.

Water Quantity & Quality

Rural communities and farms are dependent on individual water sources, either surface or ground water, for most of their drinking, cooking, bathing, washing, and irrigation needs. Excessive demands can lead to problems of water scarcity, salt water intrusion and pollution.

Surface water use requires a collection, treatment and distribution system that makes it impractical for most rural communities and single family residences. Some rural residents may be diverting untreated surface water for domestic purposes due to economic pressures.

Most rural Americans derive their drinking water from the ground using either dug or drilled wells. Ground water is increasingly subject to contamination from industrial, mining and agricultural sources, as well as from localized problems such as malfunctioning on-site sewage systems. Most aquifers in the United States are contaminated — either locally (failing on-site systems, irrigation waters, etc.) or at a distance due to industrial wastes, mine discharges, and/or urban run off.

Additionally, there is increased demand on the available water supply as more people move into rural areas. In coastal areas the withdrawal of groundwater has been so great that, in many cases, that the aquifer has been contaminated with salt water due to a reversal of the hydraulic gradient caused by pumping down the water table. In in-land areas with limited recharge potential, many communities are facing water shortages caused by the lowered level of the water table caused by over pumping of the aquifer.

Exacerbating the problem, state and local environmental public health agencies do not have the resources to conduct the permitting, testing, maintenance, and monitoring needed to ensure that these groundwater systems provide healthy water.

Agriculture, and especially agri-business, requires huge quantities of water contributing both to the problem of lowered water tables and groundwater contamination due to irrigation returns (polluted with fertilizers, pesticides, etc.). Nitrites and other groundwater contaminants consumed through well water supplies pose specific health threats to rural populations, particular infants and children. Further, in the event of flooding, agri-businesses (such as factory farms and large feed lots) can present a threat to water quality that is more than just a local concern. Each year these facilities produce hundreds of tons of manure that accumulate on site before being treated or trucked off-site for processing. In the event of flooding, this fecal material gets washed into surface water supplies and/or soaks into the ground, potentially polluting surrounding drinking water wells and rivers.

All of these problems can be aggravated by periodic droughts. The impact global climate change may have on drought and/or flooding incidents is still the subject of much debate and speculation.

Wastewater Treatment & Disposal

Individual on-site sewage disposal systems at rural sites have minimal oversight. The degree to which on-site sewage system designs are checked and the installation monitored by a regulatory agency is unknown. What is certain is that once the system is installed, oversight of the operation and maintenance of the system is virtually non-existent. Without regular maintenance, the sewage may not be treated adequately, potentially contaminating groundwater sources. This may be particularly problematic in small pockets of more densely developed areas.

Given that few states require testing and licensing of designers and installers of on-site sewage disposal systems, little is known of their qualifications and training. Moreover, there are concerns regarding the education and training of the regulatory officials, where regulations exist, who are overseeing these systems.

Pesticides

Since the publication of *Silent Spring*⁴³, the safety of pesticide use has come under increased scrutiny. Despite over 30 years of testing and regulation, much remains unknown about the health and safety consequences of pesticide use. There is no doubt that herbicides, insecticides, fungicide, etc., have been an economic boon to agriculture. Indeed it is unlikely that we would have our high standard of living had it not been for the use of many of these pesticides. There are a number of health and safety issues, nevertheless, associated with the use of pesticides in agriculture. Wide-scale application of pesticides (especially aerial applications) has the potential for the pesticide to drift from the intended area onto neighboring properties. Even when pesticides are applied properly, farm workers can receive high doses of harmful substances if they enter the sprayed area before the chemical has been absorbed or broken down.

The EPA has passed and enforces strict federal requirements for labeling and use of pesticides. Farmers, however, have been exempted from many of these requirements leading to concerns over the proper use of these compounds, adherence to label instructions and even to the existence or availability of the label when pesticides are bought in bulk and then repackaged for day-to-day use. There is also concern over the education, training and supervision of the farm-workers that are actually applying these compounds.

Another area of increasing concern is with pesticides used within the home or brought into the home on worker's clothing and boots. These scenarios create potential exposures for family members that come into contact with the pesticide-laden clothes through direct contact (by doing laundry), or indirectly (through contamination of other clothing washed with the contaminated garment).

Housing and Land Use

In addition to pesticide exposures in the home, rural housing can present many of the same risks as urban and suburban housing. Lead paint used in older houses can be a particular problem; lead based paints were used extensively in many areas due to its weather-resistant properties.

Another potential problem area is indoor safety. Older rural homes may have been built without adherence to local or national building codes. Local building codes may be entirely absent. Lack of codes or adherence to building codes can lead to potential problems including faulty electrical wiring, cross connections in the plumbing system, irregular or steep stairs, etc.

Indoor air quality problems are less likely in older homes. The current concern over toxic molds and the build up of contaminants in the home is likely to be substantially reduced through the greater air exchange rates in older rooms as well as the availability of "openable" windows. However, these concerns may be a greater problem in rural schools, especially those built from the 1960s to the 1980s, when energy conservation measures included sealed windows, limited air exchange rates and the installation of carpeting.

⁴³ Carson, Rachel. *Silent Spring*. Mariner Books, New York, 2002

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Specific land-use issues such as mining and agricultural production also have the potential to create environmental hazards in rural areas. Significant concerns with regard to mining include acid drainage into groundwater and land subsidence under homes. As suburban developments encroach upon rural areas, the resulting changes in land use patterns, economic impacts, increasing transportation, threats to water supplies and issues with traditional land use (e.g., farming) often arise. Driven by economic pressures, the conversion of cropland to residential use can create problems such as traffic (air quality) and water supply (several individual points of water diversion vs. one irrigation well, thereby creating additional “holes” for contamination to reach the aquifer). Unplanned population growth can stress the infrastructure of rural counties - straining water supplies, sewage treatment and disposal, transportation patterns, community economics and can result in a conflict from incompatible land uses (e.g., pig farms and a suburban development).

Another urban influence affecting rural America is the desire among urban dwellers to escape to rural areas for recreational purposes, further stressing roads, water supplies, and local facilities. Even when people visit rather than settle in rural communities, health and safety consequences may emerge. Recreational and tourist areas need to address the increasing number of people wanting to use their facilities and assure adequate supplies of potable water, sewage disposal, food service facilities, roads, etc.

Occupational Health & Safety

Mechanized farming is one of the more hazardous occupations, involving the use of various types of equipment with the potential for falls from height, pinching and entrapment, and acute trauma and death from contact with sharp blades, tines, etc. Farm worker accidents kill or maim hundreds of individuals each year. Given that many farm workers are children and young adults, these accidents are especially tragic.

U.S. agriculture depends heavily on migrant or seasonal workers in many areas. The use of migrant labor presents a host of potential health and safety concerns, e.g., migrant worker housing, adequate supplies of drinking water, sewage disposal, adequate cooking and eating facilities, length of the work day and week, and pesticide use, to name only the most obvious potential environmental health hazards.

A second area of concern is traffic safety. Long stretches of lightly traveled roads tend to encourage speeding. Additionally, limited road construction and maintenance budgets, road engineering limitations, the possibility of the entry of slow moving farm vehicles (or animals) on to the highway, and other factors increase the potential for crashes.

Zoonotic / Vector Borne Disease

People living or recreating in rural areas are more likely to come into contact with animals and their diseases, many of which are transmissible to humans. Given the attention devoted to West Nile Virus today, most people recognize the potential for contracting vector borne diseases regardless of where they live. People living in rural communities, however, face additional risks. Humans and animals share a number of diseases (TB, Influenza, brucellosis, tularemia, etc.). People living on or near a farm are more likely to come into contact with these diseases through contact with farm animals.

People living in rural areas are also more likely to engage more frequently in outdoor activities, such as hunting and trapping that can result in exposure to pathogens through contact with animal body fluids and/or ectoparasites like ticks and fleas.

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Finally, there are a number of emerging infectious diseases that are termed peri-domestic diseases because the animals that harbor the infectious agent are neither domestic (living in the home) nor wild, but rather live near people in barns, cabins, sheds, etc. Lyme disease and Hantavirus pulmonary syndrome (HPS) are two recent examples of infectious diseases that have resulted from humans moving into areas that were previously inhabited by the deer mouse. Development of areas that had formerly been wild or uninhabited for a period of years, has resulted in residents contracting the disease agent by coming into contact with ticks (Lyme disease) or by inhaling dust particles contaminated with mouse urine (HPS).

Solid & Hazardous Wastes

Rural areas often have limited solid waste services or none at all, leaving homeowners to haul waste to a dumpsite or dump on their own or another person's property. Commonly, there are illegal sites in the rural "invisible" areas where community members dump their garbage and junk.

Similarly, past practices of disposing industrial and other wastes have resulted in many disposal sites (both legal and illegal) that contain hazardous chemicals that pose a threat to groundwater or anyone coming into contact with the site contents. Many of these sites were located in rural areas because land was cheaper (for legal sites) and the dumpers were less likely to be observed (for illegal dumping).

Finally, another previously mentioned issue is the problem of manure accumulation, handling and disposal.

Cross Cutting or Structural Issues

In addition to the preceding areas of concern, at least three areas of over-arching concern have been identified by this review.

Lack of Resources

Regardless of the program area reviewed, one constant is the manner in which community needs, problem analysis, program planning and implementation, and evaluation are constrained by the lack of adequate funds to hire new staff and train existing staff. In many cases only the most rudimentary oversight programs are possible. Even where the financial resources exist, many agencies find that they are unable to recruit well-qualified employees that have both the requisite education and training and are willing to work in rural communities.

Often rural health departments become the training ground for new staff who often leave for better paying, urban agencies once they have gained experience and competence.

Regulatory Fragmentation

Regardless of the pollutant or source, rural areas face special challenges due to having, by definition, sparse populations spread over a considerable geographic area. This is compounded by the fragmentation of the environmental health system, where regulatory authority is shared by many local, state and federal agencies. For

example, an issue of possible illness due to pesticide exposure may involve the local public health agency, state departments of environmental protection, air quality control, and/or labor and industries.

Inadequate Data and Data Systems

Because of the sparse population in rural areas there tends to be a lack of concern about issues such as those enumerated above and hence, an absence of sufficient data to justify programs to address these needs. Community health assessments often find EH issues at the top of the list of community concerns, however, the small numbers of people often preclude epidemiological studies so there is seldom reliable data linking disease outcomes to exposures.

Priority Research Questions

1. What are the long term benefits and costs of education and training in the field of environmental health?
What are the costs of not having this education and training?
2. What are the costs and benefits of government regulatory programs and efforts to “privatize” environmental health programs such as food protection and on-site sewage regulation?
3. How is the current public health system functioning in terms of communications, program coordination, resource allocation, and legal authority, and what effect does this have on environmental health programs?
4. Can research tools be developed to enhance the ability of environmental researchers to link exposure to environmental contaminants in rural areas with small populations?
5. How do we prioritize and address specific environmental concerns such as down wind air pollution, air pollution from forest and brush fires, water quality from private wells, sewage treatment systems for small communities, etc.?

Appendix A: Additional Research Questions by Topic

Rural Public Health Infrastructure

- How does dependence on service reimbursement as a funding source affect rural residents? Do rural public health agencies charge more for services provided?
- Are there differences between services that are legally mandated and those that are actually provided?
- How do communities with limited public health infrastructure fare? What are the circumstances behind the lack of public health and what are the implications for the health of the population residing there?
- How do rural areas reconcile the trade-off between the provision of personal health care services and population-based services? What is the impact of the trend toward emphasizing population-based services on the rural safety net?
- How are rural LPHAs dealing with smaller and less specialized workforces? What are alternative strategies for expanding the size of the workforce and enhancing its training? What opportunities are offered through distance learning or regionalization?
- Do rural communities respond to a lower level of resources by meeting fewer of the essential functions or by implementing those functions in a different manner? How are these decisions made?
- How have states have organized themselves to protect the public's health within their borders? What lessons can be learned from different state structures and systems?
- With respect to the core functions of public health, what must be done in every community? Is it being done? Who is doing it?
- What is the nature of the public health infrastructure that should be available *in* rural communities versus available *to* rural communities (e.g., should there be an epidemiologist in every community)?
- What must public health be responsible for directly providing versus those activities that are to be "assured"?
- Should performance standards be applied to "public health services" whether or not "public health professionals" provide them (e.g., if there is no LPHA)?

Workforce Development and Competency Enhancement

- How do funding streams impact rural public health workforce development?
- What is the current education and training of the rural public health workforce? What is the relationship between formal public health education and essential service delivery? Does it matter?

Rural Health Disparities

- What are effective rural models for reducing disparities in chronic and infectious disease incidence, prevalence and burden? For injuries, domestic violence, violence and traffic safety?
- To what extent does discrimination/racism create rural health disparities? How can public health effectively confront this issue?
- What is the relationship between cultural competency, knowledge, and skills and the elimination of rural health disparities?
- How can healthcare delivery public health formal and informal community organizations and participants come together to more effectively address health disparities in rural areas?
- Are there social attitudes and cultural factors that contribute to rural health disparities in areas such as mental health, chronic disease, sexually transmitted diseases and substance abuse?
- How might research on community capacity, including civic organizations, employers, faith based organizations and healthcare delivery systems, contribute to addressing health disparities? To what extent are these entities involved and can they make a difference in reducing health disparities?

Access to Care/Safety Net Support

- What roles can each of the following entities play in assuring access to healthcare services?
 - Federally qualified health centers
 - Critical access hospitals
 - Rural health centers
 - Rural health network
 - Volunteer organizations/programs
 - Schools
 - Aging organizations/services
- What scope of practice issues most directly affect availability of quality health services in rural areas?
- What is the ability of local organizations, professionals and others to support immediate versus longer term health status improvement?
- What is the community capacity to provide public health and medical services for the uninsured, underinsured, and the full range of education and income levels?
- What factors are associated with access to care in rural areas—social/cultural, geographic, economic?
- What are the key access issues with respect to a number of critical health priorities—preventive services, personal care, oral health, mental health, home care, etc.?

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- Can the availability and utilization of health care services be quantified in its effect on the overall health status of rural populations?
- Are there differences in the health status of rural populations based on the utilization of health care services?
- Is there a difference in the availability and utilization of clinical preventive services between rural and urban populations?
- What models exist for the integration of personal and population-based services in rural areas?
- What are the unique characteristics or clusters of characteristics associated with rural communities in which the health department plays a major role in direct provision of safety net services? Do these have implications for policy?

Rural Public Health Preparedness

- How can public health preparedness tools be applied to areas without (or with a weak) public health infrastructure? Do we need new tools?
- How do we capture and catalogue the unique resources in each community that can be utilized in a public health emergency?
- Has the influx of preparedness dollars had an impact on local public health infrastructure in rural areas?
- Do governmental jurisdictions impede rural response?
- What are best practices for rural public health preparedness?
- What are the public health training needs for rural responders that do not self-identify as part of the public health workforce?
- What is the impact of preparedness response planning on existing public health services and capacities, both positive and negative? Why do some respond positively and how do we learn from them?
- What are the implications of overlapping coordinating entities and the lack of uniform partners at the community level for public health and emergency planning efforts?
- Who is ultimately responsible for public health and emergency planning efforts at the local level? Do they understand and welcome this responsibility?
- What resources at the state, regional, and national levels can be accessed for local planning efforts?
- How do rural communities with fewer resources and potential responders address the issue of surge capacity?

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- How do we increase the sensitivity of existing surveillance systems and new syndromic surveillance systems to assure that they capture small, unexpected increases in rural areas?
- How are states using new funding streams designated for public health preparedness to improve preparedness in rural areas? What are the differences across states?
- Are we effectively building public health infrastructure that can be applied across a wide array of public health issues? What happens when BT funding changes?
- Is the threat the same in all communities?
- How do potential responders differ in rural versus non-rural areas? What are the training implications?
- What are the potential economic considerations for rural preparedness efforts?
- How do we assure inter-state and intra-state communication? Do regional approaches facilitate communication within regions at the expense of communication across regions?

Environmental Health

- What are the influences and effects of global trends on the health of local rural communities (e.g., global climate change, changes in the patterns of production and distribution, etc.)?
- What are the health effects of inhaling smoke from forest fires, brush fires and/or other sources of combustion by-products? At what levels? How can these health affects be measured?
- What is the quality of water systems for the 42 million people who obtain their drinking water from private wells?
- How can areas with limited or threatened water supplies assure the continued availability of potable water?
- How can we design and develop effective and affordable sewage treatment systems for small communities?
- How can we design and develop effective and affordable on-site sewage treatment systems for individual properties that lack suitable conditions for the installation of traditional or alternative systems?
- To what extent are building and housing codes enforced in rural communities and on farm properties? Is this a problem?
- How many rural counties / communities have active land use planning? What are the economic and political drivers?

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- How many rural counties have (or have the potential to develop) adequate water, sewage treatment, and transportation systems to meet expected growth?
- What are the most common sources of accidents in rural areas? What are the risk factors?
- Why does the incidence of zoonotic and vector borne disease in the United States seem to be increasing?
- What is the impact of solid and hazardous waste disposal sites on rural communities, including transportation issues, problems with scavenger animals (birds, rats, etc.), groundwater (or surface waters) contamination, and methane and leachate handling?

Appendix B: Rural Health Research Center FY2003 Research Agenda

Behavioral Health

Effects of Alcohol Use on Educational Attainment and Employment in Rural Youth

GRANTEE: South Carolina Rural Health Research Center

Bioterrorism Issues

Understanding the Roles of the Rural Hospital in Responding to Bioterrorist Attacks and Other Emergencies

GRANTEE: Project Hope Walsh Center for Rural Health Analysis

Emergency Medical Services (EMS)

Do We Need a Rural Payment Differential Under the Medicare Ambulance Fee Schedule

GRANTEE: Project Hope Walsh Center for Rural Health Analysis

Volunteer Labor and the Organizational Structure of Rural EMS Service Providers

GRANTEE: Project Hope Walsh Center for Rural Health Analysis

EMS Scope of Practice and Practice Settings Impacting EMS Services in Rural America

GRANTEE: North Carolina Rural Health Research and Policy Analysis Center

Rural EMS Infrastructure: Readiness and Reimbursement

GRANTEE: South Carolina Rural Health Research Center

Hospitals

Rural Hospital Closures, 1990-2000: Community Profiles and Economic Indicators Before and After the Event

GRANTEE: North Carolina Rural Health Research and Policy Analysis Center

What is Causing the Increase in Rural Hospital Costs?

GRANTEE: Project Hope Walsh Center for Rural Health Analysis

Impact of the 1997 Balanced Budget Act, the 1999 Balanced Budget Refinement Act, and the 2000 Benefits Improvement and Protection Act

Measuring Financial Impact of Payment Policy on Rural Hospitals

GRANTEE: RUPRI Center for Rural Health Policy Analysis

Long Term Care

Comparison of Rural and Non-Rural Nursing Homes, Residents and Quality (continuation of 2 year project)
GRANTEE: Southwest Rural Health Research Center

Comparing Assisted Living Facility Resident Medication Use in Rural and Non-Rural Assisted Living Facilities
GRANTEE: Southwest Rural Health Research Center

Medicaid and State Child Health Insurance Program

Access to Health Care for Young Rural Medicaid Beneficiaries
GRANTEE: North Carolina Rural Health Research and Policy Analysis Center

The State Child Health Insurance Program and Access to Medical Transportation Services
GRANTEE: Southwest Rural Health Research Center

Medicare

Medicare Payment for Post-Acute Care Transfers
GRANTEE: Project Hope Walsh Center for Rural Health Analysis

Is Medicare Beneficiary Access to Primary Care Physicians At Risk?
GRANTEE: RUPRI Center for Rural Health Policy Analysis

Assessment of Barriers to the Delivery of Medicare Reimbursed Diabetes Self-Management Education in Rural Areas.
GRANTEE: South Carolina Rural Health Research Center

Access to Physician Care for the Rural Medicare Elderly
GRANTEE: WWAMI Rural Health Research Center

Minorities, Children, Disabled, and Other Special Populations

Insurance Status and Quality of Care for Children in Rural Areas: 1987-2000
GRANTEE: South Carolina Rural Health Research Center

Unhealthy Lifestyle Behaviors among Rural Minority Group Members: Prevalence and Trends: A National Rural and Urban Study
GRANTEE: WWAMI Rural Health Research Center

Practice, Service Delivery, and Visions for Rural Health

Use and Effect on Patients of Disease Management in Rural Areas

GRANTEE: Southwest Rural Health Research Center

Access to Cancer Services for Rural Colorectal Cancer Patients: A Multi-State Study

GRANTEE: WWAMI Rural Health Research Center

Public Health and Health Promotion

Rural Healthy People 2010: Expansion and Update

GRANTEE: Southwest Rural Health Research Center

Quality of Care

Determinants of Quality of Care in Rural Communities: How Does the Health Care Infrastructure Affect Quality of Care in Rural America?

GRANTEE: Project Hope Walsh Center for Rural Health Analysis

Rural Quality Improvement Focus on Diabetes

GRANTEE: RUPRI Center for Rural Health Policy Analysis

Research-Policy Interface

Analytic Capacity for Rapid Response to Emerging Rural Analytic and Policy Issues

GRANTEE: North Carolina Rural Health Research and Policy Analysis Center

Uninsured and Safety Net

Uninsurance and Welfare Reform in Rural America

GRANTEE: RUPRI Center for Rural Health Policy Analysis

Effects of Uninsurance during the Preceding 10 Years on Health Status Among Rural Working Age Adults

GRANTEE: South Carolina Rural Health Research Center

Workforce

Changes in the Supply, Distribution, Workload and Reimbursement Patterns of Pharmacists in Rural Areas

GRANTEE: North Carolina Rural Health Research and Policy Analysis Center

To Stay or Leave: Evidence from a Cohort of Young Rural Physicians

GRANTEE: Project Hope Walsh Center for Rural Health Analysis

Bridging the Health Divide The Rural Public Health Research Agenda

Establishing a Fair Payment for Rural Physicians

GRANTEE: RUPRI Center for Rural Health Policy Analysis

The Workforce Implications of Community Health Centers

GRANTEES (Joint Project): WWAMI Rural Health Research Center and South Carolina Rural Health Research Center

The Community Health Worker Certification Process

GRANTEE: Southwest Rural Health Research Center

Distribution and Retention of General Surgeons in Rural Areas of the U.S.

GRANTEE: WWAMI Rural Health Research Center

Additional Information

For a bibliography of Rural Health Research Center Reports: www.ruralhealth.hrsa.gov/policy/rhrccpublist.htm

For a database of rural research in progress as funded in FY 2001-02: www.rural-health.org

Research Center Contact Information

Contact the Rural Health Research Centers by Phone:

- North Carolina Rural Health Research and Policy Analysis Center: (919) 966-5541
- Project HOPE: (301) 656-7401
- RUPRI Center for Rural Health Policy Analysis: (402) 559-5260
- South Carolina Rural Health Research Center: (803) 777-6096
- Southwest Rural Health Research Center: (979) 458-0653
- WWAMI Rural Health Research Center: (206) 685-0401

For further information about the Rural Health Research Center program, contact Joan Van Nostrand, DPA, Director of Research — Phone: (301) 443-0613, Email: Jvan_nostrand@HRSA.GOV

Center for Rural Health Practice
University of Pittsburgh at Bradford
300 Campus Drive
Bradford, PA 16701

(814) 362-5050
Fax: (814) 362-5044

www.upb.pitt.edu/crhp