Rural Healthy People 2010

A Companion Document to Healthy People 2010

A Report Prepared by the Southwest Rural Health Research Center
School of Rural Public Health, The Texas A&M University System Health Science Center

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EDITORS:

Larry Gamm, Ph.D.
Linnae Hutchison, MBA
Betty Dabney, Ph.D.
Alicia Dorsey, Ph.D.

The Texas A&M University System Health Science Center
School of Rural Public Health
Southwest Rural Health Research Center
College Station, Texas

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PROJECT OFFICER:

Joan Van Nostrand, DPA
The Office of Rural Health Policy
Health Resources and Services Administration
United States Department of Health and Human Services
Rockville, Maryland

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AUTHORS AND CONTRIBUTORS

Larry Gamm, Ph.D.
Professor, Department of Health Policy and Management, Associate Director of the Southwest Rural Health Research Center, School of Rural Public Health, The Texas A&M University System Health Science Center

Linnae Hutchison, MBA, MT
Research Associate, Southwest Rural Health Research Center, School of Rural Public Health, The Texas A&M University System Health Science Center

Betty Dabney, Ph.D.
Assistant Professor, Department of Environmental and Occupational Health, School of Rural Public Health, The Texas A&M University System Health Science Center

Alicia Dorsey, Ph.D.
Associate Professor, Department of Social and Behavioral Health, Administrator of Academic Programs, School of Rural Public Health, The Texas A&M University System Health Science Center

Gail Bellamy, Ph.D.
Director of Community Studies, Associate Director in the West Virginia University Health Science Center Eastern Division, West Virginia University Institute for Health Policy Research, Charleston, West Virginia; formerly Adjunct Associate Professor, School of Rural Public Health, The Texas A&M University System Health Science Center

Craig Blakely, Ph.D., MPH
Professor and Department Head, Department of Health Policy and Management, Director of the Office of Research, School of Rural Public Health, The Texas A&M University System Health Science Center

Jane Bolin, Ph.D., JD, RN
Assistant Professor, Department of Health Policy and Management, School of Rural Public Health, The Texas A&M University System Health Science Center

James Burdine, Dr.PH, MPH
Associate Professor, Director of the Department of Social and Behavioral Health, School of Rural Public Health, The Texas A&M University System Health Science Center

Susan Carozza, Ph.D.
Assistant Professor, Department of Epidemiology and Biostatistics, School of Rural Public Health, The Texas A&M University System Health Science Center

Brian Colwell, Ph.D.
Associate Professor, Department of Social and Behavioral Health, School of Rural Public Health, The Texas A&M University System Health Science Center

Pete Fos, Ph.D., MPH, DDS
Professor, Chair of Clinical Sciences, School of Dentistry, University of Nevada–Las Vegas

Catherine Hawes, Ph.D.
Professor, Department of Health Policy and Management, Director of the Southwest Rural Health Research Center, School of Rural Public Health, The Texas A&M University System Health Science Center

Ken McLeroy, Ph.D.
Professor, Department of Social and Behavioral Health, Associate Dean for Academic Affairs, School of Rural Public Health, The Texas A&M University System Health Science Center

Jennifer Peck, Ph.D.
Assistant Professor, Department of Epidemiology and Biostatistics, School of Rural Public Health, The Texas A&M University System Health Science Center

Stacey Stevens, Ph.D.
Texas Commission on Alcohol and Drug Abuse, Austin, Texas; formerly Assistant Professor, Department of Social and Behavioral Health, School of Rural Public Health, The Texas A&M University System Health Science Center

Tom Tai-Seale, Ph.D.
Assistant Professor, Department of Social and Behavioral Health, School of Rural Public Health, The Texas A&M University System Health Science Center

Miguel Zuniga, Dr.PH, MD
Assistant Professor, Department of Health Policy and Management, School of Rural Public Health, The Texas A&M University System Health Science Center

Graduate Research Assistants – 2001-2003, School of Rural Public Health, The Texas A&M University System Health Science Center

Kristie Alexander, MPH '02
Memorial Hermann Children's Hospital, Houston, Texas; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

D'Arcie Anderson, MPH
Medical School, Missouri School of Osteopathy, Missouri; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Scott Bell, Ph.D., MPH '02
Medical Student, University of Texas Health Science Center at San Antonio, College of Medicine, San Antonio, Texas; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Denise Blevins, MPH '02
Office of the Inspector General, Department of Health and Human Services, Dallas, Texas; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Graciela Castillo, MPH Candidate '03
Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Coleman Chandler, MPH Candidate '03
Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Paul Crews, MPH '02
Guthrie Ambulatory Health Care Clinic, Fort Drum, New York; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Magda de la Torre, MPH '02
University of Texas Health Science Center, Department of Dental Hygiene, School of Allied Health Sciences, San Antonio, Texas; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Annie Gosschalk, MPH '02
Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Stephanie Pittman, MHA ’02
Wise Regional Health System and Foundation, Decatur, Texas; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Cortney Rawlinson, MPH candidate ’03
Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Leticia Shanley, MPH student and Medical student
University of Texas Health Center at San Antonio, College of Medicine, San Antonio, Texas; formerly Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Sarah Stone, MSPH candidate ’03
Graduate Research Assistant, School of Rural Public Health, The Texas A&M University System Health Science Center

Editing

Susan Lee, BA
Technical Editor, The Texas A&M University System

Contributing Centers and Offices

Southwest Rural Health Research Center
School of Rural Public Health
The Texas A&M University System Health Science Center
1266 TAMU
College Station, TX 77843-1266
(979) 458-0653
www.srph.tamushsc.edu
www.srph.tamushsc.edu/srhrc
www.srph.tamushsc.edu/rhp2010

Office of Rural Health Policy
Health Resources and Services Administration
Rockville, MD 20857

Rural Healthy People 2010:

A Companion Document to Healthy People 2010

VOLUME 2:
Introduction, Literature Reviews

INTRODUCTION TO RURAL HEALTHY PEOPLE 2010 (VOLUME 2)*

Rural Healthy People 2010 (RHP2010) is comprised of two volumes. Volume 1 contains brief overviews of the top rural health concerns and objectives associated with Healthy People 2010 focus areas, references to key literature about these concerns, and descriptions of models for practice that rural communities can draw upon to achieve key Healthy People 2010 (HP2010) objectives. Volume 2 is an appendix that presents more detailed literature reviews and associated references for the top rural health concerns.

One of the objectives of RHP2010 is to review the research literature on a number of HP2010-related rural health issues. Each chapter in Volume 2 corresponds to the Overview and Models for Practice chapter that deals with the same topic in Volume 1. Most of the rural health priorities examined here are Healthy People 2010 focus areas and/or objectives associated with health conditions and/or access to care conditions. The focus in the following literature reviews is on summarizing research findings that outline important factors related to the rural health conditions being explored by professionals and other interested parties in states and rural communities. The reviews do not address methodological issues in the conduct of rural health research. Also, authors may use the terms urban and rural interchangeably with metropolitan and non-metropolitan counties during discussion. More precise labels are applied when the research being summarized employs more exacting classifications of counties that are central to the points being presented in these reviews. For a discussion of the various urban-rural classification schemes, see Ricketts.[1]

Frequently, studies that examine rural-urban differences in health-related conditions across the nation attend, also, to the impact of other factors such as population age, poverty, education, employment, health insurance status, and race/ethnicity on differences in health-related conditions. In some statistical analyses, one or more of the latter factors appear to be more powerful factors than rural location in accounting for poorer access or poorer health in a population. It is important, of course, to be cognizant of the importance of addressing any of these factors in urban or rural settings that contribute to significant disparities in access to health or health status. It is the case that in many rural areas, the population is disadvantaged on several, if not all, of these factors. This provides an additional reason to be attentive to these other social and economic factors that are often associated with poorer health and that must be attended to in strategies to improve the health of populations in these rural areas.

Although some policies are mentioned in the treatment of these topics, this document does not formally evaluate or advocate particular policies. Researchers at the Southwest Rural Health Research Center and researchers at other Rural Health Research Centers with funding from the Office of Rural Health Policy are continually engaged in projects that are more directly related to policy options. These centers are identified at the website of the Office of Rural Health Policy (http://ruralhealth.hrsa.gov). The advocacy dimension here is directed largely at encouraging health organizations, professionals, and communities to consider what some communities or other organized efforts have accomplished to address rural health priority issues.

In a number of rural health priority areas, of course, one cannot ignore the contribution of a number of health policies to increase the supply of physicians and other health providers in rural areas or the role of Medicare and Medicaid in supporting health care for large numbers of rural residents. We intend this work to be helpful to policymakers, as well as to state and local rural health leaders, and rural

*Reference numbering in Volume 2 reflects the order in which references were introduced in the corresponding overviews in Volume 1.

residents. It will hopefully add to our collective understanding of rural health conditions, knowledge of some of the unique challenges facing delivery of health services in rural areas, and an appreciation of the innovativeness and commitment of many rural health leaders and communities to make the most of available resources to advance the health of rural residents.

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ACCESS TO QUALITY HEALTH SERVICES IN RURAL AREAS—INSURANCE: A LITERATURE REVIEW

by Jane Bolin and Larry Gamm

SCOPE OF PROBLEM

- Serious concerns exist about both the number and increasing rates of Americans without health insurance.[44] Those without health insurance under age 65 total 41.2 million, according to estimates using U.S. Census data.[10] If the uninsured population continues to increase at the current rate (0.4 percentage increase between 2001 and 2002), 46 million working-age Americans will be uninsured by 2005.[11]
- Persons living in nonmetropolitan areas are more likely to be uninsured than those in metropolitan areas—20 percent versus 17 percent.[1] More detailed comparisons show that the percentage of persons under 65 who are uninsured is higher in rural areas and large central metropolitan counties than in fringe counties in large metropolitan areas or in small metropolitan counties.[9]
- Access to health insurance has been identified by both national and state experts as a rural health priority,[32] and access to quality health services was most frequently selected as a rural health priority in a survey of state and local rural health leaders.[8]
- African Americans and especially Hispanics are more likely than whites to be uninsured.[10, 33] Uninsured rates are also higher among the poor and chronically ill.[2, 34]
- Lack of health insurance is a critical factor in influencing timely access to health care. 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.[35, 36] The Department of Health and Human Services interagency workgroup has identified health insurance as one of the 10 "leading health indicators" and generally a reliable predictor of overall health status.[37, 38]

GOALS AND OBJECTIVES

The goal of Healthy People 2010's access to quality health services focus area is to improve access to comprehensive, high-quality health care service.[1] Access to health insurance is critical to achieving this goal and the related Healthy People 2010 objectives:

- 1-1. Increase the proportion of persons with health insurance.
- 1-2. Increase the proportion of insured persons with coverage for clinical preventive services.

Health insurance is an important determinant of health and disability status, likelihood of physician use, and overall likelihood of health care treatment.[2]

Access to affordable health insurance matters, especially for the medically vulnerable and underserved. Prior research examining differences in the health status of those who are medically vulnerable (elderly, poor, and uninsured) with their less vulnerable counterparts, demonstrates that health insurance is an important determinant of health and disability status, likelihood of physician use, and overall likelihood of health care treatment.[2] Health insurance is an important determinant of access and utilization of all aspects of health care services and has a strong influence on a person's health.[3-7] Those who are uninsured are more likely to lack a regular source of care and less likely to use many health services, including critical emergency services, prenatal services, and nursing services.[39] Reduced preventive care and reduced disease screenings are also associated with uninsured status.[18, 40] Lack of financial resources or health insurance with which to pay for treatment is also a

"key disparity" in blocking access to much needed mental health treatment for persons with mental illness.[41, 42]

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to a survey conducted by the Rural Healthy People 2010 team, access to quality health services (which includes access to insurance) was most frequently identified as a rural health priority. Approximately three-quarters of the respondents named access to quality health services as a priority.[8] It was the most often selected priority among all four types of state and local rural health respondents in the survey and across all four geographic areas. Nine out of 10 leaders of state health organizations nominated access as a priority, while about two-thirds of the public health agencies, rural health centers and clinics, or hospitals did the same—a statistically significant difference among the groups. No significant differences across regions appeared, as access nominations appeared uniformly high across four geographic regions of the country.[43] Moreover, access to health insurance was singled out as a rural health priority by 26 percent of state and national rural health experts reached in a preliminary survey that allowed them to declare rural health priorities in an open-ended fashion.[32]

PREVALENCE AND DISPARITIES IN RURAL AREAS

Persons living in nonmetropolitan areas are more likely to be uninsured than those in metropolitan areas—20 percent versus 17 percent.[1] More detailed comparisons show the percentages of persons under 65 who are uninsured are higher in rural areas and large central metropolitan counties than in fringe counties in large metropolitan areas or in small metropolitan counties.[9] A 1997 survey focusing on the non-elderly population demonstrates that the percentage of uninsured increases from 14.3 percent in metropolitan counties to 17.5 percent in non-metropolitan counties adjacent to metropolitan areas, and to 21.9 percent in non-metropolitan counties not adjacent to metropolitan counties (see Table 1). Other differences in insurance coverage appear across these urban counties, rural adjacent (to urban), and rural non-adjacent counties. Other private insurance, i.e., individually purchased health insurance, is more prevalent in the rural counties, especially among the rural non-adjacent counties, than in urban counties. Medicaid and other public coverage are more prevalent in the rural non-adjacent counties than in urban counties or rural counties adjacent to urban counties.

Persons living in nonmetropolitan areas are more likely to be uninsured than those in metropolitan areas—20 percent versus 17 percent.[1]

Table 1. Health Insurance Coverage of Non-Elderly across the U.S., 1997.

	Urban Counties	Rural Counties Adjacent to Urban	Rural Non-Adjacent
Uninsured	14.3%	17.5%	21.9%
Public: Medicaid & Other	11.1%	11.0%	15.5%
Other Private Insurance	04.9%	05.6%	07.6%
Employer-Sponsored Insurance	69.7%	65.9%	55.0%

Adapted from Ormond, et al., 2000.[15]

Serious concerns exist about the number, percentage, and rate of increase of Americans without health insurance.[44] Estimates of the proportion of uninsured Americans range from nearly 14.6 percent[10] to 16 percent, or about one out of six persons under age 65, are uninsured.[12]

Estimates using U.S. Census data show that those without health insurance under age 65 total 41.2 million.[10] This amounts to an increase of 1.4 million

over the 14.2 percent uninsured in the previous year.[10] If this annual increase of 0.4 percentage points between 2000 and 2001 in the percentage of uninsured continues at the same rate, 46 million working-age Americans will be uninsured by 2005.[11] Other projections considering employer coverage—whether through the employee and/or the employee's working spouse—anticipates declines of as much as 6.7 percentage points between 1997 and 2008 in the percent insured because of workforce changes. These figures could be higher if health insurance premiums increase dramatically, if unemployment rises, or if employees decide against taking the insurance offered.[45]

Among racial and ethnic groups, Hispanics are more likely than other Americans under age 65 to be uninsured (36 percent), and African Americans (21 percent) are more likely than whites (14 percent) to be uninsured. Also, young adults 19-24 years of age are more likely to be uninsured (32 percent) as are those separated from their spouse (33 percent).[12] A total of 8.5 million children, or 11.7 percent of all children, are among the uninsured.[10]

The majority (57 percent) of the uninsured are full-time workers, while 20 percent are part-time workers. Despite Medicaid programs, the highest rates of uninsured are still in the poor and near poor—the two lowest—income groups.[13] State-by-state differences in income eligibility standards account in part for variations within and across regions of the United States.

> The majority (57 percent) of the uninsured are full-time workers.

The rates of the uninsured have increased over two decades. U.S. Department of Labor estimates in 1993 showed that 37 million Americans lacked health insurance, up from 31 million in 1987.[46] If current economic conditions continue or worsen, the 41.2 million uninsured non-elderly for 2001 could reach, as noted earlier, 46 million or more by 2005.[11]

The effect of difficult economic times is amplified in rural areas because businesses tend to be smaller, and health insurance costs are a higher percentage of an employer's semi-fixed operating costs. The continuing decline of rural employers offering health insurance, combined with lower incomes among rural residents ($30,057, compared to $39,381 in metro areas)[21, 47, 48] makes it more difficult for rural families to pay out-of-pocket for health insurance.

Variation by Region

Several studies report that people living in the South and West have lower rates of private or job-based insurance.[9, 10, 14] The uninsured rates are 12 percent in the Northeast and 10 percent in the Midwest, while the uninsured rates in the South and West are 16.6 percent and 18.2 percent, respectively.[10]

> Prior research shows that rural residents tend to have higher rates of private, self-purchased health insurance and are more likely to be uninsured.[21-25]

Some studies of rural health insurance coverage in the Midwest have not demonstrated significant variation in health insurance coverage in rural and nonrural populations in those populations.[49, 50]

Comer and Mueller[49] explain that the lack of difference between urban and rural uninsured in Nebraska may be due to the great similarity in social composition of urban and rural Nebraska.[51] A more recent study, however, finds rural Nebraskans to experience longer spells without health insurance.[24] A 1994 Minnesota study demonstrates that rural residents are more likely to be uninsured and to be self-employed; they are, also, more likely to earn less and to be older than their urban counterparts.[23] A 1998 study in Washington State found that rural residents experience a slightly higher uninsured rate than urban residents.[25]

Other studies report that working adults living in rural areas are less likely to be offered health insurance through their jobs, i.e., employer-sponsored insurance programs.[20, 21] Most of this difference is associated with rural dependence on smaller firms and lower wage rates.[21] Prior research shows that rural residents tend to have higher rates of private, self-purchased health insurance and are more likely to be uninsured.[21-25]

Rural areas tend to have smaller businesses, resulting in higher premium costs spread across fewer employees. Combined with higher premiums for such occupations as farming, mining, logging, and fishing, many families may not be able to afford insurance.[26] Although focused principally on 12 metropolitan areas, a study of health insurance coverage by employers observes that small businesses continue to be less likely than larger businesses to offer health insurance in 2001; only 62 percent of firms with three to 49 employees offer insurance in comparison to 97 percent of larger firms that do so. For those continuing to offer coverage, small firms are more likely to respond to premium increases by increasing the employee's share of premiums, increasing co-pays and deductibles, using stricter rules for covering employees and dependents, dropping retiree coverage (if they offered it), reducing services covered, and changing products and/or carriers.[52] Given lower incomes paid to rural workers, increases in the employee's share of health insurance premiums and deductibles and co-payments for services may contribute to lower employee acceptance of the insurance coverage offered.

The fact that some regions and rural areas have higher rates of uninsured persons translates into less access to services. The lack of health insurance predicts lower utilization of health care and preventive services.[16, 17] A study that finds larger percentages of uninsured and lower prevalence of employer-sponsored insurance for non-elderly residents in rural counties than in urban counties, also finds more rural residents than urban ones reporting fair or poor health, no visit to a health professional in the prior year, and less confidence in getting needed health care services.[15]

Variation in Insurance Coverage by Race and Ethnicity

Racial and ethnic minorities are more likely than white Americans to be uninsured. One study found that 10 percent of white/non-Hispanics were uninsured, while 18.2 percent of Asian/Pacific Islanders, 19 percent of blacks, and 33.2 percent of Hispanics were uninsured for the entire year in 2001.[10] Several other recent studies also point to higher uninsured levels among minority populations.[33, 53, 54]

One of these studies, comparing nationally representative samples of working age adults (18 to 64) for 1997, 1999, and 2001, reports the disparities in insurance noted above across Hispanics and African Americans in comparison to whites. These disparities are multiplied, according to the study, by the fact that only about one-third of Hispanics and African Americans without insurance report having a regular source of care in contrast to one half of whites who report the same. Only 62 percent of Hispanics in comparison to 74 percent of African Americans, and 79 percent of whites report a doctor's visit in the past year. More damaging, these disparities for Hispanics appear to be increasing over time.[33]

In a study in 1998 focusing on adult workers, approximately 39 percent of Hispanic respondents were uninsured. Of the Hispanic workers surveyed, 34 percent said their employer did not offer health insurance, and 11 percent reported they were not eligible for the insurance plan offered by the employer.[55] This rate of uninsurance exists despite the fact that 9 million of the 11 million uninsured Hispanics live in a family with at least one member employed. In contrast to the 64 percent of workers nationally covered by employer-based insurance, only 43 percent of Hispanics have such coverage. Over two-thirds of the uninsured Hispanics reported difficulty in paying medical bills or contact by a collection agency about unpaid medical expenses.[56]

IMPACT OF THE CONDITION ON MORTALITY, MORBIDITY, AND A CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

Because adults with chronic conditions and those in their late middle age are more likely to need care, these groups are especially likely to recognize better health outcomes as a result of health insurance coverage.[57] Thirty percent of working-age people with chronic illnesses live below the poverty level.[4, 58, 59] The general health of persons without insurance is poorer than persons with private insurance.[61] Another study reports that the general health of uninsured who recently lost insurance is only slightly less poor than the overall general health of privately insured. However, those classified as "long-term uninsured" or low-income are also classified as *significantly* less healthy.[61]

A lack of health insurance coverage is associated with lower utilization of preventive services and is associated with reduced preventive care such as cancer screening, and care for congestive heart failure, diabetes, chronic obstructive pulmonary disease (COPD), oral and dental health, and mental health.[16, 17] Health insurance, according to another recent review of research, contributes to adults' receipt of appropriate preventive, chronic, and acute care services; those lacking health insurance coverage, however, experience greater health decline and die sooner.[57]

Lower rates of preventive service utilization are documented for rural areas, although differences vary by service. For example, differences in mammogram screening may be more attributable to education or income rather than place of residence. Other preventive services are negatively correlated to rural status and to being uninsured.[18] The uninsured are also more likely to be hospitalized for avoidable conditions, such as pneumonia and uncontrolled diabetes, and more likely to be diagnosed for cancer at later stages.[19]

The Institute of Medicine's (IOM) Commission on Uninsurance concludes that minorities and lower-income adults, often suffering from poorer health and lack of stable health insurance coverage, find improved health insurance coverage particularly beneficial.[57] Such coverage, the commission concludes, would likely reduce racial and ethnic-related disparities in use of appropriate health care services and reduce similar disparities in morbidity and mortality rates.[57]

BARRIERS

Unavailability of insurance through an employer is often the primary reason working-age Americans are uninsured. In a study of uninsured workers, 59 percent have employers who do not offer health insurance; 21 percent are ineligible for the employees' health plan, and 20 percent decline the coverage offered by their employer.[27] Budetti and colleagues[55] found that 42 percent of workers with incomes below $20,000 and 20 percent with incomes between $20,000 - $35,000 were either not offered employee health benefits or were ineligible.

Most likely to be uninsured are those working in small firms; those earning less than $10.00 an hour; those working in retail, construction, or service industries; and those who are single and without children. Although only 20 percent of the overall American workforce is employed in firms with less than 25 employees, workers from these small firms account for 42 percent of the uninsured workers in the country.[27]

Even for those small businesses that do offer insurance plans, employees may have little or no choice among health plans. Since 1988, more employers who offer health insurance tend to offer choices among two or more health plans, the percentage peaking at 67 percent in 1996 and then dropping to 60 percent of employers in 2001. According to this survey of employers, those employers with three to 24 workers who offer health insurance are much less likely to offer such choice and show a similar decline in percentages offering two or more plans, dropping from 11 percent of employers in 1996 to 8 percent in 2001.[62]

Prior research consistently demonstrates a strong nexus between health insurance status, chronic illnesses, and poverty.[2, 4, 34, 63-68] During difficult economic times, food and basic necessities are purchased before health insurance, and health insurance is more likely to be dropped or deferred.[28] Since persons living in rural areas are more likely to have seasonal work and lower incomes, they are the most at-risk group of being both uninsured and living below federal poverty levels.[6, 7, 29] A 1997 national survey reports that the poverty rate (those with income below the federal poverty level) increases with degree of rurality, increasing from 13.8 percent among metropolitan counties to 15.8 percent among counties adjacent to metropolitan areas, and 22.5 percent in counties not adjacent to metropolitan areas.[15]

> Persons living in rural areas are more likely to have seasonal work and lower incomes; they are the most at-risk group of being both uninsured and living below federal poverty levels.[6, 7, 29]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Many factors influence access to health insurance coverage. Since 66.6 percent of non-elderly Americans receive their health insurance through their employer, access to jobs that offer health insurance is very important. Larger businesses are found primarily in suburban and urban areas, while businesses in rural areas tend to be smaller. For small businesses, the fixed cost of providing employees with health insurance can be prohibitively high. Thirty percent of workers in firms with less than 25 employees are uninsured.[53]

Higher poverty rates and overall lower wages in rural areas magnify the problem of a lack of employer-based health insurance coverage or coverage that is more costly to workers. Sixteen percent of workers are uninsured, but a third of workers earning less than $20,000 are uninsured.[53]

Although those with chronic diseases may have the greatest need for health insurance, they may be less likely to have it, especially if they are poor. The Kaiser Commission[59] reports that "people with chronic illnesses who are poor or near poor are about three times more likely to be without health insurance than those with higher incomes." This finding has strong implications for the rural working "near-poor" residents who may not have access to regular income or employer-sponsored insurance.

An Indiana study reports that, based on 1994 data, pre-existing condition exclusions associated with chronic disease are an important contributor to lack of adequate coverage for those with such illnesses. Adequate coverage is reduced by about 10 percentage points among those with chronic illnesses versus those without. The reduction is 25 percentage points among single individuals, with even greater impacts among single individuals working in small firms.[34]

Education is also an important factor in health insurance rates. Those with fewer years of education are more likely to fall into the uninsured category. Figures from the Current Population Survey[69] show that working-aged persons with the highest likelihood of being uninsured in 1997 are those who stopped school at or before eighth grade. Only 55 percent of persons in this category have health insurance. College graduates and those with some graduate school are most likely to be insured (90 to 93 percent).[69]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Providing tax incentives and some regulatory protection for developing MEWAs (Multiple Employer Welfare Associations) or health insurance purchasing cooperatives may be near-term solutions for smaller business organizations and co-ops in some regions of the country. Some groups, however,

oppose changes along lines that it would grant ERISA status to, or otherwise limit, state oversight of these groups.[70]

Other policy solutions relating to persons who are near poverty but who still do not qualify for Medicaid may include Medicaid extensions and waivers and expansion of the State Children's Health Insurance Program (SCHIP). Although the 1990s saw significant efforts in these areas, the current economic downturn and state budget shortfalls are likely to restrict these options for addressing the needs of more of the uninsured, at least for the near future.[30]

A number of communities, led principally by provider groups in those communities, have established special health plans or programs for the uninsured. These programs emphasize the provision of key preventive and other primary health services that are often associated with reducing demands upon very expensive emergency room services or acute care facilities where such admissions might be preventable by timely primary care. An analysis of 20 such organized community initiatives focuses on those serving urban areas.[71] A related study offers detailed case studies of five of these initiatives.[72] Some rural initiatives exist, however, such as a few models for practice reported in Volume 1 of this report, that serve rural regions or rural and urban communities. More generally, Ormond and associates[15] suggest that, based on studies in eight states with significant rural populations, the rural health providers are providing a larger share of "safety net" services for the rural uninsured than providers in urban areas are providing for uninsured.

An important step in community efforts to address the problem of the uninsured is the development of reasonably accurate estimates of the number of uninsured locally. A guide has been developed to support the efforts of community groups to arrive as such estimates.[31]

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Rural populations in the U.S. tend to face a number of barriers and challenges in accessing affordable health insurance; these may be greater for some populations than others. Existing research shows significant differences in access to insurance between rural and non-rural populations and that these differences are amplified for racial and ethnic minorities. The percentages of people who are uninsured increases as one compares metropolitan area counties with nearby rural counties, and then with more remote rural counties—the counties with the most uninsured. Most striking are the higher proportions of uninsured among, especially, Hispanics and African Americans, nationally.

The relatively larger proportions of small businesses and lower-paying jobs in rural areas is reflected in less employer-supported health insurance, fewer choices and less attractive provisions among employer-sponsored plans, and lower ability of workers to purchase higher cost, individual insurance policies. At the same time that poverty and/or chronic conditions are associated with an increased need for care, the same conditions increase the likelihood that such people will be uninsured. The combined effects of all of these factors is to place rural populations in many areas of the country at risk of being uninsured and at risk of failing to find adequate or timely treatment for health conditions.

Although there is evidence of some success in some states in reaching more of the uninsured via extending Medicaid program eligibility and enrolling more previously uninsured children in the State Children's Health Insurance Programs, current budget cutbacks in most states threaten to reverse this progress. There is evidence, too, of innovative community efforts sponsored by local providers to extend coverage or services to the uninsured. Although providers in many rural areas continue to make major efforts to maintain "safety net" services for the uninsured, it is unclear how long they will be able to maintain the services in the face of growing economic challenges to rural populations and providers.

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ACCESS TO QUALITY HEALTH SERVICES IN RURAL AREAS—PRIMARY CARE: A LITERATURE REVIEW

by Larry Gamm, Graciela Castillo, and Stephanie Pittman

SCOPE OF PROBLEM

- There are fewer physicians, with the exception of family practitioners and general practitioners, in rural areas in all four regions of the nation.[37]
- Health manpower shortages, and recruitment and retention of primary care providers were identified as major rural health concerns among state offices of rural health.[38] Access to quality health services was the most often nominated rural health priority by state and local rural health leaders across the nation.[2, 3]
- Fifteen percent of adults in the United States, according to estimates, do not have a preferred doctor's office, clinic, or any other place in which they receive care.[1]
- Only about 10 percent of physicians in America practice in rural areas despite the fact that one-fourth of the U.S. population lives in these areas.[10]
- As many as 12 percent of all hospitalizations may be avoidable[21] and are disproportionately frequent among the poor and non-white populations.[33-35]

GOALS AND OBJECTIVES

It is estimated that 15 percent of adults in the United States do not have a preferred doctor's office, clinic, or any other place in which they receive care.[8] In light of this disparity, the Healthy People 2010 goal is to improve access to comprehensive, high-quality health care service.[1, 8] Many of the access to primary care issues addressed by Healthy People 2010 are problems experienced in many rural areas of the United States.

This review addresses the following HP2010 objectives:

- 1-4. Have a source of ongoing care.
- 1-5. Have a usual primary care provider (PCP).
- 1-8. Increase the proportion of underrepresented ethnic and racial groups among those awarded degrees in the health professions.
- 1-9. Reduce avoidable hospitalizations associated with three ambulatory-care-sensitive conditions—pediatric asthma, uncontrolled diabetes, and immunization-preventable pneumonia and influenza.[1]

The above objectives having to do with access to ongoing care or primary care provider are addressed, as well, under other focus areas in this report. These areas include oral health; mental health; diabetes; and maternal, infant, and child health. Affecting these objectives in many rural areas are shortages of primary care providers, including primary care physicians and non-physician primary care providers (NPPCPs), such as nurse practitioners (NPs) and physician assistants (PAs); and an under-representation of female and minority PCPs. Progress on these objectives should contribute to effective utilization of preventive services and primary care by all rural population groups to attain reductions in avoidable hospitalizations and to improve overall health status.

Key definitions used in this discussion include:

- *Access* is defined by the Institute of Medicine[39] as "the timely use of personal health services to achieve the best possible health outcomes." Availability, accessibility, affordability, accommodation (relationship between practitioner and patient), and acceptability of care are integral components of the construct of access.[40]
- A *Usual Source of Care* is the regular place where an individual who is sick or needs advice goes to receive medical care. This place is often considered an entry point into the health care

system. It is also believed to contribute to the continuity of care.[6] People with a usual source of ongoing care are more likely to receive a variety of preventive services than people without one.

- *Avoidable Hospitalization* refers here to hospitalizations for ambulatory care sensitive conditions (ACSCs), such as asthma, diabetes, congestive heart failure, and others that can be avoided through utilization of timely and effective primary care and preventive services.
- *Primary Care Providers* are generalist allopathic and osteopathic physicians in family practice, general internal medicine, general pediatrics; and, for women, obstetrics-gynecology providing primary care services,[41] as well as, physician assistants and nurse practitioners, and certified nurse midwives providing primary care services.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, access to quality health services (which includes access to primary care) was rated as the top ranking rural health priority. Approximately three-quarters of the respondents named access as a priority.[2] It was the most often selected priority among all four types of state and local rural health respondents in the survey and across all four geographic areas. Nine out of 10 leaders of state health organizations nominated access as a priority, while about two-thirds of the public health agencies, rural health centers and clinics, or hospitals did the same, a statistically significant difference among the groups.[3] No significant differences across regions appeared, as access nominations appeared uniformly high across four geographic regions of the country. Also, in a preliminary survey of state and national rural health experts allowing them to state priorities in an open-ended fashion, three topics related to primary care—access to primary care, access to health workforce, and access to health services—were frequently named as rural priorities.[4] One or more of these three primary care topics was named by nearly two-thirds (65 percent) of those who nominated priorities in this preliminary survey.

According to the Rural Healthy People 2010 survey, access to quality health services (which includes access to primary care) was rated as the top ranking rural health priority.[2]

PREVALENCE AND DISPARITIES IN RURAL AREAS

To address prevalence and disparities in access to primary care in rural areas, this review considers several topics that are of continuing importance to rural health. They include:

- access to usual source of ongoing care,
- access to primary care providers,
- disparities among primary care subspecialties and other specialties,
- female physician representation,
- minority physician representation,
- supply of non-physician providers, and
- avoidable hospitalizations.

Usual Source of Ongoing Care and Usual Primary Care Provider

Rural and urban populations fair relatively equally at 89 percent and 87 percent, respectively, in having a usual source of ongoing care. The same is true with respect to having a usual primary care provider, with 78 percent of rural and 76 percent of urban residents reporting such. Rural residents are less likely, however, to report their usual primary care provider having evening or weekend hours, 29 percent and 39 percent, respectively.[5]

With respect to chronic conditions, one study finds non-significant differences in prevalence of congestive heart failure, diabetes, hypertension, and rheumatoid arthritis among rural and urban Medicare

beneficiaries. Rural counties that are not adjacent to urban counties do reflect a greater prevalence of pulmonary disease than urban counties or rural counties that are adjacent to urban counties.[42] However, possibly reflecting poorer access to primary care in rural areas, utilization of outpatient services by Medicare beneficiaries is significantly higher for all five chronic conditions in urban counties than in either type of rural county, and significantly higher in rural counties adjacent to urban counties than in non-adjacent rural counties. These differences are reflected in either more visits, more claims, or both for all five conditions.[42]

Among racial and ethnic groups, Hispanics are less likely than white and African-American populations to have a usual source of care. And, rural Hispanics are less likely than their urban counterparts to have a usual source of care—72 percent in rural areas and 77 percent in urban areas. From 87 to 90 percent of white populations and African-American populations in rural areas and in urban areas have a usual source of care.[6]

Estimates based on national data suggest that Hispanics and African Americans, respectively, record 20 percent and 33 percent fewer primary care visits per person than white, non-Hispanics. These data reflect visits to physician offices, community health centers, and hospital outpatient departments.[7]

> The total number of active allopathic physicians serving nonmetropolitan areas increased at a slower rate than did those serving metropolitan areas between 1980 and 2000.[43]

Access to Primary Care Physicians

The total number of active allopathic physicians serving nonmetropolitan areas increased at a slower rate than did those serving metropolitan areas between 1980 and 2000, resulting in 156 physicians per 100,000 population in nonmetro settings in contrast with 280 per 100,000 in metro counties.[43] The maldistribution of physicians in favor of urban areas is a continuing concern affecting rural access to care. The maldistribution is especially pronounced with respect to specialists and is likely to become an increasing problem with primary health care.[9] This relative undersupply of PCPs and specialists may be of greatest concern for the rural chronically ill, severely mentally ill, and/or disabled.

> The core problems appear to be physician recruitment and retention in rural and underserved areas, with retention being the greater challenge.[6]

The core problems appear to be physician recruitment and retention in rural and underserved areas, with retention being the greater challenge.[6] Americans residing in rural areas often have limited access to health care because physicians tend to settle and practice in urban areas.[44] Only about 10 percent of physicians in America practice in rural areas despite the fact that one-fourth of the U.S. population lives in these areas.[10] More specifically, 8.7 percent of the 675,047 active physicians in the United States and 14 percent of the 308,564 practicing primary care physicians provided services in rural areas in 1998.[11]

Gross data suggest there has been a general increase in the number of physicians in both rural and urban areas over the past decade. Closer analysis of both national productivity data and estimates in two states of those physicians actually practicing, indicates little growth in the effective supply of rural physicians and a decline of 9 percent for family physicians.[12]

The long-standing maldistribution of primary care physicians in rural areas led Congress to pass the Health Professions Educational Assistance Act of 1976, which included provisions for the identification of health professional shortage areas (HPSAs). The purpose of the legislation was to

increase the supply of physicians practicing primary care in such underserved areas.[45] There are currently about 2,157 designated HPSAs in rural and frontier areas of all states and U.S. territories with regard to primary medical care. In contrast, only about 910 HPSAs of the same type exist in urban areas.[46]

At the same time, there is evidence that many rural counties that are relatively more socially and medically disadvantaged are less able to attract physicians trained in the U.S. Such counties are more reliant on physicians classified as International Medical Graduates.[47]

Even in situations where a local physician is available, many rural residents rely on physicians outside of their locality for care. Reasons for bypassing local providers may include such things as high local physicians' fees, inadequacy of local physicians' skills or medical equipment, and inability of local physicians to meet community health needs. One study estimates that well over 40 percent of people living in rural counties travel outside their home county for physician services.[19] A survey of rural Iowans reveals that 30 percent of respondents with a family physician rely upon one outside their own county. The reason most often given is to gain better care.[20]

Disparities among Primary Care Physicians

It is well known that subspecialists are less likely to settle in rural areas than in urban areas. For these and several of the primary care specialties, the necessary patient population base may not be available in the rural setting to support the specialization.[44] Several primary care-related specialties present particular inequalities for rural areas in light of widespread rural needs.

Table 1 illustrates the disparities between rural and urban areas by physician specialty type based on 1995 nationwide data.

General Pediatricians

The total number of general pediatricians represents an increase of 73 percent from 1981 to 1996 (19,739 to 34,100), but the rural pediatrician-to-child-population ratio remains much lower than the urban ratio. Among rural counties, only those with a population over 25,000 had substantial ratio increases.[48] Although rural areas record a 21 percent increase in pediatricians during this 15-year time period, pediatricians practicing in urban areas register an 80 percent increase. Translation of these data means that only 8.1 percent of the pediatricians in the U.S. are available to 20 percent of the nation's children residing in rural areas.[48]

Table 1. Number of Physicians by Specialty per 100,000 People.

	Urban	*Rural*
Family/General Practice	28.1	26.1
Pediatricians	17.5	5.2
General Internists	35.4	11.8
OB/GYN Specialists	13.7	5.1
Other Specialties	134.1	40.1

Adapted from Rosenblatt and Hart, 1999.[44]

Pediatricians, it has been argued, are less likely to practice in rural areas in groups with fewer than five physicians because it is difficult to provide 24-hour care, on-call, and backup coverage without help from other colleagues. They are more likely to settle, then, in rural areas of about 10,000 people or more—areas large enough to support five or more doctors.[44]

General Internists

A similar under-representation of internal medicine generalists is found in rural areas, too, as is shown in Table 1. As is the case for general pediatricians, the limits in the ability of internists to cover for those trained in family practice or pediatrics may account for the small number of internists in smaller rural areas.[44]

General Obstetrician-Gynecologists

The disparity in the rural supply of obstetrician-gynecologists, reflected in Table 1, is becoming more prevelent at the same time that fewer family

physicians are delivering babies.[44, 49] The decrease, nationally, in the number of obstetrician-gynecologists and family physicians who deliver babies is more pronounced in rural areas than urban areas. Rural family physicians offering obstetric care fell from 43 percent in 1988 to only 37 percent in 1992; moreover, only 65 percent offer care for newborns.[50]

This decline may be reflected, as well, in the reduced participation of rural family physicians and rural obstetricians in prenatal care in rural areas over the last two decades. Prenatal visits to rural family physicians during seven selected years between 1980 and 1992 accounted for 17.7 million visits compared to 6.8 million prenatal visits to rural family physicians between 1993-1999. Such visits to rural obstetricians dropped from 25.7 million to 21.4 million between the two time periods. The rural family physician's share of the total number of prenatal visits to rural physicians during the two time periods dropped from 38.7 percent to 23.7 percent, while the rural obstetrician share of the rural total increased.[51]

The rapid rise in costs of malpractice coverage for obstetrical services in the 1980s, an escalation not unlike that occurring in medicine today, may account in part for the decline in prenatal and obstetrical services in rural areas. In a 1987 Government Accounting Office study, 25 percent of all medical malpractice suits involved obstetrics and resulted in the most expensive payments. No other discipline has been affected by malpractice this severely.[52] Spiking medical liability insurance costs among obstetricians, internists, general surgeons, and other specialists over the past several years[53] may have an even more profound impact on rural access, as independent practices and small groups may be less able to withstand these accelerating costs.

Even where family physicians continue to provide high-quality obstetric care, obstetricians are needed for consultation and for emergency situations. Without a local obstetrician-gynecologist, some rural residents may be forced to travel for obstetric care, and perinatal outcomes may be negatively affected.[44]

A study of the impact of the earlier medical liability crisis found that women with high-risk pregnancies are especially affected by this dilemma since between 14 and 49 percent of physicians across the states report having reduced the number of high-risk cases they will take.[49] In North Carolina, 25 percent of rural physicians, in contrast to 13 percent of urban physicians, stopped or decreased care given to high-risk pregnancies.[49]

Disparities among Other Specialties

The rural disparities in physician supply are most evident when one considers all specialties, excluding the generalists. The number of these specialties per 100,000 people are 40.1 and 134.1 in rural and urban areas, respectively.[44] Many rural hospitals are dependent on some of these specialties such as general surgeons, anesthesiologists, and radiologists[54] for continued operation. And, because the rural hospital is an important anchor for retaining primary care physicians in a rural area, the retention of such specialists is all the more important to maintaining access to primary care in such areas.

Female Physician Representation

The increasing number of physicians who are women may further restrict the supply of rural physicians. The number of female physicians, residents, and medical students has increased by 300 percent since 1970.[10] Women account for almost 43 percent of all generalists among the most recent medical graduates[13] and are projected to account for 30 percent of the physician workforce by 2010.[55]

Female physicians are less likely to practice in rural areas than in urban areas (see Table 2).[13] An analysis based on 1996 national data reveals that only 13 percent of rural physicians are women compared to 19.4 percent of physicians in urban locations. The disparities in percentages of female physicians practicing in rural areas are even more pronounced (by 8 to 10 percentage points) with respect to rural family practitioners/general practitioners (FP/GPs) and obstetrician-gynecologists.[13]

Table 2. Female Physician Representation.

	Urban	*Rural*
Total Number Physicians	434,506	51,743
Female Physicians	19.4%	13%
Female Generalists	25.9%	15.7%
Female Family Practioners/ General Practitioners	20.1%	12.4%
Female OB/GYN Practioners	27.4%	17.5%

Adapted from Doescher, et al., 2000.[13]

The increasing proportion of female physicians and their tendency to settle and practice in urban areas may thus contribute to the undersupply of physicians in rural areas.[13] Moreover, the greater tendency of female physicians over their male counterparts to specialize in pediatrics, psychiatry, and obstetrics and gynecology[13] may point to even greater future shortages in these specialty areas in rural areas.

The under-representation of female physicians in rural areas may also have an effect on the health of female residents in rural areas. Female patients usually prefer female doctors and are more likely to receive pap smears and mammograms if done by a female physician, especially if the physician is an internist or family physician.[13] Thus, rural disparities in the numbers of female physicians practicing in rural areas may further limit use of care.

Minority Physician Representation

In 1999, African Americans constituted 2.6 percent and Hispanics 3.5 percent of the physician workforce. These figures are very small considering that each of these two minority groups constitutes 12 percent of the American population. The comparable figures for Native Americans reflect an even greater disparity—0.1 percent of the physician workforce and 0.7 percent of the population.[27] The consequences of these disparities are likely to affect minority population access to care. Minority general physicians are more likely to serve minority populations and larger proportions of the poor and/or uninsured.[14-16] Moreover, there is evidence that minority patients prefer to see physicians who are of the same ethnic/racial group as themselves.[17] Little research was identified relating to minority physicians' relative role in rural settings.

A 1993 national survey of generalist physicians who graduated from medical colleges about 10 years earlier investigates differences in the social background, training, and practice experiences of these physicians.[15] African-American and Hispanic-American physicians are much more likely than white physicians to come from a rural or inner city background and to have graduated with a National Health Service Corp service obligation. These minority physicians also report relatively larger proportions of their patients are poor, reliant on Medicaid, and reflecting the same racial/ethnic background as their own.[15]

A study of 51 California communities in 1993 finds that African-American and Hispanic physicians are more likely to practice in areas with higher concentrations of residents of their own race/ethnicity and to care for higher percentages of these patients. Such communities are also four times as likely as others to have a shortage of physicians. Compared to other physicians, African-American physicians are likely to care for more Medicaid patients, and Hispanic physicians are more likely to care for more uninsured patients, according to the study.[14]

The ratio of Hispanic physicians to Hispanic populations in places such as California with large populations of Hispanics, 1:2893, is well below the overall physician/population ratio among non-Hispanic physicians and the non-Hispanic population, 1:335. Moreover, there are forecasts that the number of Hispanic physicians will not begin to keep up with the growth in the Hispanic population in California, which currently makes up over 30 percent of the state's population.[28]

Non-Physician Primary Care Professionals

Non-physician primary care professionals, such as physician assistants, nurse practitioners, and certified nurse midwives (CNMs), are becoming increasingly more important and common in rural and urban areas. In comparison to rural and urban

physician-to-population ratios, NPPCPs considered here appear to slightly favor rural settings, as shown in Table 3. They are able to provide needed primary care in most cases and, earning less than physicians, are better able to conform to the resource constraints in rural areas than physicians.[18]

Table 3. Number of Non-Physician Primary Care Providers per 100,000 Population, 1996.

	Total Number	*Rural*	*Urban*
Nurse Practitioners	55,730	24.72	20.08
Physician Assistants	31,084	11.91	11.66
Certified Nurse Midwives	5,337	2.47	1.90*

*11.8 percent of Nurse Practitioners and 18.3 percent of Certified Nurse Midwives are not practicing. (Adapted from Baer and Smith, 1999.[18])

Nurse Practitioners

Nurse practitioners are registered nurses with advanced education (most often today at the master's or post-master's level) and clinical training in primary care or another specialty. National estimates indicate that about equal numbers of NPs practice in ambulatory care and hospital settings, 24 and 23 percent, respectively; 19 percent practice in public health, while 12 percent of NPs are not practicing.[18] Another study reports that most NPs are engaged in practice in primary care settings.[56]

Physician Assistants

The physician assistant profession, an extension of the physician profession rather than nursing, originated in the 1960s as a response to primary health care needs of the underserved.[18] The results of a number of studies present a mixed picture about the contribution NPs and PAs are likely to make to providing additional sources of primary care in rural areas.

Physician assistants practicing in rural areas are much more likely than those in urban areas to be engaged in general primary care practice, as opposed to specialty services.[31, 32] Without respect to geography, however, PAs tend to be more closely divided than NPs between primary care and specialty care.[56]

A study of PA retention raises serious concerns about the ability of rural areas to retain PAs in the face of possibly more attractive opportunities in urban settings.[57] Although PAs were intended to provide service in underserved areas, their distribution increasingly resembles the distribution of physicians in favor of urban areas. They may be attracted to the opportunities from urban areas in the form of more competitive wages, a shorter work week, and fewer hours on call.[31]

One study projects that both NPs and PAs are expected to nearly triple their 1995 numbers by the year 2015.[58] Another notes that, although there are far more NPs than PAs, the number of PAs graduating is increasing while the number of NPs graduating has leveled off.[56] It remains to be seen whether NPs and PAs will measurably improve the availability of primary care in rural areas in the coming years or be drawn to specialized practice and urban settings.

Certified Nurse Midwives

Certified nurse midwives specialize in prenatal, perinatal, infant, and gynecological care. They address all stages of pregnancy as well as nutritional counseling, primary care, and mental well being. According to the most recent available data from the National Center for Health Statistics, CNM-attended births in the U.S. account for 9.5 percent of all vaginal births in 2000.[59]

Although built on a long, rich history in rural areas dating back to the 1920s, the number of nurse midwives has not grown as rapidly as NPs and PAs.[18] This is despite studies reporting that CNM-attended births reflect treatment and outcomes comparatively equal to or better than those attended by physicians.[60, 61]

As is shown in Table 3, the ratio of CNMs to population is higher in rural areas than in urban

areas. Of particular importance to vulnerable populations who may lack a usual source of care are research findings that 80 percent of CNMs serve patients who have one or more characteristic of being at risk, and 56 percent of patients served by CNMs are in underserved areas.[62]

IMPACT OF THE CONDITION ON MORTALITY

This review did not identify specific studies linking primary care shortages directly to mortality rates. One might anticipate, however, that delays in diagnosis and treatment for any number of serious conditions such as cancer—delays that might be attributable to poor access to primary care—could result in more mortalities that might have otherwise been prevented.

IMPACT OF THE CONDITION ON MORBIDITY

One consequence of an undersupply and/or underutilization of primary care providers may be increased hospitalizations that might have been prevented with the timely provision of preventive and primary care service. As many as 12 percent of all hospitalizations may be avoidable.[21] Nationally, such hospitalizations have been found to be more prevalent among lower and middle income group African Americans.[21] A 10-state study finds African Americans (especially adults), Hispanics (especially children), and the elderly in both minority groups are more likely than whites to be hospitalized with preventable conditions.[22]

A South Carolina study finds that for adult men, bacterial pneumonia is the second most common ACSC behind congestive heart failure; for adult women, the most common ACSC is bacterial pneumonia, with asthma the second most common. Among pediatric patients, bacterial pneumonia and asthma are, by far, the leading ACSC, with diabetes ranking in eighth place followed by immunization-preventable conditions.[33]

A number of studies identify differences in primary care practices that might contribute to avoidable hospitalizations. A statewide study in Washington of diabetic care among Medicare patients finds that patients in large rural towns remote from metropolitan areas are more likely than patients in smaller towns and urban areas to receive recommended diabetic care during their physician encounters.[63] A study of rural outpatient care reports that many diabetic patients do not receive recommended services,[64] a situation not restricted to rural practice. A more recent case study, however, demonstrates that a rural physician's office can employ a combination of an electronic diabetes monitoring system and cluster group visits to significantly improve glycemic control in diabetic care.[65]

More generally, over 100 community health centers, including a number of rural centers, have participated in disease management-focused collaboratives to improve diabetes care.[66] Also, several large integrated delivery systems focused principally on rural areas have launched successful disease management programs to better manage diabetes, congestive heart failure, and other conditions that are associated with avoidable hospitalizations.[67]

A study of Kentucky Medicaid-covered children identifies a number of treatment-related differences among rural and urban children treated for asthma, but it concludes that rural children are not disadvantaged in treatment in relation to urban children. Among the differences is the greater likelihood of urban children relative to rural children to be treated in an emergency room, while rural children are more likely to have ambulatory care visits. Urban children's asthma-related prescriptions are more likely written by pediatricians, while rural children's prescriptions are more likely to be prescribed by family practice or general practice physicians. Not unrelated to this difference, rural children who receive an anti-inflammatory drug are more likely to receive inhaled steroids, and urban children are more likely to receive cromoglycates;[68] the comparative efficacy of the two drugs is still debated.

A national study of self-reported access among Medicare beneficiaries finds a mixed picture in comparing various types of rural counties with urban

counties. Beneficiaries in most types of rural counties are more likely than those in urban ones to report receiving flu shots and pneumonia vaccinations, but those in rural counties are less likely than those in urban counties to report recent mammographies and pap smears.[69]

Access to such appropriate and timely primary care services is important to avoid aggravation of a condition or progression of disease that results in avoidable hospitalization. A number of the chapters appearing in this volume attest to the potential impact of not having a regular source of care, impacts associated with later stage diagnosis for cancer, lack of prenatal care, diabetes progression, and the like.

Poorer access to care is implicit in the designation of health professional shortage areas. Such shortages are far more prevalent in rural and frontier areas of all states and U.S. territories than in urban areas.[46] A study of adults in Kentucky concludes that HPSAs are associated with poorer health status, especially in older individuals.[45]

BARRIERS

An Oklahoma statewide study identifies a number of factors that are associated with a lower likelihood of adults' use of primary care-based preventive services. Among those less likely to use such services are residents from rural areas, those lacking access to a usual source of care, those at greater risk for avoidable illness, and the poor lacking health insurance.[23] In contrast, Comer and Mueller[40] find that Nebraska rural residents are more likely than urban ones to report having a personal physician who they normally see for care, more physician visits, and more hospitalizations. The authors suggest that the reasons for these findings that are contrary to national studies may be that there are no significant differences between Nebraska urban and rural residents in income, health insurance, or health status.[40]

Geographic barriers may impact access to primary care. Rural residents more commonly cite the lack of local resources and travel time as a reason for not having a usual source of care.[6] A weak or nonexistent public transportation system can compound travel distance concerns, especially for the rural elderly and poor who may need assistance in reaching a provider.[40]

The average travel time to their source of care is quite similar for urban and rural residents—17 minutes versus 19 minutes, respectively.[6] Differences in travel distances, however, can be more pronounced as only 7 percent of urban dwellers travel 13 to 50 miles to their source of care, while 24 percent of rural residents travel this distance. The distance to receive emergency care is similar to the distance to doctors.[70]

Geographic distribution of medical resources appears to combine with minority status in limiting access to health care. Minorities living in rural areas with larger proportions of minority populations may experience greater geographic barriers to care. In a study of geographic access to physicians and hospitals of African Americans in nine Southern states and of Hispanics in six Western states, such barriers are noted. Pathman and colleagues focus on physician-population ratios and distance to hospital measures in rural town-areas in these states. They find that town-areas in the West with higher Hispanic concentrations have relative lower access to physicians and to hospitals. They find, too, that African Americans in the South in town-areas with higher African-American concentrations have lower access to hospitals.[70]

While one study of African Americans in the South attributes lack of receipt of preventive services to low incomes,[72] another study identifies a number of barriers to preventive health services for low-income African Americans in the South: inability to pay, perception of need, service availability, accessibility of services, and the perception of racism.[73] (See the Access to Insurance chapter for further information on this topic.)

Minority physicians are more likely than others to serve minority populations, and African Americans and Hispanics may tend to seek care from physicians of their race/ethnicity because of personal preference

and language.[17] This may not translate, however, into a minority physician preference to practice in rural areas. The National Health Service Corps (NHSC) awards scholarships to underrepresented minorities to increase the numbers of minority physicians in certain areas. One study reveals that NHSC physicians are well matched by race to their practice sites, and minority physicians practice in areas with a larger minority population. Minority physicians in rural areas, however, are usually not from rural areas and prefer to practice in urban locations once their National Health Services Corps obligations to serve in an underserved area are fulfilled.[74]

Although studies find that minority health professionals are more likely to serve areas with relatively larger proportions of racial and ethnic minority groups, this may not translate into minority patients making more frequent use of physicians representing the same minority group. A national study finds that African Americans reflect lower continuity of care if their regular physician is an African American or Hispanic American rather than white. The same study finds that Hispanic Americans record lower continuity of care if their regular physician is Hispanic American instead of white or African American.[75]

Finally, lack of health insurance coverage contributes to underutilization of health services. Uninsured people under the age of 65 are 2.6 times less likely to have a usual source of care than people who have public or private insurance.[8] In 1996, 23 percent of rural residents under the age of 65 were uninsured compared to only 18 percent in urban areas.[6] Lack of insurance or underinsurance are problems facing many rural residents. (See the Access to Insurance chapter for more information regarding access to insurance.)

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Recruitment and Retention of Primary Care Physicians

Projections of the future supply of family physicians suggest that with factors such as the decline in medical student interest in primary care residencies and the increased percentage of graduates in such residencies who are women, a decline in primary care physicians in rural areas and nationwide can be anticipated after 2010.[76] The national resident placement program in 2001 reflects four straight years of decline in the number of family practice residency positions, in the number of such residency positions filled, and greater decline in the number of such positions filled by U.S. medical school graduates.[77] More modest declines in residency placement are noted in several other primary care-related residency programs.[77]

Reviews of numerous studies reveal that primary care physicians who were raised in rural areas are more likely to practice in rural areas.[24, 79]

Reviews of numerous studies reveal that primary care physicians who were raised in rural areas are more likely to practice in rural areas.[24, 78] One study finds that greater than 50 percent of rural female physicians were raised in a town with less than 25,000 people.[10] Several recruitment factors, especially family lifestyle factors, serve to differentiate between female and male physicians in their rural practice location choice. Among over 100 generalist physician respondents who were recruited to towns of 10,000 or less in six states in the Northwest, recruitment conditions such as flexible scheduling, spouse opportunities, availability of child care, and family leave opportunities were significantly more likely to be rated as very important by female physicians.[25]

A recent analysis of several studies concludes that rural curricula and rural rotations in the medical school experience appear to contribute to physician choice of rural practice.[78] One study of rural primary care practice and retention over a 15 year time period from 1978-1993 finds that participation of Thomas Jefferson Medical College (Philadelphia) graduates in that College's Physician Shortage Area Program (PSAP), receipt of a National Health Service Corps scholarship, male gender, and participating in an elective senior family practice rural preceptorship are predictive factors for rural primary care practice. Participation in PSAP demonstrates the strongest predictive power. For those not participating in PSAP, growing up in rural areas and having freshman plans for family practice, were important predictors of graduates to become rural primary care physicians and to remain in such practice.[79]

A recent analysis of several studies concludes that rural curricula and rural rotations in the medical school experience appear to contribute to physician choice of rural practice.[79]

Retention of rural physicians is arguably a greater challenge than recruitment.[6] Relief coverage and sociocultural integration are the two most important factors in rural physician retention, according to an eastern Kentucky survey. Sociocultural integration includes acceptance by the community, recreational opportunities, spouse's happiness, family ties to the area, and a religious support system. Other factors include quality of local schools, availability of quality housing, and availability of practice partners.[80]

The development of rural community-focused attitudes and activities by physicians, too, are recognized as important elements in retention of rural physicians.[81-83] Although medical school curricula can be modified to better address a number of these issues, such things as rural residencies and rural interdisciplinary training programs can involve medical students and residents in community-focused activities early in their professional work.[84]

Female and Minority Representation

There are a number of reasons, too, why female physicians do not choose to practice in rural areas. Reasons associated with family and social issues include rural-magnified challenges such as balancing work and family, maternity leave, and job opportunity for spouse or partner. Professional reasons include such matters as work overload, lack of female colleagues, fewer opportunities for advanced training, and acceptance by the community.[10]

The low supply of minority physicians in rural areas is no doubt related, in part, to the relatively smaller number of underrepresented minorities (URMs) who are enrolled in medical colleges and who are applicants to American medical colleges. The number of URMs enrolled in American medical colleges peaked in 1994, remained steady in 1995, and decreased by 5 percent in 1996. The enrollment of URMs has declined steadily from 1996 through 2001.[26, 27] The decline is attributed in large part to reductions occurring at public medical schools and in states directly affected by 1996 court and referenda decisions on affirmative action.[26-28]

URMs among the applicant pool have leveled off, as well. From 1974 to 1988, the number of URMs increased from 7 percent to 10.5 percent of the total applicant pool, but then increased only to 10.9 percent of the pool in 1999. Asian/Pacific Islanders are the major force in the expansion of the applicant pool increasing from 12 percent in 1988 to 20 percent in 1999. White applicants dropped from 71 percent of the pool in 1988 to 61 percent in 1999. Moreover, women constitute two-thirds of all African-American applicants, while all women constitute 45 percent of the total applicant pool in 1999.[85]

Non-Physician Primary Care Providers

Access to non-physician primary care providers is limited in some instances by scope of practice

regulations that vary from state to state, some national and state-specific reimbursement constraints, and by competition from urban areas for limited numbers of providers.[29] NPPCPs practicing in rural, or in more remote rural settings, experience more autonomy or independence than those in other settings. Apart from their reliance upon regular supervision by physicians, rural PAs tend to have more independence from physicians than their urban counterparts as demonstrated, for example, by being located in a separate facility than their supervising physician and serving as the principal provider for larger proportions of their patients than is true for urban PAs.[30-32] Although such conditions may be attractive to some NPPCPs, it is possible that it may be offset by greater monetary benefits and professional support found in larger, urban facilities.[29]

Causes of ACSCs Success or Failure in Rural Areas

Several state studies examine factors that appear to be associated with ambulatory care sensitive conditions. There is unanimity in finding low income to be strongly associated with ACSCs, moderate support for greater prevalence of ACSCs among non-whites, and mixed support regarding the impact of access to primary care physicians upon ACSCs. In South Carolina, avoidable hospitalizations associated with ACSCs are more frequent among rural residents, nonwhites, low-income residents, those without a primary care physician, and those without insurance or with public insurance instead of private insurance.[33] In Utah, ACSC hospitalization rates were higher in rural regions as compared to urban and were positively associated with county level poverty rates.[34] Finally, a New York study relies on separate analyses for three groups of counties: downstate metropolitan, upstate metropolitan, and relatively more rural counties. Within all three groups, poverty is the strongest predictor of ACSC hospitalizations; lower population density and, surprisingly, number of physicians per 1,000 population are associated with prevalence of ACSC hospitalizations. County percentage of African Americans is associated with ACSCs in two metropolitan county groups but not in the more rural group of counties.[35]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

In addition to the following information, a number of more detailed treatments of rural physician training, recruitment, and retention issues and programs are available elsewhere.[36, 86-88]

- Important to many rural areas is Title VII of the Public Health Services Act (1963) that aims to provide generalist physicians to serve in medically underserved areas. The Act provides incentives for new medical graduates to practice in Health Professional Shortage Areas for a period of years. A study of Title VII funded programs concludes that these new medical graduates are vital to the elimination of health professional shortage areas.[89]
- The J-1 Visa Waiver Program allows international medical graduates (IMGs) to remain in the United States if they practice in certain rural or underserved areas. The number of J-1 visas increased from 70 in 1990 to 1,374 in 1995. IMGs are expected to help with the physician maldistribution problem by taking the physician jobs that Americans do not want, such as in some rural and underserved areas. There have been disagreements about the extent to which this program is addressing the primary care needs of rural areas.[44] At the same time, however, the fact that this program does not restrict waiver recipients to primary care practice enables J-1 waiver physician recruitment into specialties that are necessary to rural hospitals but often in short supply—specialties such as general surgery, radiology, and anesthesiology.[54]
- Loan repayment programs assist in repaying the loans of graduates who return to certain rural and underserved areas. They are similar to the National Health Service Corps scholarships since they provide an incentive for physicians to locate in rural areas, but they are different from NHSC programs since loan repayment programs require

a commitment only upon completion of residency training rather than admission to medical school. Nearly one-half of medical students in a recent survey indicate that they are more likely to return to their home states if a loan repayment program is in place for service in certain rural or underserved areas. Studies also suggest that a relationship exists between training in a rural area and returning to similar practice sites.[90] States are placing greater emphasis on developing more desirable practice environments for health professionals in rural underserved areas and have begun examining their scholarship and loan programs, as well. The scholarships and loans have been restructured to be more responsive to the needs of the underserved areas. In addition, stronger penalties are being enforced for non-compliance in several states, but greater stress is currently being placed on enhancing incentives for practice in undersupplied areas rather than on creation of penalties.[5]

- Tennessee's Health Access Incentive Fund and its Health Access Community Initiative are examples of some creative avenues a few states are taking to increase the supply of physicians in rural and underserved areas. The former provides practice incentive grants to qualified providers, and the latter, a new program, provides funds for local underserved areas to initiate physician recruitment efforts.[91, 92] The Tennessee Department of Health and its Office of Rural Health help identify the needs of communities in the state; a recruitment and retention committee helps identify practitioners who can meet the primary care needs of underserved communities. Financial incentives for primary care physicians can be as much as $75,000. By January 1, 1996, 124 primary care physicians and 32 mid-level practitioners had been granted support from the incentive program, and 69 counties have been helped by the services of 156 providers since 1989.[91]
- Accredited family practice rural training tracks, established in 29 of the nation's 474 family medicine residency programs, are successful in placing graduates in rural settings. According to a 1999 survey of these programs, they have experienced a 76 percent rural placement rate overall and an 88 percent rate in programs implemented during the 10-year period preceding the survey.[93] Interdisciplinary rural health training programs are employed both to meet local health needs of minority and disadvantaged rural populations and to promote rural recruitment of physicians and other health professionals. Such interdisciplinary training programs can involve medical students and residents in rural community-focused activities early in their professional work[84] in ways that contribute to physicians' attitudinal and behavioral connections to rural communities.
- Community Health Centers have been successful in meeting a number of rural health needs, serving large numbers of poor and minority patients, and offering a number of preventive and primary care services that can reduce avoidable hospitalizations. The centers demonstrate higher rates of cancer screening and lower rates of preventable hospitalizations among Medicaid patients they treat in comparison to those treated elsewhere.[94] Also, the centers meet or exceed most standards for treatment of diabetes, asthma, and other conditions via their chronic disease management efforts.[94, 95]
- Disease management initiatives are reaching a number of rural settings. Over 200 Community Health Centers, including a number from rural areas, have participated in the Bureau of Primary Health Care-sponsored Health Disparity Collaboratives for asthma, cardiovascular disease, depression, and/or diabetes to better manage these diseases to avoid, delay, or decrease the complications.[66] Similarly, the Center for Medicare and Medicaid Services is currently supporting an evaluation in 15 health systems, including several rural systems, of the use of care coordination approaches to better manage a number of diseases such as diabetes, asthma, and congestive heart failure that are associated with avoidable hospitalizations.[96]

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Access to primary care is vital to the achievement of Healthy People 2010's goal of improving access to high quality health services. The objective of maintaining a regular source of care is exceptionally difficult to achieve in rural America given the shortage of not only primary care physicians but also non-physician primary care providers, specialists, female physicians, and minority physicians. Given the higher proportion of elderly and poor in rural areas—two populations often requiring more health care—the consequences of provider shortages are significant.

Practice conditions and personal considerations may lead some physicians away from practice in rural areas. At the same time, there is evidence that those who are from rural areas and/or who have trained in rural areas are more likely than others to pursue rural practice. Although physician assistants and nurse practitioners are somewhat more likely than physicians to pursue positions in rural areas, the opportunities in rural practice, e.g., greater practice autonomy, may be offset by more attractive practice opportunities and salaries in urban settings.

Despite these challenges, viable solutions may exist through training programs with a rural focus for health provider students, loan repayment programs, recruitment of rural students—especially underrepresented minorities for medical school, and continued recruitment and retention efforts directed toward non-physician providers. The desirability of larger numbers of women enrolled in medical schools and in the medical profession needs to be followed by greater efforts to recruit medical students from rural areas and to recruit and retain more female and minority physicians in rural practice.

Finally, increased efforts are needed to reduce avoidable hospitalizations in rural areas and especially among poor and minority groups. Increasing the number of rural providers and their adoption of best practices in addressing ambulatory care sensitive conditions such as diabetes and asthma are important factors in reducing avoidable hospitalizations and improving the health status of the rural population.

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ACCESS TO QUALITY HEALTH SERVICES IN RURAL AREAS—EMERGENCY MEDICAL SERVICES: A LITERATURE REVIEW

by Cortney Rawlinson and Paul Crews

SCOPE OF PROBLEM

- Access to emergency medical services was identified as a major rural health concern among state offices of rural health.[31]
- Emergency medical services are a major factor in assuring "access to health care," one of the 10 "leading health indicators" selected through a process led by an interagency workgroup within the U.S. Department of Health and Human Services.[32]

GOALS AND OBJECTIVES

One Healthy People 2010 goal is to improve access to comprehensive, high-quality health care services.[1] Emergency medical services (EMS) is the umbrella term for a continuum of health services including pre-hospital medical services, emergency services provided at the hospital or health center, and the trauma system that often serves as the network of coordinated trauma care. These services are often the gateway to health care for a large number of individuals.

The following Healthy People 2010[1] objectives are among those addressed in the discussion of emergency medical services.

- 1-10. Reduce the proportion of persons who delay or have difficulty in getting emergency medical care.
- 1-11. Increase the proportion of persons who have access to rapidly responding pre-hospital emergency medical services.
- 1-13. Increase the number of Tribes, States, and the District of Columbia with trauma care systems that maximize survival and functional outcomes of trauma patients and help prevent injuries from occurring.
- 1-14. Increase the number of States and the District of Columbia that have implemented guidelines for pre-hospital and hospital pediatric care.

Specifically, these objectives address the pre-hospital emergency services and trauma system components of the emergency medical services system. Of particular concern in Healthy People 2010 objectives relating to EMS is the ability of the trauma system to respond to the needs of pediatric patients.

Pertinent to this discussion are the following terms:

- *Pre-hospital Services* is defined as a network of first responders serving as a vital extension of emergency care from the community to the hospital emergency room (ER). This service is further defined as that service from the initial 911 call to arrival at the hospital emergency department.
- *First Responders* is defined as the network composed of individuals providing emergency medical care as the patient's first point of contact after injury or emergency illness. These include, but are not limited to, volunteers, emergency medical technicians (EMTs), and paramedics.
- *Emergency Medical Services* is defined as the personnel, vehicles, equipment, and facilities used to deliver medical care to those with an unpredicted immediate need outside a hospital and continued care once in an emergency facility.[33]
- *Tertiary Level Services* is defined as services including, but not limited to, trauma, pediatric, neuro- and cardio-surgery, and services provided by state-designated trauma centers.[34]
- *Trauma* is defined as a physical or psychological wound or injury, resulting from external forces.[35]

- *Trauma System* is defined as an organized and coordinated effort in a defined geographic area to deliver the full spectrum of care to injured patients.[1]

There is a wide disparity in the delivery of emergency medical services between rural and urban areas. This disparity is attributable to factors such as availability of professional and paraprofessional service providers, geographic barriers, and resource constraints. Such factors pose challenges for the provision of adequate care and treatment to patients from first response through initial stabilization and subsequent emergency treatment.[6]

In rural areas, trauma patients who have a greater likelihood of needing advanced life support care are less likely to receive it.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

In a preliminary survey of state and national rural experts conducted by Rural Healthy People 2010 (RHP2010), emergency medical response was frequently named specifically as a major rural health problem. According to a subsequent, more expansive RHP2010 survey, access to quality health services (which includes access to emergency medical services) rated as the top ranking rural health priority. Approximately three-quarters of the respondents named access as a priority.[2] It was the most often selected priority among all four types of state and local rural health respondents in the survey and across all four geographic areas. Nine out of 10 leaders of state health organizations nominated access as a priority, while about two-thirds of the public health agencies, rural health clinics, or hospitals did the same—a statistically significant difference among the groups. No significant differences across regions appeared, as access nominations appeared uniformly high across four geographic regions of the country.[36]

PREVALENCE AND DISPARITIES IN RURAL AREAS

Pre-hospital Services

EMS is the vital extension of emergency care from the community to the hospital emergency room. Rural EMS is provided through of a variety of service delivery components and methods across the United States (e.g., non-transporting volunteer first responder organizations, volunteer ambulance corps, or county ground and air ambulance services). In rural areas where paid city or county services are not in place, the EMS task may fall upon volunteer community members who are trained and organized to provide such services.[4] An estimated 90 percent of emergency medical service personnel in rural frontier areas are volunteers.[4]

Injuries in rural areas occur as frequently or less frequently than in urban areas. However, many of the injuries sustained in rural areas are greater in severity and may be of different types than in an urban setting.[4] Because many rural areas rely only on basic EMTs, trauma patients who have a greater likelihood of needing advanced life support care are less likely to receive it. Low call volumes and longer transport times result in less frequent in-the-field use of potentially life-saving interventions such as artificial airways and intravenous fluids.[3, 17] The frequent and effective utilization of such procedures can be instrumental in saving the lives of many patients.

Though only one-third of all motor vehicle accidents occur in rural areas, two-thirds of the deaths attributed to these accidents occur on rural roads[7]—a situation suggesting the critical importance of minimizing the length of time from call to arrival on the accident scene.[37] This discrepancy may be due to a number of factors, such as higher speeds and different types of vehicles driven in these areas.[38]

Many rural communities are faced with a host of challenges in the delivery of adequate emergency medical services, including:

- a high reliance on increasingly hard-to-find volunteer staff;[4]
- inadequate financial resources;[6]
- aging or inadequate equipment;
- difficulty maintaining skills due to the low call volume;[3]
- lack of training opportunities close to home; lack of proper medical direction, particularly from individuals trained in emergency medicine; and
- gaps in telecommunications.[39]

Emergency Medical Services (Hospital)

Hospital emergency departments in rural areas encounter many challenges. These difficulties affect those involved in the operation of the facilities and those who require the use of them, as well.

ER staffing difficulties are a significant challenge in rural areas. Many of the ER directors are not specialists in emergency medicine, and for those who are specialized, the low volume of patients is not conducive to maintaining those skills.[4, 8] Providing 24-hour ER staff coverage is also a problem, creating a reliance on nurses' availability until the physician arrives.[9] Financial constraints in a low-population community make it difficult for many facilities to maintain tertiary-level services.[4] Rural ERs often use contract physicians in the form of local primary care physicians, or temporary or traveling physicians-for-hire.[23, 40]

Trauma System

Trauma systems primarily function as a statewide or regional triage system, connecting multiple health-care components in an effort to ensure timely response and transport times of injured patients to facilities that can provide an appropriate level of treatment.[10] Within such systems, hospitals are designated as a specific level of trauma center, ranging from I through V, with Level I being the highest. Level I centers provide a full range of services along with research and medical education. Level II centers also provide a full range of services but do not have the research and the education components. A general surgeon, and orthopedic, neurosurgical, and emergency services specialists must be available to be on call 24 hours a day, seven days a week at a Level III center. A surgeon must be available for emergency services for a Level IV center. A Level V center is a clinic staffed by non-physicians.[41]

Statewide trauma systems have been shown to reduce preventable trauma deaths in urban areas from 21 percent to 30 percent of deaths to less than 5 percent.[42] Similar effects of such systems on rural areas are now being discovered.[11] A study comparing transfer practices before and after statewide trauma system implementation found that a greater number of rural patients were redistributed to a higher-level trauma hospital with greater resources after implementation.[43] However, a comparison of mortality rates of those patients severely injured in rural areas in Vermont before and after trauma system implementation revealed no significant improvement.[44] Nonetheless, when the processes of care delivered to patients for both pre- and post-system implementation were compared in Level III and IV centers, significant improvement was found.[45]

Pediatrics and Trauma Care

Children account for 25 percent of injury victims, approximately 10 percent of emergency response transports, and one-third of emergency department visits.[12, 13] A rural Wisconsin study reports that falls, recreational activities, and motor vehicle crashes account for over one-half of all pediatric injuries.[14] A California pediatric injury study found that traumatic injury was the most frequent reason for calling EMS in rural areas, accounting for 64 percent of the calls made. Medical problems accounted for the remaining 36 percent.[13] Rural areas appear to have a greater number of pediatric calls due to neck and back injuries than urban areas. For children under the age of two, medical problems were the reason for the majority of the calls in both areas. For those age two through 18 in urban areas and six through 18 in rural areas, vehicular injury was the most common reason for calls made to EMS.[13]

A number of care limitations for rural children were noted in the same California study. For both rural and urban areas, infants and young children were less likely to receive advanced life support (ALS) procedures than older victims. Vital signs were measured less frequently, while drugs, IVs, defibrillation or intubation were used in only approximately 12 percent of the calls. The most frequent procedures used, such as spinal immobilization and the use of an oxygen mask, are those that can be performed by a basic life support (BLS) provider.[13]

IMPACT OF THE CONDITION ON MORTALITY

Pre-hospital Services

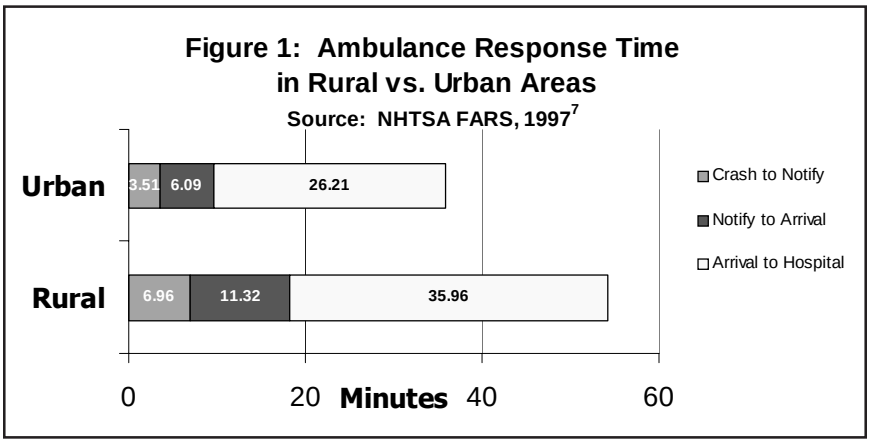
Death and serious injury accidents account for 60 percent of total rural accidents versus only 48 percent of urban.[17] A 1987 study also revealed that vehicle-crash mortality was inversely related to population density.[46] One reason for this increased rate of morbidity and mortality is that in rural areas, prolonged delays can occur between a crash, the call for EMS, and the arrival of an EMS provider. Many of these delays are related to increased travel distances in rural areas and personnel distribution across the response area. National average response times from motor vehicle accident to EMS arrival in rural areas was 18 minutes, or eight minutes greater than in urban areas.[18]

The time elapsed from the initial call until the treatment of the patient in the hospital may be critical to survival. The 'golden hour' refers to the critical first hour from incident to hospital treatment during which, if treatment is received, the patient's likelihood of survival is greatly increased.[16] Thus, delayed and prolonged response times in rural areas may contribute to additional mortalities.

The National Highway Transportation Administration's (NHTSA) Federal Accident Reporting Systems (FARS) collects motor vehicle accident reports that can be used as a measure of the impact of the condition or problem on mortality. Disparities are evident in the rural and urban average response times to fatal motor vehicle collisions.[7] A significant difference of 98 percent (3.45 minutes) exists in rural areas compared to urban areas between the time of accident occurrence and the initial notification of emergency response services, as outlined below in Figure 1.

Figure 1: Ambulance Response Time in Rural vs. Urban Areas

Source: NHTSA FARS, 1997[7]



In a study of five counties in Washington State, the mean response times for EMS to urban and rural incidents were 7.0 and 13.6, respectively. Urban victims had a response time of less than 10 minutes 84 percent of the time, compared to only 43 percent of rural victims experiencing such a short response time.[17] For those victims in rural areas, death risks were seven times higher if the EMS response time was longer than 30 minutes. After the initial response, transport times also were longer for rural areas at 17.2 minutes on average, versus 8.2 minutes in urban areas.[17] Unfortunately, because of the greater distances involved, such longer response times may be unavoidable in rural areas.

Emergency Medical Services (Hospital)

The relationship between the rural ER and mortality is complex. Among the determining factors are severity of injury or illness, time between acute event and arrival, level of ER staff expertise, and availability of equipment, drugs, and procedures.

The majority of deaths occurring from incidents in rural areas appear to occur at the scene rather than in the admitting hospital. In a five-year study by Trevillyan and associates,[15] 72 percent of trauma deaths in a rural Arkansas county occurred at the scene, re-emphasizing the critical nature of the first hour following the actual incident. Eighteen percent of the deaths occurred after arrival to the hospital, with one-half being attributed to thoracic trauma. One of the reasons behind the low "in-hospital" death total for this particular hospital is that 49 percent of those patients who had sustained major injuries were referred to other higher-level trauma centers.

The majority of deaths occurring from incidents in rural areas appear to occur at the scene rather than in the admitting hospital.

Trauma System

The effect of trauma systems on mortality rates in rural areas has yet to be clearly determined. Many studies have been performed comparing those patients who were stabilized in an outlying hospital before being transferred to a higher-level facility to those who were directly admitted to the latter facility. One such study by Rogers, et al.[44] found no difference in the mortality rates between those two types of patients.

Several other studies show indirect support for the advantages of trauma system implementation. Two separate studies by West[19, 20] show a reduction from 15 preventable deaths out of 21 before trauma system implementation, to six out of 29, with four of those six deaths having not received trauma system care following implementation. A comparable reduction is seen in another study's results reporting a drop from 20 preventable deaths out of 58, to nine out of 60, with seven of those nine not receiving trauma system care.[42] Another study attributes its rural hospital's low "in-hospital" trauma death rate to low minimum criteria for transporting patients to higher-level trauma centers.[15]

There is also evidence supporting negative consequences with the transportation of patients to other facilities after stabilization. Excluding patients who died in the first 24 hours, one study found an increased incidence of unexpected death in transferred patients. Seventy-five percent of those in the transferred group experienced an "unexpected" death following that time period as opposed to only 21 percent of those directly admitted.[21] Overall, 62 percent of the deaths in the transferred group had probabilities of survival greater than 50 percent as opposed to only 22 percent in the direct group, demonstrating an increased incidence of unexpected death in those having been transferred.

Pediatrics and Trauma Care

Unintentional injuries are the most frequent cause of death for children and adolescents one to 14 years old nationwide, with motor vehicle crashes and drowning being the top two categories.[47] In a study of Vermont and New York City, pediatric trauma death rates were twice as high in the rural area as in the urban area. Of the child trauma deaths in Vermont, 87 percent of children died before accessing adequate trauma care.[48]

Mortality rates have also been compared between pediatric and non-pediatric trauma centers. Trauma centers in Pennsylvania were categorized as urban pediatric, urban non-pediatric, or rural non-pediatric. The centers specifically designed for pediatrics received more pedestrian injuries and falls, while rural non-pediatric centers received more motor vehicle passengers. Death rates were the greatest for these rural non-pediatric centers, at 6.2 percent. Both pediatric and non-pediatric centers in urban areas had similar death rates yet were significantly lower than their rural counterparts.[12]

According to the same Pennsylvania-focused study, the youngest age group (zero to four years) experienced the highest mortality rates among all of the pediatric patients. For all of the pediatric patients, gunshot wounds were the leading cause of

death, contributing to 22.2 percent of the deaths, followed by pedestrian injuries at 8.6 percent, and motor vehicle accidents with 8.5 percent. Pedestrian injuries were the most common cause of death in the rural centers at 15 percent.[12]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Pre-hospital Services

First responders in rural areas face many challenges in providing adequate and timely service to each surrounding area. Providers of these services are often volunteers who have received only the most basic of training. Depending on the specific location, anywhere from 57 to 90 percent are completely staffed by volunteers.[3, 4] Heavy reliance upon volunteers results in a delay in response times to the accidents since they must often report to their unit before actually traveling to the scene.[17] This contributes to longer response times and, therefore, a greater potential for higher mortality rates.

Lack of funding for expensive, state-of-the-art equipment is also a major factor. Of the non-paramedic level services in Wisconsin, approximately 84 percent operate without a defibrillator. With each defibrillator costing anywhere from $3,000 to $5,000, the likelihood of a small rural organization being able to afford one is small.[3] Even with defibrillator usage, however, one study found increased survival rates for patients in ventricular fibrillation to be seen only in those communities with greater than 15,000 people. For these communities, greater resources are likely to be available, allowing for a more comprehensive and efficient emergency care structure to be in place. This, in addition to the use of a defibrillator, are the key factors believed to result in the benefits being seen in larger communities.[22]

Emergency Medical Services (Hospital)

Physician recruitment and retention are two major problems rural hospitals face. General and family practitioners are frequently relied upon to provide hospital-based emergency care in rural areas, while many are not adequately trained or certified to do so. Training programs are typically established in urban areas, attracting the majority of graduates to larger communities. A variety of factors result in this unequal distribution. Rural areas tend to lack access to the most current technology, higher trauma-level hospital facilities, collegial support, regular work hours, and competitive salaries and benefits.[6]

Many rural hospitals rely on emergency department contracting to provide adequate services to their communities. However, this carries a great cost. Nearly two-thirds of the reporting rural hospitals in one study report contracting for at least some of their emergency room coverage.[40] This is consistent with a previous study reporting that 86 percent of rural hospitals in Washington state contract for emergency department coverage, with 59 percent being obtained from non-local physicians.[23] This study also reports a typical cost for the hospital at $100 per patient visit. This is a heavy financial burden for a rural emergency department that might receive only eight emergency patients per day at most.[23]

Physician recruitment and retention are two major problems rural hospitals face.

Trauma System

As mentioned previously, inadequacies of trauma systems in rural areas can be attributed to factors like those affecting rural EMS. Logistical difficulties, longer transport distances, economic hardships of practicing medicine in a small town, the lack of sophisticated emergency-care delivery systems and the critical nature of managing common, blunt-trauma injuries all make creating an effective system for rural areas difficult. In relation to the funds received for the treatment of diseases such as cancer, cardiovascular disease, and blood-borne illnesses, trauma care is also severely under-funded.[5]

Pediatrics and Trauma Care

A number of state studies have compared rural/urban differences in the availability of pre-hospital care services to pediatric patients. In a Kentucky study, although rural areas experience higher traumatic pediatric death rates, those areas that provide 24-hour emergency care and/or the availability of ALS pre-hospital care record significantly lower rates.[28] This finding is significant given 71 percent of urban areas provide ALS, compared to only 61 percent of rural.[29] A North Carolina study reports an association between increased ALS usage and decreased pediatric mortality rates.[49] These studies all suggest that with increased training for those individuals providing pre-hospital care, pediatric trauma outcomes can be improved.

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Pre-hospital Services

The Rural Hospital Flexibility Program (RHFP), passed in 1997 as part of the Balanced Budget Act, is intended to provide financial relief to America's smallest and most vulnerable rural hospitals. While one paragraph of the legislation enables states to establish Critical Access Hospitals (CAHs) and improve rural health networks, a second, parallel paragraph permits states to use RHFP funds to improve their rural EMS systems.[50]

Geographic information systems (GIS) can be utilized in a number of ways in an effort to improve pre-hospital services in rural areas. One study analyzed GIS use to determine preferred mode of ground versus air transport, depending on the location of the accident. Patients in 'air zones' transported by helicopter arrived 13 minutes sooner than those traveling by ground. Likewise, those patients located in the 'ground zones' arrived 36 minutes sooner when transported by ambulance.[24] GIS can also assist in 911 dispatching. It is currently being used in Raleigh County, West Virginia, in locating the caller's position. As a call is received, the GIS screen determines the quickest route.[25] Thus, the use of GIS may decrease response time and time for arrival at the hospital, the two longest segments of emergency response shown in Figure 1, and in doing so may increase survival.

Emergency Medical Services (Hospital)

For in-hospital emergency care, telemedicine offers rural facilities the opportunity to take advantage of the skills and knowledge of those in other locations. Various forms of telemedicine are available for use including telephone calls, radio, and faxes. The use of computers allows for new interactive technology in several ways. The 'store and forward' method allows for video and audio clips to be sent through e-mail, and 'real time' telemedicine allows for the interaction between the patients and those treating them with others at other facilities.[51]

It is often not practical to keep an experienced surgeon on site 24 hours a day, seven days a week in a rural emergency department. However, with telemedicine, access to a surgeon is possible. A team approach is typically used in trauma, leaving the leader, or surgeon, to direct the activities of the other members rather than having hands-on contact.[26] One system takes advantage of this approach, along with the technology, by allowing the trauma surgeon to observe the treatment of a particular patient from his/her own home. Two cameras are set up in the trauma room, one at eye level and one mounted on the ceiling, for the surgeon to switch between at his discretion. Microphones mounted on the ceiling allow the surgeon to hear everything that is going on in the room as well. Results from a study using this system report that over 80 percent of referring providers believed that the telemedicine consults improved patient care, with over one-half believing that the consult could not have been performed over the phone.[26] A similar technology could provide access to specialized surgeons in urban locations for assistance with emergency operations in rural areas.

Another form of telemedicine allows an emergency nurse to examine a patient with the telemedicine workstation while the physician watches remotely. The workstation includes a document reader, a digital stethoscope, otoscope, and dermascope. The

patient's breathing and heart sounds can be monitored, and the tympanic membrane and pharynx can be seen along with skin lesions. No patients from the experimental group required additional care or a diagnosis change in one study using this approach. Overall, both patients and physicians had a positive opinion of their experience.[51]

This innovation does not come without drawbacks, namely cost. The equipment used to allow the trauma surgeon to observe the trauma treatment costs approximately $10,000 in addition to hiring technical support personnel and telecommunication costs. Insurance, licensure, and credentialing issues also are important points to consider.[26] Barriers aside, telemedicine may provide an option for low-staffed rural hospitals to take advantage of qualified emergency physicians in other locations along with potentially improving patient treatment times during high-volume periods.[51]

Trauma System

The U.S Trauma Care Systems Planning and Development Act, P.I. 101-590 enacted in November 1990, among other aspects, allows for the provision of grants for rural EMS. These grants are intended to result in the improvement of quality and availability of EMS and trauma care to rural areas.[52]

Trauma systems, when implemented in rural areas, should incorporate other services in addition to making tertiary care available at Level I or II trauma centers. Trauma prevention must be promoted; pre-hospital providers must have adequate mobilization provided for, and small hospitals must provide adequate stabilization and treatment along with or in lieu of transferring patients.[27] A sense of shared responsibility among all participants of the referring and accepting institutions can be achieved through a rural trauma coalition. And finally, referral patterns should be bi-directional. Those patients who could be more appropriately cared for in a smaller facility should be allowed to do so. Cooperation at each of these levels can help achieve a goal of having the Level I and II centers contribute to the development of the Level III centers.[27]

Pediatrics and Trauma Care

Implementing a statewide surveillance system is one suggestion by some to help in providing effective and efficient emergency medical services to children. This system would incorporate morbidity data from pre-hospital, emergency department, and hospital levels. Comparisons of injury severity among different environments could then be made, which would allow for the identification of preventable deaths and injury rate data.[28] By identifying area-specific injury patterns, prevention programs can be developed that focus on those injuries for which a particular area is at a higher risk.

It is also suggested that initiatives be taken to educate pre-hospital providers in care required for pediatric patients. Proper procedures for assessment and stabilization should be taught to both advanced and basic life support providers.[29] Area pediatricians can assist in this by sharing their expertise with their area EMS providers. Remaining aware of how their local EMS system functions, pediatricians can provide additional training and education for EMS providers that can be most beneficial for the population they serve.[30]

COMMUNITY MODELS KNOWN TO WORK

In Georgia, some counties are using regionalization of EMS systems through the consolidation of two or more systems to pool resources as a method to provide more comprehensive coverage of a larger geographic area.[50]

In Texas, attempts are underway to increase the state's EMS capacity through emergency medical technician education. Though not funded by the state legislature, this program aims to utilize distance education technologies to provide training in the rural communities.

Other states, as well as Texas, are promoting training through local training scholarships through which communities contract with an individual volunteer for their services in the local EMS system.[50]

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Access to rural emergency medical services encompasses several elements, including pre-hospital care, emergency room care, trauma systems, and pediatric care. Through close interaction, these elements constitute emergency medical care as a whole, but they must be analyzed individually for the entire system to be understood. Each component possesses its own unique challenges and issues, and it is only by taking all aspects of the problem into account that progress will be made.

Addressing the special situations and needs of rural emergency care in legislation, policy, and funding may help to eliminate some of the rural-urban disparities. However, given that some sources of these disparities, such as large geographic distances and low population density, are by their very nature, intrinsic to rurality and unmodifiable, it may never be possible to completely eliminate the rural-urban disparities in EMS.

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CANCER IN RURAL AMERICA: A LITERATURE REVIEW

by Annie Gosschalk and Susan Carozza

SCOPE OF PROBLEM

- Cancer was the second leading cause of death in 1999.[36]
- Cancer is virtually tied with psychoses as the fourth most frequently first-listed diagnoses for hospital discharges nationally.[37]

GOALS AND OBJECTIVES

While positive strides have been taken to stabilize cancer incidence and reduce related mortality,[27] it remains second only to heart disease as a leading cause of death in the United States.[1] The direct and indirect costs in terms of premature death, disability, lost years of productivity, and medical expenditures, make cancer a significant public health concern[2] to all population groups regardless of age, gender, race, or geographic region, although certain populations are more at risk than others.[3-5]

Understanding the breadth and depth of the impact of cancer on the U.S. population is multi-faceted. It should be noted the United States does not currently have a nationwide cancer registry;[26] however, cancer data are collected through the National Program of Cancer Registries and the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) registry program.[38] For the many cancer types, there is variation in incidence, staging, and mortality among subpopulations by race/ethnicity, age, gender, and geographic region. This variability among subgroups makes drawing a concise picture of the scope of the disease complex.

Data indicate that certain populations, including the elderly and African Americans, are clearly at increased risk for cancer-related morbidity and mortality. Over one-half of first cancer diagnoses occur among those 65 and older.[39] Because of population growth and the aging of America, the number of cancer cases is projected to double by the middle of this century.[27] There is also considerable variability in incidence and mortality rates by gender and race. For total cancers, African-American males have the highest cancer incidence, followed by white males, white females, and African-American females. Mortality data by race is consistent with incidence data, with the exception of total cancer mortality, which is higher among African-American females than white women.[26]

There appears to be little difference in the incidence and mortality rates of rural and urban populations, with the exception of cancer staging. There is evidence to suggest rural populations are diagnosed at a more advanced stage of cancer.[4, 5, 10, 14, 15, 17] This finding raises questions regarding availability and utilization of preventive, screening, and diagnostic services in rural areas as well as the existence of unique social and behavioral barriers.

There appears to be little difference in the incidence and mortality rates of rural and urban populations, with the exception of cancer staging.[4, 5, 10, 14, 15, 17]

Combating cancer is expressed in the Healthy People 2010 cancer goal—to reduce the number of new cancer cases as well as the illness, disability, and death caused by cancer.[8] The objectives addressed in this review are as follows:

- 3-1. Reduce the overall cancer death rate.
- 3-11. Increase the proportion of women who receive a Pap test.
- 3-12. Increase the number of adults who receive colorectal cancer screening.

- 3-13 Increase the proportion of women aged 40 years and older who received a mammogram within the preceding two years.
- 3-14 Increase the number of states that have statewide population-based cancer registries.
- 3-15 Increase the proportion of cancer survivors who are living five years or longer after diagnosis.

Objectives 3.2 through 3.8 address mortality for specific cancer sites (e.g. lung, breast, cervix); however, these objectives will not be addressed individually primarily for a lack of appropriate mortality data.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, cancer tied with the focus area of nutrition and overweight for 10th and 11th ranks among the Healthy People 2010 focus areas that were rated as rural health priorities; it was nominated by an average of 22 percent of the four groups of state and local rural health leaders.[6] Cancer was most frequently rated as a priority by rural hospitals and least often by state agency respondents in comparison to local public health offices and rural health centers and clinics; this is a statistically significant difference. There were no significant differences in cancer nominations across the four regions of the country.[7]

Rural areas report a higher prevalence of chronic diseases, including heart disease and cancer.[9, 10]

PREVALENCE AND DISPARITIES IN RURAL AREAS

Cancer is defined as an amassing and proliferation of cells[2] and is the result of internal and/or external causal factors (chemicals, radiation, viruses, and health behaviors such as tobacco use). Among men, the most common cancers (in order of incidence) are prostate, lung and bronchus, and colon and rectum. For women, breast cancer, followed by lung and bronchus, and colon and rectum are the leading cancer types (in order of incidence). African-American males have higher prostate cancer incidence and mortality than white men. While white women have the highest incidence of breast cancer among all racial and ethnic groups, African-American women are more likely to die of breast cancer and colon cancer. Of all cancer types for men and women, lung and bronchus cancer are the leading causes of cancer death.[26]

Only limited data are available to assess cancer incidence, cancer prevention behaviors, and cancer-related mortality within rural populations. Cancer registry data, both at state and national levels, are not presented by metropolitan areas versus nonmetropolitan areas or, when presented by urban/rural residence, data are not presented by individual cancer sites. In addition, when these data are available, the definition of rural is not consistent. Some discrepancies may also be attributed to the unique demographics of communities where these studies were conducted.[4]

What is known is that rural areas report a higher prevalence of chronic diseases,[9, 10] including heart disease and cancer—a finding that has been attributed, in part, to a population that is older, poorer, and less educated.[11] The disproportionate prevalence of chronic disease is reflected in higher crude all-causes mortality rates reported for rural areas.[3, 10] However, adjusting the data for age, race, and sex distributions effectively eliminates any rural disadvantage.[10] According to Monroe,[10] the majority of data available indicate there are no differences between rural and urban populations with regard to cancer incidence and mortality, but a number of studies find cancer incidence increases with population density,[10] which is a characteristic of relatively more urban settings.

Nonetheless, notable exceptions exist among select rural subpopulations in incidence and mortality. One such area is the Appalachian region—a population representing 8.3 percent of the total U.S. population.[12] The death rate in rural Appalachia

(176.3/100,000) for all cancers is higher than all of Appalachia (173.1/100,000), and it is significantly higher than the national cancer death rate (166.7/100,000). This population may be at heightened risk due to behavioral factors such as increased prevalence of tobacco use as well as socioeconomic factors.[12] Skin and lip cancer mortality rates are higher in rural areas[10] and may be attributed to increased sun exposure of rural residents, particularly among farmers.[13] Results from a National Health Interview study[35] found farmers to be at risk occupationally and recreationally for skin cancer; however, this same group is reluctant to perceive risks associated with skin exposure and to change these risk factors.

Disparities exist between rural and urban populations in the stage of disease at first diagnosis. Cancer staging refers to the degree of tumor extension and growth at first diagnosis.[10] Early staging is considered an indicator of quality medical care and improves outcomes for many cancer types.[10] Conversely, delayed diagnosis (unstaged or late stage) can result in poorer outcomes.[4] Given the importance of staging, a number of state-level studies have analyzed the relationship between rurality (Note: the definition of rural is not consistent among studies) and tumor staging and found rural residents to be at risk for late-stage diagnosis.

Disparities exist between rural and urban populations in the stage of disease at first diagnosis.

In a Mississippi study, rural residents and particularly African-American women were shown to be diagnosed at a later stage of the disease compared to urban residents.[5] This study also found higher proportions of rural cancer cases were unstaged at diagnosis. In fact, rural African-American women were found to be one and half times more likely not to have their cancer staged than urban African-American women.[5] A breast cancer study in Florida revealed African-American women residing in remote rural areas were diagnosed at a much later stage than rural white women and urban white and African-American women.[4] In an Illinois study, rural breast cancer cases were less likely to have staged tumors, and patients had significantly less access to state-of-the-art technology.[17] In a study by Liff,[14] it was found that rural Georgia residents in 10 rural counties were twice as likely to have unstaged cancers as Atlanta residents. A Texas study revealed similar findings, with a larger proportion of cancers diagnosed at the premalignant stage for urban residents.[15] These findings suggest that rural cancer patients may be disadvantaged when compared to their urban counterparts.[4, 10, 16-18]

Among the reasons suggested for this disparity is that rural areas have a disproportionately high percentage of high-risk groups. Rural residents, who are typically older,[19] less educated, and poorer, have less access to or utilization of early cancer detection programs[20, 21] than their urban counterparts. In addition, rural people regularly experience variation in the quality, availability, and accessibility of services when evaluated against their urban counterparts.[4] Limited access to quality medical care facilities, and particularly cancer prevention programs,[4] may negatively affect health outcomes for cancer patients. As Amey[4] notes, the situation for rural residents is compounded by "fewer physician visits a year, underutilization of community-based health resources, and entrance into the health-care delivery system later and sicker than urban residents." In summary, while rural populations apparently experience lower overall cancer incidence, the prognosis for rural cancer patients is poorer.[10]

The role of insurance and socioeconomic status may also play a role in cancer screening, diagnosis, staging, and treatment. In a North Carolina study of men with prostate cancer, later disease stage at diagnosis was associated with income and health status for African-American men.[22] Silverstein,[21] in analyzing data from the Savannah River Region Information System Cancer Registry, found an association between residence in an area with a high Medicaid population to be associated with an advanced stage of esophageal cancer. A statewide

Michigan study[23] also found that the low income groups (defined as receiving Medicaid) had a disproportionately large share of cancer as well. A Florida statewide study also found those insured by Medicaid and the uninsured were at a greater risk of late-stage diagnosis.[24]

IMPACT OF THE CONDITION ON MORTALITY

According to the Centers for Disease Control, in 2002, 1,284,900 new cases were expected to be diagnosed, and more than 555,600 people were expected to die from cancer.[1, 25] The number of new cases does not include a projected 1.3 million cases of basal and squamous cell carcinoma of the skin.[26] Cancer mortality overall for all age groups has decreased during the period 1993 to 1999 for men and women, while incidence has stabilized in the period 1995-1999.[27]

Because of the comparatively later stage at diagnosis, outcomes for rural populations may be poorer.[4, 10, 17] Rural residents who are also older, represent minority populations, or are low income use fewer screening services, which contributes to poorer survival rates.[28] Research has also documented that physicians are less likely to suggest screening of older and minority women.[33, 40] Data from the 1997 Behavioral Risk Factor Surveillance System[20] found rural residents were less likely to obtain certain cancer-screening services according to the timeline established by national standards. Individuals with low income, low education, and no insurance were found to significantly underutilize screening services, such as mammography and Pap smears.[41]

IMPACT OF THE CONDITION ON MORBIDITY

In 1999, there were an estimated 8.9 million people alive with a history of cancer.[25] The probability of a person recently diagnosed with cancer being alive in five years is 59 percent.[26] However, this number represents an average for *all sites*. Five year survival rates vary considerably depending on cancer type. For instance, the five year survival for the most common forms of cancer are as follows: prostate cancer, 92 percent; breast cancer, 85 percent; colon cancer, 62 percent; and lung cancer, 14 percent.[26] The survival rates underscore the need for early staging and treatment.

Beyond the tremendous personal toll exacted by cancer on individuals and families, the costs in terms of medical expenditures and lost years of life and productivity are staggering. The National Institute of Health estimates that $180.1 billion was spent in 2000 on direct and indirect cancer-related costs. This figure includes $60 million in direct medical expenditures plus $120 million in indirect costs of lost productivity years due to morbidity and premature mortality.[2]

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

The treatment of cancer can contribute to other health problems, but cancer itself has not been proven to be a precursor to other diseases.

BARRIERS

As with the limited data on individual cancers in rural areas, there is also limited information on attitudes, social support, and other related behavioral characteristics present within rural populations with respect to cancer. However, a variety of uniquely rural attitudes and barriers may impact the stage of diagnosis. Attitudes such as fatalism,[42] fear of the stigma associated with cancer, and denial of presenting symptoms may all contribute to delayed screening and thus diagnosis.[31]

Beyond attitudinal barriers that may impact the stage of diagnosis, a number of other barriers, such as access to services and limited resources, also contribute to all phases of cancer in rural populations. Such factors previously identified are enumerated below:

- poor access to health care services, including specialists;[4, 5, 10, 16]
- limited geographic access to new, effective therapies and technologies;[5, 10, 16]
- sub-optimal care for cancer patients;[16]

- minimal transportation options for either cancer screening or treatment;[16, 30]
- low participation in health promotion programs;[5, 30]
- limited knowledge of cancer, particularly the importance of early detection through regular screening;[31, 32]
- low education levels;[10, 31] and
- prohibitive cost of cancer screening and treatment.[20, 30, 31, 33]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

A number of behavioral and social factors have been identified as related to an increased risk of a variety of cancers. Smoking, excessive alcohol use, other modifiable behaviors associated with cancer risks,[29] and limited knowledge of cancer and the importance of early detection and regular screening are often addressed through health education efforts to raise awareness and change behavior. Social factors, such as living in poverty and having limited education, are far more difficult to address but often are more significant in terms of contributing to the risk of cancer. Factors in both categories are outlined below.

The following behavioral factors have been identified as being related to an increased risk for cancer:

- cigarette smoking;[2, 43]
- heavy use of alcohol;[2, 43]
- poor diet and nutrition, including a high-fat and/or low-fiber diet, as well as low intake of fruits and vegetables,[2] often resulting in obesity;
- physical inactivity;[2, 30, 43] and
- sexual behavior and sexually transmitted infections.[2]

The following social factors have been identified as being related to an increased risk for cancer:

- low income, poverty, low socioeconomic status;[16, 28, 44]
- race;[26]
- low education level;[10]
- knowledge levels regarding cancer risks and need for screening;[31, 32]
- residence in rural areas;[4]
- older age;[3, 39]
- personal or family history of cancer;[2] and
- excessive exposure to ionizing radiation, industrial substances, and certain chemicals.[2]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

The failure to distribute cancer prevention and treatment to rural populations creates a major obstacle in the national effort to diminish cancer mortality.[16] Medicare has been mandated by federal legislation to cover certain screening processes such as Pap smears and mammograms as well as improvements in quality standards of testing.[28] Certain intervention efforts, such as directing federal funds to states to expand screening programs at the state level and promoting behavioral research,[41] may help reduce avoidable morbidity and mortality from cancer. Yet, the availability of screening measures does not immediately guarantee their correct use.[28]

Solutions or interventions are intimately tied to access to health care resources. Many of the solutions most often advanced in the literature are dependent on access to primary care and clinical preventive services. Solutions most frequently articulated and potentially feasible in rural settings are listed below.

- Provide cancer education within the community, particularly emphasizing the importance of early detection through regular cancer screening.[31, 34]
- Encourage primary care providers to comply with the current screening regimen within each area of

cancer, making use of simple screening devices that possibly already exist in their practice.[34]

- Encourage the use of sun block, hats, and staying inside or in the shade during peak sun hours.[2, 13, 31, 35]

- Develop and sponsor smoking cessation programs within the community.[2]

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Mortality rates for various cancers vary by demographic attributes including age, race, sex, and residence, creating a diverse pattern of cancer survival not reflected in mortality rates. The clear conclusion to be made from the literature and data reviewed is that rural residents demonstrate a lesser adjusted rate of cancer than urban residents; this comparative advantage, however, may be offset by higher deaths of rural residents diagnosed at later stages of disease. Even though the adjusted incidence rate of cancer is lower in rural areas than in urban, the factors related to barriers to care increase the likelihood of negative outcomes.

Despite positive strides in reducing cancer incidence and mortality, the prevalence of cancer is expected to increase as the population ages. While urban and rural America are both faced with meeting the health care needs of an aging population, the impact may be especially challenging for rural areas with a disproportionate number of elderly in combination with limited resources. Ultimately, combating cancer requires a multi-dimensional approach aimed at improving access to health services, including the imperative need for early cancer screening and detection, and improving patient knowledge regarding modifiable risk factors.

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DIABETES IN RURAL AREAS: A LITERATURE REVIEW

by Betty Dabney and Annie Gosschalk

SCOPE OF PROBLEM

- Diabetes mellitus was the sixth ranking leading cause of death in 1999.[78]
- Diabetes is an "ambulatory-care-sensitive" condition.[77]

GOALS AND OBJECTIVES

America is in the midst of a diabetes epidemic. The number of diagnosed cases has increased nearly 10-fold over the past 40 years and has nearly doubled in the past 10 years.[31, 41, 79] Approximately 17 million Americans—6 percent of the population—are diabetic, with perhaps one-third of the cases being undiagnosed.[1-3] Furthermore, a newly recognized condition called "pre-diabetes" affects another estimated 16 million Americans.[2, 3]

Approximately 17 million Americans—6 percent of the population—are diabetic, with perhaps one-third of the cases being undiagnosed.[1-3]

Diabetes imposes a costly burden on the American health care system. Total direct and indirect costs due to diabetes rose from an estimated $98 billion per year in 1997 to $132 billion in 2002.[2, 80, 137] This translates to an annual health care cost of $13,243 for each person with diabetes, compared to $2,560 for non-diabetics, for 2002.[137]

The Healthy People 2010 goal relating to diabetes is as follows:

> Through prevention programs, reduce the disease and economic burden of diabetes, and improve the quality of life for all persons who have or are at risk for diabetes.[5]

For the purposes of this literature review, the following Healthy People 2010 objectives will be addressed:

- 5-1. Increase the proportion of persons with diabetes who receive formal diabetes education.
- 5-2. Prevent new cases of diabetes.
- 5-3. Reduce the overall rate of diabetes that is clinically diagnosed.
- 5-4. Increase the proportion of adults with diabetes whose condition has been diagnosed.
- 5-5. Reduce the diabetes death rate.
- 5-6. Reduce diabetes-related deaths among persons with diabetes.
- 5-7. Reduce deaths from cardiovascular disease in persons with diabetes.

Pertinent to the discussion of diabetes are the following terms:

- *Diabetes*, more properly called diabetes mellitus, is actually a group of diseases involving the inability to produce or use insulin, and resulting in elevated plasma glucose (blood sugar) levels.[1, 25]
- *Type 1*, juvenile or insulin-dependent diabetes, involves the inability to produce insulin from the outset. It generally has an early age of onset, is probably irreversible, and accounts for 5-10 percent of all cases.
- *Type 2*, adult-onset or non-insulin dependent diabetes, is 90-95 percent of all cases. Type 2 diabetes begins with insulin resistance and high insulin levels years before diagnosis.[81] Type 2 is generally later onset, but it is becoming much more common in children.[82-85]
- *Gestational diabetes* occurs in 2-5 percent of all pregnancies in the U.S. This form of diabetes is

not necessarily permanent, but it can predispose both mother and child to type 2 diabetes.[40]

- *Other diabetes* refers here to less common forms induced by certain drugs, trauma, surgery, infections, heritable conditions, chemicals, or environmental contaminants.[55, 56, 86]

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, diabetes was identified as the third highest ranking rural health concern.[6] In this nationwide survey of state and local rural health leaders, diabetes was ranked third among the most frequently nominated rural health priorities, after access and heart disease and stroke. There was substantial agreement on the rural priority status of diabetes relative to all other Healthy People 2010 functional areas. Diabetes ranked second, third, and fourth, respectively, among leaders of rural community health centers and clinics, rural hospitals, and state health leaders; it ranked 12th among local public health agencies—a statistically significant difference among the respondent groups. Diabetes was among the top five priorities in all four geographic regions. The South, more than the other three regions, rated diabetes as a priority—the second ranked rural priority in the South. The difference across the regions fell just short of statistical significance.[7]

> Diabetes was identified as the third highest ranking rural health concern.[6]

PREVALENCE AND DISPARITIES IN RURAL AREAS

Diabetes (including gestational diabetes) prevalence increased in individual states between 1990 and 1998. In 1990, only four states had an overall prevalence of diabetes greater than 6 percent. By 1997-98, 22 states had a prevalence of at least 6 percent, and all but two states had at least a 4 percent prevalence.[49]

Diabetes impacts every area of society. It occurs across all racial/ethnic and socioeconomic groups, but it is two to five times more common in African Americans, Hispanics, Native Americans, Pacific Islanders, and Asians.[8-12] Compared with non-Hispanic whites, these groups also have an increased risk for developing complications, for hospitalization, and for death from diabetes.[31] Diabetes risk also increases with age.[31] Minority group populations are increasing at faster rates than the white population in America, and society is aging. Based on census projections of sociodemographic changes in the U.S. population, the prevalence of diabetes is expected to increase nearly two fold by 2050.[4]

> The prevalence of diabetes also varies by urbanicity and degree of rurality.

The prevalence of diabetes also varies by urbanicity and degree of rurality. In 1995, the self-reported 3.6 percent prevalence of diabetes in non-metropolitan statistical areas (MSAs) of the U.S. was higher than in central cities (3.19 percent) and all MSAs (3.24 percent).[13] These figures are undoubtedly underestimates because of the recent upsurge in cases nationwide and the large number of undiagnosed cases.[87]

The prevalence of diabetes may vary significantly in different rural regions of the country. It is generally more common in the Southeast and Southwest.[12, 14-16] Rates are also very high in Hawaii and Puerto Rico, and somewhat higher in Alaska.[21, 88, 89] Regional differences may reflect racial/ethnic, socioeconomic, age, and lifestyle factors.

An important rural population group is migrant farm workers. Estimates on their total number have ranged from 750,000 to 5 million. Migrant workers are often not counted in national health surveys because of their transient employment and location, and no national prevalence data are available.[90] Nevertheless, in two published studies on migrant health clinics, diabetes rose in rank from the sixth

most frequent diagnosis or reason for physician visits in 1980 to first place in 1986-1987.[17, 18]

The issue of rural-urban disparities for diabetes is quite complex; however, the prevalence appears to be higher in developed rural areas and lower in undeveloped ones.[19-21] As the differences between rural and urban lifestyles disappear, higher rural prevalences may reflect differences in socioeconomic, racial/ethnic, or age status, more so than rurality *per se*. Rural residents from undeveloped areas typically develop diabetes at higher rates after moving to cities.[91]

As the differences between rural and urban lifestyles disappear, rural-urban disparities may reflect socioeconomic or racial/ethnic differences. This was true for Hawaii; only 3 percent of the geographic variation in diabetes prevalence was due to rural residence, and 35 percent was explained by differences in racial/ethnic proportions.[92]

IMPACT OF THE CONDITION ON MORTALITY

Diabetes was the sixth leading cause of death in the U.S. for the year 2000, accounting for a preliminary 68,662 deaths in 2000.[23] Death rates for diabetics are two times higher than for non-diabetics, and higher for both genders and for all ages and races.[24] Diabetics are two to four times more likely to die from heart disease; those with pre-diabetes are twice as likely to die from heart disease.[3, 25] Diabetes is the leading cause of deaths from kidney disease.[26]

In the Harvard Nurses Study, women with type 2 diabetes at enrollment were over three times more likely to die than those without diabetes during the 20-year follow-up period. The risk of death from all causes associated with pre-existing diabetes and coronary heart disease (CHD) was additive. Diabetes elevated the risk of dying from CHD nearly 7½ fold over the 20-year period, and the presence of both conditions at the outset elevated the risk of dying from CHD nearly 18 fold.[93]

If one also considers deaths from diabetes as an underlying cause, the toll is much higher. In 2000, deaths from complications of diabetes—heart disease, cerebrovascular disease, diabetes, infections, kidney disease, and hypertension—totaled 1,098,857, or 45.7 percent of the total deaths in the U.S.[23] Diabetes may not be a factor in all these deaths but could be involved in most of them, for it is severely under-reported as an underlying cause of death.[24] Once these considerations are taken into account, diabetes is undoubtedly a major killer of Americans.

Death rates from diabetes are not uniform throughout the country, and regional differences in mortality from diabetes can be highly significant. Highest age-adjusted diabetes mortality rates are generally in the Southeast and Southwest.[27] Racial/ethnic differences account for much larger differences in mortality from diabetes in the U.S. than rural-urban differences.[28, 29]

IMPACT OF THE CONDITION ON MORBIDITY

From the latest estimates of 17 million diabetics and 16 million with pre-diabetes,[1-3] diabetes affects 11.5 percent of the 287 million Americans. This does not include the unknown but substantial number of persons in earlier stages of the disease. Over 760,000 people were diagnosed with diabetes each year during the 1990s.[31] The risk of type 2 diabetes increases with age for the first seven decades, and it is slightly more common in women.[4, 31] It is not uncommon for 25-50 percent of elderly people in the high-risk racial/ethnic groups to be diabetic.

Once it develops, diabetes is a chronic, lifelong disease with no cure and rather ineffective, costly treatment. According to the National Hospital Discharge Survey, diabetes is the sixth leading cause of hospitalization in the U.S. for men at least 45 years old, and it is seventh overall for women of comparable ages.[30] In 1996, diabetes was listed as a discharge diagnosis in 3.8 million cases.[31]

Hospitalizations are only a small part of the total picture of morbidity from diabetes, however. There were 64 million office visits to physicians and 1.2 million emergency room visits made by diabetics in 1996.[31] In 1997, total work-loss days from diabetes totaled 14 million; disability days were nearly 88

million, and 74,927 workers with diabetes were permanently disabled.[80]

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

Diabetes itself is only part of the picture of morbidity and mortality in diabetics. Diabetes has serious complications that affect the direct cost of health care and also indirect costs such as days lost from work, premature death, and quality of life. Many of these complications are chronic, life-long conditions requiring intensive, ongoing, and expensive treatment. The duration of the disease is a major factor for development of complications.[36-38]

Virtually every system in the body can develop complications from diabetes:[25, 26, 32-35]

- cardiovascular disease;
- abnormal blood lipid profiles;
- hypertension;
- stroke;
- blindness;
- end-stage renal disease requiring kidney dialysis or transplants;
- impotence;
- peripheral neuropathy (numbness or pain in the extremities);
- gangrene and amputation of lower limbs;
- periodontal disease;
- more frequent infections, including pneumonia and influenza; and
- psychological effects—depression, social stigma, and discrimination.

Gestational diabetes is a major risk to both mother and infant[1, 25, 39, 40] and is associated with the following conditions and outcomes:

- pre-eclampsia (life-threatening high blood pressure) in pregnant women,
- complications of pregnancy,
- macrosomia (large birth weight),
- neonatal complications,
- infant mortality,
- birth defects, and
- increased risk for developing type 2 diabetes in mother and child.

It is not unusual for some diabetics to have more than one serious complication.[94] However, many of the complications of diabetes can be prevented.[25]

BARRIERS

In the face of a steadily increasing prevalence of diabetes, the American health care system has failed to prevent, detect, and manage diabetes adequately.[31, 57, 58] This is especially true in rural and low-income areas.[59-61] Rural diabetics on Medicare are less likely to visit a physician than their urban counterparts, and fewer of them have insurance coverage for medications.[57, 62-64] Rural residents tend to rely on home health care in lieu of office visits.[64] Diabetes was the sixth leading cause of death in the U.S. for the year 2000, accounting for a preliminary 68,662 deaths in 2000.[23] Death rates for diabetics are two times higher than for non-diabetics, and higher for both genders and for all ages and races.[24] Diabetics are two to four times more likely to die from heart disease; those with pre-diabetes are twice as likely to die from heart disease.[3, 25] Diabetes is the leading cause of deaths from kidney disease.[26] Rural residence is a significant risk factor for never receiving an ophthalmic examination,[65] which can detect early signs of diabetic retinopathy. When rural residents do see a doctor, they are more likely to see a generalist than a specialist for treatment of diabetes.[62] Rural patients with a history of

Rural diabetics on Medicare are less likely to visit a physician than their urban counterparts.[57, 62-64]

gestational diabetes are at high risk for developing type 2 diabetes, yet only 30 percent have adequate follow-up by their physicians.[95]

Irrespective of location, diagnosis often comes too late to prevent development of irreversible complications, sometimes more than 10 years after onset of the disease.[50] Rushed physicians who see more patients are much less likely to order recommended screening tests to detect early stages of diabetes complications.[96]

Quality of care for diabetes among Medicare beneficiaries, measured by frequency of receiving core medical tests, is actually better in large rural communities than in all other locations, including urban ones, but it is worst in remote rural areas.[62] One study finds that among diabetics on Medicare, significantly fewer rural diabetics than urban ones receive adequate posthospital home health care.[66]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Demographic, Socioeconomic, Lifestyle, and Environmental Factors

There are several explanations for the dramatic increase in diabetes. The risk of type 2 diabetes increases with age, and the American population is getting steadily older. Yet only 30 percent of the increased prevalence in diabetes is due to aging of the population.[79]

Diabetes, like other chronic diseases, is associated with lower socioeconomic status (SES).[46-49] It is also more common in people exposed to certain environmental chemicals—notably arsenic, dioxins, trichloroethylene, and benzene.[54-56] Exposures to other environmental toxicants may be important but have not been fully investigated. Environmentally induced diabetes may be closely linked with socioeconomic status, because people in the lower SES strata tend to have higher exposures to environmental contaminants.[97]

Type 2 diabetes is closely linked with obesity, and its rise parallels the steadily increasing girth in the American population.[41] The typical American diet, laden with fat and sugars, along with a sedentary lifestyle, are major factors contributing to the increase in obesity and diabetes. This relationship between lifestyle and diabetes is dramatically illustrated in various immigrant groups, who typically develop diabetes as they become Americanized.[98-101] Obesity and lack of leisure activity are more common in rural than in urban areas.[30]

The quality of one's diet, as well as its quantity, also contributes to the risk of developing type 2 diabetes. While the total contribution of carbohydrates to the typical American diet is very much the same as it was in 1900, the consumption of simple sugars, mainly in the form of soft drinks, has risen dramatically since that time to over 19 ounces per day per person.[102] Consumption of dairy products protects against the development of insulin resistance syndrome, a precursor of type 2 diabetes.[103] This may be because people who are drinking more milk consume less soft drinks.

Overall, the best efforts in public health have not been effective in reducing high-risk behaviors in Americans. There has been no improvement in food preferences or physical inactivity, according to the CDC's Behavioral Risk Factor Surveillance System.[49]

Racial/Ethnic and Genetic Factors, and Pathophysiology

As previously mentioned, type 2 diabetes occurs more frequently in minority groups, those of lower socioeconomic status, and women.[9, 11, 12] The rural-urban disparity may be much higher for African Americans; in 1994, prevalence rates were 5.34 percent for non-MSA residents versus 3.61 percent in MSAs—a 48 percent difference.[22]

Type 2 diabetes clearly has a genetic component, for it tends to occur in families. There is a high concordance between identical twins.[42, 43] Having a family history is a clearly established risk factor.[44, 45]

Type 2 diabetes develops slowly over a period of many years before the blood sugar becomes elevated. Early signs include high serum insulin levels, low blood sugar after a large meal, a peculiar pigmentation pattern of the skin called acanthosis nigricans, and modest elevations of fasting blood sugar.[104-107] Some of these signs are already evident in at-risk children.[108]

The exact cause in individual cases of type 1 diabetes is often unclear; stress, trauma, infection, and genetics may all play a role.[1, 25] Gestational diabetes is associated with excessive weight gain during pregnancy, but it is undoubtedly due to underlying predisposing conditions.[109] Drug or chemically induced diabetes can sometimes, but not always, be traced to a specific exposure.

Clinical Diagnosis

Unfortunately, many people in the pre-clinical stages of diabetes have not been diagnosed.[2, 3] By the time blood glucose becomes elevated to the clinical definition of diabetes, irreversible complications may have already taken place.[50-52] Thus, the clinical diagnosis based on elevated blood glucose may be too late to prevent reversible changes.

However, several important risk factors for type 2 diabetes can be easily identified years before the development of the disease, and these should be incorporated into routine surveillance of at-risk populations. Among these are obesity; sedentary lifestyle; android ("apple") body type, characterized by a high waist-to-hip ratio; age; family history of diabetes; giving birth to a macrosomic infant (weighing more than nine pounds); and a peculiar pigmentation pattern of the skin called acanthosis nigricans (AN).[44, 45, 104, 110, 111]

Possibly less well known, AN is probably the most visible indicator for the layman. It appears as dark, thick, velvety patches on the back of the neck, armpits, elbows and knuckles, knees, and groin. For reasons not fully understood, the presence of AN correlates with high blood insulin levels, a precursor of type 2 diabetes, even more so than obesity.[53] AN is often mistaken for dirt, and mothers may fuss at their children for not washing properly. It has been seen in children as young as four years of age.[108] As with diabetes itself, persons of color are more likely to develop AN.[112, 113]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Regardless of the type of diabetes, the risks of morbidity, mortality, and complications are related to the degree of control of blood sugar levels.[67, 70] Unfortunately, such control is not maintained in many diabetics, especially as they get older. Traditional treatments of diet, exercise, oral pharmaceuticals, and insulin therapy tend to be progressively more ineffective with duration of the disease.[114]

Psychosocial factors such as social impact and complexity of the diet regimen, along with age, history of smoking, and presence of renal disease, may be more important in determining survival than traditional clinical measures.[115] These considerations are important to take into account when planning effective prevention, interventions, and treatments for diabetes.

The solutions to controlling the epidemic of diabetes are not high-tech. Because diabetes cannot be cured or adequately treated by present methods, the Diabetes Prevention Program Research Group has recommended **prevention** as the preferable approach.[67]

There are three types of prevention, each staged to the development of diabetes:

- *Primary prevention* refers to delay or prevention of the onset of the disease in those at risk. Early stages of type 2 diabetes can be reversed by exercise and modest weight loss.[68, 69] Onset of type 2 diabetes can be prevented or delayed by similar means.[67] Methods of preventing type 1 and gestational diabetes are not well understood. Chemical- or drug-induced diabetes can be prevented by avoiding or minimizing exposure to the diabetogenic agent. There is much

controversy about gestational diabetes, especially as to whether or not universal screening of all pregnancies prevents adverse outcomes.[109]

- *Secondary prevention* means prevention complications in those already diagnosed with diabetes. Complications can be prevented or delayed by effective control of blood glucose.[70-72]
- *Tertiary prevention* aims at preventing worsening of complications once they have developed. Up to 90 percent of diabetes-related blindness can be prevented with appropriate screening and regular eye care, including annual fundoscopic (dilated) eye examinations.[26] Over half of diabetics' lower limb amputations are preventable with patient education and care.[25, 26]

All types of prevention have a place in management of diabetes from a medical and public health perspective, but primary prevention is ultimately the most cost effective and the most desirable from an ethical standpoint. The latest HHS recommendations are aimed at intervention at the pre-diabetes stage.[2, 3]

Based on strict review of published studies, the HHS Task Force on Community Preventive Services has recommended four types of interventions for reducing morbidity and mortality from diabetes. These are case and disease management by health care providers, community-based self-management education programs for adults with type 2 diabetes, and home-based programs for children and adolescents with type 1.[73]

Successful treatment of diabetes is complex. It involves patient education and monitoring of nutrition, exercise, motivation, and lifestyle, which physicians as a rule are not trained to provide. It also requires a large component of self-management, which is likely to be more successful if the provider-patient relationship and level of patient satisfaction are positive.

The American health care system, based on a model of providing acute care, has not been especially effective in the treatment and management of diabetes and other chronic diseases. A new model for diabetes care is needed, one that takes all these elements into account and is based on a chronic rather than acute disease model.[75, 76]

An intriguing new model of health care has shown promise for routine maintenance of diabetic patients after diagnosis. Using a "cluster visit" or "shared medical appointment" structure, groups of patients meet periodically with non-physician health professionals such as nurses, psychologists, diabetes educators, and dietitians.[116] The cluster visit model has also been combined with case management in a rural area.[117] This model is attractive in two respects: it may be more cost effective than a typical managed-care setting, and it can be used in rural areas not served by a physician. It could also provide a mechanism for social support in addition to health care.

Most published studies with a community component address only one component of diabetes education, prevention, detection, and care. Some of the more comprehensive programs are found in rural health networks, such as PennCARE. This HCFA (now CMS) coordinated care demonstration project uses a hybrid case and disease management approach.[118]

Early detection of diabetic retinopathy has been successful with mobile eye clinics, Polaroid or digital retinal photography with telemetry for remote diagnosis, and training of primary care physicians or optometrists in using the technologies.[119-125]

On-line access using a customized software program is effective for diabetes education and for providing social support to rural women in remote areas.[126]

The Kentucky Diabetes Control Program is based on a pyrimidal model to train paraprofessional subspecialists through centralized resource centers and regional diabetes teaching teams, as a way of reaching primary care providers and patients cost effectively.[127] This program did not depend on networking of providers, but a non-profit program in Utah conducted by *HealthInsight,* based on combining providers from rural and urban areas for their mutual benefit. The organizers followed up

with attendees to monitor progress toward goals set in the workshop.[128]

Many published diabetes education programs have not been culturally sensitive. One exception is the Texas Rio Grande Valley Diabetes Education Study, which has used Mexican-American diabetes educators and a Spanish-language curriculum at an appropriate educational level. This study used the local county Extension office as a neutral meeting place.[129]

Of 82 published adult diabetes education programs, most of them (51 percent) were conducted at clinics, followed by hospital settings (22 percent). Very few were done in the patient's home (1.2 percent) or in a private physician's office (2.4 percent). These programs were not necessarily based in rural areas, and only 34 out of the 82 programs (41 percent) had follow-up of 24 weeks or longer.[74] However, the question of whether or not diabetes education has any lasting effect on clinical outcomes remains largely unanswered.

Many effective rural diabetes prevention programs can be developed and implemented at the local level in the absence of local health care providers. Exercise may be one of the most important ways to improve diabetes risk factors, even more so than weight loss.[130, 131] Self-reported level of exercise was the only significant predictor of quality of life for diabetics.[132] Rural communities and organizations can sponsor exercise programs, with or without the participation of health care providers.

Parents can work with school administrators to provide healthier meals and snacks in the schools, and to develop alternatives to selling soft drinks and high-fat snacks from vending machines in the school corridors. States can tax soft drinks and fast foods and provide incentives to schools to stop selling them, as seen in legislation introduced in California.[133]

Social service agencies and grocery stores can provide information on nutrition and healthy lifestyles to families using social assistance or food stamps. Pharmacies and grocery stores can distribute information on diabetes risk factors and prevention. The cost of educational materials can be underwritten by companies that market and distribute fresh, whole foods, as well as by the parent grocery and pharmacy companies. Even grocery store checkers can be trained to provide information on preventing diabetes to customers.

In addition to prevention, early detection may be critical for preventing development of complications. Community-based screenings and health fairs may be the most cost effective way to identify persons at risk, based on a simple questionnaire and fasting or random blood glucose values from glucometer readings.[2]

Many pharmacies are located closer to rural markets than physicians and can potentially provide some services traditionally performed by health care providers.[134] With some training, pharmacists could do diabetes education, screening, and routine follow-ups. Diabetes education has been successfully conducted at a rural pharmacy.[135] Pharmacists and grocers could sell individual blood glucose tests. Individuals with a preliminary diagnosis could be referred to health care providers, and those found to be at risk could be provided with literature and on-site counseling or community-based classes on healthy lifestyles.

For those who have been diagnosed with diabetes, regular follow-up is essential. Routine office visits need not be performed by a physician, however.[116, 117] Using existing resources in different ways, rather than restructuring the rural health care system, may be the most effective means to provide better health services to rural diabetics.[134]

COMMUNITY MODELS KNOWN TO WORK

Diabetes is a major public health problem, and successful models for practice reflect the importance given to preventing diabetes and its complications in rural populations. Of the 68 rural awardees in the Models that Work program funded by the Health Resources and Services Administration's Bureau of Primary Health Care, 11 have programs in diabetes education, screening, prevention, or treatment.[136]

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

America is in the midst of an epidemic of diabetes, which, if unchecked, will produce an intolerable burden on our health care system and quality of life over the next generation. The prevalence of diabetes is somewhat higher in rural than in urban areas, but racial/ethnic, socioeconomic, and lifestyle factors appear to be stronger risk factors for diabetes than rural residence *per se*. Rural diabetics tend to be diagnosed later and receive substandard health care compared to their urban counterparts.

However, type 2 diabetes, the predominant form, can largely be prevented by the simple means of modest weight loss, healthy eating, and exercise. The American public health and health care systems have been largely ineffective in dealing with prevention and treatment of diabetes. Rural areas are especially disadvantaged because of the lack of nearby health care providers who are knowledgeable about diabetes and less access to insurance coverage.

New cost-effective approaches need to be developed around a chronic disease model, using the existing health care and public health infrastructure, and based upon preventive and routine patient care clustered at the community level by allied health professionals. These approaches may also be useful in solving the related problems of access to health care and prevention and management of other chronic diseases.

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HEART DISEASE AND STROKE IN RURAL AMERICA: A LITERATURE REVIEW

by Miguel Zuniga, D'Arcie Anderson, and Kristie Alexander

SCOPE OF PROBLEM

- Disease of the heart is the first ranking among the leading causes of death in 1999.[29]
- Stroke is the third ranking leading cause of death in 1999.[29]
- Heart diseases are the most frequently first-listed diagnoses for hospital discharges nationally.[26]
- Heart failure and stroke is the most frequent diagnostic category among hospitalized rural elderly Medicare beneficiaries.[27]
- Congestive heart failure, hypertension, and angina are "ambulatory-care-sensitive" conditions.[28]
- Pacemaker insertion, coronary artery bypass surgery, and coronary angioplasty are "referral-sensitive" conditions.[28]

GOALS AND OBJECTIVES

Approximately 61 million individuals in the United States are afflicted with some form of cardiovascular disease, which includes both heart disease and stroke and contributes to an estimated four of every 10 deaths in the United States.[8] Compounding the problem is the staggering percentage of the population with high cholesterol, hypertension, and obesity—all risk factors for heart disease and stroke.[30] While there has been a 50 percent reduction in coronary heart disease and stroke in the past 30 years,[3] mostly attributable to advances in therapy and technology, disparities among certain subgroups have become more exaggerated.[4] Among these vulnerable subgroups include rural populations,[5, 6] particularly those in the South and Appalachian region.[4]

Given that heart disease and stroke are the first and third leading causes of death in the United States,[1] addressing this health concern is pivotal to improving the nation's health. Specifically, the goal of the Healthy People 2010 heart disease and stroke objective is to "improve cardiovascular health and quality of life through the prevention, detection, and treatment of risk factors; early identification and treatment of heart attacks and strokes; and prevention of recurrent cardiovascular events."[2]

> Heart disease and stroke are the first and third leading causes of death in the United States.[1]

The Healthy People 2010[2] objectives addressed in this section are as follows:

- 12-1. Reduce coronary heart disease deaths.
- 12-3. Increase artery-opening therapy.
- 12-7. Reduce stroke deaths.
- 12-9. Reduce the proportion of adults with high blood pressure.
- 12-12. Increase blood pressure monitoring.
- 12-15. Increase blood cholesterol screening.

The following definitions are pertinent to the discussion of heart disease and stroke:

- *Cardiovascular disease* (CVD), as defined in HP2010, "includes a variety of diseases of the heart and blood vessels, coronary heart disease (coronary artery disease, ischemic heart disease), stroke (brain attack), high blood pressure (hypertension), rheumatic heart disease, congestive heart failure, and peripheral artery disease."[2]
  - *Coronary heart disease* (CHD) occurs when there is a decreased flow of blood to the heart muscle, resulting in damage and/or death of the deoxygenated heart muscle.[2]

- ♦ *Acute myocardial infarction* (AMI, commonly called a "heart attack") "occurs when a coronary artery becomes completely blocked, usually by a blood clot (thrombus), resulting in lack of blood flow to the heart muscle and therefore loss of needed oxygen."[2]

- *Cerebrovascular disease* "affects the blood vessels supplying blood to the brain."[2]
  - ♦ *Stroke* occurs when the brain does not receive an adequate supply of blood due to the rupture of blood vessels or the presence of blood clots.[2] There are two main types of strokes: ischemic (blockage) and hemorrhagic (bleeding). Ischemic strokes are the most common, and account for approximately 88 percent of all strokes.[31]

- *Antithrombolytic therapy* utilizes intravenous medications that dissolve blood clots, possibly reducing damage to the heart and brain during an acute myocardial infarction or a stroke.[32]
- *ACE inhibitors* are medications that enable the lowering of blood pressure by promoting the expansion of blood vessels (vasodilation).[33]
- *Statins* are a family of medications proven effective in lowering serum cholesterol and blood lipid levels. Statins have been shown to reduce the long-term risk of AMIs and strokes.[34]
- *Advanced Cardiac Life Support training* (ACLS training) heightens health care providers' awareness of current developments in the treatment procedures of cardiopulmonary emergencies.[35]
- *Coronary Artery Bypass Grafting* (CABG surgery) increases blood flow from the heart by bypassing the clogged portion of the coronary artery through a surgically implanted vein or artery taken from a different portion of the body.[36]

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, heart disease and stroke ranked second across the four groups of state and local respondents in the frequency of priority nominations received. This focus area was nominated by an average of 41 percent of the respondents.[7] Respondents from rural hospitals and rural health centers and clinics were more likely than respondents from local public health offices or state health organizations to rate this topic area as a high priority. State agency respondents were least likely to rate heart disease and stroke as a priority. The differences in nomination rates were statistically significant. The Midwest and South regions were more likely than the Northeast or West to nominate heart disease and stroke as a rural priority area. The difference across the regions was statistically significant.[37]

PREVALENCE AND DISPARITIES IN RURAL AREAS

Heart disease and stroke are respectively the first and third leading causes of death in the United States[1] and cost the United States almost $298 billion annually.[8] In 1999, cardiovascular disease contributed to one out of every 2.5 deaths, (958,775 individuals).[30] Stroke affects more than 600,000 individuals every year. The associated cost for treatment and rehabilitative services for stroke victims in the United States is an estimated $41 billion annually.[38]

Although heart disease is sometimes considered a disease mostly affecting men, half of all cardiovascular disease deaths occur in women.[8] Women are almost twice as likely to die from heart disease than to die from cancer.[39] According to the Center for Disease Control and Preventions' National Health and Nutrition Examination Survey (NHANES) III (1988-94), during early adulthood, men have higher rates of cardiovascular disease than women, but this difference lessens during later years—equaling each other at the ages of 65-74 and surpassing men at the age of 75 years.[30] The highest rates of heart disease deaths among women occur in Northeastern large urban areas followed by the South's most rural counties.[9] For men, the highest heart disease-related deaths occur in the South's most rural counties.[9] For women and men, the lowest death rates from heart disease occur in the West.[9]

As noted earlier, the incidence of heart disease and stroke has declined significantly over the past three decades;[3] however, the decline has not been uniform across all subgroups. According to 1995 data, the death rate for African-American males from cardiovascular disease is 42 percent higher than white males, and the rate for African-American females is 65 percent higher than white females.[2] Other vulnerable populations to heart disease and stroke include older African Americans,[2] Hispanic Americans,[3] individuals of lower socioeconomic status,[11] and as noted in the preceding, rural populations,[5, 6] particularly those in the South and Appalachian region.[4, 12] This trend, as summarized by Wing,[11] suggests that coronary heart disease has shifted from a disease of the privileged to one of the disadvantaged.

Vulnerable populations to heart disease and stroke include older African Americans,[2] Hispanic Americans,[3] individuals of lower socioeconomic status,[11] and rural populations,[5, 6]

According to self-reported data in the 1996 National Health Interview Survey, heart disease was 1.34 times more prevalent in non-metropolitan statistical areas (non-MSAs) (98.8 per 1,000 individuals) when compared to metropolitan statistical areas (72.6 per 1,000 individuals). Cerebrovascular disease was reportedly 1.45 times higher in non-MSAs than in MSAs (15.1 per 1,000 individuals and 10.4 per 1,000 individuals, respectively). Hypertension was also higher in rural than urban areas (101.3 per 1,000 individuals in MSAs and 128.8 per 1,000 individuals in non-MSAs).[13] Ischemic heart disease, which contributed to over 60 percent of heart disease mortalities in 1998,[40] is nationally higher in rural counties among men 20 years of age and older.[9]

True prevalence data for heart disease and stroke in rural versus urban areas are not readily available. However, differences in mortality data often reflect disparities between rural and urban areas. From 1985–1995, declines in mortality rates for premature coronary heart disease in African Americans and whites were found to be slower in the rural South than their counterparts in other geographic areas. For African-American women and men, the slowest rates of annual decline were in the rural South, with rates of 1.6 percent and 0.7 percent, respectively. The fastest areas for decline of coronary heart disease mortality among African Americans were in less metropolitan areas (counties with fewer than one million people) outside the South, which had declines measuring 3.3 percent for African-American women and 3.9 percent for African-American men.[12]

IMPACT OF THE CONDITION ON MORTALITY

Cardiovascular disease remains the leading cause of death in the United States. In 1999, there were 725,192 heart disease deaths and 167,366 stroke deaths. The age-adjusted death rate for heart disease was 265.9 deaths per 100,000, and for stroke was 61.4 deaths per 100,000.[14]

In recent years there have been numerous medical advances both in therapy and in technology of CVD. Improvements in medicine and Medicare coverage of expensive procedures have contributed to decreased mortality overall. From 1986 to 1998, mortality following an AMI admission declined by one-third—from 24 percent to 16 percent.[41] Nonetheless, disparities of benefits in medical advances in rural areas when compared to urban areas sometimes result in increased mortality.

From 1985-1995, declines in mortality rates for premature coronary heart disease in African Americans and whites were found to be slower in the rural South than their counterparts in other geographic areas.

IMPACT OF THE CONDITION ON MORBIDITY

Heart disease and stroke are leading causes of disability, annually costing the United States an estimated $19 billion and $5.6 billion, respectively.[15] Compared to population norms, quality of life domains represented by physical function, role physical, role emotional, vitality, social functioning, bodily pain, mental health, and general health are lower for people living with coronary heart disease and stroke as compared to population norms.[42, 43]

In 1999, the most common diagnosis for individuals 65 years of age and older was heart disease—comprising 23 percent (4.5 million) of total inpatient discharges, with an average stay of 4.7 days.[26] In recent years, more people have received cardiac procedures. From 1986 to 1998, angioplasty increased from 1.3 to 8.4 individuals per 1,000, and CABGs increased from 2.7 to 4.8 individuals per 1,000.[41]

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

With heart disease and stroke, there is increased likelihood of recurrence and other macrovascular complications.[16] There are a significant number (1 in 40) of AMI patients who suffer from an ischemic stroke within six months of discharge.[16] Individuals over 65, females, blacks, those with frailties, and those with prior medical history of stroke are at increased risk of stroke occurrence after an AMI.[16]

Depression is significantly associated with both heart disease[17] and stroke.[18, 19] Some studies suggest a causal relationship between depression and AMI and stroke,[19] while others report the evidence of depression after other debilitating events[44] and intensive medical treatments, such as CABG surgery.[45] Morris[18] reported in a 10-year follow-up study that individuals diagnosed with depression after suffering a stroke had a mortality rate three times higher than those not diagnosed with depression. In an analysis of several studies, Glassman[17] found a strong association between depression and heightened occurrence of and mortality from cardiovascular disease.

BARRIERS

Rural populations have certain behaviors and attitudes that contribute to their heightened risks of coronary heart disease and stroke. Rate of lifestyle change, individuals' perception of heart disease risk, and attitudes of health care providers may heighten the disparity in heart disease and stroke incidence in rural versus urban areas.

Pearson[5] proposes that rural areas do not adopt changes in behaviors as rapidly as do urban areas. Historically, rural areas have not adopted behaviors such as smoking, high-fat diets, and sedentary lifestyles as readily as urban areas. Similarly, once these coronary heart disease and stroke risk factors are adopted in the rural areas, they are reversed at a slower rate than urban areas. In one study of ischemic heart disease patients in rural West Virginia, 27 percent continued smoking after diagnosis.[46] This delay in lifestyle changes partially explains the initial lower rate of coronary heart disease in rural areas compared to urban areas, and the gradual evolution to higher rates of coronary heart disease in rural areas.[5]

Rural populations have certain behaviors and attitudes that contribute to their heightened risks of coronary heart disease and stroke.

Another possible contributor to the higher rates of coronary heart disease in rural areas is that of socioeconomic status. Lower standards of living and social and economic restrictions, rampant in some rural areas, lead to higher prevalence of coronary heart disease risk factors, such as cigarette smoking, poor dietary habits, and sedentary lifestyles.[47]

Perception of risk may also play a role in the rural/urban disparity for heart disease. Some rural inhabitants do not perceive themselves at risk for heart disease and stroke, and their behaviors are modeled by these misperceptions. Older rural

women reportedly have a decreased perception of heart disease and are less likely to participate in primary prevention efforts, such as screening procedures. This lower perceived risk is exacerbated by the decreased availability of screenings in rural areas.[20]

Attitudes of health care providers toward patients in rural settings can determine the quality of medical care. In a scenario-survey sent to a random selection of family physicians, heart patients with reduced access to services were not as likely to be referred to a cardiologist or to receive a left ventricular function test—two heart failure guidelines. Physicians' treatment methods were affected by the patient's environment.[48]

Beyond social and behavioral barriers, rural residents are faced with access challenges and service gaps in seeking treatment and prevention services. The unique challenges faced by rural residents include the prolonged distance to provision of comprehensive post-discharge care of heart failure[21] and limited access to personnel, screening services (e.g., cholesterol checks), and treatment services for heart disease and stroke. When screening does occur, dietary assessments and other needed follow-up measures are often unavailable.[49] Furthermore, organizations disseminating heart disease and stroke prevention strategies may have only limited activities in rural areas.[5]

Procedures in the treatment of heart disease and stroke are also more limited in rural areas than in urban areas. Availability of technology is a main factor for geographic differences in testing patients for stroke diagnosis.[50] Some physicians in rural areas are averse to treating stroke patients with anticoagulant therapy because of limited experience in administration and monitoring of the drug and fear of drug complications, such as excessive bleeding and/or fatal bleeding.[38] A study of Medicare patients in one state yielded an antithrombolytic therapy utilization rate 1.7 times greater in urban hospitals than in rural hospitals and demonstrated that patients who were prescribed antithrombolytic therapy were less likely to suffer adverse outcomes.[22]

The relationship between volume and outcome has been the subject of numerous studies. According to a meta-analysis study, the relationship between AMI outcome/stroke outcome and volume is somewhat controversial.[51] Thiemann[52] reported that high mortality rates of elderly patients after an AMI are not related to a deficiency in the number of procedures provided at the hospital (i.e., angioplasty, bypass surgery, etc.) or specialty of the attending physician, but are related to a low volume of patients. Another study reports higher mortality rates after angioplasty for AMI patients in rural hospitals than for urban hospitals. However, the post-CABG mortality rates were similar for urban and rural hospitals.[53]

Variations in training may also exist. Disparities in level and frequency of ACLS training may exist when comparing rural and urban health care facilities. Standards of care for cardiac arrest patients are established in ACLS training.[54] Dane,[55] in a study of a tertiary care center, reported that patients requiring resuscitation efforts were almost four times more likely to survive to discharge if attended by an ACLS-trained nurse than if attended by a non-ACLS-trained nurse.

Quality of care relating to heart and stroke treatment has been studied in rural versus urban hospitals. One study found that six quality indicators (QIs) for AMI inpatient care were not as likely to be followed in rural hospitals as in urban hospitals, resulting in a lower quality of care in the rural hospitals. There was a dramatic difference in the level of adherence to the quality indicator of administering of aspirin during a hospital stay to ideal candidates—87.8 percent in urban hospitals, 83.9 percent in semirural hospitals, and 75 percent in rural hospitals.[23] Reduced accessibility to continuing medical education may contribute to the differences in care.[5]

Baker,[24] however, reported that the differences in rural versus urban hospitals did not result from different levels of quality but from access to technology or specialists. Although it is controversial whether outcome success correlates to the number of specialists in an area, one study conducted in the Appalachian region found that nonmetropolitan

counties had a cardiovascular physician-to-patient ratio less than one-third of that found in metropolitan counties.[6]

Finally, it is often the case that rural areas do not offer as many heart and stroke services as do urban areas. In particular, there may be limited access to cardiac rehabilitation services, such as dieticians, exercise physiologists, and social workers.[6] While availability of services and distance traveled impact treatment-seeking behavior, another critical factor is patient intent. In one study[56] of rural patients who had experienced a cardiac event, only 28.3 percent attended a cardio rehabilitation program, and of that percent, only 17 percent actually completed the program. In measuring a number of variables, including rurality and distance traveled, it was determined that the most significant factor in attending cardiac rehab was patient intent. A key component of intent was whether or not the physician recommended the program.

high blood pressure; and over 108 million Americans age 20 years and older are "overweight" (have a body mass index ≥25.0).[30]

The American Heart Association and the American College of Cardiologists have endorsed the following risk reduction strategies for persons with existing CVD, which are shown with their corresponding reduction in cardiovascular events and mortality:[58]

Strategy	CV Event Reduction (%)	Mortality Reduction (%)
Smoking cessation	-	43
Lower serum lipids	42	30
Exercise	25	20
Aspirin	30	15
Anticoagulants	53	10
ACE inhibitors	25	20
Beta-blockers	26	27
Blood pressure reduction	21	12

Source: Smith, 1997[58]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Heart disease and stroke are related to a varied and complex set of risk factors. Factors such as age, gender, locality, race and ethnicity, and heredity are considered non-modifiable risk factors. However, there are modifiable risk factors such as smoking, high cholesterol, hypertension, physical inactivity, obesity, diabetes, and stress.[5] The risk of coronary heart disease can be predicted using blood pressure, cholesterol, and LDL-C categories in algorithms developed by the Framingham Study.[57] The 1988-1994 NHANES III performed by the Centers for Disease Control and Prevention found that in the United States, approximately 102.3 million individuals have "borderline high risk" cholesterol levels of 200-239 mg/dL, and 41.3 million individuals have "high risk" blood cholesterol levels of ≥240 mg/dL; 20 percent of Americans suffer from

As seen above, lifestyle changes can dramatically reduce the occurrence of premature heart disease and stroke. For example, smoking is a modifiable risk factor and accounts for approximately 20 percent of all cardiovascular disease deaths;[30] however, smoking cessation results in a significant reduction in mortality related to heart disease.

Pearson[5] suggests that rurality is directly linked to higher rates of cardiovascular disease. When compared to urban areas, rural areas reportedly have lower education levels, which have been shown to directly correlate to increased rates of cardiovascular disease and risk factors such as smoking and obesity.[5]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Modifiable risk factors can be influenced through evidence-based preventive measures. Primary

prevention strategies are those that aim to prevent the onset of heart disease and stroke, such as assessing the presence of risk factors and targeting modifiable risk factors. According to an American Heart Association scientific statement, risk factor assessments should begin as early as 20 years of age.[25]

Secondary prevention strategies are those that increase the likelihood of early diagnosis, such as through screening efforts and warning-sign information dissemination, and those that address the treatment of the disease. Access to diagnostic tests and procedures and treatment modalities is paramount the quality and quantity of life of persons affected by these conditions (see Access section). Evidence-based standardized treatment protocols improve the functioning, well-being, and survival of heart disease patients. Additional gains in reducing heart disease and stroke death rates and the burden of disease can be realized by implementing evidence-based primary and secondary preventive measures:

- Encourage consumption of "heart healthy" foods.
- Assess risk factors.[25]
- Decrease the level of modifiable risk factors, such as smoking, sedentary lifestyle, and over-consumption of foods.
- Increase blood pressure and cholesterol screening and follow-up (i.e., dietary counseling, stress management, etc.).[59]
- Increase dissemination of information on warning signs and prevention.[5]

Tertiary prevention strategies are those that aggressively treat heart disease and stroke, endeavoring to decrease their severity and occurrence of complications, such as through antithrombolytic therapy. Tertiary prevention addresses both the habilitation of heart disease and stroke patients and their rehabilitation efforts following diagnosis and include:

- heightened medication management,
- increased utilization of telemedicine technology and stroke teams,
- increased utilization of antithrombolytic therapy,
- stricter adherence to quality indicators in the treatment of AMI,[23] and
- implementation and frequent utilization of ACLS training. (Camp[60] shows that ACLS-trained rural hospital personnel can have similar outcomes to ACLS-trained major teaching hospital personnel.)

Disease management may also serve as a method to address heart disease and stroke. The key aims of this approach are to "inform physicians, educate patients, increase monitoring, and facilitate compliance. Improved outcomes include decreased hospitalization and emergency room visits, and improved quality of life."[61] Nonetheless, additional research is needed to assess the effectiveness of disease management programs in rural areas.

Additional research is needed to assess the effectiveness of disease management programs in rural areas.

Finally, "Telestroke"—telemedicine utilization for stroke treatments—and the formation of stroke teams are modern concepts developed in the pursuit of heightened quality in after-stroke care.[62] Levine[62] suggests that stroke teams—health professionals specifically trained in stroke care—should be available to remote communities through telemedicine. Quality care is provided through a physician at the local site and through the expertise of the remote site's stroke team.[62] Studies gauging the effectiveness of "telestroke" technology are ongoing; "telestroke" may prove a viable option in after-stroke treatment for patients in rural areas.

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Heart disease and stroke are the leading causes of morbidity and mortality. Rates of reduction are varied, and certain populations are particularly vulnerable, including rural populations. Several risk factors for heart disease and stroke are more predominant in rural areas; however, access to services and preventive measures, such as screening, are not as readily available. Many risk factors are modifiable, and a decrease in these risk factors will directly correlate to a decrease in the incidence of heart disease and stroke.

Regardless of the volume/outcome relationship in heart disease and stroke, as findings have been somewhat inconclusive, there are disparities in treatment style and adherence to quality indicators. Best modes of practice can be followed in both rural and urban areas. Heart disease and stroke will continue to be priority health issues in rural areas as long as access to quality care and prevention efforts are not addressed and modifiable risk factors are not effectively changed.

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MATERNAL, INFANT, AND CHILD HEALTH IN RURAL AREAS: A LITERATURE REVIEW

by Jennifer Peck and Kristie Alexander

SCOPE OF PROBLEM

- Infant mortality is higher in rural areas in the South and Western regions.[3]
- Adolescent mortality is higher in rural areas in all four regions of the country.[3]

GOALS AND OBJECTIVES

Improving the health of women, infants, children, and families, a Healthy People 2010 goal, involves identifying and eliminating health disparities in underserved populations. The key Healthy People 2010 objectives addressed in this review are as follows:

- 16-1. Reduce fetal and infant deaths.
- 16-6. Increase the proportion of pregnant women who receive early and adequate prenatal care.
- 16-8. Increase the proportion of very low birth weight (VLBW) infants born at Level III hospitals or subspecialty perinatal centers.
- 16-11. Reduce preterm births.

Differences across these key indicators of maternal and infant health have been observed across urban and rural locations. This article reviews the current state of these indicators of maternal and infant health as highlighted in Healthy People 2010[1] and identifies the extent of inequality by urban and rural residence. Several definitions are utilized to examine maternal and infant health:

- *Fetal Mortality* refers to the death of a fetus between 20 weeks of gestation and birth. There are two measures for this indicator of perinatal health: fetal death rates (the number of deaths reported for every 1,000 live births and fetal deaths combined) and fetal death ratios (the number of fetal deaths for every 1,000 live births in the same year).
- *Neonatal Mortality* includes deaths within the first 28 days of life.
- *Postneonatal Mortality* identifies deaths from day 29 to one year of age.
- *Infant Mortality* is defined as the death of an infant before one year of age.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, maternal, infant, and child health was ranked as the ninth highest rural health priority and was nominated by 25 percent of state and local rural health respondents as a rural health priority. Maternal, infant, and child health was in a virtual tie with substance abuse, and educational and community-based programs for the seventh, eighth, and ninth place rankings.[2] Unlike most of the higher-ranking priorities, no significant differences were noted in frequency of nominations for maternal, infant, and child health either across four different types of state and local rural health respondent groups or across the four geographic regions of the country.[29]

Differences across these key indicators of maternal and infant health have been observed across urban and rural locations.

PREVALENCE AND DISPARITIES IN RURAL AREAS

Disparities in Infant Mortality

The infant mortality rate is an indicator of a population's health, reflecting the well being of infants, children and pregnant women and the general state of maternal health, prenatal care, and public health practices.[1] Among industrialized nations, the United States ranked 26th in infant mortality in 1996.[9] The national infant mortality rate for the year 2000 was 6.9 infant deaths per 1,000 live births, down slightly from the 1999 rate of 7.1[30] but still well above the national target of 4.5.[1]

Twice as many infant deaths occur during the neonatal period compared to the postneonatal period (4.6 versus 2.3 per 1,000 live births in 2000).[30] Neonatal deaths commonly result from congenital anomalies, prematurity, or complications of pregnancy and delivery; in contrast, postnatal deaths are less often the result of genetic or pregnancy-related causes and more often the result of infectious disease and injuries.[11, 31]

National infant death rates by area of residence show rates to vary across urban and rural regions.[3] According to national data from 1996 through 1998,[3] infant mortality rates for nonmetropolitan counties appear similar to metropolitan counties, with the exception of fringe counties of large metropolitan areas. The rates for these "suburban" counties are 20 percent lower (6.1 deaths per 1,000 live births) than other levels of urbanization (7.5 per 1,000 live births for other metropolitan counties and 7.7 per 1,000 live births for nonmetropolitan counties).

> The rate for the nonmetropolitan South is exceeded only by the infant mortality rate for large central metropolitan counties in the Midwest (9.6 per 1,000 live births).[29]

When evaluated for regional variations, infant mortality rates are highest in the South, followed by the Midwest, Northeast, and West, respectively. Rates in the Northeast and Midwest regions are highest in central metropolitan counties, while nonmetropolitan counties have the highest rates in the South and West regions. Nonmetropolitan counties in the South exhibit higher infant mortality rates (8.7 per 1,000 live births) than nonmetro areas in all other geographic regions. When compared to metropolitan rates, the rate for the nonmetropolitan South is exceeded only by the infant mortality rate for large central metropolitan counties in the Midwest (9.6 per 1,000 live births).[29]

A study based on 1985 and 1987 national data reports higher rates of postneonatal mortality among nonmetropolitan county residents.[32] Controlling for other risk factors such as race, maternal age, parity, marital status, maternal education, and prenatal care, rural residence is independently associated with increased rates of postneonatal mortality but not with rates of neonatal mortality.

In addition to national infant mortality estimates, a number of state-based studies have examined the association between infant death and rural residence.

In an Illinois study,[4] researchers found that rural residents have a slightly higher, though not statistically significant, rate of neonatal mortality (6.9 per 1,000 births) compared to the rest of the state (6.7 per 1,000 births). The most rural counties with populations less than 2,500, however, have a rate of neonatal death that far exceeds all other areas (11.3 per 1,000 births). Postneonatal deaths are also higher in rural counties (3.7 per 1,000 births) than in the rest of the state (2.6 per 1,000). Using records from 1988, the neonatal mortality rate for all rural counties dropped and became lower than the rate for the state (4.8 versus 5.9, respectively). However, the neonatal death rate in the most rural counties (7.6 per 1,000) continued to exceed that of all nonmetropolitan counties (4.8) or the rest of the state (5.9). Postneonatal mortality rates remained higher among rural women (3.5 versus 2.8) but not statistically different.

In Alabama, rural residents with normal birth weight infants have higher rates of postneonatal mortality than urban residents. The differential in postneonatal mortality rates between blacks and whites is also greater for rural residents. Among rural residents, the postneonatal mortality rate for blacks is 2.5 times higher than rural whites, while urban blacks have rates 2.1 times higher than urban whites.[5]

A Washington state study[6] reports that rural residents who delivered infants in urban facilities between 1984-1988 had higher rates of neonatal mortality (10.2 per 1,000 births) than rural women delivering in rural facilities (3.7 per 1,000 births) or urban women delivering in urban facilities (5.2 per 1,000 births). In this study, rural and urban designations are based on the distance to hospitals officially designated as rural or urban. The higher rates of adverse pregnancy outcomes among rural residents delivering in urban hospitals may be evidence that high-risk pregnancies are appropriately referred to regional facilities with the appropriate resources. However, this finding may also be a reflection of poor access to local care.

A Florida study documents that the rates of infant mortality in rural residents (9.3 per 1,000) compare unfavorably to rates for urban residents (7.5 per 1,000 births).[7] The authors conclude that rural residence influences infant death indirectly through its association with other risk factors such as poverty, race/ethnicity, age, education, and availability and access to medical resources.

In a study of access to care in a rural area in Indiana, availability of obstetrical services in nonmetropolitan counties is negatively correlated with infant mortality ($r=-0.38$, $p=0.02$).[17] Furthermore, 14 percent ($R^2=14.44$) of the variability in infant mortality in nonmetropolitan counties is explained by physician availability. Thus, lack of access to local care may explain some portion of disparate infant mortality rates in rural communities.

As a whole, a number of state-based studies have found increased rates of infant mortality among rural residents. When other known social and biological risk factors are taken into account, there is evidence that rural residence may have an indirect effect on infant mortality rather than a direct association. Thus, disparities in infant mortality by area of residence may result from the disproportionate distribution of poverty, race/ethnicity, age, education, and availability and access to medical resources.

Disparities in Adverse Pregnancy Outcomes

Total fetal mortality rates in 1990 were reported to be slightly lower for metropolitan (6.8 per 1,000 live births and fetal deaths) than nonmetropolitan (7.1 per 1,000 live births and fetal deaths) populations.[33] Rates were inversely associated with the mother's educational attainment, revealing an increase to 8.4 fetal deaths per 1,000 live births for mothers with less than 12 years of schooling.

Fetal death ratios in 1992 were approximately 4 percent higher in nonmetropolitan areas (7.6 per 1,000 live births) than in metropolitan areas (7.3 per 1,000).[34] Higher fetal death ratios were consistently observed in nonmetropolitan areas across racially defined groups; however, fetal death ratios were approximately two times higher among blacks than whites.[34] Reports of pregnancy outcomes, such as low birth weight and premature birth, have had mixed results when rates are compared for rural and urban populations.

A study of Iowa women, who delivered live-born infants by cesarean section, found rural residents to have poorer birth outcomes than women residing in urban counties.[8] These rural residents had lower birth weights, shorter gestations, lower Apgar scores, longer hospital stays, higher costs, and greater distances to travel for delivery than urban women or women living in rural areas adjacent to urban areas.[8]

In Illinois, low birth weight and fetal death rates were found to be slightly higher in rural counties compared to the rest of the state, but these differences were not statistically different (low birth weight, 6 percent versus 5 percent; fetal death rate, 6.7 versus 6.3).[4]

A Wisconsin study[35] found that although rural women are more likely to have inadequate prenatal care, rates of low birth weight outcomes do not differ between urban and rural residents. However, urban women have higher rates of very low birth weight outcomes (< 1000 grams) than their rural counterparts (10.8 per 1,000 compared to 7.6 per 1,000). Furthermore, low prenatal care utilization is positively associated with low birth weight in urban counties, but this association was not observed in rural counties.

A comparison of birth outcomes for women attending public health department prenatal clinics found rural women deliver infants with lower average birth weights despite entering prenatal care earlier than urban women.[36] However, rural residence does not significantly predict infant birth weight patterns when adjusting for race, education, total prenatal visits, weeks gestation at first prenatal visit, and prepregnancy weight/weight gain.

Crude analyses of metropolitan and nonmetropolitan differences show slightly lower percentages of low birth weight, very low birth weight, and neonatal death rates among nonmetropolitan residents but higher rates of postneonatal deaths. The differences in low and very low birth weight persist among blacks and American Indians when the data are stratified by race, but rural whites have higher rates of low birth weight than urban whites. When other risk factors such as race, maternal age, parity, marital status, maternal education, and prenatal care are controlled in the analysis, neonatal mortality and low birth weight no longer differ by metro-nonmetro residence. However, rural residence is independently associated with postneonatal mortality rates.

> Prenatal care for rural women may be approaching rates for urban women, but care in both groups remains inadequate and below the national goal of 90 percent initiating care in the first trimester.[1]

Disparities in Prenatal Care

Among several national and state-based studies of prenatal care utilization, the majority of studies report less adequate prenatal care among rural women than among urban women. There is a plethora of evidence from studies using data from the late 1980s that prenatal care among rural residents compares unfavorably with care received by urban populations. The few reports from 1990s' data suggest that prenatal care remains inadequate in both urban and rural locations but may be most lacking in urban areas. Thus, prenatal care for rural women may be approaching rates for urban women, but care in both groups remains inadequate and below the national goal of 90 percent initiating care in the first trimester.[1]

> Non-metropolitan residents in the United States are more likely than their urban counterparts to delay prenatal care until the third trimester.[32]

Analysis of the National Linked Birth Death Data Set for the 1985-1987 study period reveals that non-metropolitan residents in the United States are more likely than their urban counterparts to delay prenatal care until the third trimester.[32] This result persists after controlling for other risk factors such as race, maternal age, parity, marital status, and maternal education.

Using the Adequacy of Prenatal Care Utilization Index[37] to combine information on timing and amount of care, disparities by residence become apparent. Significantly more nonmetropolitan women (16.8 percent) receive inadequate prenatal care compared to metropolitan women (12.5 percent). When evaluated by race/ethnicity, the disadvantage among nonmetropolitan residents persists for each racial/ethnic group; however, the difference by residence is greatest among Hispanic women (19 percent metro and 32 percent nonmetro), notable among whites (8 percent metro and 13 percent nonmetro), and alarmingly high for both

groups of African Americans (25 percent metro and 29 percent nonmetro). When comparing the proportion of women with adequate prenatal care, there is no difference by residence, with roughly one-third of all women classified as receiving adequate care.

A number of state-based studies conducted in Washington, Illinois, Wisconsin, and Virginia found comparable trends in inadequate prenatal care among rural women.[4, 6, 35, 36]

Analysis of the 1988 National Maternal and Infant Health Survey shows that U.S. women residing in nonmetropolitan areas were more likely to receive inadequate prenatal care than metropolitan residents, irrespective of race/ethnicity or socioeconomic status.[15] However, differences by race/ethnicity are also observed. When comparing white, black, and Hispanic women by residence, Hispanics who live in nonmetropolitan areas are the most likely to receive inadequate care.[15] The probability of inadequate care is highest for high-risk Hispanic women living in rural areas. The high-risk profile includes those who are poor, have no insurance, have an unwanted pregnancy, live alone and unmarried, are young, have low educational attainment, have no previous pregnancies, use a public provider, drive an hour or more to provider, and do not take prenatal classes. Inadequate prenatal care is defined, according to the Kotelchuck Adequacy of Prenatal Care Index, as entry later than the fourth month of pregnancy or receiving less than 50 percent of the expected number of visits.[37]

In contrast, a study of Hispanic women in San Diego County, California, found rural women to enter prenatal care earlier than urban women. Those delivering in urban county hospitals in 1991-1992 were twice as likely to delay prenatal care beyond 24 weeks gestation than women who delivered in rural hospitals, independent of other factors such as income, education, marital status, language, pregnancy wantedness, and total number of barriers to care.[38] The most frequent barriers to prenatal care were the same for urban and rural women: lack of money, distance to care, lack of transportation, and depression.

The most current comparison of urban and rural prenatal care comes from the 1995 National Survey of Family Growth. This survey indicates that more nonmetropolitan than suburban women receive delayed or no prenatal care.[16] However, urban central city residents have the highest percentage of prenatal care delayed beyond the first trimester. More suburban residents initiate prenatal care early, followed by nonmetropolitan residents and central city residents.

Disparities in Obstetrical Care

Pregnant women residing in rural areas with fewer available obstetric services in their communities frequently opt to deliver outside their communities.[18] Seeking services outside the community is considered an indicator of inadequate access to care. Rural women seeking obstetrical services outside their local community hospital experience more complications during delivery and higher rates of preterm birth compared to rural mothers who deliver at local facilities.[18] The infants treated in facilities outside the community also have longer and more expensive stays.

According to data from the 1995 National Survey of Family Growth, fewer nonmetropolitan mothers have insurance to cover all expenses associated with labor and delivery.[16] Thus, a higher percentage of nonmetropolitan residents pay out-of-pocket expenses for all or part of their labor and delivery charges.[16]

> Urban women are two to three times more likely to deliver at facilities with high technology capabilities compared to rural women.[39]

Another study examines whether use of high-technology services differs for urban or rural women in the U.S.[39] Among women with high-risk pregnancies, including those with preterm births or who receive a high-risk medical diagnosis, urban women are two to three times more likely to deliver

at facilities with high technology capabilities compared to rural women.[39]

IMPACT OF THE CONDITION ON MORBIDITY AND MORTALITY

Adverse Pregnancy Outcomes

There were over four million births in the United States in the year 2000, and the crude birth rate was 14.8 per 1,000 population.[40] Adverse pregnancy outcomes such as fetal death, low birth weight, and preterm birth, however, were a major source of perinatal morbidity and mortality. The leading causes of infant mortality in 2000 included congenital malformations, low birth weight and preterm birth, and sudden infant death syndrome (SIDS), accounting for 20.7, 15.4 and 7.7 percent, respectively, of all infant deaths.[30] After the first month of life, the leading cause of infant death is SIDS, representing approximately one-third of postneonatal deaths in 1997.[30]

Low birth weight and premature birth are major sources of infant morbidity and mortality. Preterm birth accounts for the majority of neonatal deaths not associated with birth defects.[1] Long-term impairments associated with low birth weight and preterm birth include cerebral palsy, autism, mental retardation, vision and hearing difficulties, learning disabilities, and delayed development.[10]

Respiratory distress is the most common cause of death among low birth weight infants.[11] The introduction of surfactant in the early 1990s for the treatment of respiratory distress contributed to improved survival of premature and very low birth weight infants.[41] Although survival of the preterm or low birth weight infant has improved along with medical advancements, rates of long-term disabilities associated with these birth outcomes have not experienced a similar decline.

Prenatal Care and Obstetrical Care

Lack of available local prenatal and obstetrical care in rural areas is reported to be associated with higher rates of preterm delivery, infant mortality, and complications during delivery.[17-20] Overall, fewer preterm and low birth weight infants are born to women who receive early and comprehensive prenatal care.[42]

Hypotheses for the association between access to care and pregnancy outcome include longer travel time for routine care, which is associated with poor compliance for prenatal care due to factors such as transportation problems.[43] Other explanations include lack of adherence to prenatal protocols prescribed by providers in distant locations, delayed hospital arrival following onset of labor, and the stresses associated with travel and delivery in an unfamiliar setting.[18]

Maternal mortality can potentially be reduced through quality prenatal and obstetrical care. Maternal deaths from complications such as ectopic pregnancy, infection, and hemorrhage can be prevented. It is estimated that early diagnosis and effective treatment of pregnancy complications may prevent over half of all maternal deaths.[27, 28]

BARRIERS

Access to available prenatal and obstetrical care is necessary to ensure the health and well being of mother and baby. Although there has been recent progress with technological advancements in perinatal medicine, access to such services has concurrently deteriorated for rural residents. One reason for decreased access is the number of family practitioners dropping obstetrics from their practice, most often due to the high cost of medical malpractice insurance and increasing fear of litigation.[44] A total of 9 percent of all physicians practice medicine in rural areas.[45] The number of rural obstetric providers in the United States has been decreasing since the early 1980s,[46, 47] with a 20 percent decrease in obstetric providers between 1984 and 1989 alone.[47] The number of rural family

The number of rural obstetric providers in the United States has been decreasing since the early 1980s.[46, 47]

physicians providing obstetric or neonatal care has also declined in recent decades.[11] In 1992, only 37 percent of rural family physicians offered obstetric services, and only 65 percent provided care for newborns.[48] Thus, the decline in access to maternity care is accompanied by declining access to neonatal services.

A decrease in obstetric services in rural areas has created a barrier to prenatal and obstetric care, particularly for women with high-risk pregnancies. In the 1980s, there was a transition to regionalized systems of perinatal care to provide access to tertiary care for high-risk, rural mothers and their infants. Regionalization led to marked improvements in birth weight-specific infant mortality rates among rural infants,[6, 18] but regional variation remains.[32] Furthermore, interhospital transport has been associated with excess morbidity[49] as well as additional expense, stress, and inconvenience.[50]

Other barriers to prenatal care for women living in rural communities include less access to health insurance,[21] greater distance and travel time to providers,[22] transportation problems,[11, 23, 24] and child-care difficulties for larger families.[23, 24]

Other barriers to prenatal care for women living in rural communities include less access to health insurance,[21] greater distance and travel time to providers,[22] transportation problems,[11, 23, 24] and child-care difficulties for larger families.[23, 24] However, a study of predictors of distance traveled for prenatal care showed that up to 50 percent of rural Alabama women bypassed the nearest rural hospital to obtain obstetrical care, with approximately one-third delivering in metropolitan hospitals.[22] Rural women with higher incomes and insurance coverage are more likely to travel further to seek obstetrical services from larger hospitals with neonatal intensive care units.[22]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Fetal Mortality

Risk factors for infant death include low birth weight, preterm birth, delayed or lack of prenatal care, mother under age 20 or over age 40, low educational attainment of mother, maternal smoking during pregnancy, and more than three previous births.[12] Additionally, maternal and infant morbidity and mortality more commonly result from unintended pregnancies.[13, 14] It is estimated that one-third to one-half of all pregnancies in the U.S. are unplanned.[13, 51, 52] This estimate increases to 75 percent of all pregnancies among women under 20 years of age.[13] Women with unintended pregnancies are more likely to engage in high-risk behaviors, such as smoking, alcohol intake, and poor nutrition,[13] and delay prenatal care beyond the first trimester.[13]

In addition to reflecting disparities by racial/ethnic composition and poverty, higher infant mortality rates among the nonmetropolitan South may result from disproportionately low maternal ages and risk behaviors, such as smoking during pregnancy. Birth rates among adolescents 15 to 19 years of age are highest among residents of nonmetropolitan counties in the South (70.4 per 1,000 female adolescents).[3] According to the National Center for Health Statistics, the percentage of births among teenagers (less than 20 years of age) in 1992 was higher for nonmetropolitan mothers (16 percent) than metropolitan mothers (12 percent).[53] The difference by geographic location is even more pronounced when examined by race. Among nonmetro blacks, 27 percent of live-born infants are born to mothers under 20 years of age. The corresponding figure for nonmetro white infants is 14 percent.

Both adolescents and adults who live in the most rural counties are more likely to smoke than those living in other levels of urbanization.[3] According to national birth certificate data from 1996, young women age 15–19 also have the highest rates of smoking during pregnancy.[54] Although the rate of smoking during pregnancy dropped slightly between

1990 and 1996, 17.2 percent of women in the 15-19 age group continued to smoke during pregnancy in 1996.[54]

Adverse Pregnancy Outcomes

Fetal deaths are commonly associated with maternal complications including amniotic fluid levels and maternal blood disorders.[55] Risk factors associated with low birth weight include younger and older maternal age, high parity, low socioeconomic status, low educational attainment, inadequate prenatal care, low pregnancy weight gain, previous low birth weight infant, multiple births, smoking, alcohol intake, and illicit drug use.[36, 56] Less is currently known about the risk factors for preterm birth. Predictors identified to date include previous preterm delivery; multiple gestation; the use of alcohol, tobacco, and illicit drugs during pregnancy; low prepregnancy weight; low weight gain during pregnancy; vaginal infections; and domestic violence.[1, 56, 57]

Studies have shown that demographic composition and behavioral risk factors differ for rural and urban women in ways that influence pregnancy outcomes, such as low birth weight.[36] Rural women receive approximately one year less of formal education than urban women.[58] Poverty rates in rural areas are reportedly 30 percent higher than in urban areas.[59] Rural women are less likely to be married, lacking the social, emotional, and financial support that marriage may offer, which may have a link to adverse pregnancy outcomes.[60] A lack of social support or tangible assistance is previously shown to be associated with poor birth outcomes, particularly among those who are very young, unmarried, or have less than a high school education.[61]

Inadequate Prenatal Care

The percentage of women delaying prenatal care or receiving no prenatal care has improved during the period of 1989-1997 from 25 to 18 percent. The top three reasons for not initiating early care include not knowing they are pregnant, inability to pay for care, and inability to obtain an earlier appointment.[25] Twice as many non-Hispanic blacks (28 percent) and Hispanic women (26 percent) delay or receive no prenatal care compared to white women (12 percent).[25] Furthermore, over 32 percent of mothers under age 20 and 32 percent of mothers with less than a high school education receive delayed or no prenatal care.[25] Of note, most of the characteristics that predict prenatal care utilization such as age, race, ethnicity, marital status, income, education, and rurality are the same as those associated with adverse pregnancy outcomes, such as low birth weight.

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Prenatal care is regarded as a successful approach for improving pregnancy outcomes. However, close to 20 percent of pregnant women in the United States continue to refuse or delay prenatal care.[25] Women who do not receive prenatal care or who delay prenatal care beyond the first trimester are at risk of severe maternal morbidity and possible mortality due to undetected complications of pregnancy.[25] The effectiveness of prenatal care is believed to be due to three primary components: early and continuous risk assessment, health education, and medical and psychological intervention.[26]

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice Section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Rural mothers and their children comprise a large segment of the U.S. population. Thus, health disparities between rural and urban groups are of national concern. Increased rates of adverse pregnancy outcomes in rural areas, such as preterm birth and low birth weight have been observed, as well as higher rates of infant mortality. Access to prenatal care is critical for reducing maternal and infant morbidity and mortality, though rural women tend to receive less adequate prenatal care than their urban counterparts. Although the risk factors for these conditions tend to disproportionately affect women in rural areas, the health status of rural

mothers and infants can be largely improved by eliminating existing barriers to high quality, comprehensive prenatal care. Improving the health of rural mothers and infants, from preconception to pregnancy to birth and beyond, advances the health of the next generation.

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MENTAL HEALTH AND MENTAL DISORDERS—A RURAL CHALLENGE: A LITERATURE REVIEW

by Larry Gamm, Sarah Stone, and Stephanie Pittman

SCOPE OF PROBLEM

- A survey of state and local rural health leaders finds mental health and mental disorders to be the fourth most often identified rural health priority.[43]
- Mental health is one of the 10 "leading health indicators" selected through a process led by an interagency workgroup within the U.S. Department of Health and Human Services.[44]
- Psychoses is virtually tied with cancer as the fourth most frequently first-listed diagnoses for hospital discharges nationally.[45]
- The suicide rate among rural males is higher than among their urban counterparts across all four regions of the nation.[20]
- Among 1,253 smaller rural counties with populations of 2,500 to 20,000, nearly three-fourths of these rural counties lack a psychiatrist, and 95 percent lack a child psychiatrist.[16]
- Access to mental health care and concerns for suicide, stress, depression, and anxiety disorders were identified as major rural health concerns among state offices of rural health.[46]

GOALS AND OBJECTIVES

One Healthy People 2010 goal is to "improve mental health and ensure access to appropriate, quality mental health services."[5] This review addresses the Healthy People 2010 mental health and mental illness goal—improve mental health and ensure access to appropriate, quality mental health services emphasizing access to treatment by mental health providers in rural areas. This review addresses this Healthy People 2010 goal and three of the objectives associated with the goal:

- 18-6. Primary care screening and assessment.
- 18-7. Treatment for children with mental health problems.
- 18-9. Treatment for adults with mental disorders.

Mental disorders affect approximately one-half of the population over a lifetime[1] and are among the most impairing of chronic diseases.[2, 3] Healthy People 2010 distinguishes among several related terms in examining mental health:

- *Mental health* is a state of successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity. Mental health is indispensable to personal well being, family and interpersonal relationships, and contribution to community or society.

Mental disorders affect approximately one-half of the population over a lifetime[1] and are among the most impairing of chronic diseases.[2, 3]

- *Mental disorders* are health conditions that are characterized by alterations in thinking, mood, or behavior (or some combination thereof), which are associated with distress and/or impaired functioning and spawn a host of human problems that may include disability, pain, or death.
- *Mental illness* is the term that refers collectively to all diagnosable mental disorders.[5]
- *Mental disorders* include three major categories of mental illness:
  - *Schizophrenia* will affect more than 2 million people per year in the U.S.[47]
  - *Affective disorders* (major depression and manic depressive illness) are the leading cause of disability among adults in developed

nations such as the U.S. (World Health Organization), and high rates of suicide are associated with these mood disorders.[48]

- *Anxiety disorders* (panic disorder, obsessive-compulsive disorder, posttraumatic stress disorder, and phobia) are more common than other mental disorders, affecting as many as 19 million people in the U.S. each year.[49]

General labels attached to mental illness considered severe or serious are:

- *Serious mental illness (SMI)* is a diagnosable mental disorder found in persons aged 18 years and older that is so long lasting and severe that it seriously interferes with a person's ability to take part in major life activities.
- *Serious emotional disturbance (SED)* is a diagnosable mental disorder found in persons from birth to age 18 years that is so severe and long lasting that it seriously interferes with functioning in family, school, community, or other major life activities.[5]

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

Mental health and mental disorders were identified as the fourth highest ranking rural health concern among 28 functional areas.[4]

According to the Rural Healthy People 2010 survey, mental health and mental disorders were identified as the fourth highest ranking rural health concern among 28 functional areas identified by Healthy People 2010.[4] In this nationwide survey, 37 percent of the state and local rural health leaders responding selected mental health and mental disorder as one of their top rural health priorities, after access, oral health, and diabetes. There was substantial agreement on the rural priority status of mental health relative to all other Healthy People 2010 functional areas. Although mental health ranked in 12th place among most often identified priorities by local public health officials, it ranked among the top five most frequently selected priorities among state health leaders, and leaders of rural community health centers and clinics and rural hospitals. In fact, state health leaders and leaders of rural community health centers and clinics were significantly more likely than local public health officials and rural hospital leaders to identify mental health as a priority.[43] Mental health was ranked in the top five priorities across all four regions of the country, but the Northeast and West regions were significantly more likely than the Midwest or South to nominate this focus area as a priority.[43]

PREVALENCE AND DISPARITIES IN RURAL AREAS

Mental disorders are widespread in urban and rural areas alike and affect approximately 20 percent of the population in a given year.[6, 7]

Mental disorders are widespread in urban and rural areas alike and affect approximately 20 percent of the population in a given year.[6, 7] An estimated 20 percent of children and adolescents age 9 to 17,[8] and as many as 25 percent of those 65 years and older[9] suffer from mental illness each year. Approximately one-half of the population experiences a mental disorder over a lifetime.[1] Mental illness is often a contributor to and/or a consequence of disabilities or other serious health-related conditions among the nation's most vulnerable populations such as the homeless, alcohol or substance abusers, and abusing families.[19] Compared to other chronic diseases, mental disorders strike earlier, often in the period extending from the teens to the mid-twenties.[7] Of those who experience a mental disorder, only a minority report treatment in the preceding year.[10]

The prevalence of lifetime and recent mental disorders appear to be similar in rural and urban areas.[6, 11, 12] However, rural residents with mental illness may be less likely than their urban counterparts to define

themselves as needing care.[13, 50] They are less likely, too, to report three or more recent mental disorders.[6]

There is evidence of higher suicide rates, a standard indicator of mental illness, in rural areas particularly among adult males and children.[12, 20] There also are more suicide attempts among depressed adults in rural areas than in urban areas.[21]

Utilization

Under-utilization of mental health services has been identified as a feature of mental health in most settings.[10] Recent reviews find substantial evidence that utilization of mental health services is lower in rural than in urban areas.[13, 33, 42]

The use of outpatient mental health services is frequently found to be lower in rural areas than in urban areas.[23, 31, 32, 34] In a three-year study of inpatient and outpatient Medicaid claims in Maine, rural Medicaid beneficiaries are less likely than urban ones to have an outpatient mental health visit in a year's time; those with visits have fewer mental health visits per year, and rural disparities in inpatient visits are even more pronounced.[32] Similar underutilization is found in a study of a commercially insured population in Maine.[51] Nonetheless, degree of unmet treatment need for SMI may be lower in rural areas. According to one recent national study, rural residents with SMI are more likely than urban dwellers and young adults to have their treatment needs met.[35]

Numerous studies associate poverty, age, and minority status with a low, or a lower, likelihood of receiving mental health care.[13] Blacks and rural residents underutilize mental health services and seek help later.[15] The difference in utilization between blacks and whites may reflect cultural differences in dealing with mental illness.[14] Rural African Americans often perceive the mental health system as representing the dominant culture.[15]

Elderly adults may face particular challenges in accessing mental health services. Although an estimated 15 to 25 percent of non-institutionalized elderly suffer from mental disorders, only 2 to 4 percent of mental health professional's practice time is spent with elderly clients. Unfavorable reimbursement and patient perception of provider reluctance are among possible reasons for such apparent underservice of the elderly.[17] The nursing home picture appears even less favorable to mental health treatment for the elderly. Although two-thirds of elderly nursing home residents suffer from a mental disorder, less than 5 percent receive a mental health treatment within a one month period.[52]

Children and Adolescents

Nationally, an estimated 20 percent of children and adolescents, similar to rates among adults, suffer from emotional and behavioral disorders. About 11 percent of children experience significant functional impairment; 5 percent of children experience extreme functional impairment, and 10-15 percent of children and adolescents have symptoms of depression at any one time. Among youths nine to 17 years of age, 9 to 13 percent suffer from serious emotional disturbances, conditions affecting their daily functioning.[7, 48, 53, 54] A study based on a 1990-1992 nationwide survey found that the most youthful age group considered, those age 15 to 24, are most likely to report not receiving minimally adequate treatment for serious mental illness.[55]

A recent study notes several articles over the past decade that report that rural youth receive fewer mental health services than urban youth.[42] Rural children are likely to be disadvantaged in mental health treatment, especially for serious emotional disturbances. Rural areas are most disadvantaged in meeting the needs of children with serious mental health problems because of the relative lack of psychiatrists, and especially child psychiatrists, in rural areas.[16]

The Great Smoky Mountains Study of Youth found that rural children with mental illness receive mental health care from a variety of sources, and rural children are less likely to use these services. Typically, children with mild mental health problems are served by a loose network of family physicians, school counselors, mental health workers, and child protective caseworkers.[56, 57] A study of rural teens in

a Mississippi River Delta county finds that youth who experience depressive symptoms report relatively fewer visits to physicians' offices but more visits to emergency rooms, public health clinics, and school-based clinics. Such utilization patterns suggest the need for better linkages among ambulatory settings and mental health providers.[58]

IMPACT OF THE CONDITION ON MORTALITY

The impact of mental health and mental disorders on mortality in rural areas appears in several forms. Suicide was the fourth leading cause of death among children aged 10-14 in 1999, climbing to third for ages 15-24 and to a high rank of second leading cause of death for ages 25-34. It drops to the fourth leading cause among the 35-44 age group, to the sixth leading cause of death among the 45-54, and to eighth rank among the 55-64 age group, after which it is no longer ranked in the top 10 leading causes of death for older groups.[59]

Higher suicide rates are found in rural areas, particularly among adult males and children.[12, 20]

Higher suicide rates are found in rural areas, particularly among adult males and children.[12, 20] For adult males, this is most pronounced in the less populated nonmetropolitan counties, without a city of 10,000 or more.[20] Suicide rates increase with age and are a serious problem among the elderly; the rates are highest among white-American males aged 65 years and older.[60]

The presence of more than one mental disorder is a major risk factor for suicide.[61] Major depression combined with alcohol abuse, for example, presents a serious added risk.[62] An Arkansas study finds that rural individuals suffering from bipolar disorders report higher rates of suicide attempts than their urban counterparts.[23] In addition to mood disorders such as depression and bipolar disorder, unwillingness to seek help because of the stigma attached to mental illness and barriers to accessing mental health treatment are also major risk factors for suicide.[60]

There is evidence, too, that depression, anxiety, and other psychosocial factors contribute to progression and outcomes associated with chronic illnesses, such as heart disease and cancer.[22] One study, for example, links depression to early mortality among first heart attack survivors.[63]

IMPACT OF THE CONDITION ON MORBIDITY

Depression is an important cause of morbidity and a frequent co-morbidity for other illnesses. According to a report from the U.S. Surgeon General,[18] depression is the leading cause of disability in the United States.[64] For example, depression in elderly patients is frequently seen as a co-morbidity to other acute or chronic illnesses. The highest prevalences of depression (percentages varying with methodologies) are seen in patients with stroke (25 to 48 percent), coronary artery disease (8 to 44 percent), cancer (1 to 40 percent), Parkinson's disease (4 to 90 percent), and Alzheimer's disease (20 to 40 percent).[65] A review of clinical epidemiologic surveys reports that untreated mental disorders can complicate the treatment of physical disorders,[7] possibly leading to death.

One study finds the threshold for admission to the Arkansas State Hospital system, as measured by violence and destructive behavior, is higher for patients from rural areas. Lack of adequate mental health services in rural areas may delay entry into the mental health system until behavior is more serious. Also, substance abuse among the rural mentally ill was associated with particularly high rates of violence.[66]

No differences in one year symptom outcomes are observed in studies comparing rural and urban people with depression.[21] Worse symptom outcomes among those with more serious mental illness, however, are observed in rural areas, especially with co-occurring substance abuse.[24]

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

Mental disorders are important co-morbidities of physical illness and contributors to suicide, and they

affect the financial capacity to effectively address other health problems. Studies of depression treatment impact on costs for treating physical problems underscore important medical and cost effects for rural areas. Among persons in nonmetropolitan areas, a $1.00 increase in the costs of depression treatment is associated with a $1.42 reduction in the costs of treating physical problems. In contrast, no cost-offset effects can be observed in depressed metropolitan populations.[67] Both reductions in work disability and possible reductions in health care costs are associated with depression treatment in primary care clinics in the Seattle area.[68] A meta-analysis of dozens of studies finds that the coordination of outpatient psychotherapy with inpatient and/or outpatient medical treatment is frequently found to contribute to reductions in health care costs.[69]

Another study of patients in three rural primary care clinics finds that psychological distress, more than severity of chronic medical illness, accounts for functional impairment among primary care patients.[70] Such impairment can extend to the ability to hold a job and retain health benefits.

Mental illness can seriously undermine the employment participation of the rural workforce. Among all illnesses and health behaviors, mental disorders are identified as one of the leading contributors to disability and associated disease burden, defined as years of life lost to premature death and weakened by disability.[3, 18] Days and dollars of lost productivity or avoidable expensive hospitalizations are clearly identifiable with untreated depression.[39]

BARRIERS

Three principal factors have been presented as contributing to the problem of mental illness in rural settings:

- limited access to specialty mental health providers;
- lack of sufficient mental health training, expertise, and coordination among health care providers located in rural settings; and
- limited utilization of available mental health services because of stigma or limited awareness of mental disorders.

Supply of Mental Health Providers

The provision of mental health services in rural areas is often dependent upon a small collection of formal and informal care providers—possibly one or two specialty mental health providers, primary care physicians, rural hospital and nursing home staff, school counselors, social workers, counselors, ministers, law enforcement personnel, criminal justice workers, self-help groups, family members, and friends.[13, 15] Probably the greatest difference in mental services in rural and urban areas is the availability of and accessibility to specialty mental health services. And, although the supply of specialty mental health professionals shows substantial growth in the number of mental health specialists nationwide during the 1990s, the increase is minimal in rural areas.[28]

There is evidence of an insufficiency of both mental health infrastructure and supply of professionals in rural areas. Twenty percent of non-metro counties lack mental health services; the same is true in only 5 percent of metro counties. Non-metro counties have, on average, less than two specialty mental health organizations, while metro counties report an average in excess of 13 mental health organizations.[12, 28] Moreover, fewer rural hospitals than urban ones offer inpatient psychiatric services.[12]

By federal definition of mental health professional shortages, rural areas disproportionately suffer from a shortage of mental health providers.[71] In 1999, 87 percent of the 1,669 Mental Health Professional Shortage Areas (MHPSAs) in the United States were in non-metropolitan counties and home to over 30 million people.[29]

There is relatively low availability of mental health providers in rural areas, and an even lower

availability of specialized providers such as psychiatrists and child psychiatrists in the most rural counties. The same directional disparity for the least populated counties exists, although at a lesser magnitude, for psychologists and social workers.[16] One Arkansas study, for example, reports 7.2, 5.0, and 3.9 times more psychiatrists, social workers, and psychologists per capita, respectively, in metropolitan than in non-metropolitan counties.[23] Another study from the same state finds more than 10 times as many of both medical providers and mental health specialists within 30 miles of urban individuals with depression compared to these providers within 30 miles of their rural counterparts.[39]

Among 1,253 small rural counties with populations of 2,500 to 20,000, nearly three-fourths of these rural counties lack a psychiatrist, and 95 percent lack a child psychiatrist. Only about half of these counties have a master's level or doctoral level psychologist or social worker working in health settings who are resident within their boundaries. According to presence and volume measures, only availability of physicians appears to present some degree of parity between the small rural counties and the other counties with more than 20,000 population. However, over one-third of the most rural counties, those with less than 2,500 population, do not have a family practice physician.[16] This finding suggests that approximately one third of these smallest rural counties may not have any health professionals available to address mental health needs, and a large percentage of small counties may have no immediate available choice for professional mental health services beyond the local physician.

The scarcity of providers may require great travel distances for patients. Distance to providers may account, in part, for the greater difficulties among rural adults than urban adults in remaining engaged in outpatient care over time. Greater travel distance to outpatient services, a feature of rural settings, is associated with fewer mental health visits by adults and with a lesser likelihood of receiving care in accordance with treatment guidelines.[30]

Role of Primary Care Professionals

Rural people are more likely than urban ones to use primary care practitioners for mental health needs.[36] This is especially true of the poor,[32] the elderly,[72] minorities,[73] problem drinkers,[74] and the seriously mentally ill.[23, 34]

Physicians who practice in rural and frontier areas play an even larger role in mental health care than their urban counterparts.[36] This may be attributed to the scarcity of mental health professionals[11] and the stigma-associated reluctance with seeing a mental health professional.[37, 38]

Treatment of mental illness by primary care practitioners, however, faces a number of practice and professional constraints such as:

- insufficient mental health training in medical school or residency;[32, 36]
- limited time for additional education required for managing challenging cases;[39]
- insufficient skills in mental health;[32]
- failure to detect a mental disorder;[75]
- heavy patient case load;[32, 36]
- short visits for patients;[36]
- lack of time for counseling and related therapies; and[36]
- lack of specialized backup.[39]

Even when specialized mental health professionals are available for possible referrals, there appear to be a number of obstacles to primary care physicians making such referrals:

- idiosyncratic standards regarding when to refer patients to a mental health specialist;[36]
- stigma and concerns about the patients' acceptance of the diagnoses and future impact on insurability;[40]
- patient reluctance to use mental health providers;[76]

- lack of available specialist services;[32, 76]
- long waiting times for appointments;[76, 77]
- primary care physicians' bad experiences with psychiatrists;[36]
- lack of communication from referral mental health specialist inhibits physician's ability of followup;[76]
- disagreement with psychiatrists' concern for confidentiality impeding necessary information sharing to enable the referring physician to work with patient; and[36]
- primary care physicians' distrust or dislike of psychiatrists.[36]

Primary care physicians, according to some researchers, may deliberately underdiagnose mental illness. Rural family physicians may readily detect depression but may be reluctant to make formal diagnoses because of stigma, doubts about the patient's acceptance of a mental disorder diagnosis, or a concern for the patient's future insurability.[40, 41] Evidence suggests that coding of patient visits may be adjusted in some instances to allow for reimbursement for care that would not be reimbursable to the provider in question if the more accurate code were recorded.[41]

Among primary care providers, nurse practitioners and physician assistants, according to one study, are less like than primary care physicians to see patients with depression, to prescribe antidepressants, or to treat such patients without referral.[76] The increased prevalence of these non-physician primary care providers in rural areas, therefore, may not translate into significantly greater mental health treatment resources.

A shortage of mental health providers in rural areas is viewed as both a detriment to coordination of mental health services and an advantage in providers knowing one another and the patient.[36] Coordination of mental health care is seriously undermined by rural provider shortages, resulting in gaps in essential services or distances separating the providers serving the same rural client. However, in the rural setting, coordination may benefit from the fact that the doctors, counselors, social workers, and law enforcement personnel may be personally acquainted.[78]

Role of Perception and Recognition

A lack of anonymity in rural communities and the perceived social stigma associated with mental illness may prevent seeking of treatment.[26, 42] Regardless of reference to depression treatment by the general medical sector or specialty mental health sector, a recent study finds that rural individuals perceive less anonymity than do urban ones in such treatment.[39] There is evidence, too, that rural persons suffering from mental disorders may be less likely than their urban counterparts to perceive a need for mental health care.[13]

Rural people with depression may also perceive less availability of and accessibility to specialty mental health treatment and less accessibility to mental health treatment in the general medical sector.[39] Those with more symptoms of depression are more likely to hold stigmatized views of mental health services.[26] This stigma associated with seeking mental health treatment is frequently identified as a more serious barrier to care for rural residents than for urban ones.[26, 42] However, another study finds no such differences.[39] Still another study finds rural people with serious SMI less often giving stigma as a reason for not seeking care than urban residents.[35] While stigma is less often cited in the latter study, rural residents are more likely than nonrural dwellers to report several reasons (e.g., financial concerns, desire to solve problem on their own)[35] for not seeking treatment for SMI.

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Although relatively little is known about the causes of mental illness, a number of factors may contribute to mental disorders, to their consequences, or to failure to adequately treat the disorders. Stress is frequently associated with the appearance of mental

disorders such as anxiety and depression. Stresses associated with economic hardship, e.g., the farm crisis of the 1980s or loss of a major employer, can affect the mental health of rural populations.[25, 26] A study finding depression more widespread in farming communities during farm crises and failures suggests that providers should respond to such crises on individual and community levels.[25] Stressful life events along with mental disorders and substance abuse disorders are among the risk factors for suicide.[27]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

A number of solutions to the rural undersupply of mental health professionals have been proposed and attempted. Among these are:

- identification of shortages and facilities,
- dependence on managed behavioral health care programs to attract mental health professionals,
- improved training and recruitment of rural mental health professionals,
- greater reliance upon primary care practitioners for mental health care,
- improved linkages between PCPs and mental health specialists, and
- increased outreach and informal support.

Access and Facilities

Seeking designation as a MHPSA in order to attract mental health professionals to rural areas can be advanced by making information on current supplies and locations of mental health professionals more complete, accurate, and available. A careful analysis of MHPSA measurement issues and mental health manpower needs has resulted in numerous recommendations to meet information needs and to otherwise address related credentialing, licensing, and other mental health manpower responses.[29]

Several types of local health centers are key players in mental health. Community mental health centers (CMHCs) remain an important source of mental health services in many rural areas. A recent study suggests that their services to the poor may be advanced by regulatory and financing changes promoting ties with primary care providers and health networks.[32] Similarly, increased availability of non-doctoral level psychologists and social workers, supported by appropriate licensure and reimbursement provisions, could enhance CMHC staffing.[32] Some Medicaid Managed Behavioral Healthcare (MMBH) arrangements have been creative in including CMHCs in networks of providers, and some CMHCs and primary care providers have been effective in sharing scarce mental health professionals.

Community Health Centers (CHCs) or Federally Qualified Health Centers (FQHCs) have been called upon to help meet mental health services needs among the rural poor. At least one study[79] of seven CHC sites in rural and urban underserved areas contracting with managed care suggests that mental health services may fair less well with such arrangements. Specifically, panel restrictions imposed by an HMO may require switching to new and unfamiliar mental health providers who are often geographically inaccessible to the center's Medicaid population.

Telehealth, in various rural settings, plays a role in mental health service delivery. The term telehealth encompasses the terms of telemedicine, telemental health, or telepsychiatry. Positive experiences are being reported from recent experiences with telepsychiatry, with direct psychiatric encounters.[80, 81] A recent study suggests that both providers and clients value the additional interpersonal connection that video-conferencing provides and that relatively inexpensive video-telephone-based approaches can support this connection.[82] At the same time a number of telemental health networks have been successful over a number of years, networks have variously included direct psychiatric encounters, training, crisis response, medication management, and/or other components associated with admission, commitment, or discharge activities.[83] More

generally, telehealth remains an important option for providing training, consultation, and support to rural primary care providers in the face of continued rural shortages of mental health specialty providers.[23]

Managed Behavioral Health Care

A number of government organizations and other employers contract with Managed Behavorial Healthcare Organizations (MBHOs) for mental health services that are carved out, or handled, by a health plan that is distinct from the health plan covering medical services. A study of a switch to a managed behavioral health care carve out for Maine state employees and their dependents reports that such a change can produce utilization benefits for both urban and rural participants. The switch finds significant increases in penetration, i.e., numbers using mental health services, and in the numbers of mental health visits by participants. Rural penetration rates and numbers of visits are significantly lower than urban rates both before and after the carve-out. A significant increase in the number of mental health visits to primary care physicians is credited to the managed behavioral health care organization's acceptance of service by primary care physicians.[84]

Medicaid Managed Behavioral Healthcare Organizations (MMBHOs) that carve-out mental health benefits from other health benefits have been expected to produce benefits for rural areas. That is, MMBHOs were to reduce costs, reduce use of inpatient mental health care, increase reliance on outpatient care, direct more patients to mental health specialty providers, make mental health providers more available to rural areas, and manage providers in rural areas.[85, 86] Although MMBHOs appear to shift more patients to outpatient care, their record on providing more specialty mental health providers to rural areas or managing providers in rural areas is quite mixed. Montana is a case of where lack of specialty providers in rural areas led to failure of an MMBHO directed at shifting patients to specialty providers.[87] There are numerous reports of the inability of MMBHOs to constrain the behaviors of the scarce rural providers because of the lack of alternative providers.

MMBHOs have faced even more challenges in serving the mental health needs of rural children. Many Medicaid children suffer from serious emotional disturbances for which outpatient care, the strength of MMBHOs, may be ill-suited.[54] Based on a few states' MMBHO experiences with children with serious emotional disturbances, rural areas may not have the needed services, and funding may be insufficient to provide for the needed support services, as in New Mexico. Or, expanded services to children may contribute to MMBHO failure to adequately contain costs, as in North Carolina. Both of these states have recently terminated their MMBHO programs.[85] These examples and terminations of MMBHO programs in several other states point to challenges and uncertainties faced by state MMBHOs.

MMBHO solutions may be more successful where they capitalize on existing strong linkages between primary care and specialty mental health providers (and do not underestimate the daunting task of building linkages where such relations have been strained). Success may be found, too, in allowing for different delivery system arrangements in different regions, especially allowing for participation of a mix of county and other public and nonprofit provider organizations and professionals in the delivery of rural mental health services.[85, 88]

Training and Coordination

The Ad Hoc Rural Mental Health Provider Work Group[89] has outlined a number of major recommendations to enhance the supply and effectiveness of rural mental health professionals:

- Develop rural health focused didactic and experiential training for mental health graduate students.
- Recruit rural-connected individuals into graduate training programs in the mental health disciplines.
- Increase training-related placement of mental health students in rural areas to increase the supply and effectiveness of rural mental health providers and improve consumer access.

- Incorporate training support activities for behavioral health services into area health education centers.
- Provide federal and state funds to train rural mental health professionals.

There is recognition that the primary care physician is a major source of mental health care in rural areas.[32, 90, 91] Also, there is some evidence to support confidence in mental health treatment provided by primary care physicians.[13, 39] A number of researchers, however, indicate concerns about deficiencies of primary care providers in treating the mentally ill.[41, 77, 92-94] One study of primary care treatment of depression found evidence of little follow-up of patients during acute phase treatment as is called for in depression treatment guidelines. The result of such low-intensity treatment left two-thirds of the patients either with several symptoms with some danger of relapse or with persistent depression despite treatment.[95] Proposals to strengthen the ability of the PCP to provide mental health services include improving the competency of primary care providers through clinical practice guidelines, utilization of screening instruments, and creating greater contact of PCPs with mental health professionals via a variety of linkages.[36]

Integrated treatment addressing psychological health with physical health in patients may advance both cost and quality objectives in the system of care. The coordination of mental health services with primary health care has frequently been found to contribute to reductions in health care costs.[69] Integration of mental health services into a primary care organization requires attentiveness to the views of communities, professionals, and patients regarding stigma, confidentiality, and preferred treatment modalities. Of professional and organizational import, too, are implications for documentation, billing, and finances of the primary care organization.[96]

Improving the link between primary care providers and mental health specialists is of major interest among authorities on rural mental health.[32, 37, 97-99] One study identifies four models linking primary care providers and mental health professionals based upon the examination of 53 primary care organizations in 22 states:[100]

- diversification—primary care organization or physician hires mental health personnel to offer services at the primary care site;
- linkage—primary care organization enables mental health personnel independent of the primary care organization to offer services at the primary care site;
- referral—arrangements for patients of primary care providers to use off-site mental health providers; and
- enhancement—additional training for primary care providers to diagnose and treat mental health patients.

Outreach and Informal Support

Interventions aimed at outreach and increasing perceived need for help among the mentally ill may be very important.[13] Policies and programs are advocated to increase awareness of existing mental health services.[13] Advertising[101] and general outreach and education can play a part. Interventions to increase anonymity and acceptance of evidence-based treatment in rural America are advocated, as well.[13] Increased attention to cultural competence in the presentation of care in rural setting and to important sub-populations within rural settings must be part of such interventions.[102]

Transportation support may address isolation, poverty, distance barriers to professional resources, and lower utilization in rural areas. Transportation has long been a problem in accessing mental health services, especially among the rural and poor and remains so today even among those in Medicaid managed behavioral health care programs.[54]

The shortage of mental health providers in rural areas is often compounded by the lack of less formalized, but not unimportant, sources of support. Often missing, for example, is consumer and family advocacy for mental health that is often present in

urban settings.[18] Also missing in many rural settings are coordinated efforts such as Assertive Community Treatment (ACT) teams that rely on both numbers of patients and numerous local resources for their success.[103]

Informal caregivers among family, friends, or neighbors and natural helpers, such as local ministers or local sheriffs who are called upon in time of need or crisis, may be important resources in rural communities. Paraprofessionals in the form of parish nurses or promotores, for example, may be critical to linking clients with mental health service providers. The role of paraprofessionals may be critical in building relationships between local healers and mental health and medical professionals in some ethnic settings (e.g., among Native Americans). Programs that target informal caregivers, natural helpers, and paraprofessionals may be of particular importance in improving access to appropriate mental health services in many rural areas.

The informal social network, smaller and tighter in many rural areas, may reduce anonymity for the person who needs mental health services. At the same time, however, a strong and supportive social network can move those who need help to seek it, and support them in that quest. Significant benefit might result from targeting this larger audience to identify mental illness and to help the mentally ill to recognize their illness and to seek help.

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Mental health and mental disorders are serious problems in rural areas. These problems are reflected in the frequent failure to identify such conditions early on, lack of access to mental health professionals to treat such conditions, and the tremendous consequences of mental illness for treatment of physical illnesses and for day-to-day life. Mental health needs occur among men, women, and children of all ages, ethnic groups, and social backgrounds. Some of these groups appear particularly disadvantaged in rural areas in gaining necessary treatment. Among these groups experiencing rural disparities are children, the poor, the elderly, and African Americans and other minority groups.

These problems are reflected in the frequent failure to identify such conditions early on, lack of access to mental health professionals to treat such conditions, and the tremendous consequences of mental illness for treatment of physical illnesses and for day-to-day life.

Concerns regarding anonymity, treatment, and stigma associated with SMI may be more pronounced among some rural populations. These factors, combined with the existence of stressful occupations, and a lack of knowledge of mental illness symptoms or treatments may reduce utilization of mental health care. The continuing shortage of mental health professionals in rural areas creates serious access problems. It is all the more important, therefore, that rural primary care practitioners receive continuing training in mental health diagnosis and treatment. Similarly, ongoing attention to coordination between physicians, mental health specialists, and other formal and informal sources of mental health support is all the more critical to rural areas.

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NUTRITION AND OVERWEIGHT CONCERNS IN RURAL AREAS: A LITERATURE REVIEW

by Tom Tai-Seale and Coleman Chandler

SCOPE OF PROBLEM

- Overweight and obesity are one of the 10 "leading health indicators" selected through a process led by an interagency workgroup within the U.S. Department of Health and Human Services.[40]
- Nutritional disorders with complications and comorbidities are the ninth most frequent diagnostic category among hospitalized rural elderly Medicare beneficiaries.[41]
- Nationally, rural areas have higher self-reported rates of adult obesity than urban areas, but there is considerable variation among men and women across regions.[42]
- Diet and activity patterns have been ranked second only to tobacco as the leading "actual causes of death" in the United States, i.e., contributing to the diagnosed condition associated with death.[43]

GOALS AND OBJECTIVES

The goal of Healthy People 2010's nutrition and overweight focus area is to promote health and reduce chronic disease associated with diet and weight.[1] The problem of obesity and overweight is described as a new epidemic according to the Surgeon General's recent *Call to Action.*[2] In the last 20 years, the number of American children and adults who are overweight or obese has doubled. Sixty-one percent of American adults are overweight or obese, and 13 percent of children and adolescents are overweight. Traditionally, rural areas have experienced a lower incidence of overweight and obesity due to the increased physical demands characteristic of an agrarian lifestyle. However, this is no longer the case, and rural residents experience an increased prevalence of obesity and overweight compared to their urban counterparts.

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> Rural residents experience an increased prevalence of obesity and overweight compared to their urban counterparts.

The primary objectives addressed in this discussion relate to decreasing the incidence of obesity and improving dietary quality as follows:

- 19-1. Increase the proportion of adults who are at a healthy weight.
- 19-2. Reduce the proportion of adults who are obese.
- 19-3. Reduce the proportion of children and adolescents who are overweight or obese.
- 19-15. Increase the proportion of children and adolescents aged six to 19 years whose intake of meals and snacks at school contributes to good overall dietary quality.
- 19-16. Increase the proportion of worksites that offer nutrition or weight management classes or counseling.

Pertinent to this discussion are the following terms:

- *Body Mass Index (BMI)* is a popular method used to gauge whether or not a person is overweight. BMI is calculated by dividing a person's weight

(in kilograms) by his or her height (in meters, squared). A healthy weight range is a BMI of 19 to 24.9.[44, 45]

- *Overweight* is defined as exceeding expected, normal, or proper weight; especially exceeding the bodily weight for one's age, height, and build. An overweight individual has a BMI of 25 up to 29.9.[45, 46]
- *Obesity* is a condition characterized by excessive bodily fat and characterized by a BMI of 30.0 or higher.[45, 46]

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, nutrition and overweight tied with cancer for 10th and 11th ranks among the Healthy People 2010 focus areas that were rated as rural health priorities; it was nominated by an average of 22 percent of the four groups of state and rural health respondents.[3] There were statistically significant differences among the respondents, as local public health agencies and local rural health centers and clinics were more likely than state agencies or rural hospitals to rate this topic area as a priority. The Northeast and Midwest produced statistically significantly higher percentages of nominations for nutrition and overweight as a priority than did the South and West.

Published studies that assess the health priorities of rural residents are rare, and there is no indication that obesity is considered the most pressing health issue in rural areas. Clearly, however, there is interest in combating the nutrition and obesity problem in the U.S. The diet industry in the United States is a multi-billion dollar business reaching every area; rural physicians publish concerns about rising obesity; and obesity has been classified as a leading health indicator by the surgeon general, reflecting a major public health concern.[2]

While overweight and obesity is found throughout the United States, the problem may be especially severe in rural areas.

PREVALENCE AND DISPARITIES IN RURAL AREAS

While overweight and obesity is found throughout the United States, the problem may be especially severe in rural areas. Table 1 summarizes relevant studies illustrating obesity and overweight are more prevalent among rural children and adolescents than their urban counterparts.

Children and Adolescents

While none of the studies reviewed in Table 1 contain nationally representative samples of rural populations, they nevertheless support the notion that childhood and adolescent obesity appears to be worse in rural areas across the United States. This is apparently a reversal of the situation in the United States prior to 1980, when, in general, obesity was more common in children in large metropolitan areas.[4, 5]

Adults

Among adults, national survey data and smaller regional studies[6-9] support the view that obesity is more common in rural areas. For adult men, the prevalence of obesity steadily increases with declines in population density—being lowest in large central metropolitan areas and highest in counties with no city greater than 10,000 residents.[2] For adult women, the highest prevalence of obesity is also in rural areas. A national study examining the prevalence of obesity by gender and race (black and white) found that rural white men and women are more likely to be overweight than their urban counterparts, even when controlling for demographics and mediating variables like energy intake and expenditure.[28] A similar study of white women also found that obesity is more common in rural areas than in metropolitan areas.[47]

For black men and women, however, the picture is more complicated. No effect of rural residence is

Table 1. Selected Comparison Studies of Prevalence of Obesity and Overweight between Rural and Urban Children and Adolescents.

State	Obesity & Overweight Comparison	Results	Source
Michigan (rural northern)	Rural Michigan 4 to 17 year olds (N=993) were compared with state children overall.	The prevalence of obesity was 3 to 9% higher among rural children.	Gauthier, 2000[120]
Iowa	Rural 4th graders (N=457) were compared to a national sample.	Rural Iowan children were taller and heavier than the national sample.	Gustafson-Larson and Terry, 1992[121]
Kentucky	Children in grades 3 through 5 (N=54) were invited to participate.	One-third of rural children were overweight.	Crooks, 2000[67]
North Carolina	1,000 rural and 1,000 urban school children from North Carolina were compared.	The odds of being obese were 50% higher for rural children.	McMurray, 1999[65]
West Virginia	Fifth graders in three rural counties participated.	Forty percent were overweight.	Neal, 2001[122]
South Carolina	Sixth graders (N=352) in two rural counties were compared to the national average; three-fourths of the students were African American.	Forty-nine percent of the students were obese compared to a national obesity average of 21%.	Felton, et al., 1998[123]
Central New Mexico	Rural American-Indian 5th graders (N~2,000) participated.	One-third of the students were overweight.	Davis and Lambert, 2000[124]
South Texas	Mexican Hispanics ranging in age from 12 to 17 years old (N=4,375) were compared to national averages.	Forty percent were overweight, and 22% were obese (double the national average).	Lacar, et al., 2000[125]

found when controlling for demographics and mediating variables—save for extremely overweight black men, who are more prevalent in both rural areas and in large cities rather than in mid-sized cities[i].[28]

IMPACT OF THE CONDITION ON MORTALITY

In 14 studies (each having more than 20,000 subjects), it has been shown that obesity is associated with an elevated risk of mortality. Further, studies with fewer subjects usually show the same relationship—if they are followed long enough.[48] Current estimates are that obesity increases the risk of death from all causes about 1.5 fold and from coronary heart disease about two-fold.[12-15, 48]

Regional differences in obesity-related mortality are also observed. The age-adjusted coronary heart disease death rate in the South is highest in rural areas and second highest (in most years) in the rural Northeast.[16]

IMPACT OF THE CONDITION ON MORBIDITY

Obese children suffer more psychosocial dysfunction, hypertension, abnormal cholesterol metabolism, and orthopedic conditions like Blount's disease and hip problems such as slipped capital femoral epiphysis.[17] Excess weight on an adolescent tends to be carried into adulthood,[18-21, 49] facilitating the early beginning of atherosclerosis or buildup of fatty tissue in the arteries.[22] For both men and women who were overweight as adolescents, the rates of atherosclerosis, diabetes, coronary heart disease, hip fractures, and gout are increased.[14]

Overweight and obesity increases the risk of a great variety of serious diseases including heart disease; stroke; hypertension; gallbladder disease; cancer of

the endometrium, colon, kidney, gallbladder, and postmenopausal breast.[23] Overweight and obesity is also associated with high cholesterol, type 2 diabetes, glucose intolerance, menstrual irregularities, pregnancy complications, stress incontinence, and psychosocial disorders.[23] Further, the number of chronic medical conditions increases and the quality of life decreases with increasing body mass index.[12] It is relatively easy to develop obesity-related health complications. In fact, a weight gain of a mere 11 to 18 pounds over normal doubles the risk of developing type 2 diabetes.[50] In one study among women, being overweight by as little as 5 percent increased the risk of developing heart disease by 30 percent.[51]

The higher rates of obesity in rural areas may be one reason why some studies show that rural areas have higher rates of chronic diseases,[52-55] including stroke—especially among blacks.[56] This may be a new trend. Earlier studies show lower rates of coronary heart disease in non-metropolitan areas.[57, 58] One recent study, however, does not support this trend.[59]

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

Overweight and obesity causes lost wages due to illness and places huge burdens on the health care system, requiring more physician visits and nursing care. A health economist calculated that obesity is associated with a 36 percent increase in both inpatient and outpatient hospital spending—more than either the increase of costs due to smoking or drinking.[60] It is estimated that obesity accounts for between 6 to 7 percent of our total health care expenditures and costs our country over $100 billion dollars annually.[10, 11]

Finally, the overweight bear the brunt of severe social criticism that characterizes them as unhealthy, diseased, emotionally immature, weak, lazy, and impulsive.[24] Consequently, they face a wide variety of social problems including stigmatization, discrimination,[25] and other negative social outcomes. For example, seven years after determination of obesity in late adolescence, women who were obese had lower rates of marriage, fewer years of completed education, lower family incomes,[61] and higher rates of poverty. The authors believe that obesity was a determinate, not a consequence, of these social correlates.[62]

BARRIERS

There is evidence that rural life presents special challenges to maintaining a healthy weight. Among these are cultural and structural limitations in rural areas that may negatively affect both diet and exercise.

Cultural limitations include the following:

- *Higher dietary fat and calorie consumption, and a lower frequency of exercise.* Some studies indicate that rural residents in some areas may have a higher fat and calorie intake than the average U.S. citizen.[63, 64] A number of studies found that rural school children and particularly African-American girls have a higher fat intake than their urban counterparts[ii].[65-68]
- *Television watching.* Some evidence supports the idea that overweight rural youth may watch more videos and/or play more on the computer than their non-overweight peers.[67] Television watching may cause obesity in four ways: youth who watch television may snack more while watching; they may watch more commercials for high calorie and/or high-fat foods and select these over more nutritious foods;[69] they may have a lower metabolic rate because of television watching,[70] and they may substitute television watching for more energy-consuming activities. The last of these is viewed by some as the strongest cause of obesity.[71]
- *Failure of education.* The over consumption of fat and calories among rural people, to the extent it exists, may be due to a failure of education or to a cultural pattern. There is evidence, for example, that rural residents comply less with dietary recommendations.[72] This may reflect a rural preference for reliance on non-professional health advice. Some studies indicate that people in rural environments prefer informal to formal

information channels.[73] It may also reflect less social support in rural areas for compliance,[74] or it may reflect less confidence in the recommendations of rural health professionals.

- *Differential amounts of exercise.* Traditionally, rural adults exercised more than their urban counterparts due to the greater proportion of rural residents who were farmers. While farmers may get more exercise than non-farmers in rural areas,[75] fewer people are farming, and it is becoming ever more mechanized.

Structural causes of obesity include the following:

- *Lack of nutrition education.* Some studies suggest rural caregivers may lack the knowledge necessary to provide good nutrition to children. In a small qualitative study (N=20) designed to investigate barriers to nutritious feeding of toddlers, rural Michigan caregivers lacked knowledge of easy meal planning, the principles of nutrition, cooking skills, and child-appropriate portions; but they also complained of structural limitations—lack of time and money to prepare nutritious meals.[76]
- *Access to nutritionists.* Rural areas have difficulties attracting nutritionists. In fact, nutritionists score worse than physicians and pharmacists in being willing to work in rural areas—even when in rural health professional training programs.[77] This leaves the task of training rural residents in nutrition to other health professionals. Physicians, however, have little training in behavioral counseling[78, 79] and feel ill-prepared to provide diet therapy.[80] Further, only about half of physicians feel that good diet and exercise habits are very important for the average person, and even less believe it is their role to educate patients about resources in the community that could help patients with health promotion.[81] Regarding other health providers, nurses in rural areas frequently get questions about nutrition but only score average on nutrition tests.[82, 83]
- *Limited resources.* Smaller schools have fewer nutrition services.[84]
- *Exercise.* Rural areas may have fewer physical education classes in schools, fewer sidewalks, and fewer exercise facilities. Hospitals may offer exercise programs, but rural hospitals are much less likely than urban hospitals to have exercise programs, and they are more likely to identify this as an unmet need being affected by a lack of personnel and funds.[85]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

While the recent increase in obesity and its detrimental effects are clear, it is less clear how overweight and obesity can be prevented.[2] It is also not clear why rural children and adolescents are often heavier than their urban counterparts.

A fair portion of the disproportionate prevalence of obesity in rural areas is caused by the distinctive demographic composition of rural communities. Rural residents are on average older, less educated, and have a lower income than urban residents; and those who are older, less educated, and have a lower income have greater obesity.[26-33]

A fair portion of the disproportionate prevalence of obesity in rural areas is caused by the distinctive demographic composition of rural communities.

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

According to the Surgeon General, the most effective prevention and treatment strategies for obesity are unknown.[2] In addition, the literature contains few long-term studies on the prevention and treatment of obesity and even fewer in rural communities. Thus, it is hard to identify model programs with confidence. Nevertheless, the outlines of a model

program can be discerned from the Surgeon General's recent suggestions for developing a public health response.[2] Elements may also be borrowed from programs utilized in urban areas.

In brief, the Surgeon General calls for communication, action, research, and evaluation to address obesity at each of five social settings: family and community, school, health care, media and communications, and worksites. Thus, the best program ensures that there are effective and complimentary interventions at each setting. No such program exists in the literature at the present time.

The Surgeon General's call for communication is meant to highlight the need to inform, motivate, and empower decision makers in all social settings to prevent and decrease overweight and obesity. The call specifically states that "individual behavior change can only occur in a supportive environment with accessible and affordable healthy food choices and opportunities for regular physical activity." Thus, model programs cannot focus only on changing the behavior of the obese. Indeed, the Surgeon General makes plain that "actions to reduce overweight and obesity will fail without … [a] multidimensional approach." To be successful, interventions must consider individual behavior change, group influence, institutional and community influences, and public policy. Few programs at present are so far reaching.

Model programs should also use media and communication to stress healthy dietary choices and the benefits of regular physical activity. The Surgeon General asks that weight-loss programs and goals be truthful and reasonable, that media outlets balance messages that may encourage over-consumption and inactivity with more healthful messages, that healthier eating and physical activity messages be integrated into youth TV programming, that media professionals employ actors of diverse sizes, and that nutrition and exercise scientists be trained in media advocacy. These are reasonable goals for model programs.

The best place to start in preventing obesity is with preventing the development of obesity in young children. Obesity may be more effectively treated in preschool than in elementary school.[86] Nutrition authorities assert that a diet that contributes no more than 30 percent of calories from fat and less than 10 percent of calories from saturated fat is safe for children above two years of age.[87-90] Though rare, more extreme dietary restrictions may cause harm to children.[91, 92]

Many interventions designed to prevent or treat obesity in children can be applied across a population, that is, provided to all children. In general, nutritional interventions for all children focus on purchasing foods with less fat content, eliminating excess or added fat in food preparation, using cooking methods that do not add fat, and increasing the amounts of fresh fruits and vegetables. Fat-lowering diet interventions using these techniques at preschools have proven successful.[34, 35] One of the keys is to lower fat intake in foods children enjoy eating.[93] For example, a school-based intervention that is easy to implement is to substitute good for poor quality snacks in school vending machines. This has proven successful in both metropolitan and rural areas.[94]

In general, combining fat-lowering school food service programs with enhanced physical activity in physical education classes and classroom-based health education may offer effective interventions to obesity among children. Through these interventions, the fat content of school lunches has been significantly reduced, and the level of school physical activity has been significantly increased in both rural and urban studies.[95-98] Recent reviews of the literature also suggest the effectiveness of school-based heart-health programs at improving the health behaviors of students.[99, 100] The evidence is mixed as to whether school children make up in other meals the extra fat lost in modified school lunches or compensate for receiving extra activity at school by getting less activity after school.[96, 98] Consequently, school-based fat-lowering diets and activity-increasing programs should be accompanied by interventions aimed at families.

A recent review suggests that children are affected by the heart-health habits of their parents and that

school-based programs are strengthened when a family component is included.[101] For example, fat avoidance of parents is one of the best predictors of fat avoidance in children.[102] Further, children have better exercise performance and less obesity when their parents are physically active,[103] and families who are involved in organizations or activities that promote activity (e.g., YMCA, YWCA, health clubs, health spas, sports, and Scouts) have children with better physical activity performance scores and less obesity. Young children, however, may not model parental health behavior and require more active interventions.[104] While families should work together to reduce childhood obesity through reduced calorie intake and increased physical activity, there is evidence to suggest that obese children may benefit best by programs that involve parents separately in weight-loss counseling.[105]

School-based, fat-lowering, activity-increasing programs for all students in a class are often not, however, effective in significantly lowering the average body mass index of students in a school. While successfully lowering fat intake and increasing activity, these positive effects may be obscured by the large developmental changes occurring during early school years and by the averaging that occurs in these studies. For school-level weight loss, a long intervention period or more substantive changes may be needed. Nevertheless, such programs help build in students the foundation for life-long health habits. For weight loss among obese children, school-based programs that use behavior modification (setting specific goals, behaviors, and rewards) for reducing fat and calorie content and increasing physical activity, coupled with the provision of special low-calorie school lunches, and social support training for those in the child's social network (parents, teachers, physical education instructors, peers, food-service personnel, and administrators) have proven successful.[106]

Beyond school-based programs, community or home-based programs have been successful in reducing child and adolescent obesity. The Children's Health Project, while developed for children with high LDL in the north Philadelphia suburbs, contains components that seem applicable to rural areas. One such component, the parent-child auto-tutorial (PCAT), consists of a home-based self-instruction program consisting of 10 'talking-book' lessons with audiotape, picture booklet, paper and pencil activities, and a parent manual.[36, 37] Children who use the program significantly lower their total fat and saturated fat intake in comparison to controls and do as well as children receiving face-to-face counseling with a dietician.

Nutrition and physical exercise counseling programs that are offered once a week in the community for children at-risk for diabetes and their parents have also shown to improve both exercise and nutrition habits.[107]

As to adults, the most successful therapy for weight loss and maintenance combines a low calorie diet (800 to 1,500 calories a day) with increased physical activity and behavioral therapy.[23] The NIH clinical guidelines for adults state that while reducing fat intake is helpful, this is insufficient for weight loss without a reduction in calories. A low calorie diet achieves about an 8 percent weight loss in six months. The NIH recommends that each low calorie diet should be personally tailored to the patient, and the patient should receive frequent contact with health professionals during weight loss.

The behavioral therapy component of treatment consists of practices designed to help individuals or groups overcome barriers to compliance with dietary and activity recommendations. These include: self-monitoring of eating habits and physical activity, managing stress that triggers dysfunctional eating, eliminating stimuli that lead to overeating, generating solutions to problem behaviors and making plans to implement them, making rewards contingent on good behavior, restructuring thought to set realistic goals and eliminate self-defeating thoughts, and building social support networks.[23]

Numerous programs have used some or all of the strategies above to achieve weight loss in adults. Some of these have been developed in rural areas, and others may be easy to adapt. Weight-loss programs broadcast over cable television offer promise for overcoming the distance barriers and

costs associated with treatment in rural settings and have proven as successful as face-to-face interventions in urban interventions.[38] Short programs on network television affiliates that stress simple diet rules have also proven successful. In one study, a behavior modification diet received 15 minutes of air time on Mondays and 5 minutes on Wednesdays and Fridays on a morning show for a month. Each week, a few simple eating rules were emphasized for losing weight, and participants charted their progress at home. Subjects completing the entire program lost an average of 5.6 pounds.[108]

Correspondence courses may also prove useful in overcoming barriers that hinder meetings in rural areas. Courses modeled on behavior modification techniques have shown that weight loss can be achieved and maintained among those who are active correspondents in metropolitan areas.[39] These courses could easily be offered in rural areas. Web-based courses also offer promise for rural areas.

Programs designed to increase fruit and vegetable consumption may also reduce fat and calorie intake. Several community-based efforts have been successful in promoting the habit of eating at least five servings of fruit and vegetables a day.[109-111] These can be tried in rural settings. While nutritionists have not generally recommended diet meal replacements, these have been found to reduce and keep weight off in some rural participants.[112]

Solutions to rural obesity may also require additional involvement of physicians and other health professionals. Many primary health care providers in both rural and urban settings feel ill prepared to give nutrition and physical activity counseling. Continuing nutrition education delivered to rural physicians in rural settings in Wyoming increased both physician knowledge of nutrition and the use of educational materials for nutrition.[113] Physicians working in rural southern areas were trained to use a simple dietary assessment device, deliver specific behavior change recommendations, and use a monitoring and reinforcement system to increase dietary compliance.[114] A three-session counseling program using small achievable steps designed to improve self-efficacy among low-literacy and low-income patients in the South was successful in a modest lowering of body mass index and in statistically significant improvements in dietary habits in 11 counties throughout largely rural North Carolina.[115] Physicians in rural North Carolina have also found that patients may accept a very low-fat diet—but this has only been shown in a small study with motivated coronary artery disease patients.[116]

In worksites, the Surgeon General calls for creating opportunities for regular physical activity during the workday, ensuring that healthy foods are available for lunch, establishing or promoting employee membership in fitness facilities, and creating incentives for workers to achieve and maintain healthy body weight. Few rural worksite studies focused on obesity have been published. One study with mostly white male rural energy workers in Texas and Louisiana, who consume a high-fat, low-fiber diet, found that workers know they should eat a healthier diet but lack the efficacy expectations to do it.[117] The lack of self-efficacy clearly underlies much of the failure to improve life-style behaviors[118] and may be especially important to develop in rural residents. One promising study found that the confidence and intention necessary to lower fat intake can be increased in rural worksites.[119]

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

It is not clear why living in a rural area increases the odds of being obese and suffering its effects. Certainly, the demographic composition of rural areas accounts for some, perhaps a large portion, of the extra risk. But rural areas also have other challenges: fewer prevention and treatment facilities, further distances to reach them, and perhaps cultural challenges that may vary from place to place.

Given the current state of knowledge, those designing interventions to decrease rural obesity will be hard-put to know where to begin as the list of possible contributing factors is large and perhaps

varied from region to region. There is, however, wisdom in starting with basics: improving diet (decreasing fat and calorie intake) and increasing exercise. The Surgeon General's *Call to Action* makes it clear that progress can be made at each level of society: from individual to community, school to worksite, and media to health care. Surely, one of the more important steps is to begin coalition formation in each rural community to raise awareness of the problem and to improve resources. It is likely that progress will occur slowly through improvements in infrastructure that can impact rural obesity: nutrition and exercise education, better school lunches, and more exercise sites. Increased emphasis on attracting more public health workers trained in nutrition to rural areas, training rural primary-care givers in effective nutrition and exercise change strategies, and enhancing the rural public's sense of self-efficacy to make diet and nutrition changes are avenues that may help trim the belts and enhance the health of rural America.

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Endnotes

[i] Some studies, however, do not show increased obesity in rural areas.[74] The lack of effect may, however, be due to demographic differences: rural mothers tended to be younger, perhaps before the period of greatest weight gain between the ages of 25 to 34.[126]

[ii] However, not all studies agree about rural fat intake. In a nationwide food consumption survey of adolescents (N=933), degree of urbanization had no effect on the total amount of fat consumed.[72] Further, excess fat intake may or may not translate into excess calorie intake. Rural teenage girls from eight southern states had significantly lower caloric intake than their urban counterparts.[127] In instances where the calorie restrictions are severe or nutrient density is very poor for growing children, the higher rates of obesity may simply reflect shorter stature.

THE STATE OF RURAL ORAL HEALTH: A LITERATURE REVIEW

by Pete Fos and Linnae Hutchison

SCOPE OF PROBLEM

- Nationally, rural areas record higher rates of people 65 and older with total tooth loss than do their urban counterparts. Among the four regions, only in the Midwest is this rural rate exceeded by the small metropolitan counties.[8]
- Shortages of dentists are much greater in rural areas in all four regions of the country.[8]
- Dental visits within the past year tend to be lower among 18-64 year old people in rural areas than in urban areas across all four regions of the country.[8]
- Dental shortages were identified as major rural health concerns among state offices of rural health.[19]
- Dental conditions are "ambulatory-care-sensitive" conditions.[20]

GOALS AND OBJECTIVES

The goal of the Healthy People 2010 oral health focus area is to prevent and control oral and craniofacial disease, conditions, and injuries, and improve access to related services.[2] The proceeding statement, from the Surgeon General's Report on Oral Health, provides the first national acknowledgement that oral heath is an important component of overall health:

> …Oral health means much more than healthy teeth…Oral health is integral to general health. You cannot be healthy without oral health. Oral health and general health should not be interpreted as separate entities."[1]

This report describes methods to address the following Healthy People objectives:[2]

- 21-1. Reduce the proportion of children and adolescents who have dental caries experience in their primary or permanent teeth.
- 21-2. Focus on untreated dental caries. The objective is to reduce the proportion of children, adolescents, and adults with untreated dental decay.
- 21-3. Increase the proportion of adults who have never had a permanent tooth extracted because of dental caries or periodontal disease.
- 21-4. Reduce the proportion of older adults who have had their natural teeth extracted.
- 21-5. Reduce periodontal disease.
- 21-6. Increase the proportion of oral and pharyngeal cancers detected at the earliest stage.
- 21-7. Increase the proportion of adults who, in the past 12 months, report having had an examination to detect oral and pharyngeal cancers.
- 21-8. Increase the proportion of children who have received dental sealants to their molar teeth.
- 21-9. Increase the proportion of the U.S. population served by community water systems with optimally fluoridated water.
- 21-10. Increase the proportion of children and adults who use the oral health care system each year.
- 21-12. Increase the proportion of low-income children and adolescents who received any preventive dental service during the past year.
- 21-13. Increase the proportion of school-based health centers with an oral health component.
- 21-14. Increase the proportion of local health departments and community-based health centers, including community, migrant, and homeless health centers that have an oral health component.

Several definitions are pertinent to the discussion of oral health in the United States:

- *Dental caries* is defined as tooth decay or a disease of the teeth resulting in damage to the tooth structure and is typically a disease of children. Children tend to have increased incidence of smooth surface and pit and fissure lesions, while adults tend to have increased incidence of root caries.[2, 21]
- *Periodontal disease* is defined as an inflammation of the gums involving the bones and is typically an adult issue.[21]
- *Edentulism* is defined as loss of natural teeth.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, oral health ranked in fifth place among the 28 Healthy People 2010 focus areas, receiving priority ratings from about 35 percent of the respondents.[3] It was rated as a priority most frequently by state organizations, rural health centers and clinics, and local public health agencies; it was least frequently identified as a priority by hospitals. The differences are statistically significant. No significant differences emerged in this regard across geographic regions.

Oral health ranked in fifth place among the 28 Healthy People 2010 focus areas.[3]

PREVALENCE AND DISPARITIES IN RURAL AREAS

While safe and effective prevention measures exist for the most common dental diseases,[1] i.e., dental caries and periodontal diseases, there are disparities in access to and utilization of these measures. The recent report released by the United States Surgeon General, *Oral Health in America: A Report of the Surgeon General*,[1] has brought national attention to oral health disparities in our nation's population. These disparities are most evident in the incidence and prevalence of dental caries and periodontal diseases. To a lesser degree, these disparities also exist in oral and pharyngeal cancers and other craniofacial disorders. The disturbing concern is that these disparities now exist in spite of major improvements in the oral health of Americans over the past 40 to 50 years.

Dental caries is the most common chronic disease suffered by children.[1]

Understanding the scope of the oral health issue facing the United States begins with focusing on the state of children's oral health. Dental caries is the most common chronic disease suffered by children—five times more prevalent than asthma and seven times more prevalent than hay fever.[1] More than 50 percent of all children experience dental caries by the age of eight years. About 80 percent of all children have dental caries by age 18.[4] In addition to its prevalent nature, dental caries is typically irreversible. Compounding the problem is the fact that 25 percent of children in the U.S. have not seen a dentist by age six.[1] It is estimated that more than 51 million school hours are lost annually due to dental-related problems.[1]

Since 1970, however, the incidence of dental caries in permanent teeth has significantly decreased in school-aged children. The proportion of untreated dental caries in permanent teeth among school-aged children has been decreasing steadily over the past 30 years. This decline can be attributed to several factors. First, the percentage of school-aged children with dental sealants on permanent teeth has increased over the past few years. This increase in sealant usage is due to increased use of the procedure by dental providers, increased coverage by dental insurance, and educated parents. Second, since 1980, the proportion of the U.S. population with fluoridated community water supplies has increased to approximately 60 percent. Nonetheless, over 100 million Americans do not have fluoridated community water supplies.[1]

A disparity in prevalence of dental caries exists across socioeconomic and geographic subgroups in the population. Low-income children have two times greater prevalence of dental caries when compared to other children. In addition, low-income children have a significantly greater amount of untreated decay than other children. While dental sealants have been proven effective in reducing the incidence of dental caries among children, only 3 percent of poor children have dental sealants compared to 23 percent of children overall.[2] Racial disparities are also striking. Among children, 36 percent of African Americans and 43 percent of Hispanics have untreated dental caries, compared to 26 percent of Caucasians.[2] Hispanic children have the greatest number of dental caries in primary teeth when compared to all other children.[5] Among all the people over the age of two years in the U.S., 44 percent visit a dentist once a year, of which, 50 percent are non-Hispanic whites, 30 percent Hispanic, and 27 percent non-Hispanic blacks.[2]

Low-income children have two times greater prevalence of dental caries when compared to other children.

Periodontal disease is positively correlated with age across all socioeconomic and geographic subgroups in the population. Periodontal disease is more frequently found in African Americans and low-income adults. Men are more likely to develop destructive periodontal disease than females. Thirty-five percent of adults with less than a high school education have periodontal disease compared to 28 percent of high school graduates, and only 15 percent of those high school graduates with some college.[5]

Other oral health issues falling in this category include cleft lip and palate as well as oral and pharyngeal cancers. (Note: These two subjects are not treated in depth in this discussion due to space limitations.) Cleft lip and palate occurs in one in every 600 live births in whites and one in every 1,850 live births in African Americans.[1] Oral and pharyngeal cancers account for approximately 2 to 4 percent of all cancer cases in the United States.[6] The most common site of occurrence is the tongue, accounting for approximately 30 percent of all oral and pharyngeal cancers, followed by the lip (17 percent), and the floor of the mouth (14 percent). Overall, men have an incidence rate 2.6 times that of women with 14.8 per 100,000 versus 5.8 per 100,000 among women. Blacks have a higher rate than whites (12.4 per 100,000 and 9.7 per 100,000, respectively). In particular, black males have the highest reported rates. The rates among black and white females are similar.[9]

Oral health has received little attention in rural health research. Of the existing research, more research has been conducted across and among racial and ethnic subgroups.[22] An assumption that can be made is that oral health disparities that exist in urban areas are at least as severe, if not more pronounced, in rural areas. This assumption is based on poverty, limited supply of dental care providers, and inadequate transportation.

The available research, though limited, supports this assumption. A distinct disparity is seen in the survey data between urban and rural areas, revealing dental caries among children and adults to be more prevalent in rural populations than in urban populations. In 1999, rural adults were less likely than urban adults to have had a dental visit in the past year. Within urban areas, 67.1 percent of the total survey sample had a dental visit in the past year. In rural areas, only 58.3 percent of the sample survey had a dental visit in the past year. This finding illustrates the difference in access that exists in urban and rural areas.

A distinct disparity is seen in the survey data between urban and rural areas, revealing dental caries among children and adults to be more prevalent in rural populations than in urban populations.

Studies have also indicated that children in rural areas have more dental caries experience than urban children.[7] For example, one study of the oral health status of children attending public schools in Oklahoma focused on the level of dental caries experienced in the Native-American population in comparison to non-Indian children. Native Americans live predominantly in the rural areas and are dependent on the public health care delivery system. Results for white and Native-American children ages five to six years and children 15 to 17 years revealed the prevalence and severity of caries in Native-American children are significantly greater.[23]

The age-adjusted prevalence rate of edentulism, total tooth loss, in the United States is also higher in rural areas than in urban areas.[8] Although edentulism is more prevalent among low income than high-income people, those in rural areas are more likely to have such loss.

IMPACT OF THE CONDITION ON MORTALITY

About 30,000 new cases of oral and pharyngeal cancers are diagnosed annually, along with the occurrence of about 7,500 deaths.[9] While being a relatively rare occurrence, these cancers carry one of the lowest survival rates of all. Eighty-two percent of these patients will survive at least one year after diagnosis, while only 50 percent will have a survival of greater than five years.[10] The five-year survival rate is 58 percent for whites compared to that of African Americans, whose rate is much lower at 34 percent.[9] (See the Cancer chapter for additional information regarding cancer.)

> Oral diseases and conditions affect the entire body and body systems.

IMPACT OF THE CONDITION ON MORBIDITY

It is important to continue to recall that oral health directly affects general health. Oral diseases and conditions are not limited to the oral cavity and supporting structures but affect the entire body and body systems.

A case-control study was conducted to determine the risk factors for cerebrovascular ischemia. Suspected risk factors included chronic or recurrent respiratory infections, ear-nose-throat infections, and dental infections. Study results indicated that cases of cerebrovascular ischemia (ischemic stroke) had statistically significantly worse dental status and more severe periodontitis than controls. After adjusting for age, socioeconomic status, and established risk factors, poor dental status was significantly associated with cerebrovascular ischemia.[24]

Periodontitis has been suggested as a risk factor for coronary heart disease. Studies have been performed to investigate the association between periodontitis and artherosclerosis and coronary heart disease. Current evidence does not confirm that periodontitis is a risk factor for coronary heart disease, but an association seems to exist.[25, 26] Studies have found a relationship between periodontal disease and carotid artery intima-media wall thickness. This indicates that periodontitis may have an etiologic role in arthrosclerosis.[27]

CONTRIBUTER TO MANY OTHER HEALTH PROBLEMS

Many oral diseases have been linked to other medical problems. These medical problems include preterm low birth weight babies, cardiovascular disease, diabetes, and respiratory disease. Recent research has suggested an association between preterm and low birth weight babies and periodontal disease. Retrospective studies have shown that expectant mothers with periodontal disease have a three to seven times greater chance of having a preterm low birth weight baby than mothers who did not have periodontal disease.[28] Prospective studies have suggested that mothers with periodontal disease may have a higher risk for preterm low birth weight babies.[29] A recent study of pregnant African-American mothers indicates that a significant association exists between low birth weight deliveries and serum antibodies against periodontal-disease-causing-bacteria.[30] (Refer to the Maternal, Infant, and Child chapter for further information on preterm and low birth weight babies.)

Periodontal disease has been linked with diabetes mellitus. (Refer to the Diabetes chapter for more information on diabetes.) Evidence indicates that diabetes mellitus, a risk factor for severe periodontal disease, commonly is found in patients with periodontal disease. This trend suggests a relationship between these two disease processes. In fact, studies have shown that elimination of periodontal disease can improve treatment and control of diabetes.[31]

Respiratory and oral infections have been thought to be related for many years, due to anatomic proximity and physiological functioning. A study of national data has indicated that people with confirmed acute or chronic respiratory disease had poorer oral hygiene scores than subjects without respiratory disease. This association was confirmed after adjusting for age, race, gender, and smoking status.[32]

BARRIERS

Overall, the trend in the proportion of persons who experienced a dental visit in the past year has remained constant over recent years, and the same is true for most subgroups. But, disparities across subgroups in the population are observable across urban/rural areas, race, ethnic group, age, and income level. The causes of the oral health disparity between urban and rural areas can be traced to several factors that can be categorized as access to care and utilization, economic, and dental resources.

Access and Utilization

Access to care, defined as "the timely use of personal health services to achieve the best possible outcomes,"[20] is a major determinant of oral health and general health. The challenges to improving access to care in rural areas constitute a long list. These are lack of dentists, inadequate supply of dentists who accept Medicaid or other discounted fee schedules, reluctance by dentists to participate in managed care programs, socioeconomic nature of rural populations (poverty, low educational attainment, cultural differences, lack of transportation), and absence of a coordinated screening and referral network.[11]

Ability-to-pay, including access to health and dental insurance, is an important determinant of receiving adequate and necessary dental care. According to the Surgeon General's Report, children with dental insurance are 2.5 times more likely to receive dental care than children without dental insurance. However, less than 20 percent of children with Medicaid insurance coverage receive one dental visit each year.[1] Often, Medicaid insurance does not include dental insurance coverage, or there is a lack of providers accepting Medicaid dental insurance.

Race differences show a disparity in the proportion of persons who had a dental visit in the past year.[12] In 1999, the percentage of whites who had a dental visit in the last year equaled 67.1 percent. At the same time, among blacks, only 56.1 percent had a dental visit the past year. A similar lower percentage of American Indians or Alaska Natives reported dental visits at 56.2 percent in 1999. When ethnic groups are evaluated, white, non-Hispanics have the greatest proportion of persons who had a dental visit the past year.[12]

Age-based disparities also exist. This disjoint can be described by reviewing the trends in dental visits from 1997 to 1999 in the United States across age groups.[33] Overall, 65.2 percent of people two years of age and over (this is equivalent to the total number of expected people who should visit a dentist) had a dental visit in the past year. Specifically, the percentage of individuals having a dental visit in the past year are as follows: for ages two to 17, 72.6 percent in 1999; for adults ages 18 to 64, 64.6 percent in 1999; and for persons 65 years and older, 55 percent in 1999.[33] These proportions are directly affected by access to care.

Economic Factors

Income level is a major factor contributing to utilization of access to care. Adults living in poverty (income at 200 percent of the federal poverty level or below) are less likely to receive dental care than wealthier adults. Among people who are considered non-poor (incomes 200 percent or greater than the Bureau of the Census poverty threshold), 72 percent had a dental visit the past year.[12] Among the near

poor (incomes of 100 percent to less than 200 percent of the poverty threshold), the percentage dropped to 48.5 percent in 1999. Among the poor (incomes below the poverty threshold), the percentage is even lower at 46.2 percent having a dental visit the past year.[12]

Income has a dominant effect on access, ameliorating much of the disparity across racial and ethnic groups. That is, more modest differences in percentages having a dental visit in the last year were found in people who are poor—whites, non-Hispanics (49.9 percent), blacks, non-Hispanics (46.7 percent), and Hispanics (41.9 percent).[33]

Dental Workforce Issues

Dental workforce supply is an important determinant of oral health status because of the need for trained professionals to provide therapeutic and preventive care. Here again, rural disparities exist. The distribution of dentists in large metropolitan areas is over 60 per 100,000. In rural cities the ratio is 40 dentists per 100,000; and in rural non-city areas, it decreases to about 30 per 100,000 population. This disparity may become more serious as the supply of dentists is decreasing due to declining numbers of dental students and an increase in the number of retiring dentists.[13]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

Cigarette smoking is a significant risk factor for periodontal disease.[2] In spite of significant decreases in cigarette smoking among adults during the 1950s and 1960s,[34] this trend has now reached equilibrium. In 1998, rural adults represented a greater proportion of cigarette smokers (31 percent males and 27 percent females) compared to adults in urban areas (25 percent males and 20 percent females). (Refer to the Tobacco section for more information.)

Regarding oral cancers, various potential risk factors exist that increase one's likelihood of developing these diseases. The greatest of these are alcohol consumption and tobacco usage. About 75 percent of all cases are attributed to the usage of either smoked or smokeless tobacco.[6] Smoking increases the chances of the occurrence anywhere in the oral cavity; pipe smoking increases the chances of the occurrence in the lips where the pipe stem has contact, and smokeless tobacco increases the likelihood of cancer developing in the cheek, gums, or inner lip.[35] Those who consume alcohol regularly are at a six times higher risk of developing oral cancer, and if this consumption is accompanied with tobacco use, the risk increases. Other risk factors that can increase one's oral cancer risk are exposure to ultraviolet light, oral irritation, vitamin A deficiency, and Human Papillomavirus infection.[35]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Partnerships between states and dental providers have been attempted to increase access to care through Medicaid. In Washington, a pilot program to provide dental services in private offices to Medicaid children was conducted by the state and the dentists in the community.[36] After one year, 37 percent of enrolled Medicaid children made at least one visit to the dentist, compared to 12 percent of children not enrolled in the program. This indicates that expanded access to care is effective in introducing children to the dental care delivery system.

"Health commons" is an approach that has been used for low-income rural populations.[14] "Health commons" is a creative, community-based approach that is designed to develop collaborative activities in an attempt to solve oral health problems in disadvantaged populations. "Health commons" sites are integrated primary care practices that include medical, dental, behavioral, social, and public health services. To be successful, a "health commons" approach requires comprehensiveness to enhance dental service capacity, expand the available dental workforce, develop interdisciplinary primary care teams at the community-based sites, and formulate oral health policy. The interdisciplinary nature of this approach allows for the inclusion of dental services in the primary care model, giving access to

dental care for uninsured, low-income rural populations.

It is proposed that programs such as Project Head Start should be expanded to target areas in which children demonstrate unmet need. In fact, children who participate in Head Start have been found to have high rates of dental caries.[15] Head Start program guidelines provide for education, health care, parent involvement, and social services. The specific program standards for direct dental services include: a) oral examination, b) treatment to relieve pain, discomfort, or infection, c) restoration of carious lesions, d) needed pulp therapy, e) extraction, when appropriate, and f) removal of dental plaque.[37]

At the same time, there are recognized barriers to Head Start-based dental programs that result in children not receiving needed dental care. These barriers have been determined to be: a) lack of parent participation, b) no available private transportation, c) parents' perception of quality of care, d) distance to providers, e) transportation costs, f) lack of adequate funding, g) limited hours of operation, and h) no available health services in the community.[38] In any case, it has been proposed that such programs must provide more than screening and necessary care, and move toward a comprehensive, integrated treatment program.[15]

Dental Insurance Reforms

Dental insurance or public assistance may be important to address rural disparities in oral health. About 55 percent of the U.S. population are covered by private dental insurance.[39] Recent studies have demonstrated that children with dental insurance are more likely to receive needed dental care than uninsured children.[40] Children with dental insurance have more dental visits, and a greater proportion have three or more visits.[39]

Medicaid is designed to provide dental benefits for the medically indigent population. Many have stated that Medicaid expenditures are inadequate, with less than 1 percent of expenditures used for dental treatment.[41] Less than 20 percent of all Medicaid children receive preventive dental services each year.[16] Additionally, Medicaid programs in most states do not provide any adult dental services.

Expansion of Medicaid coverage and improvement of access to Medicaid dental services could have a beneficial effect in eliminating the disparity seen in rural areas. A study of unmet dental need in Medicaid children found a high prevalence of dental caries among those who regularly utilized dental services, but a relatively low level of unmet need. The study results indicate that Medicaid children who use dental services, a small proportion of the entire study sample, had less unmet dental need.[42]

Expansion of Medicaid alone may not be the answer to the disparity of dental caries experience between low-income and other children. Research indicates that children with Medicaid dental coverage are less likely to receive a dental visit than children with private dental insurance.[43] This indicates that expansion may need to be accompanied with modification in the design of the Medicaid dental program.

Fluoridation

The systemic and topical beneficial effect of fluoride has been documented for many years. Fluoridated community water supplies reduce the incidence and prevalence of dental caries in a population at a very cost-effective price.[44, 45] Benefits from fluoridated community water supplies have been reported to range from an 11 to 40 percent reduction in dental caries.[17]

Fluoridation of community water supplies in urban areas is very common, although this may not be feasible in rural areas. In these cases, delivery of fluoride in other media is recommended. Research has shown that caries prevention programs that use both systemic and topical fluorides result in a significant decrease in the prevalence of dental caries.[46] Topical fluoride application occurs through the use of toothpastes, mouth rinses, and professionally applied gels.

One approach that is useful in implementing fluoridated community water supplies is the

community diagnosis process.[47] This process includes collection of community-specific primary data on oral health status of school-aged children. The data indicate the need for caries-preventive measures that can be used to answer the controversy of community-wide public health interventions. The community diagnosis process results in information for presentation to lawmakers, stakeholders, and other decision makers who are affected by public health measures.

Dental Sealants

Dental sealants have been proven to be a cost-effective dental-caries-preventive strategy. Research shows that dental caries in sealed permanent teeth are significantly less likely than in unsealed teeth. One study found that permanent molar surfaces with dental sealants were 50 percent less likely to have dental decay.[48] This study also determined that dental sealant usage is most beneficial in those children and adolescents who are at risk for occlusal caries.

Dental Professionals Supply

For the past decade, the federal government has used health professional shortage areas (HPSAs) and medically underserved areas (MUAs) as designations for intervention. Through the National Health Service Corps (NHSC), health care providers have been placed in identified need areas. But, results indicate that this distribution of providers has not been effective in addressing the oral health needs of those people in the underserved areas.[49]

Given the decreasing trend in the number of dental care professionals, other health care professionals must be included in the dental team. A coordinated, collaborative effort is needed to address the disparity in oral health status throughout the nation. Several potential efforts include pediatricians and others in the oral health care of children.

Pediatricians may be able to help in improving the oral health status of low-income and rural children by participating in oral health prevention during well-child care visits. These children have difficulty obtaining needed dental treatment, with less than 20 percent of Medicaid-eligible children under 21 years receiving preventive dental services.[16] Most pediatricians feel that they should play an important role in children's preventive dental programs, but they lack the requisite knowledge to be an effective member of the dental team. To facilitate training, medical education must include information about oral health, including growth and development, in medical school, residency training, and continuing education courses.[50]

Another method is the expansion of school-based dental services. This expansion would involve the education and training of school nurses and the establishment of school-based dental clinics. These school-based dental care centers would be most important in dental health education and dental sealant programs.

Regarding oral and pharyngeal cancers, over three-fourths of these cancers are present in areas readily visible or palpatable during an oral examination. Regular examinations by a health professional offer primary and secondary prevention opportunities by diagnosing the cancer in its early stages.[18] Eliminating or reducing the exposure to the risk factors along with having regular oral exams may greatly reduce the likelihood of developing either of these deadly diseases.

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

OTHER FINDINGS

A population that is often forgotten in the disparity discussion is the special needs population. People with developmental disabilities and complex health problems may face additional barriers to dental care because of the attitude of policymakers and dental providers toward this population. The more obvious physical condition is given primary attention, with oral health issues ignored.

There are currently an estimated 54 million people who are defined as having a disability according to the Americans with Disabilities Act. Of these, approximately 7.5 million have mental retardation, and more than 4.5 million people have seizure disorders.[51]

The common overall oral health finding for persons with developmental disabilities is poor oral hygiene, characterized by a) extensive gingivitis, b) gross calculus deposits, c) high prevalence of periodontal disease, and d) dental caries experience similar to the general population.[52] People with special needs are not a homogenous group, i.e., oral hygiene and oral health status contrasts sharply across the severity of the developmental disability.[53] Barriers to provision of the appropriate level of care include a) physical restrictions, b) financial constraints, c) and willingness of the dentist to treat special needs people.[54]

A compounding problem is that the level of disabilities may result in the need for a hospital setting for the delivery of dental services. Providing oral health care for people with disabilities is a difficult task. Special needs populations usually require approximately 20 percent more time for completing a dental treatment plan.[55, 56] Studies of people with mental retardation living in a long-term care setting showed that 40 percent of the people could be treated with local anesthesia, with the remaining requiring pre-operative sedation or general anesthesia.[57] The need for hospital care is not a problem in urban areas, but it is unusual to locate hospital dental services for an underserved rural special needs population.[58]

Elderly people are another population that exhibits oral health disparity. The elderly population living in long-term care facilities have similar oral health needs as people with developmental disabilities. As age increases in the elderly population, there is an associated increase in prevalence of physical and mental disabilities. This results in dependence on others to maintain oral hygiene and oral health.[59] Persons living in long-term care environments are two times more likely to be edentulous and have fewer restored teeth. This same trend is seen in people with developmental disabilities.

SUMMARY AND CONCLUSIONS

The literature is quite clear in describing the oral health disparity that exists in the United States today. Despite the fact that the overall oral health status has improved in this nation over the past 30 years, there is a stark contrast in oral health and dental caries experience among specific subgroups in the population. Groups lagging behind include rural populations, racial and ethnic minorities, low-income populations, elderly, and special needs populations.

A major contribution to this disparity seems to be access to care. There are many determining factors for access to care, including income, educational attainment, area of residence, dental workforce, and dental insurance. An interaction effect exists among these factors, compounded by specific subgroup characteristics. Many efforts have been undertaken to improve access to care, with some success. Lessons can be learned from these past efforts. No one intervention is likely to successfully eliminate the existing oral health disparity in the United States.

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SUBSTANCE ABUSE—TRENDS IN RURAL AREAS: A LITERATURE REVIEW

by Linnae Hutchison and Craig Blakely

SCOPE OF PROBLEM

- Substance abuse is one of the 10 "leading health indicators" selected through a process led by an interagency workgroup with the U.S. Department of Health and Human Services.[15]
- Men and women in metropolitan areas of the Northeast and West are less likely to report consumption of five or more drinks in one day in the preceding year than their nonmetropolitan counterparts.[16]
- Alcohol has been ranked as the third leading "actual cause of death" in the United States, i.e., contributing to the diagnosed condition associated with a death.[17]
- Illicit use of drugs has been ranked as the ninth leading "actual cause of death" in the United States, i.e., contributing to the diagnosed condition associated with a death.[17]
- Substance abuse was identified as a major rural health concern among state offices of rural health.[18]

GOALS AND OBJECTIVES

A goal of Healthy People 2010 is to reduce substance abuse to protect the health, safety, and quality of life for all, especially children.[1] Addressing the issue of substance abuse treatment and prevention in rural areas begins with understanding the complex etiology underlying substance abuse and utilizing this information to develop effective drug prevention programs. Fundamental to this understanding is identification of the unique barriers and limitations encountered by rural Americans in seeking effective substance abuse prevention programs and treatment.

While tremendous strides have been taken to educate Americans, particularly youth, on the devastating effects of substance abuse, emerging patterns suggest the drug prevention message is failing to reach one sector seemingly immune to substance abuse—rural America. New evidence indicates not only a convergence of rural and urban usage rates but also, for certain substances, higher usage rates in rural areas compared to urban areas.

For the purposes of this review, abuse of alcohol, methamphetamines, and inhalants serve as the primary focus[i]. Tobacco use is addressed in depth in the section on tobacco use. This discussion addresses the following Healthy People 2010 objectives:

- 26-1. Reduction in motor vehicle crash deaths.
- 26-2. Cirrhosis deaths.
- 26-3. Drug-induced deaths.
- 26-7. Alcohol and drug-related violence.
- 26-8. Lost productivity.
- 26-9. Increase age and proportion of drug-free youth.
- 26-10. Reduction in adolescent and adult use of illicit substances.
- 26-11. Binge drinking.
- 26-12. Average annual alcohol consumption.
- 26-15. Reduction of inhalant use among adolescents.
- 26-16. Increase proportions of youth disapproving of substance abuse.
- 26-17. Perceiving risk associated with substance abuse.

Understanding the problem begins with defining substance abuse and identifying the major substances of abuse.

- *Substance abuse* is a "maladaptive pattern of substance use"[19] that contributes to a myriad of

health problems and, for certain individuals, leads to increased incidence of violence and accidents.

- *Current use* is defined as one incidence of substance use in the last 30 days. For instance, consumption of one alcoholic drink in the past 30 days is considered current use.
- *Licit drugs* are a category of substances including alcohol, tobacco, and inhalants.
- *Illicit drugs* are a category of substances including methamphetamines, marijuana, and cocaine.

Compounded by access barriers, including shortages of substance abuse treatment service centers and providers, substance abuse in rural areas is an increasingly important rural public health concern.

IDENTIFIED BY PEOPLE LIVING IN RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

According to the Rural Healthy People 2010 survey, substance abuse was selected by 25 percent of the respondents as a rural health priority among the 28 Healthy People 2010 focus areas. Substance abuse, ranked sixth, was virtually tied with education and community-based programs and with maternal, infant, and child health—the seventh, eighth, and ninth place rankings among the priority nominations.[2] There were no significant differences across four groups of state and local rural health respondents. However, there were differences across geographic regions. Respondents from the Northeast and West were significantly more likely than those from the Midwest or South to nominate substance abuse as one of their five rural health priorities.

PREVALENCE AND DISPARITIES IN RURAL AREAS

In urban and rural America, alcohol and tobacco are by far the most frequently abused substances. In a 2001 national survey, 48.3 percent of respondents ages 12 and older reported current alcohol use, up from 46.6 percent in 2000.[4, 20] Tobacco use, nonetheless, is clearly the drug that claims the most lives (430,000 per year).[1] Approximately 24 percent of adults and 15 percent of adolescents between the ages of 12 and 17 report current cigarette use.[16]

The abuse of alcohol spans across geographic, demographic, social, and economic boundaries. Nationally, an estimated 15.1 million people abuse alcohol,[3] with rates of binge drinking among adults remaining relatively constant since 1988. The highest prevalence of binge drinking is reported in the 18 to 25 year old group at 32 percent.[1] Among 12 to 20 year olds, alcohol is the drug of choice, with 28.5 percent of this age group reporting having used alcohol in the last month.[4] Usage rates and associated health conditions also vary by gender. Men have higher rates of alcohol use than women; however, women experience a faster progression of alcoholism with less consumption.[21]

Heavy alcohol use (defined in this case as consumption of five or more alcoholic drinks in one day in the last year), nationally, appears to vary little by urbanicity among 18 to 49 year olds.[16] However, there is some regional variation in this level of alcohol use, with nonmetropolitan areas of the Northeast and West reporting a higher prevalence than their metropolitan counterparts in these regions.[16] Binge drinking rates among nonmetro residents are also reported equal[4] to or higher than rates for metropolitan residents.[6]

Drug abuse, though considerably less prevalent than tobacco and alcohol abuse, affects 7.1 percent of the population, or 15.9 million users.[4] Illicit drug use by adults has remained relatively steady at 6 percent since 1980, with men experiencing a higher rate of substance abuse (7.7 percent) than women (5 percent).[20] Youths exhibit a higher incidence of drug use than adults. Among 12–17 year olds, approximately 10.8 percent reported using an illicit drug in 2000.[4]

On average across all age groups, residents of large metropolitan counties have the highest rate of illicit drug use (7.65 percent), followed by nonmetropolitan (5.8 percent), and completely rural counties (4.8 percent).[4] However, the prevalence of illicit drug use among youth reveals an emergent

pattern—14.4 percent in rural areas, 10.4 percent in counties with small metropolitan areas, and 10.4 percent in large metropolitan areas.[4]

While substance abuse was once considered a problem confined to urban areas, growing evidence suggests not only a convergence in substance abuse patterns[9, 22] between metropolitan and non-metropolitan areas but for certain substances such as alcohol, methamphetamines, and inhalants, usage rates by youths are actually higher in rural than in urban areas. This upward trend is disturbing in light of the fact urban usage rates are simultaneously declining, prompting questions regarding availability of drugs, effectiveness or lack of prevention programs, or change in social factors facilitating the increase in rural areas.[5]

The disparity in urban and rural substance abuse patterns is most striking in the use of inhalants among youth.

Cocaine and marijuana use among youth are higher in urban areas, whereas methamphetamine use is higher in rural areas.[20] The annual prevalence of methamphetamine use among rural eighth graders is 3.5 percent versus 2.2 percent in urban areas. In 1999, 6.4 percent of non-metro 12th graders used methamphetamines versus 4.2 percent of metropolitan 12th graders.[23]

The disparity in urban and rural substance abuse patterns is most striking in the use of inhalants among youth. In one study, 6 percent of intercity children (age 8-12) used inhalants compared to 16 percent of rural children.[24] In this age group, inhalants were the drug of choice for rural children (under age 12) compared to urban children for whom the drug of choice was alcohol. For ages 12 to 17, one study estimated 8.9 percent, or 2.1 million, youth used inhalants—a percentage significantly higher for rural youth than for urban youth. Common inhalants include the following readily available products: glues, solvents, butane, gasoline, and aerosols.[25] Most of these products are not only ubiquitous in many homes but relatively inexpensive and easily accessible, making these products highly attractive to youth.

Rural areas, like urban areas, are not uniform in their demographic and economic profiles. Similarly, substance abuse patterns vary among rural communities based on the communities' unique attributes. According to the Monitoring the Future Study, prevalence rates for substance abuse, in aggregate, among adolescents are lower for youth residing in open country and on farms than for youths in small towns.[9] Overall youth drug involvement is highest in the non-metropolitan South, followed by Midwestern metro 12th graders.[26]

One measure of drug use prevalence is treatment admission data. Treatment admissions for alcohol use are substantially higher in rural areas, particularly in those areas with a central city of 10,000, while admission rates for opiates and cocaine tend to be higher in urban areas than in rural areas.[16] The significantly lower number of hospital admissions for alcohol use in entirely rural areas may indicate a lack of access to services locally rather than significantly lower rates of admissions.

Annually, over 100,000 deaths are related to alcohol consumption (5 percent of all deaths).[9]

Native-American Indians (particularly teens) exhibit the highest levels of illicit drug use[27] compared to youth studies nationwide. While the majority of Native-American Indians live in rural areas, there are a number of cultural risk factors exclusive of rurality that influence substance abuse rates in this population.

IMPACT OF THE CONDITION ON MORTALITY

Annually, over 100,000 deaths are related to alcohol consumption (5 percent of all deaths), making alcohol consumption the fourth leading cause of death in the United States.[9] This mortality rate translates to nearly 1.5 billion years of potential lost life before age 65.[9] Alcohol-related mortality is

further divided into accident and non-accident categories. A significant non-accident-related cause of death is alcohol-related cirrhosis of the liver, which contributed to 11,755 deaths in 1999.[28] Alcohol-related accidents comprise the larger proportion of total alcohol-related deaths. In 1994, 44 percent of U.S. traffic fatalities (17,461 lives) were alcohol related, with the highest rates among 21–24 year olds.[7] Despite these dismal statistics, the number of alcohol-related traffic fatalities is declining from an all-time high during the 1980s. In addition to traffic fatalities, alcohol is also associated with accidental deaths such drownings wherein 47–65 percent of adult drownings are alcohol related.[7]

Approximately 38,900 deaths are related to drug abuse.[6] Determining the number of deaths related to inhalant abuse is difficult due to the lack of a national database to document these deaths.

IMPACT OF THE CONDITION ON MORBIDITY

Alcohol consumption is associated with a myriad of health consequences. Chronic health problems include alcoholism; chronic liver disease or cirrhosis; impaired cognitive function; brain damage; acute pancreatitis; heart and skeletal muscle degeneration; reproductive disorders; hypertension; increased risk of certain cancers of the liver, esophagus, nasopharynx, and larynx; fetal alcohol syndrome; immune system depression; nutritional and blood disorders; and acceleration of diabetes.[7]

Abuse of alcohol is a particular concern for pregnant women and the developing fetus. Fetal Alcohol Syndrome (FAS) is a series of birth defects resulting from alcohol use by the mother during pregnancy. In 1999 and 2000, 12.4 percent of pregnant women used alcohol, and 3.9 percent were binge drinkers.[20] While this number is significantly lower than for nonpregnant women in 1999 and 2000 (48.7 percent current users and 19.9 percent binge drinkers), the effects on the developing fetus can be devastating.[20] The birth defects include growth retardation, central nervous system effects, mental handicaps, facial morphological abnormalities, and hyperactivity. The incidence of FAS is estimated between .5 and 3 per 1,000 live births.[7]

Illicit drug use health-related consequences include hepatitis, tuberculosis, sexually transmitted diseases, various bacterial infections, and HIV infection.[7] Adverse effects of inhalant use include depression, nosebleeds, headaches and eye pain, kidney or liver damage, chronic fatigue, heart failure, slurred speech, anemia, loss of muscle control, personality changes, muscle and joint pain, and poor balance and coordination.[8]

Finally, the link between psychiatric disorders and alcoholism cannot be overlooked. In one study of rural women, alcoholism was preceded by a psychiatric co-morbid disorder,[3] while for men the reverse was true—depression followed the development of alcoholism. Diagnosis of co-morbid psychiatric disorders, especially in women, is vitally important in reducing the incidence of substance abuse.

CONTRIBUTOR TO MANY OTHER HEALTH PROBLEMS

Understanding the breadth and depth of the substance abuse problem requires looking beyond prevalence data alone and examining the role of substance abuse as a contributor to other health risks. Alcohol and drug use act as agents in the host-agent-environment risk factor paradigm. The correlation between substance abuse and driving under the influence is an example of this paradigm and a particular concern in rural areas where there is an increased dependence on automobile transportation. In 1985, over 50 percent of all auto accident fatalities were alcohol related. However, this number decreased to 38 percent in 1999.[29] Contrary to popular perception and media focus, most alcohol-related auto accidents occur among moderate drinkers and not binge drinkers, reinforcing the need for prevention campaigns to include moderate drinkers in their target audience.

Research suggests that due to greater distances traveled and greater access to and reliance on automobile transportation, a higher prevalence of driving while under the influence is found in rural areas compared to urban areas. Driving under the influence arrests are most prevalent in non-

metropolitan areas with cities less than 10,000 and in rural areas (818.2 per 100,000 persons and 735.7 per 100,000 persons, respectively).[10] Rural youth are particularly at risk. For ages 12–17, the incidence of driving while intoxicated is higher in rural than in urban areas.[26] Forty percent of rural 12th graders reported using alcohol while driving compared to 25 percent of their urban counterparts.[7]

As mentioned earlier, alcohol is also related to accidents and violence. Thirty-one percent of unintentional injury death victims, 23 percent of suicide victims, and 32 percent of homicide victims were intoxicated at the time of death.[11]

> For ages 12-17, the incidence of driving while intoxicated is higher in rural than in urban areas.[26]

Other health-related consequences of substance abuse (including alcohol and illicit drugs) such as teen pregnancy, injury, low worker productivity, and homelessness resulted in an annual economic cost of $277 billion in 1995.[1] Substance abuse also contributes to higher absenteeism and higher job-related accidents, which is a concern because rural adults are engaged in some of the most dangerous and injury-prone occupations.[30]

BARRIERS

While rural and urban areas experience drug use problems, the consequences are not the same due to the limited ability of rural areas to offer effective substance abuse treatment. In rural areas, the hospital, rather than a treatment center, is responsible for delivery of substance abuse treatment. Only 10.7 percent of hospitals in rural areas offer substance abuse treatment services compared to 26.5 percent of metropolitan hospitals.[12] Furthermore, only 79.5 percent of rural counties offer mental health services compared to metro area counties wherein 95.7 percent offer these services.[12] Adding to the burden is 6.6 percent of rural substance abuse treatment providers hold a specialization in drug and alcohol abuse as opposed to 17.8 percent of providers in urban areas.[27]

The perceived social stigma associated with substance abuse treatment also plays an increased role in rural areas. Rural life inherently does not lend itself to anonymity. Therefore, for certain populations, seeking treatment is difficult due to the stigma associated with substance abuse and desire to remain anonymous. This is a particular concern for rural women not seeking treatment.[3]

Physical distance also plays a role in the pursuit of treatment. According to one study, patients are not willing to travel as far for substance abuse treatment as they are for general medical treatment.[13] While this factor impacts treatment-seeking behavior, the National Longitudinal Epidemiologic Survey found no difference in treatment attendance for rural and urban inhabitants.[31]

Financial burden is another factor impacting treatment-seeking behavior. Although managed care has not penetrated the rural market to the extent it has the urban market, health plans are shifting toward cost sharing. This trend effectively shifts greater financial responsibility to the patient, especially for behavioral health services (including substance abuse treatment). It is well documented that an increase in cost sharing on the patient reduces services used.[13] Combined with the stigma surrounding the perceived need for treatment, rural residents may be less apt to seek drug abuse treatment services.

There is an urban bias built into the federal funding allotment formula for substance abuse services. Urban residents ages 18 to 24 are double weighted, resulting in greater funding directed toward urban substance abuse services; however, alcohol dependence is higher in rural areas, and drug use is not significantly different in urban and rural settings.[14] In fact, a study by the Rand Corporation concluded that in order to achieve greater equity between urban and nonurban areas, up to 22 percent of the Substance Abuse Services Block Grant would need to shift between states.[14]

Despite the enormous economic and social costs associated with substance abuse, the majority of entitlement spending is directed toward addressing the consequences of substance abuse rather than treatment and prevention. Nearly 92 percent of entitlement monies are spent on treating health-related consequences, with a meager 8 percent directed toward prevention.[32]

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

While access to effective treatment for substance abuse is a major barrier to substance abuse treatment, a key issue is also the low propensity for individuals to seek treatment in rural and urban areas.[13] Lack of access coupled with a low affinity to seek treatment may contribute to the growing prevalence of substance abuse in rural areas.

The role of parents and peer groups cannot be overemphasized in youth substance abuse. It is known that not only does parental approval of alcohol use increase frequency of use,[33] but children of alcoholics are four times more likely to develop alcoholism[3] than children of non-alcoholics.

On the drug supply side, national data collected by the Drug Enforcement Administration (DEA) points to an increase in drug trafficking activities in rural areas.[10] In cities less than 10,000, the number of drug violations per capita has increased 10.2 percent from 1990 to 1998.[27] One reason for the rise in methamphetamine use in rural areas is increased ease of access and supply due to the fact that the majority of clandestine methamphetamine labs are seized in rural areas.[34]

Other challenges to substance abuse prevention and treatment relate to regulatory and legislative policy. While age 21 is the legal drinking age in all 50 states, controls over sales, marketing, and possession are variable by region.[7] Commercial marketing continues to target the young, contributing to the perception that alcohol and tobacco are culturally acceptable and readily available. The perceived ease of access to alcohol and other substances of abuse by youth may be one indicator of the gap between regulation and enforcement. Unlike other disparities between rural and urban areas, the perception of ease of access to alcohol and other substances of abuse is fairly uniform between the two regions. Seventy-eight percent of eighth graders and 96.5 percent of 12th graders in the smallest rural areas said access to alcohol was "easy" or "fairly easy" compared to 81 percent of metro eighth graders and 96.2 percent of 12th graders. Perceived ease of access to inhalants was 67 percent for rural eighth graders and 82.6 percent for 12th graders compared to 68.8 percent and 81.1 percent of metro eighth and 12th graders, respectively.[7] These statistics suggest there is little difference in the ease of access perception among rural and urban youth.

Efforts to provide more formalized leisure activities may decrease the opportunity for youth to abuse alcohol or other substances. According to one study,[35] substance abuse takes place, not surprisingly, in informal locations such as parking lots and friends' homes. Considering the number one reason cited for drinking is to "have fun" (61 percent), followed by avoidance of peer pressure and pressure to conform (7.1 percent) and to forget problems (4.5 percent),[36] the need to provide formalized activities as a method to combat drug abuse cannot be overlooked. Alternative activities should include those that are incompatible with substance abuse.

> At least three factors impact the likelihood of substance abuse among youth: peer use, parental use, and self-esteem.[24]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

A number of studies have analyzed the effectiveness of drug prevention programs ranging from scare tactics that are punitive in nature to peer-focused prevention programs targeting the small peer group to knowledge-based programs such as Drug Abuse

Resistance Education (DARE). Their effectiveness is directly correlated with the link to the underlying etiology of substance abuse. At least three factors impact the likelihood of substance abuse among youth: peer use, parental use, and self-esteem.[24]

According to Nan Tobler's 1992 meta-analysis of 143 drug prevention programs, there is no difference in effectiveness of programs in rural versus urban areas;[36] however, programs that focus on peers are more effective than knowledge-based programs. Peer programs are based on peer cluster theory, which asserts that adolescents of families who advocate and communicate an anti-drug message tend to gravitate toward peers who share similar values. Conversely, adolescents with weak family ties or families who communicate a pro-drug message are more likely to associate with problem youth. In fact, "90 percent of adolescents who use drugs have friends who use the same drugs."[22] Furthermore, the pressure to conform (including the use of drugs) among peer groups is often a greater predictor of drug use than the influence of external pressures such as that of "pushers." Therefore, anti-drug campaigns should focus on the small peer group rather than solely on external influencers.

Finally, Social Inoculation Theory asserts that a child's decision to use drugs depends on his/her ability to resist situational social pressure.[24] Therefore, programs that focus on building self-esteem and teaching social refusal skills are often effective in combating substance abuse.

Access to treatment services is a fundamental hurdle to addressing substance abuse in rural areas. One method to decrease access hurdles is to focus on the role of the rural health provider as an active member of the behavioral health continuum of care. As Fortney[13] points out, "…rural providers should focus on detection and brief counseling rather than detection and referral." Traditional avenues of treatment seeking are often unavailable to rural residents. Many rural residents are self-employed and do not have the benefit of employee assistance programs. Therefore, it is necessary to investigate alternative methods to provide education and counseling such as through Alcoholics Anonymous meetings, schools, churches, and community-sponsored awareness campaigns.[13]

Supporting formalized activities for youth, integrating drug abuse prevention and education into existing school-based health programs, investing in peer-focused prevention programs, and programs designed to improve self esteem are feasible community-level interventions for reducing substance abuse among youth. These programs should also involve parents, as research indicates parental perception and attitude toward substance use is correlated with the child's perception toward substance use—particularly for alcohol.

Combating Fetal Alcohol Syndrome begins with education, especially for rural disadvantaged pregnant mothers. In rural Vermont, a study integrated an alcohol assessment tool into Women, Infants, and Children (WIC) program visits. Not only did nurses educate at-risk pregnant mothers on the risk to the fetus, but they also addressed alcohol use after the pregnancy. Rather than focusing solely on the pregnancy, the study focused on the mother and the family on a long-term basis—beyond the term of the pregnancy.[37]

Another theory associated with substance abuse is the risk factor theory, which asserts a myriad of factors contribute to the decision to abuse drugs and alcohol. These factors include individual, peer, family, school, workplace, media, community, and economic conditions.[39] The literature provides evidence of a number of strategies available to providers and treatment centers in addressing risk factors associated with substance abuse. A universal finding seems to suggest that interventions that target a single factor are likely to fail. Most successful treatment and prevention programs tend to operate at several levels, addressing several risk factors simultaneously.

Finally, socioeconomic conditions, such as poverty and low educational attainment, are also linked to substance use and abuse. These factors are particularly onerous in rural regions, as these areas tend to experience lower socioeconomic conditions. As Rebhun[38] suggests, "it is probable that substance

use rates can be affected by programs not directly targeting them: for example, improvements in economic status, educational attainment, and mental health in general could reduce the numbers of people who decide to use substances or who use them excessively."

COMMUNITY MODELS KNOWN TO WORK

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

Prevention, education, enforcement of drug laws, and access to care are key to combating substance abuse in rural areas. Rural youths are particularly at risk for developing substance abuse disorders, therefore requiring an increased focus on preventative programs and initiatives. As with any health-related concern, the tendency has been to respond more aggressively to the often more visible conditions in urban areas, translated through development of policies that have short-changed rural communities to some degree. There is little question that economies of scale dictate that equal resources are not plausible. However, inefficiencies aside, rural needs cannot be ignored. Certainly, increased school-based educational efforts (beginning in elementary school) and active involvement of parents, peers, and the community are measures available to rural areas to combat substance abuse.

To address access issues, providers may play a vital link by educating office staff on identifying substance abuse in the primary care setting and providing brief counseling. Too frequently, providers only intervene when patients present with clinical conditions attributable to substance abuse. Providers must also focus attention on the etiologic continuum to significantly impact the real problem. Ultimately, the ability to quell the growing problem of substance abuse in rural areas hinges on a clear understanding of not only the behavioral and social conditions associated with substance abuse but also the unique barriers to prevention and treatment.

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Endnotes

[i] Steroid use is mentioned as a Healthy People 2010 objective. According to Monitoring the Future Data, steroid use does not appear to vary significantly by urbanicity[24, 40] although it should be noted that the highest incidence of steroid use is among 10th graders in non-metropolitan statistical area (MSA) areas at 1.3 percent versus 1.1 percent in large MSAs for the same age group.

TOBACCO USE IN RURAL AREAS: A LITERATURE REVIEW

by Stacey Stevens, Brian Colwell, and Linnae Hutchison

SCOPE OF PROBLEM

- Tobacco use is one of the 10 "leading health indicators" selected through a process led by an interagency workgroup within the U.S. Department of Health and Human Services.[16]
- Rural adolescents (except in the Midwest) are more likely than their urban counterparts to smoke.[4]
- Adult men and women in most rural counties, with some variation across regions, are more likely to smoke than those in urban counties.[4]
- Tobacco has been ranked as the leading "actual cause of death" in the United States, i.e., contributing to the diagnosed condition associated with a death.[17]

GOALS AND OBJECTIVES

The Healthy People 2010 goal is to reduce illness, disability, and death related to tobacco use and exposure to second hand smoke.[1] Major objectives of Healthy People 2010 are reducing exposure to second hand smoke (SHS) and tobacco use by teens and pregnant women. Because there are rural and urban disparities in these major areas, this review focuses on the ill effects of smoking during adolescence as well as during pregnancy, and provides an overview of select prevention and cessation programs.

> Tobacco use remains the leading cause of preventable death in the United States.

Tobacco use remains the leading cause of preventable death in the United States, with 430,000 deaths each year (one in five) attributable to tobacco use. The resulting cost is an estimated $50 to $73 billion dollars in health care costs—nearly 12 percent of all medical costs[7, 18, 19]—and another $50 billion dollars in indirect costs.[20] Compounding the tobacco issue in rural versus urban areas is the "lack of critical mass of resources to deal with the consequence of substance abuse" in rural areas.[8]

This review addresses the following Healthy People 2010 objectives:

- 27-1. Adult tobacco use.
- 27-2. Adolescent tobacco use.
- 27-3. Initiation of tobacco use.
- 27-4. Age of first tobacco use.
- 27-6. Smoking cessation during pregnancy.
- 27-7. Smoking cessation by adolescents.
- 27-9. Exposure to tobacco smoke at home among children.
- 27-10. Exposure to second hand smoke.
- 27-14. Enforcement of illegal tobacco sales to minors.
- 27-16. Tobacco advertising and promotion targeting adolescents/young adults.

IDENTIFIED BY PEOPLE LIVING RURAL AREAS AS A HIGH PRIORITY HEALTH ISSUE FOR THEM

Tobacco use ranked sixth among the Healthy People 2010 focus areas in terms of rural health priority rating, selected by an average of 26 percent across the four groups of respondents within the states.[2] Local public health agencies most frequently nominated tobacco use, and state agencies were least

> Tobacco use ranked sixth among the Healthy People 2010 focus areas in terms of rural health priority rating.[2]

likely to nominate it as a priority in comparison to rural hospitals or rural health centers/clinics. The Northeast and Midwest produced higher percentages of nominations for tobacco use, the sixth most nominated priority area, than did the South or the West, where it ranked eighth and 13th, respectively. There was a statistically significant difference among the regions.

PREVALENCE AND DISPARITIES IN RURAL AREAS

Cigarette use is more prevalent in rural areas than in large and small metropolitan areas. The overall rate of smoking is 33 percent in nonmetropolitan areas compared to 27 percent in large metropolitan areas and 28 percent in small metropolitan areas.[3] Educational attainment has replaced gender as the most predictive sociodemographic predictor of smoking, with those not completing high school having the highest rates of smoking (37 percent) and college graduates having the lowest (17 percent).[3, 19]

> Cigarette use is more prevalent in rural areas than in large and small metropolitan areas.[3]

Prevalence of Tobacco Use among Adults in Rural Settings

Adults living in the most rural areas are the most likely to smoke. In rural areas, 27 percent of women and 31 percent of men report themselves as regular smokers.[4] Higher rates in rural counties likely reflect two factors, delayed access to medical and media resources and lower educational attainment, both of which are strongly associated with smoking.[4] Of the 15 states with the highest prevalence of current cigarette smoking among adults, the majority were highly rural, southern, and tobacco producing.[19] Among states with the highest number of adults currently smoking cigarettes were Kentucky (30.8 percent), West Virginia (27.9 percent), and South Dakota (27.3 percent), all of which are considered more rural states.[21]

Of particular concern across urban and rural settings alike is the prevalence of smoking among young adults and adolescents. The 1995 young adult smoking prevalence was 24.8 percent, up from 22.9 percent in 1991. A variety of investigations of smoking on college campuses have confirmed this trend in college students.[23]

Smokeless tobacco use is also particularly prevalent among adults in rural settings. After a review of six studies among adults, Bell et al. remarked, "among U.S. adults, smokeless tobacco use is associated with low socioeconomic status, male sex, Native American race, and southern or rural residence."[5] Usage of smokeless tobacco increased threefold from 1972 to 1991, and smokeless tobacco production increased in each of those nine years. Unfortunately, three million American users of smokeless tobacco are under 21 years of age.[22] The prevalence of smokeless tobacco use remains highest among young males aged 18 to 24 years[6] and is higher in rural versus urban areas.

> The prevalence of smokeless tobacco use remains highest among young males aged 18 to 24 years[6] and is higher in rural versus urban areas.

Prevalence of Tobacco Use among Adolescents in Rural Areas

A continuing concern is the age of initiation, that is, the age at which youth begin using tobacco products. Studies cited in the 1994 Surgeon General's Report on Smoking found the mean age of onset for first use of cigarettes is 14.5 years, and 89 percent of daily smokers first try a cigarette by 18 years of age, with nearly 37 percent first trying a cigarette before age 14.[19] Since most smokers try their first cigarette before the age of 18,[19, 24, 25] children and adolescents should be considered the most important targets for education, prevention, and cessation efforts.[23] Of all groups, tobacco use by adolescents has experienced the sharpest increase—nearly 78 percent between 1988 and 1996.[7] The rate of past month use has since decreased slightly from 14.9 percent in 1999 to 13.4

percent in 2000. The number of youth who begin to smoke each day decreased from 3,186 in 1997 to 2,145 in 2000; however, this decrease was primarily among male youth. The rate of smoking in 2000 was higher for female (14.1 percent) than male youth (12.8 percent).[26]

While these decreases are a positive sign, there is wide disparity in tobacco use between adolescents living in rural versus urban settings. The prevalence of past month smoking in adolescents aged 12 to 17 is higher in rural than urban counties (18 percent versus 11 percent, respectively).[4] More alarming are data reported in the Center on Addiction and Substance Abuse (CASA) Whitepaper on substance abuse in rural America. They report both past month cigarette and smokeless tobacco use by eighth graders is higher in rural versus small and large metro areas. Specifically, rural eighth graders are twice as likely to smoke cigarettes (26.1 percent versus 12.7 percent in large metro areas), and they are nearly five times more likely to use smokeless tobacco (8.9 percent versus 1.8 percent) than those in metro areas.[8] Finally, a study of smoking initiation utilizing data from the Cardiovascular Health in Children and Youth Studies (CHIC I and II) found that children in rural areas were significantly more likely to begin smoking than urban children at all time periods of the six year longitudinal study and were more likely than their urban counterparts to start smoking after 12 years of age.[27]

As demonstrated above, a problem exists not only with cigarette use among adolescents, particularly rural adolescents, but a significant problem also exists with the use of smokeless tobacco among these youth. The National Household Survey on Drug Abuse assesses smokeless tobacco use among youth and found that 25 percent of males and 3 percent of females between 12 and 17 years of age have tried some form of smokeless tobacco. Among 12th grade males, 12 percent used smokeless tobacco nearly every day.[22] In general, research suggests an alarming bimodal distribution in which rural youth begin use of smokeless tobacco around age 12, while those urban youth who begin to use do so around age 18.[9] According to one study, rural males who reported having tried smokeless tobacco outnumber urban males by a ratio of approximately 4:1. In that study, 36.4 percent of male rural first graders reported having tried smokeless tobacco, increasing to 72.5 percent by the seventh grade.[9] The incidence of reported continued use of smokeless tobacco among rural youth was 9.1 percent, 12.8 percent, 12.9 percent, and 20 percent among first, third, fifth, and seventh graders, respectively. This study also supported findings that nicotine dependence may be common in rural boys as young as six years of age.

Prevalence of Tobacco Use during Pregnancy

In addition to tobacco use among adolescents, a second critical problem is tobacco use among pregnant women. Cigarette smoking is associated with increased rates of infant mortality and puts infants at risk for sudden infant death syndrome (SIDS), poor lung function, asthma, and respiratory infections. As such, nearly every prenatal care program addresses the use of tobacco in pregnancy.[10]

While the number of women smoking during pregnancy has decreased, smoking prevalence among pregnant women still exceeds the Healthy People 2000 objective to reduce smoking by pregnant women to 10 percent.[12] U.S. birth certificate data in 1997 show that 13.2 percent of women giving birth reported that they smoked during pregnancy. Of particular concern is evidence suggesting that smoking rates among rural pregnant women remains higher than smoking rates among urban pregnant women. For example, reports from the Arizona Department of Health indicate that, in 1999, rural mothers were more likely to smoke than urban mothers.[10] Disparities exist in progress against smoking as well. In Missouri, the greatest reductions in smoking during pregnancy and in heavy smoking during pregnancy occurred in women living in metropolitan statistical areas (MSAs) rather than in women living in rural settings. For pregnant women in urban areas, the rate of smoking was 20.5 percent in 1992 and dropped to 17.4 percent by 1997. During the same time period, the rate of smoking among pregnant women in non-MSAs was less significant, dropping from 25.7 percent in 1992 to 25 percent in 1997.[28]

Prevalence of Second Hand Smoke

A third and final critical area related to the ill effects of tobacco use in rural settings relates to second hand smoke, as it is often called. Tobacco-related illnesses as a result of exposure to SHS are clearly present in both rural and urban settings. However, some evidence suggests a greater tolerance for SHS and related illnesses in rural settings. The National Social Climate of Tobacco Control Survey (2001) measured the extent to which tobacco control and tobacco use are ingrained in the social institutions that influence decisions about tobacco. Rural responses to questions indicated more acceptance of tobacco in the household, in the car, around children, and less disagreement with children under 18 regarding smoking than those living in urban areas.[11] Thus, we might expect to find a higher prevalence of SHS-related illnesses in rural settings, though sufficient research has yet to be completed.

IMPACT OF THE CONDITION ON MORTALITY

Tobacco use remains the leading cause of preventable death, resulting in 430,000 deaths among adults annually.[1] The resulting cost is an estimated 50-73 billion dollars in medical bills.[7]

Tobacco use is also a significant contributor to many other health problems including coronary heart disease, lung disease, cancer, damage to the female reproductive system, and injury to an unborn fetus (including low birth rate, stillbirths, and a higher rate of infant mortality).[12]

As suggested in an earlier section, tobacco use among youth remains of great public health concern. More than five million youth under 18 years old living today will die prematurely as a result of their involvement with tobacco.[13] Evidence suggests adverse changes in lipid proteins,[29, 30] abnormal spirometry and lung function tests, and respiratory bronchiolitis among young adolescents who smoke.[31] Since a larger percentage of rural versus urban youth use tobacco, in the future we might expect a corresponding higher percentage of adverse health consequences related to smoking in rural areas, which are not as equipped with the necessary resources to deal with these problems. Unfortunately, while it is obvious that age of initiation of tobacco use is lower and prevalence of use is higher in rural areas, the reasons for this are just beginning to be investigated by researchers.

Tobacco use during pregnancy is also a significant public health concern. Cigarette smoking during pregnancy is associated with increased rates of infant mortality. Smoking during pregnancy puts infants at risk for sudden infant death syndrome, poor lung function, asthma, and respiratory infections. Between 20 to 30 percent of low birth weight incidence is attributable to maternal cigarette smoking. In 1995, estimated smoking attributable medical costs for those with complicated births was $1.4 billion in 1995 dollars.[12]

SHS contributes to an estimated 3,000 lung cancer deaths and 62,000 coronary heart disease deaths in nonsmokers annually, as well as contributing to increased severity and frequency of asthma, SIDS, bronchitis, chronic middle ear infection, and pneumonia.[14] One-third to one-half of current cigarette smokers have children living in the home, and 70 percent allow smoking in the home. Children exposed to SHS in the home have more annual days of restricted activity, bed confinement, school absences, increased risk of SIDS, and chronic middle ear infections. SHS also causes up to 300,000 lower respiratory tract infections like pneumonia and bronchitis and increases the risk of new cases of asthma as well as severity and number of attacks in children.[32]

IMPACT OF THE CONDITION ON MORBIDITY

Morbidity and mortality are treated under the mortality section because the death-dealing effects of tobacco work through its contribution to deadly illnesses.

CONTRIBUTER TO MANY OTHER HEALTH PROBLEMS

Tobacco Use and Other Risk Behaviors

Cumulative risk behaviors often exist, and other risk behaviors are more common among those who smoke than those who do not smoke, particularly among adolescents. These include drinking alcohol,[31, 33-36] using other illicit drugs,[31, 33-35] engaging in sexual activity,[31, 33, 34, 36] school misbehavior and low academic achievement,[31, 33, 34, 37] violence or antisocial behavior,[31, 33, 34, 36] and mental health problems.[31, 34]

A study of high school students in a rural, tobacco-growing county found a strong correlation between smoking and drinking. Approval of drinking had strong association with being a smoker, and having drinking friends increased the likelihood of being a smoker.[38] In addition, tobacco and alcohol, as gateway drugs, may play a role in increased use of illicit drugs. Teens who drank or smoked in the past month are "30 times likelier to smoke marijuana than those who did not; those who used cigarettes, alcohol, and marijuana at least once in the past month are almost 17 times likelier to use another drug like cocaine, heroin, or LSD."[8] Rural students were found to have a higher prevalence for alcohol and cigarette use (particularly excessive use) than their urban counterparts.[39]

While limited in number, studies conducted in rural areas provide information about the various reasons for and correlates to tobacco use in general, and adolescent tobacco use specifically. Findings of the research indicate a lack of knowledge, issues related to susceptibility, and modeling of the social environment are among the most common reasons for tobacco use in rural areas.

Research examining the knowledge of the health effects of smoking indicates that most are aware of the relationship between smoking with cancer, but less than one-half of those surveyed recognized its association with heart disease.[40] Those with less education were less informed about this association.[40] There are also knowledge differences concerning the health effects of cigarettes versus smokeless tobacco. A majority of youth consider smokeless tobacco a safe alternative to cigarettes.[9]

Many factors are associated with the initiation of tobacco use. The 1994 Surgeon General's report details a variety of sociodemographic, environmental, behavioral, and personal factors that are associated with the onset of smoking or use of smokeless tobacco.[31] Among the factors listed were low socioeconomic status; male gender; accessibility to tobacco; tobacco advertising; parental, sibling, and peer use; normative expectations; and social support associated with use. Other variables that are commonly related include lack of academic achievement and other associated problem behaviors, intent to use, and previous experimentation with tobacco.

The personal factors that are commonly associated with increased risk of tobacco use include functional meanings of tobacco use to the individual as well as subjective expected utility, and self-esteem/self-image issues. Personality factors and a variety of measures of psychological well-being have been linked as well.[31]

Modeling the social environment has often been found to be associated with use of tobacco in rural areas. A North Carolina study of fourth and sixth grade children found modeling of use by best friends, and perceived prevalence of use among same-age peers were strongly related to the initiation and experimentation stages of tobacco use. Other key factors related to use were offers from friends and parents, adjustment to school, and behavioral self-regulation.[41] Another study found that having friends or family members who smoke was significantly associated with increased susceptibility to smoking;[42] another revealed peer pressure, identification with athletes, and association of tobacco use with maturity strongly influence initial trial of smokeless tobacco.[9]

In a study of tobacco cessation and determinants of relapse, most of those who had tried to quit and relapsed reported living with tobacco users; half reported that all or most of their close friends and co-

workers used tobacco, and a small percent cited peer pressure as a reason for relapse.[40]

BARRIERS

Overall, a lack of resources in rural areas is a major obstacle to tobacco use education, prevention, cessation, and treatment. Barriers to prevention and treatment in rural areas include transportation, lower median income to pay for treatment, lower prevalence of insurance coverage, limited media resources designed to change unhealthy habits, and minimal access to medical services for cessation assistance and treatment.[8]

Rural communities do not generally have the economies of scale needed to provide substance abuse treatment services. The responsibility falls to hospitals (40 percent) as opposed to 18 percent in the rest of the country.[8] Moreover, individual tobacco users in rural areas often do not have sufficient resources to support treatment or cessation costs. A survey of Medicaid coverage in 2000 revealed only 33 of the 50 states and the District of Columbia offered some coverage for tobacco-dependence treatments, and only one state offered coverage for all treatments recommended by the Public Health Service. Some pharmacotherapy coverage was offered by 31 states—an increase of 35 percent from 1998, and 23 offered coverage for over-the-counter drugs. Sixteen states offered coverage for all recommended pharmacotherapy treatments in 2000. A total of 13 states offered special tobacco-dependence treatment programs for pregnant women, and in two states, counseling services were covered for pregnant women only. Seventeen state Medicaid programs reported no coverage for tobacco-dependence treatment.[43]

Beyond limited financial resources to support treatment and cessation efforts, rural dwellers also face the challenge of limited access to care providers. As of 1997, more than three-fourths of the country's Mental Health Professional Shortage Areas (MHPSAs) were in nonmetropolitan areas, which equates to 70 percent of the population residing in underserved areas.[44] As tobacco dependence treatment often requires the use of a mental health professional, it would be more likely for rural areas to lack access to these services. Rural residents have difficulty accessing substance abuse treatment programs, as distance to treatment and transportation are primary obstacles.[8, 45]

The 1991–1995 National Ambulatory Medical Care Survey assessed trends in treatment of smokers by U.S. physicians to determine if physicians' practices meet current standards. Smoking counseling increased from 16 percent in 1991 to 29 percent in 1993, but it then fell to 21 percent in 1995. Nicotine replacement therapy use increased from .4 percent in 1991 to 2.2 percent in 1993, and it fell to 1.3 percent in 1995. The study also found that identification of patient smoking status was done 67 percent of the time in 1991 but did not increase over time. Physicians' practices fell far short on national health objectives and practice guidelines for treatment of smokers. Patient visits for diagnoses not related to smoking represent important missed intervention opportunities.[46] Thus, tobacco users in rural settings face two critical barriers: first, limited access to primary care providers who may assist in their cessation efforts; and second, if the tobacco users have access to a primary care provider, the likelihood is that the physician will miss important intervention opportunities.

Finally, dentists are uniquely situated to identify tobacco use. According to one study, only two-thirds of dental schools offer tobacco cessation training for dentists, and only 8.7 percent of dentists surveyed reported having strong knowledge in tobacco cessation as compared to 25.4 percent of physicians surveyed reporting strong knowledge.[47] However, the limited number of dentists serving rural areas may be too busy to take advantage of opportunities to intervene and provide cessation support to their patients.

KNOWN CAUSES OF THE CONDITION OR PROBLEM SO EFFECTIVE INTERVENTIONS OR SOLUTIONS CAN BE IDENTIFIED

To identify potentially effective interventions or solutions to tobacco use, particularly among the high-risk populations identified previously such as

adolescents and pregnant women, it is necessary to isolate factors contributing to tobacco use. Nicotine dependence, lack of educational resources, locality of tobacco growers, and failure to adequately enforce laws regarding tobacco sales to minors may contribute to an increased prevalence in rural areas. Tobacco is grown in approximately 500 counties in the southern states including Kentucky, North and South Carolina, Virginia, Tennessee, parts of Georgia, Florida, West Virginia, Maryland, southern Indiana, Pennsylvania, and Ohio,[48] which correlates to the area with the highest prevalence of tobacco use for men.[4]

While the number of community tobacco prevention policies has increased in the past decade, rural communities do not necessarily comply with these policies. A Missouri study revealed that a majority of tobacco outlets in rural communities neither complied with the state law banning tobacco sales to minors, nor did the majority of businesses comply with the state clean indoor air act.[49] Another study in rural Missouri revealed that half of police chiefs, city managers, and mayors were unaware of a state law restricting public smoking.[49]

Despite laws in all states to prevent underage tobacco use, many merchants sell directly to minors. Of minors who smoked, "38.7 percent reported they obtained cigarettes at a store, with only 15.8 percent needing to ask 'someone to buy cigarettes for them'."[23] A study examining the effectiveness of a longitudinal community intervention on the reduction of tobacco sales to minors and subsequent effects on tobacco consumption by youth found that in intervention communities (community education, merchant education, and voluntary policy change), the proportion of stores selling to minors dropped significantly. While encouraging, youth reported still being able to obtain tobacco from other sources.[50]

PROPOSED SOLUTIONS OR INTERVENTIONS THAT ARE FEASIBLE IN RURAL COMMUNITIES

Novotny, Romano, Davis and Mills[15] noted that there are seven basic components to community tobacco control. These include surveillance, problem assessment, legislation, health department and community-based programs, public information campaigns, technical information collection and dissemination, and coalition building.

The Centers for Disease Control (CDC) document, Best Practices in Comprehensive Tobacco Control Programs – August 1999[18] recommends the inclusion of community programs to reduce tobacco use, chronic disease programs to reduce the burden of tobacco-related disease, school programs to prevent the onset of smoking in youth, enforcement of existing tobacco statutes (especially minors' access and clean indoor air regulations), aggressive counter-marketing, cessation programs, and ongoing surveillance and evaluation of programming. All of these components seem to be necessary, but their incorporation into effective programming is made difficult by the diffused communication networks and the lack of economies of scale in rural areas.

The 1994 CDC Guidelines for School Health Programs to Prevent Tobacco Use and Addiction[51] pointed out key principles for effective school-based interventions. These principles apply to all schools, regardless of geographic location, and incorporate broad concepts such as creating environmental supports for not using tobacco. This includes the prohibition of tobacco use in all areas of schools (including adults-only areas), at school sporting events, etc. Provision of cessation services to faculty and students is also recommended, as is appropriate classroom health education. The Guidelines also recommend a variety of environmental supports and barriers to tobacco use. One of the most important remains the necessity of providing regular messages regarding tobacco use from families, schools, and the community and reinforcement of community-based efforts to reduce tobacco use. The detailed recommendations include specific school tobacco-related policies such as the prohibition of tobacco use on school premises or at school functions and the prohibition of tobacco advertising (including clothing) at school events or in school-related publications.

The CDC reports that there are effective school-based curricula in its Programs that Work database.

These curricula are common in that they utilize some type of social influences approach to teaching youth about tobacco. Such an approach incorporates traditional forms of education about the health effects of tobacco, but with it there is a focus on analyzing and understanding environmental influences on smoking initiation, media messages, etc. Effective curricula also incorporate methods of countering social pressure to use. Such curricula are designed to enhance general skill sets that are useful for youth in a variety of situations: refusal skills, assertiveness, stress management, etc.

There is also evidence that some approaches to youth prevention do not work, are to be avoided, and may actually be iatrogenic. Many adults find scare tactics such as showing pictures of diseased organs, etc. attractive, but youth appear to be less affected over the long term. Kelder, Edmundson, and Lytle[52] warn against using this type of approach, as it may weaken adults' arguments by overstatement. Approaches that use affective education also demonstrate little success and, in some cases, iatrogenesis. One of the best suggestions, then, is for schools (within the context of comprehensive community tobacco control) to perform quality, comprehensive health education, with an appropriate amount of time dedicated to the effort. The importance of family and community support, teaching, and modeling cannot be overstated.

Environmental support for avoiding tobacco includes actions such as limiting access to tobacco through enforcing sales bans to minors at the retail level (through banning direct sales as well as minors' access to vending machines). Police, prosecutor, and judge support, then, is also important. There is also evidence that high sales taxes significantly affect youth use. Data indicate that a 10 percent increase in the price of cigarettes yields an overall reduction in cigarette consumption by approximately 3–5 percent and reduces the number of youth who use tobacco by as much as 7 percent.[53, 54] Price increases through taxation are even more effective in reducing consumption among minorities and those with a lower income.[55]

While interventions have been conducted in rural communities, applicability and feasibility of implementation in other rural communities is not known. School-based education programs (beginning in the elementary grades) and enforcement of existing tobacco sales laws and ordinances may decrease rates of tobacco use in adolescents. Worksite health promotion programs may do likewise for adults. Finally, promotion of tobacco cessation training to physicians and dental care providers may decrease tobacco use in adolescents and adults. However, their direct applicability and level of effectiveness specifically in rural settings is only speculative at this point.

COMMUNITY MODELS KNOWN TO WORK

Community interventions or model programs "known" to work are difficult to identify in rural settings. Almost no information or evaluation exists on the effectiveness of classroom or community prevention programs or treatment programs in rural communities nationwide.

See the Models for Practice section in Volume 1 for a catalog of models.

SUMMARY AND CONCLUSIONS

There is a clear difference in tobacco use prevalence among those living in rural versus urban areas, whether the individual is an adolescent, adult, or pregnant woman. Higher use in rural areas will eventually lead to higher numbers of people with health problems that rural areas are ill equipped to handle. While past research has shown that education, enforcement of existing laws, product labeling, and anti-tobacco advertising campaigns may reduce tobacco use, more research is needed to understand the factors that contribute to higher prevalence of both smoke and smokeless tobacco use in rural areas.

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The Rural Healthy People 2010 contributors explore many of the disadvantages and disparities facing many rural communities with an eye toward creating wider understanding of rural health needs. At the same time, we do not wish to diminish advantages and attractions that many rural areas already offer to their residents and visitors. More important, we want to recognize and highlight many rural communities, like those featured in Rural Healthy People 2010 "models for practice." They reflect the hard work and commitment of rural people unwilling to accept existing conditions and who, instead, explore new pathways to improve the health of rural people.

For more information contact:

The Southwest Rural Health Research Center
School of Rural Public Health
The Texas A&M University System Health Science Center
1266 TAMU
College Station, Texas 77843-1266
(979) 458-0653
http://www.srph.tamushsc.edu/srhrc
http://www.srph.tamushsc.edu/rhp2010