

Rural Health Workforce Methods and Analysis

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INTRODUCTION

In the preceding chapter, we described trends and issues in the rural health workforce. To make sense of that information, it is important to understand how these trends and statistics are derived. In this chapter, we discuss key methodological issues that underpin rural health workforce analysis. We begin with the problem of defining what is “rural.” No single definition of rural areas or populations exists. Therefore, any classification we use to separate rural areas from urban areas—or more rural areas from less rural ones—is limited. Variations can alter policy decisions, such as the designation of health workforce shortage areas, which determine whether a rural area is eligible for government programs. Indeed, different sets of rural classifications are often the reason why rural statistics from different sources seem to contradict each other. Therefore, we review the rationale, strengths, and limitations of several rural classifications used in policy work and health services research.

In the second part of this chapter, we outline important issues to keep in mind when undertaking rural health workforce analysis. These methodological issues include who is counted as a rural resident, who is counted as a rural provider, how providers should be counted, comparisons of shortage area designation strategies, and rural/urban comparisons versus intrarural comparisons. We also direct attention to some issues of data interpretation related to the regionalization of specialty care and provider recruitment and retention.

DEFINING RURAL

The term rural suggests many things: landscape types, unique demographic structures or settlement patterns, isolation, economic activities such as farming, forestry and mining, and a unique socio-cultural milieu. Taken singly or together, however, these *aspects* of rurality never completely *define* rurality. Rural cultures exist in urban places. Farming occupies only a tiny fraction of the rural population. Urban places and populations often differ more from each other than they do from their rural “hinterlands.” Generations of rural sociologists and rural geographers have struggled with the concept, not always with success. Charles Galpin, the American “father of rural sociology,” suggested in 1918 that the terms “rural” and “urban” might be abandoned as theoretically hopeless (Gilbert, 1982).

Despite the theoretical limitations of the concept of rurality from the perspective of sociology or academic geography, it remains a practical analytic and policy tool. But the theoretical weakness of the concept has an important ramification for its use in policy, research, and data analysis. We must specify which aspects of rurality are relevant to the phenomena being examined and employ a definition that at least partially captures those aspects. Thus, the definition of rurality employed for one purpose may be inappropriate or inadequate for another. If one asks the question, “What’s rural?” the answer must be, “It depends on the question being asked.”

In addition to thinking about which aspects of rurality are important for any given policy issue or research question, the investigator must also contend with the geographical level of available data. The strengths and weaknesses of any given classification are strongly rooted in its underlying geographic unit. While smaller geographic areas allow for more detailed analyses, less information is collected at this scale due to cost and methodological difficulties. Typical units used for the collection of health and demographic data in the United States include states, counties, municipalities, census tracts, and ZIP codes. The county is a convenient and frequently used unit of analysis. Its boundaries remain fairly stable over time, and many health-related data are collected at the county level. The large geographic size of counties (compared to, for example, census tracts) and the demographic and economic heterogeneity that often exists within counties, however, can weaken some kinds of analyses.

UNDERBOUNDING AND OVERBOUNDING

One way to evaluate the usefulness of a rural classification is to consider the extent to which it “underbounds” or “overbounds” rural areas. Some large counties, especially in the west, contain both large cities and less densely settled areas that can be considered rural in terms of economy, landscape, and level of services. Due to their urban cores, these counties are usually defined as metropolitan. In such a case, the rural areas are underbounded—that is, areas that “should” be considered rural are being counted as urban. At the same time, in this example, urban areas are being overbounded. In other definitions, small towns within counties may be classified as rural when, for some purposes, they are more usefully understood as urban centers. In this case, rural is being overbounded and urban is being underbounded. Some degree of over- and underbounding

Table 3-1: Comparison of Some Common Rural Definitions

Definition	Geographic Unit	Characteristics	Strengths/Weaknesses
Metropolitan/ Nonmetropolitan	County	Dichotomous definition used by OMB. Counties that are part of Metropolitan Areas (MA) are metropolitan. All others are considered nonmetropolitan. About 19.7% of 2000 population lived in nonmetropolitan areas. USDA taxonomy.	Strengths: Useful as a dichotomous definition of rurality. Fairly stable over time for examining longitudinal data. Underlying geographic unit (county) very stable over time. Weaknesses: Does not differentiate nonmetropolitan counties. Significant underbounding of rural in many large metropolitan counties. Some overbounding of rural in nonmetropolitan counties with larger cities.
Rural Urban Continuum Codes (RUCCs)	County	Metropolitan counties are categorized into four groups, based on size of county population. Nonmetropolitan counties are categorized into six groups, based on total urban population of the county and whether it is adjacent or nonadjacent to a metropolitan county. USDA taxonomy.	Strengths: Differentiates metropolitan and nonmetropolitan counties by important demographic differences within each group. Adjacency criteria may suggest degree of economic integration with metropolitan county. Weaknesses: Over and underbounding as in metropolitan/nonmetropolitan. Use of total urban population to classify nonmetropolitan counties may tend to mask differences between counties with several small urban centers versus one or two larger centers.
Urban Influence Codes (UICs)	County	Metropolitan counties are grouped into two groups based on size of urban population. Nonmetropolitan counties are grouped into seven categories based on size of largest city in county and adjacency/nonadjacency to a metropolitan county. USDA taxonomy.	Strengths: Use of largest city criterion for grouping nonmetropolitan counties may be better than RUCC method for suggesting level of locally available services by differentiating counties with several small towns from those with one or two large towns. Adjacency criteria may suggest degree of economic integration with metropolitan county. Weaknesses: Over- and underbounding occurs as in metropolitan/nonmetropolitan. Does not differentiate metropolitan counties as well as RUCCs.
Economic Research Service Typology	County (non- metropolitan only)	Classifies non-metropolitan counties into one of six mutually exclusive categories based on primary economic activity. Counties may also be assigned nonexclusive policy classifications. USDA taxonomy.	Strengths: Very useful for differentiating among non-metropolitan counties according to economic activities, rather than demography or geography. Weaknesses: No classification or differentiation of metropolitan counties. County unit creates over- and underbounding problems. Economic categories may not be specific enough for many uses.
Goldsmith Modification	County and census tract	Identifies metropolitan counties with large land areas and large rural populations (using census tract data). Based on the OMB metropolitan/nonmetropolitan definition. HRSA taxonomy.	Strengths: Enhances the metropolitan/nonmetropolitan definition by addressing the problem of overbounding urban in large area MA counties. Weaknesses: Continued underbounding of urban in nonmetropolitan counties. No differentiation of nonmetropolitan counties or small area metropolitan counties. Difficult to use with data based on counties. No plans to be updated.
Urban/Rural	Census tract	U.S. Bureau of the Census definition. Rural census tracts are those outside of places with >2,500 population and lying outside of “urbanized areas” (usually found in MA counties in and around central cities). About 24.8 % of the 1990 population lived in rural areas.	Strengths: Significantly reduces problems of under- and overbounding associated with use of county-based definitions. Weaknesses: Data other than census data are not collected by census tract. Difficult to apply to health data that are often collected at the county or ZIP code level. Most data consumers lack familiarity with census tract geography and definitions. Not stable across census years—there were substantial changes for the 2000 census.
Rural Urban Commuting Areas (RUCAs)	Census tract	Multi-tiered definition developed by HRSA, WWAMI RHRC and USDA. Employs census commuting data to classify census tracts based on census geography and commuting activity between places.	Strengths: Use of commuting data strongly differentiates rural areas according to their economic integration with metropolitan areas and other rural areas. Very sensitive to demographic change. The structure of the codes allows for many levels of generalization—from 2 groups (rural/urban) to 30. Weaknesses: Difficult to apply to health data that are often collected at the county or ZIP level. Will not be stable over time—very sensitive to demographic change. Complex structure of codes not easy to master for casual users.
Rural Urban Commuting Areas (RUCAs-ZIP approximation)	U.S. Postal Service (USPS) ZIP codes	Approximates the census tract RUCA codes for ZIP codes.	Strengths: Use of commuting data strongly differentiates rural areas according to their economic integration with metropolitan areas and other rural areas. Very sensitive to demographic change. The structure of the codes allows for many levels of generalization—from 2 groups (rural/urban) to 30. Use of the ZIP code unit makes them useful with a wide variety of data collected at that level. Weaknesses: Will not be stable over time—very sensitive to demographic change. Complex structure of codes not easy to master for casual users. The underlying geographic unit is subject to substantial change by the USPS over time.

is inherent to any definition of rurality. One simply has to understand which way the “error” goes and keep it in mind when evaluating data and policy.

COMMONLY USED DEFINITIONS

In the United States, most definitions of rurality use the census tract or the county as the basic geographic unit. A detailed discussion of the census tract-based U.S. Census Bureau definition of rurality, as well as four commonly used county-based definitions, follows. In addition, we discuss a recently developed taxonomy based on postal ZIP codes that has been adopted by the Federal Office of Rural Health Policy (FORHP) for some of its grant programs. The various definitions discussed below are compared in Table 3-1. While individual state-based definitions are not reviewed here, some states have developed rural definitions relevant to their particular geography and policy issues. The Washington State Department of Health, for example, has used 124 aggregated ZIP code Health Service Areas (HSAs). For further information on any of these definitions, please see the Rural Health Resources section at the end of this volume.

CENSUS DEFINITION

The U.S. Census Bureau definition of rural begins with what is urban. Urban areas are defined as the territory in places of 2,500 or more population (Census Designated Place) or in the built-up “urbanized area” around a Census Designated Place with a population exceeding 50,000. The Census Bureau considers all other territories rural. Twenty-one percent of the U.S. population lived in census tracts designated as rural in 2000 (U.S. Census Bureau, 2003). This census tract-based number slightly exceeds the 19.7 percent living in nonmetropolitan counties. Populations living in small towns of greater than 2,500 in very remote counties are considered urban under the Census Bureau definition, but they are considered nonmetropolitan under the Office of Management and Budget (OMB) definition discussed below. At the same time, populations living in the more remote areas of large metropolitan counties are designated rural under the census definition. In fact, it has been shown that about 36 percent of the OMB nonmetropolitan population is designated as urban by the Census Bureau definition, and 15 percent of the OMB metropolitan population is designated as rural by the census definition (Ricketts, 1999c). This explains why, in many instances, “rural” figures in publications seem to be at odds with one another. At first glance, the relatively fine level of geographical detail offered by the use of census tracts as a unit of geography appears to be a major advantage over the somewhat coarse county unit (3,142 counties compared to 65,433 census tracts). However, except for decennial demographic data, very little

information is collected at the census tract level. (For more details, see U.S. Census Bureau, 2003.) With the 2000 census, the Census Bureau has added to its taxonomy by subdividing rural into larger and smaller places.

COUNTY-BASED DEFINITIONS

METROPOLITAN/NONMETROPOLITAN

Health services researchers and policy makers commonly use dichotomous definitions of rurality. Of these, the OMB’s county-based metropolitan/nonmetropolitan taxonomy is used most frequently. It also forms the basis for more detailed taxonomies such as the Department of Agriculture’s (USDA’s) Urban Influence Codes (UICs), Rural Urban Continuum Codes (RUCCs), and the Economic Research Service’s county typology codes (referred to as the ERS codes—see below). The OMB defines Metropolitan Areas (MAs) as areas containing a (census-defined) central city of at least 50,000 population, a total (census-defined) urbanized area population of at least 50,000, and a total metropolitan population of at least 100,000 (75,000 in New England) (Ricketts, Johnson-Webb, & Taylor, 1998). Counties that include a central city or have at least 50 percent of their population in the urbanized area of the central city are classified as metropolitan. All other counties are considered nonmetropolitan. There are 3,142 counties in the United States. In 1999, 2304 of the counties were non-metropolitan. Based on 2000 census data, 19.7 percent of the population of the United States lived in them¹. (For more details see OMB, 2003.)

RURAL URBAN CONTINUUM CODES (RUCCS)

Taking the metropolitan/nonmetropolitan distinction as its basis, the RUCC codes subdivide metropolitan counties into four groups based on the size of their populations. Each nonmetropolitan county falls into one of six categories based on the total size of its population and whether it is adjacent to a metropolitan county. To qualify as adjacent to a metropolitan county, a nonmetropolitan county must share a boundary with a metropolitan county, and there must be a minimum of commuting to the metropolitan county. This is a much more graduated definition of rurality than the metropolitan/nonmetropolitan definition. For example, if one is most interested in very isolated rural counties with small urban settlements, the RUCC taxonomy makes it possible to distinguish those counties quite easily. One important aspect of the RUCC scheme is that it uses total urban population in the county as a criterion, not the size of the largest settlement. In the RUCC taxonomy, for example, a nonmetropolitan county with three urban centers of 4,000 population is not distinguishable from a nonmetropolitan county with a single population center of

¹ Analyses using the metropolitan/nonmetropolitan classification in this volume use the 1999 definition. It is expected that increasing urbanization will increase the number of counties classified as metropolitan in the near future.

12,000 population. (For more details on RUCCs see ERS, 2003.)

URBAN INFLUENCE CODES (UICs)

The UIC taxonomy is another county-based definition based on the metropolitan/nonmetropolitan dichotomy. In this system, counties are classified into nine groups, two metropolitan and seven nonmetropolitan. Metropolitan counties are divided into those with populations of greater and less than one million. Nonmetropolitan counties are grouped according to adjacency and nonadjacency to metropolitan counties and according to the size of the largest urban settlement in the county. As with the RUCC taxonomy, physically adjacent nonmetropolitan counties are considered adjacent only if a minimum level of commuting occurs between the metropolitan and the nonmetropolitan county. The UIC system is often employed in the analysis of rural health services. Its use of the size of the largest town in a county as a taxonomic criterion is often helpful because the size of the largest town in a county often relates to the likelihood of the local availability of hospitals, clinics, and specialty services. A collapsed version of these codes is used in Chapter 5 of this monograph to describe the workforce profiles of the 50 states. (For more details, see ERS, 2003; Ghelfi & Parker, 1997.)

ECONOMIC RESEARCH SERVICE (ERS) TYPOLOGY OF NONMETROPOLITAN COUNTIES

The USDA has also developed a taxonomy for nonmetropolitan counties that is quite distinct from UICs, RUCCs, and other county-based definitions. The ERS taxonomy relies on the primary economic activity of each county rather than demographic characteristics. This typology assigns one of six mutually exclusive economic categories—farming dependent, mining dependent, manufacturing dependent, government dependent, services dependent, and nonspecialized—to each county. In addition, a county may receive one or more policy classifications: retirement destination, federal lands, commuting, persistent poverty, and transfers dependent (Ricketts, Johnson-Webb, & Taylor, 1998). Taken together, the economic classification with any policy classification may help the researcher or policy maker form an understanding of the socio-economic context of health services and policy issues in a county or group of counties. The ERS typology can be a useful tool for moving beyond demographic and geographic characteristics alone as basis for understanding rural issues. (For more details, see ERS, 2003.)

RURAL URBAN COMMUTING AREAS (RUCAs)

A recently developed rural/urban definition uses census tract-level demographic and work commuting data to define 30 categories of rural and urban census tracts. The categories are based on the size of cities and towns and the functional relationships between places as measured by census-level

journey to work data. For example, in the RUCA scheme, a small town where the majority of commuting is to a large city is distinguished from a similar sized town in the same county with commuting connectivity primarily to other small towns. Thirty categories can be unwieldy, and the codes were designed to collapse in various ways to highlight different aspects of connectivity, urban settlement, and isolation and to facilitate better targeting of program interventions. The FORHP has adopted RUCA codes to determine eligibility for certain federal grant programs in rural areas, the ERS is using the codes in their studies, and researchers are using this scheme (Phillips et al., 2003).

The census tract-level RUCAs have the advantage of being demographically precise, but they have the disadvantage of the census tract unit—namely, that very few health data are collected at the census tract level. To address this issue and enhance the utility of the RUCA taxonomy, researchers at the University of Washington, working with the USDA ERS, developed an approximation of the census tract RUCAs for postal ZIP codes. The researchers used a census tract-ZIP code crosswalk table to match census demographic and commuting data as closely as possible to ZIP codes, and then assigned a RUCA code to every residential and commercial ZIP code in the United States. While slightly less precise than the census tract version, the ZIP code RUCAs are an important tool in rural taxonomy because a plethora of health and economic data include ZIP codes. It becomes possible to examine data at a fine level of geographic detail from such sources as vital statistics, disease registries, Medicare and Medicaid, insurance claims, and a host of others. Because the RUCA code areas are smaller than counties and thus have more geographically homogeneous characteristics, their use to examine such phenomena as physician-to-population ratios in this monograph would reveal greater disparities than are reported using county-based definitions. (For more information on census tract RUCAs, see ERS, 2003. For more information on ZIP code RUCAs, see WWAMI RHRC, 2003.)

Definitions of rurality are limited and approximate. Rurality is multidimensional, with many sociologic, demographic, economic, and geographic facets. The various rural concepts are often imprecise and occasionally contradictory. Sometimes, rurality is usefully understood as a continuum. Other times, it is better understood as a dichotomy. To choose a definition of rurality that helps the health policy maker or health researcher make useful distinctions between rural and urban, or within rural areas, it is important to understand which aspects of rurality matter for health, health workforce, and the delivery of health services to rural populations. We address these issues in the next section of this chapter.

SPECIAL ISSUES IN RURAL HEALTH WORKFORCE METHODS AND ANALYSIS

Health workforce policy and research are concerned primarily with assessing the adequacy of the supply and distribution of health care providers with respect to the requirements for health care services of a given population. In most cases, workforce analysis is performed to obtain a clear snapshot of the composition of the current health workforce and identify the location and magnitude of shortages, and in some cases, surpluses of providers. Increasingly though, policy makers and researchers are interested in forecasting such shortages. Accurate forecasts would, of course, greatly facilitate policy development and implementation. Unfortunately, while the statistical tools for forecasting shortages are improving, there is often little agreement about the assumptions that should go into such models, and accurate data are often unavailable. Accurate forecasting of rural shortages and population requirements for health is particularly difficult because of small populations and small numbers of providers. In this section, we review the methodological issues involved in measuring the rural workforce.

Generally, the discussion below addresses key issues in measuring the rural health workforce—measurement that would be a necessary prelude to any attempts to forecast and address workforce supply or population requirements for health services. Using almost any definition of rurality, an examination of the size and composition of the rural health workforce reveals important differences between the rural and urban health care systems. These differences raise important methodological and policy considerations that health policy makers and workforce researchers need to keep in mind.

DATA AVAILABILITY

Rural data from federal surveillance systems and surveys have been extremely limited (Ricketts, 1999a), and funds for rural surveys have been scarce. While there has been some progress in making more rural data available, the shortage of rural data continues to impede production of relevant, effective, and policy-relevant research. Workforce analysis, including methods for designating health provider shortage areas, is important to research, policy, and the targeting of resources to the rural communities most in need of providers. To make meaningful progress, researchers need better methods and tools to describe and compare quality of care for small numbers of providers and for providers practicing under unusual circumstances. Likewise, intrastate small area health provider workforce modeling and analysis methods are rudimentary and need to be further refined. Substantial progress has been made recently, primarily because of center funding from the FORHP, the Bureau of Health Professions (BHP), and the Bureau of Primary Health Care (BPHC). To maximize the development and utility of these methods, they will need to be widely disseminated to state offices of rural health, Primary

Care Offices, and analysts, among others (e.g., see Ricketts et al., 1994).

ESTIMATING PROVIDER SUPPLY—WHO GETS COUNTED?

Estimating provider supply usually begins with the question, “Whom should we count?” This question deserves serious attention for anyone interested in meaningful comparisons and analysis. The simplest comparison of rural versus urban physician supply is a case in point. In 2000, about 204 physicians (excluding residents) actively provided patient care per 100,000 population in the United States. In nonmetropolitan counties, the number was 119, and in metropolitan counties, 225 (BHP, 2002). This difference is, of course, deceptively large. As noted in Chapter 2, rural areas often do not have the population base to support specialists, and so specialists tend to concentrate in cities.

We can achieve a better sense of the difference in health workforce between metropolitan and nonmetropolitan areas by comparing the generalist physician-to-population ratios of metropolitan and nonmetropolitan parts of the country. (Generalists are defined here as physicians practicing in family practice, general internal medicine, general pediatrics, and general practice.) In 2000, 78 generalist physicians practiced per 100,000 population in metropolitan areas compared to 57 in nonmetropolitan areas, a large difference to be sure, but not nearly the magnitude of the previous comparison (BHP, 2002).

This illustration also applies to other types of health care providers. In rural areas, physician assistants are about 70 percent generalists; in urban areas, only about 40 percent work as generalists (Larson et al., 2001). Specialist dentists (oral surgeons, orthodontists, etc.) tend to concentrate in urban areas as well. When estimating rural provider supply, it is imperative to ensure that comparisons are meaningful.

ESTIMATING PROVIDER SUPPLY—HOW SHOULD WE COUNT PROVIDERS?

After deciding whom to count, another deceptively simple question that should be asked is, “How should we count providers?” While this question applies equally to rural and urban providers, the ramifications of a wrong answer may be much more severe for rural estimates of supply. In short, counting individual providers (head counts) without determining their medical specialty, level of clinical activity, or type of practice is likely to lead to substantial overestimates of the amount of care available to a population.

A recent study of the productivity of generalist physicians in Washington State (Larson et al., 2003) showed substantial variation in physician productivity. Using a standard full-time equivalent (FTE) metric of 105 outpatient visits per week, the study determined that 4,124 generalist physicians produced only 2,781 FTEs of care. In a large population of

physicians, it is possible to use such information to adjust estimates of available care from head counts.

The special issue that arises in estimating available care in small rural areas is that very high or very low productivity by one or two providers may severely bias estimates of available care based on head counts, even with a productivity adjustment applied. Conversion to FTEs will yield much better estimates of available care than simple head counts. But in areas served by only a few providers, such as a remote rural county, great care must be taken to obtain accurate estimates of provider productivity.

INTERPRETING ESTIMATES— SHORTAGE OR MALDISTRIBUTION?

We noted above that the generalist physician-to-population ratio for nonmetropolitan counties of the United States was 57 per 100,000 population in 2000 and 78 per 100,000 population in metropolitan counties. Does this discrepancy indicate a rural shortage of generalist physicians? A rural county may qualify for federal Health Professional Shortage Area (HPSA) designation at a ratio of 1:3,300 (30 generalist physicians per 100,000). Fifty-seven generalist physicians per 100,000 translates to a generalist physician-population ratio of about 1 generalist physician per 1,754 rural residents. Thus, it is difficult to claim that nonmetropolitan America overall is suffering from a severe shortage of generalist physicians. Even the state with the lowest nonmetropolitan generalist physician-to-population ratio (Louisiana) has 42 generalists per 100,000 population (1 generalist per 2,380 population). Closer investigation often reveals substantial intrarural and state-to-state variation in the supply of health care providers—both of which are evident in the interstate comparisons of provider supply shown in Chapter 4 and the state profiles in Chapter 5.

SHORTAGE DESIGNATION

The geographic maldistribution of health care providers in the United States is a longstanding problem, and many federal programs are designed to help mitigate provider shortages in rural areas. Eligibility for these programs is often based on the formal designation of a geographic area (usually a county or part of a county) as a shortage area, and this designation may significantly affect the number and type of health care providers available to a rural population. To grasp how shortages can be measured and mitigated, it is important to understand the two basic federal shortage designation types, the Health Professional Shortage Area (HPSA) and the Medically Underserved Area (MUA). Certain underserved populations are sometimes eligible for designations as population HPSAs or MUAs, but we discuss only geographic-based designations here.

HPSA DESIGNATION

The HPSA concept, under a different name (Critical Health Manpower Shortage Area), was originally developed to designate areas that would be eligible for providers serving

in the National Health Service Corps (NHSC). The NHSC program offers scholarships and loan repayment to health care providers in exchange for two to four years of service in underserved communities. HPSA status can be granted on the basis of shortages of medical or dental providers. HPSA designation is now used as a criterion for eligibility for several programs designed to enhance the rural health care workforce and increase access to care for rural residents. These programs include eligibility for 10 percent Medicare Incentive Payments, Medicare reimbursement for telehealth services, Rural Health Clinic certification, and of course, NHSC providers. HPSA designation criteria vary somewhat, but HPSA status is usually granted to a county or part of a county (usually an agglomeration of census tracts or minor civil divisions within the county) with fewer than 1 primary care physician per 3,500 residents in the area. (Areas with less than 1 physician per 3,500 but greater than 1 per 3,000 population may qualify in some circumstances; see BHP, 2003). NHSC physicians already in service, international medical graduates (IMGs) with J-1 visa waiver status, nurse practitioners, and physician assistants are not included in the count of providers used to determine the ratio of primary care physicians-to-population. The BPHC is currently considering changes to these criteria, including one that would recognize nurse practitioners and physician assistants in the provider count. Each nonphysician clinician would be counted as 0.5 of a primary care FTE. Such a change, along with others currently under consideration, could have a substantial effect on the eligibility of currently designated HPSAs (COGME, 1998; Federal Register, 1998; BHP, 2003).

MUA DESIGNATION

As with HPSA designation, Geographic MUA designation is granted to whole counties or parts of counties. MUA status is required for eligibility for establishment of Community Health Centers and Federally Qualified Health Centers and for eligibility for IMGs practicing under J-1 visa waiver status (IMGs with J-1 visa waiver status may also practice in HPSAs). Status as a MUA is granted based on a score assigned from a combination of four criteria: physician-to-population ratio, the proportion of the population 65 and older, the proportion of the population living on incomes below the federal poverty level, and the infant mortality rate. (For more information, see BHP, 2003.)

RECRUITMENT AND RETENTION

As noted in Chapter 2, recruitment and retention of health care providers in rural areas is both an important theme and a persistent problem in rural workforce policy and research. While the effects of programs to increase provider counts can be straightforward to measure, understanding long-term retention of providers in rural settings can be complicated. Studies of retention have yielded mixed results and raised the issue of what is meant by the term “retention.” For example, Pathman, Konrad, and Ricketts (1992) found very low rates of long-term retention of NHSC physicians in

their NHSC locations. Rosenblatt et al. (1996), on the other hand, found that while NHSC alumni did leave their original sites at a high rate, many continued to serve other underserved communities long after their service obligations had expired. In a study of the long-term locational behavior of physician assistants, Larson et al. (1999b) noted that there are several geographic dimensions of retention. From the perspective of a single community, the loss of a provider is a failure to retain a needed health professional. From the perspective of a state government that may have paid for training a rural provider, a move from one underserved community to another in the state is not necessarily a failure. If an NHSC dentist finishes her obligation in a small, underserved Appalachian community and moves to a small town in Montana with a shortage of dental providers, this is a loss to a particular community and state but not to the overall supply of providers caring for underserved rural populations. When evaluating programs or planning policy to enhance retention of rural providers, it is important to be clear about what is meant by retention in the particular programmatic or policy context.

REGIONALIZATION AND SPECIALTY CARE

A particularly complex issue that confronts rural health care is maintaining reasonable access to specialty care for rural residents. As already noted above, the base population required for some specialty areas of care is simply not present in many rural areas, and services become concentrated in tertiary centers. Even when the base population is large enough to support a specialty, other problems may impede the safe and efficient delivery of specialty care. Technological resources may be inadequate, and the long hours and lack of backup can be problematic for specialty care providers. Providing dependable specialty services often presents a complex health workforce problem, one that cannot be resolved just by obtaining the services of a physician specialist. It may be as difficult to recruit and retain ancillary providers such as radiology technicians, laboratory technicians, nurse anesthetists, and others with the training to support the delivery of specialty care as it is to recruit and retain specialist physicians.

Rural surgical services, for example, can be very difficult to retain even if a population is large enough to generate sufficient volume to keep a rural surgeon busy. Surgical services have become increasingly dependent on the availability of expensive technology and an infrastructure of support personnel including technicians, nurses, radiologists, pathologists, surgical assistants, and anesthesiologists. While nurse anesthetists perform a substantial amount of anesthesia services in rural settings, many rural general surgeons are reluctant to perform more complex procedures without an anesthesiologist (Lynge, 2001).

In the absence of local specialist providers, rural residents must rely on regionalized networks to receive specialist care. Regionalized care may require us to rethink who counts

as a rural provider. The case of the regionalization of rural obstetrics illustrates the critical tension between local care and regionalized care. It is well established that having local obstetrical care is associated with better neonatal outcomes (Nesbitt, 2002). At the same time, it has long been abundantly clear that the survival of high-risk infants is significantly enhanced by having early and efficient access to the neonatal intensive care unit (NICU) and the specialist nurses and pediatricians who practice there. An adequate obstetrical workforce to serve rural populations includes local providers who practice obstetrics on a regular basis and refer higher-risk women to tertiary centers at an appropriate time; it also includes the staff of NICUs in tertiary centers. When thinking about rural access to specialty care, workforce policy and analysis must move beyond the town, county, or local health service area and consider the larger regions in which many specialty services are delivered and the potential of telehealth to strengthen such regionalized systems.

COMPARISONS—LOOKING BEYOND AGGREGATE DATA

In a society in which 80 percent of the population lives in metropolitan areas, it is understandable that the remaining 20 percent of the population often gets lumped into a group called “rural.” While rural/urban comparisons are usually the right place to start, policy makers and researchers may tend to accept the dichotomous classification as primary and tacitly assume that intrarural variations in health, health care, and the health workforce are not as important as rural versus urban variation. Sometimes this is the correct approach; significant rural/urban variation in health status, health outcomes, or access to health care often marks differences best dealt with as a rural/urban issue. For example, during the late 1970s and early 1980s, researchers noted high rates of neonatal mortality among rural residents. Research and policy efforts were directed at understanding and addressing the rural/urban gap in neonatal survival chances, efforts that eventually eliminated those rural/urban differences (Hein & Lathrop, 1986; Rosenblatt, Reinken, & Shoemack, 1985; Larson, Hart & Rosenblatt, 1997).

Sometimes the rural/urban difference in health status, outcomes or workforce resources is not the most important one; substantial intrarural variation in outcomes, health status, health care provider supply, and workforce composition may also exist. The workforce in large rural towns is usually very different in composition and capability from the workforce found in small and remote towns of the same state. Overall rural averages (and rural/urban comparisons), while useful as a starting point in understanding rural workforce issues, should always be examined carefully to determine how much variability underlies the average. In workforce analysis, averages may hide as much as they reveal. For example, while the statement that rural care is oriented toward primary care is generally

true, it is also important to understand that some specialists are available in many rural areas and that they do tend to concentrate in larger regional (but rural) centers, leading to very different rural workforce profiles within states. This is explained at the state-by-state level in Chapter 5.

The importance of rurality as a distinguishing factor may vary from state to state as well. In Montana, the rural and urban generalist-to-population ratios are quite similar: 69/100,000 and 72/100,000. In Nebraska, the corresponding numbers are 59 and 73. State to state and region to region variation in rural workforce supply can be substantial too. Rural generalist supply per 100,000 population varies from 88 in Maine to 42 in Louisiana. New Hampshire has 15 general surgeons per 100,000 rural population, while rural Nevada has 4. The underlying socio-economic milieu varies too. Rural per capita income is \$17,591 in New Mexico and \$26,295 in Wyoming. In Kentucky, 16 percent of rural families live on incomes below the federal poverty level, while in Iowa, only 6 percent of rural families did so. Just as counting all providers equally in workforce analyses is problematic, counting local populations as head counts also can produce serious biases in results. For example, counting 20 boys of 11 years old in an area as equivalent to 20 older men of 80 is clearly not appropriate when estimating the health care needs of a community. Newer models of need (and alternative demand models) take the sex and age distribution and their estimated need and use of medical care into consideration. As these models become more sophisticated, disease-specific needs will be integrated

into them. All of these factors come to bear on workforce analysis, forecasting, and policy efforts to enhance the availability of providers to rural residents. Rural workforce policy must take into account both intrarural variation and regional variation in supply, demand, requirements, and socio-economic context.

SUMMARY

Rural workforce analysis often begins with selecting a definition of rural. The definition of rural that is employed is crucial. The selection of an appropriate definition for use in policy analysis depends on the questions being asked and on practical considerations of data availability. In addition to the issue of an appropriate rural definition, rural health workforce analysis presents unique methodological challenges. The different provider mix in rural areas, the regionalization of specialty care, the estimation of shortages, and the amelioration of shortages are all areas that require special analytic attention from policy analysts, policy makers, and researchers. Perhaps most important is the need to guard against assuming that all rural areas are similar or even that all rural areas in a single state are similar and face similar workforce problems. The next two chapters explore interstate and intrastate variation in the availability of rural health care resources extensively in a series of interstate comparisons and individual state rural health workforce profiles.

