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# **Frontier/Remote, Island, and Rural Literature Review**

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## **Preface and Background**

This literature review was initially funded as part of a larger project by the Health Resources and Services Administration's (HRSA's) Office of Rural Health Policy (ORHP) and by the Department of Agriculture's Economic Research Service (ERS). The larger project's purpose was to create a national frontier/remote geographic definition that includes the nation's islands. The project's title was "National Frontier/Remote and Island Definition Project" and was started in 2007. Through the project process the Frontier and Remote (FAR) Methodology and Codes were created in their pilot version in 2012. The pilot version of the codes was first added to the ERS web site in June 2012. The ORHP Federal Register Notice appeared in September, 2012 and asked for comments on the new frontier taxonomy scheme. Subsequent to this the FAR methodology will be adjusted and applied to the 2010 Census data and Version 1.0 of the codes will be made available on the web. After the completion of the update (the initial project), this literature review will remain available on the University of North Dakota Center for Rural Health web site.

The initial purpose of this review was to provide a sound foundation upon which to build a new frontier definition. This review is now an ongoing working document that is updated as errors are found and as new relevant taxonomies are developed and discovered. Judgment is employed in selecting which taxonomies to include and we have attempted to error on the side of including taxonomies that are marginal.

If you know of information that you believe should be added to this review or find errors in the text, please let Dr. Hart know by e-mailing him at [gary.hart@med.und.edu](mailto:gary.hart@med.und.edu). To check on whether a newer version of this review is available, go to the following web location: <http://ruralhealth.und.edu/pdf/frontierreview.pdf> and check the current version there.

## **Purpose**

The initial purpose of this literature review was to provide background material for the Frontier/Remote and Island Definition Project. It highlights the evolution of the term frontier as it applies to remote, sparsely settled territory in the U.S. and discusses related definitions of rural that are relevant to the Project's goal of creating a national frontier/remote and island geographic taxonomy. In addition, this review is intended to be a working document that is modified with additional input as the project team gathers more materials and as new publications become available. The version number and version date on this document can be checked against the newest available version on the web site (<http://ruralhealth.und.edu/pdf/frontierreview.pdf>) to determine if this is the most current version.

The original project was aimed very pragmatically at creating a definition of frontier based on easily explained concepts of remoteness and population sparseness. The goal was to create a statistical delineation that would be useful in a wide variety of research and policy contexts and adjustable to the circumstances in which it was applied. The new geographic taxonomy should prove useful in various research and policy environments, such as rural health care, regional science, demography, rural sociology and agricultural economics. The development of the definition was informed by policy needs, but ultimately was based on social science theory and practice and be independent of specific policy considerations. However, any statistical delineation of this nature is approximate at best and not suited to all applications. Given the remarkable diversity of settlement patterns and conditions across the contemporary U.S. frontier, however defined, mistakes in how areas are classified can only be minimized, not eliminated. It is necessary to build some degree of flexibility into any definition. It is up to researchers, policymakers, program managers, and policy advocates to ensure that the definition is applied appropriately within specific contexts.

## **Why is it important to delineate frontier areas?**

This project seeks to delineate U.S. territory characterized by very low population density and a high degree of remoteness. Such territory lies at one end of the rural-urban continuum, and can be usefully viewed as a subset of rural. For most people living in frontier communities, remoteness affects daily life in myriad ways and is viewed as both a blessing and a curse. Researchers, economic development experts, and policy makers tend to focus on the economic and demographic challenges associated with remoteness. Remoteness has been linked with persistent population loss and out-migration (Albrecht, 1993; Cromartie, 1998; McGranahan and Beale, 2002; McGranahan et al., forthcoming; Partridge et al. 2008); an aging population and natural decrease (Johnson, 1993; Johnson and Rathge, 2006); low median earnings, low housing values, and poverty (Partridge and Rickman, 2008; Partridge, et al. 2009); and loss of retail and wholesale trade (Adamchak et al., 1999; Henderson et al., 2000; Wensley and Stabler, 1998). By improving geographical delineations of frontier areas, this project is designed to contribute to research efforts to better understand these types of challenges common throughout rural America, but that are particularly acute in frontier communities.

Perhaps the fundamental and defining challenges facing frontier communities are the increased per capita costs of providing services. Access to health care is a primary concern motivating this research, but distance and low population densities increase costs of providing all types of social services, including schools, police and fire protection, public utilities, and transportation. According to central place theory, population size and remoteness determine not only the number of retail establishments in a community, but the lack of availability of higher-order services. The costs associated with providing lower-order services (groceries, sporting goods, nursing care) are lower than those associated with a higher-order service (appliances, motor vehicles, major trauma intervention), thus they require a larger population to support them (Mulligan, 1984). Recent research, based on central place theory, estimated minimum population sizes (known as demand thresholds) needed to support different types of retail establishments in rural areas (Shonkwiler and Harris, 1993; Henderson et al., 2000; Wensley and Stabler, 1998). For frontier communities, population decline has been a major contributor to decline in the retail and wholesale sectors, at least in the Great Plains (Adamchak, et al., 1999).

As is true for the many definitions of rural, this delineation of frontier areas could aid policymakers in efforts to improve the targeting of resources to underserved rural populations. If the only outcome of clarifying the definition were an improved mechanism for funneling health care to where it is needed most, the clarification would be well worth the effort. Because there are 50 to 60 million rural residents in the nation, decisions about resource use have significant ramifications in terms of the dollars spent and the well being of rural populations. Common definitions of rurality are the basis for many policy decisions, including criteria for the allocation of the nations' limited resources. However, it is always important to specify which aspects of rurality are relevant to the phenomenon being examined and then to use a definition that captures those elements. For some rural development issues, the concept of frontier is a critical one.

### **Placing Frontier Definitions in a Broader Rural Context**

Frontier/remote is taken in this project to be thought of as a subset of rural. Of course, there are many definitions of rural and as much disagreement about them as there is about frontier. While it is not a project dictate that the created frontier/remote definition be a subset of a specific rural definition, the project team understands the advantages of such a link. While a defined frontier/remote taxonomy could be subdivided into those frontier areas that are termed wilderness and not, this project's objectives do not include making such a distinction. Many of the rural taxonomies have multiple categories some of which can be used and evaluated for their utility in designating frontier/remote areas. For instance, the ERS' county-based Urban Influence Codes (UICs) consist of a dozen codes and uses the OMB definition of Metropolitan to divide the nations' urban-like and rural-like counties into 2 groups. The taxonomy divides the Non Metro counties into 10 categories. The most frontier-like of these categories (i.e., category number 12) could be considered as possible frontier/remote areas. Thus, this review not only examines the few frontier taxonomies but reviews definitions of rural more generally. More emphasis in this review is placed on rural definitions that have been utilized more often and those that are of more recent in origin. In the literature there are

few actual frontier/remote taxonomies, although many of the rural/urban definitions can also be used to identify frontier/remote-like areas.

Only by defining "rural" appropriately can we discern differences in health care concerns and outcomes across rural areas and between rural and urban locales. The definition of rurality used for one purpose may be inappropriate or inadequate for another" (Larson and Hart, 2003). Inappropriate definitions may bias research findings and policy analyses.

"The U.S. has evolved from a rural agricultural society to a society dominated by its urban population. Depending on which definition is used, roughly 20% of the population resides within rural areas. Approximately 3 fourths of the nations' counties are rural, as is 75% of its landmass. While the rural population is in the minority, it is the size of Frances's total (rural and urban) population. As important as the rural population and its resources are to the nation, there is considerable confusion as to exactly what rural means and where rural populations reside. We will discuss defining rural and why it is important to do so in the context of health care policy and research" (Hart, Larson, and Lishner, 2005).

It may be asked why attention should be paid to rural and frontier taxonomies. Such taxonomies are exceptionally important in several contexts. What we know about subsets of the U.S. population is in no small measure a function of how we define frontier, rural, and urban and all their gradations. When demographic, health care, and other estimates do not agree, it is important to understand the part that varying geographic taxonomies are responsible. The various geographic taxonomies frame our very perceptions of the nation's settlement patterns, populations, and sub groups. The taxonomies are critical to the governmental allocation of scarce resources. They act as eligibility criteria for a cornucopia of federal and state programs. Good geographic taxonomies coupled with additional information can be used to better target the allocation of resources to those in most need, which reduces waste and pinpoints the resources where they will do the most good. These cases and others regarding the importance of geographic definitions of rural, urban, frontier, and intra rural are well portrayed by Hewitt (1989) (see Appendix) and are also available from many other sources (e.g., Isserman, 2007; Isserman, 2005; Hart, Larson, and Lishner, 2005; Morrill, Cromartie, and Hart, 1999; Coburn et al., 2007; Cromartie and Bucholtz, 2008; and Ricketts, Johnson-Webb, and Taylor, 1998). In addition, it is apparent that there is not and will not be a single rural/frontier/remote taxonomy that meets all needs. Different geographic taxonomies are needed for various purposes and the more desirable that such taxonomies be adaptable to specific needs.

"Although some policymakers, researchers, and policy analysts would prefer 1 standardized, all-purpose definition, "rural is a multifaceted concept about which there is no universal agreement. Defining rurality can be elusive and frequently relies on stereotypes and personal experiences. The term suggest pastoral landscapes, unique demographic structures and settlement patterns, isolation, low population density, extractive economic activities, and distinct sociocultural milieus. But these aspects of rurality fail to completely define "rural". For example, rural cultures can exist in urban places. Only a small fraction of the rural population is involved in farming, and towns range from 10s of thousands to a handful of

residents. The proximity of rural areas to urban cores and services may range from a few miles to hundreds of miles. Generations of rural sociologists, demographers, and geographers have struggled with these concepts (Hart, Larson, and Lishner, 2005).

Health care researchers focus great attention and time on statistical methodologies, however, geographic methodologies are often neglected. Deciding which rural definition to apply to a research or policy analysis topic depends on the purpose at hand, the availability of data, and the appropriate and available taxonomy. There is no perfect rural definition that meets all purposes and never will be. Researchers must be deliberate and insightful when defining rural and when applying the appropriate definition and its associated taxonomy to program targeting, intervention, and research (Hart, Larson, and Lishner, 2005).

### **General Review of the Frontier Concept**

Using the term "frontier" to describe a particular portion of contemporary U.S. settlement is a risky proposition. Its extensive historical baggage and multiple, overlapping (and sometimes opposing) connotations exposes any geographical classification system employing the term to some degree of criticism and misinterpretation. The frontier definition proposed here is a geographical concept meant to delineate areas characterized primarily by remoteness. Applying this particular meaning to the term has increased in recent years, especially in the rural health policy arena, and represents a natural evolution of the term with parallels in other disciplines (as described below). However, in advisory discussions related to this projects, some advocated for a more neutral label such as "remote areas", and we recognize that such a term could easily be substituted. We chose to keep the term frontier for several reasons, not just for the obvious benefit of being able to use a shorter, more intuitively appealing descriptive label in research publications and other outlets. Most importantly, it seems appropriate to adopt the term in this context because it has always been used to describe distinctive aspects of America's population as Europeans expanded into remote areas, and its meaning has always shifted with the times (Turner, 1921; Prescott, 1978).

Originally a French military term denoting battle lines, or the zone between enemy combatants, the term came to describe many different types of borders or border areas dividing the known and unknown. These include political borders, zones of cultural conflict or interaction, even the line at edge of human knowledge between the known and unknown. Paramount in the United States, from the earliest years onward, was its application to the process of European conquest and settlement, a definitively demographic and ever-changing border zone between settled and unsettled (at least by Europeans) territory.<sup>1</sup> According to the concept's greatest proponent: "The American frontier is sharply distinguished from the European frontier--a fortified boundary line running through dense populations. The most significant thing about the American frontier is that it lies at the hither edge of free land (Turner, 1893)."<sup>2</sup>

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<sup>1</sup> First used in North America in 1676:

Quotes are taken from online version available at: <http://search.proquest.com/docview/103444441/halsall/mod/1893turner.html>



Turner's thesis, that Americans' experience along the frontier shaped our society in profound ways, was itself a profound turning point in American thought. More importantly in relation to this project was the connection he drew with the Census Bureau's definition of frontier—a series of statistical delineations of U.S. geography based on population density. By making this statistical mapping exercise (otherwise relatively obscure) a central feature of his soon-to-be-famous thesis, Turner gave impetus to this approach to defining frontier, at the same time that he recognized the fuzziness of the concept: "In the census reports it is treated as the margin of that settlement which has a density of 2 or more to the square mile. The term is an elastic one, and for our purposes does not need sharp definition. We shall consider the whole frontier belt, including the Indian country and the outer margin of the "settled area" of the census reports (Turner, 1893)." This connection highlighted the essentially demographic nature of the concept as applied to the U.S.

In fact, Turner used the results of the 1890 Census to argue that the American frontier was dead. The Census showed that the distinct frontier line that had been mapped for several decades had fragmented into a pattern of scattered settlements across the Great Plains and Rocky Mountains. This suggested to Turner that "frontier settlement" as a process defining the American character no longer existed. As the significance of the frontier line itself waned, the term frontier assumed a much broader regional connotation. Historians who were critical of Turner's thesis replaced his concept of frontier as a process of expansion on the part of Europeans with a "New West" regional concept incorporating Native Americans and other excluded minorities (Limerick, 1987; Nobles 1997).

For geographers and others, the term also came to mean not just the line dividing more densely-settled and less densely-settled territory, but all of the less densely-settled territory beyond the line. For example, after the 1980 census, Frank Popper published a series of academic and news articles claiming to refute Turner's statement that the frontier had disappeared. Although the line was gone, Popper observed that huge tracts of the U.S. were still very sparsely populated and remote. He applied the term frontier to all sparsely-settled territory, as many others were doing, and his research showed that more than half the land area of the U.S. was still frontier. He also claimed that the number of frontier communities was growing because of persistent population loss throughout the Nation's heartland (Popper, F.J., 1986). Social scientists and others are increasingly using the term frontier to describe sparsely-settled and geographically remote territory, especially in the U.S. (Duncan, 1993; McGranahan and Beale, 2002).

On the federal and state health care front, frontier came to have a general meaning similar to that advocated by Popper (i.e., sparsely-settled) with remoteness often emphasized. "In the mid-1980s, the federal Community Health Center program decided to consider as frontier those counties with a population less than or equal to 6 persons per square mile located at considerable distance (greater than 60 minutes travel time) to a medical facility able to perform a caesarian section delivery or handle a patient having a cardiac arrest. These latter criteria were forgotten through the years and programs began to define frontier counties with only a single criteria – population density of 6 persons per square mile or less." (Definition of Frontier section of following web page (accessed 4/21/2011: <http://frontierus.org/index->

[current.htm](#)). For a bibliography, demographics, federal programs, and other materials related to frontier see the National Center for Frontier Communities web site (<http://frontierus.org/index-current.htm>).

It is clear from an overview of the literature that a fairly small group of factors have a tendency to be included in most of the rural and frontier taxonomies. The Census Bureau used population density (areas of less than 2 people per square mile) exclusively in its 19<sup>th</sup> Century definition made famous by Turner. In contemporary applications, geographic remoteness has been equally emphasized. For instance, McGranahan and Beale (2002) identified a set of frontier counties based on 2 measures applied to nonmetropolitan counties: population density (less than 10.1 persons per square mile) and non-adjacency to a metro area as a proxy for remoteness. Many other measures attempt to capture these overlapping but distinct concepts of sparseness and remoteness (in no particular order): population size, distance to urban areas (measured in linear miles, travel miles, or travel time), degree of urbanization. Hewitt (1989) provides a basic description of these factors and others (such as type of economic specialization), and the apparent reasoning behind their use (see Appendix). Many of the listed factors have a face validity that is quite obvious. For instance, society's perception of rural areas is that they are those places where the population settlement pattern demonstrates low density (i.e., sparsely settled areas). In addition to the monograph by Hewitt, there are several other journal articles/monographs that address the differences in selected rural definitions (e.g., Ricketts, Johnson-Webb, and Taylor, 1998; Hart, Larson, and Lishner, 2005; Isserman, 2005; Hall, Kaufman, and Ricketts, 2006; Coburn et al., 2007; Vanderboom and Madigan, 2007; and Cromartie, 2008). In addition, see selected web sites at the end of this document). Most rural and frontier geographic taxonomies use a subset of the listed factors in combination to create their geographic taxonomies.

Most of the rural definitions are based on counties (or their equivalents) as the geographic unit. The county certainly has a place as the basis of definitions but it also has severe problems. The most important reasons for using counties include that they: 1) have much available data; 2) are significant political entities; 3) seldom change boundaries; 4) are traditionally used in many reporting systems and data sets; and 5) are well known to the populace, program managers, researchers, and politicians. However, there are significant problems with county use for many purposes. Counties were created by means of political processes and often are extremely heterogeneous units whose aggregate averages on data items end up being representative of nowhere within the county. Furthermore, the rural/urban character within many counties varies dramatically. For instance, Pima County, Arizona ranges from an urban city of over half a million population near its northeast corner to large remote areas that are extremely sparsely populated along its southwest Mexico/U.S. border (Pima county vastly over bounds the city of Tucson). Likewise, many counties or groups of counties under bound their built up areas. Some large states like Arizona (114,006 square miles – significantly larger than the United Kingdom) have few counties (17 counties), while smaller states like Virginia (42,769 square miles) have many smaller counties (134 counties). Counties vary in size from state to state, with the counties in the West generally much larger than those of the East.

Use of different rural definitions can make substantial differences in estimates of important factors. “The choice of definition for 'rural' that is used to present demographic and health data can make a substantive difference. For example, whether a disproportionate number of rural residents are elderly depends on how rural is defined. Furthermore, wide variations in health status indicators within non metropolitan areas will not be apparent unless non metropolitan data are disaggregated by region, urbanization, proximity to urban areas, or other relevant factors” (Hewitt, 1989). When the 2 historically most used rural/urban-like taxonomies are compared (OMB’s Metropolitan and the Census Bureau’s Urbanized Areas/Urban Clusters) 17.9 % of the U.S. population is categorized as being either Metro/Rural or Non Metro/Urban (2000 Census data). Thus, depending on how these categories are handled the rural population of the U.S. can be estimated at anywhere from 10.3 % to 28.2 % of the nation’s total population. Such differences make reported information vastly different depending on which definition is employed. Although having rural definitions that differ in geographic units and criteria is not inherently bad because they may be used for different purposes, this example does demonstrate that they can lead to considerably different populations being designated. This often leads to confusion when estimates based on 2 different taxonomies yield considerably different estimates and the audience does not appreciate the differences in the definitions. Clearly the choice of existing geographic taxonomies and the development of new taxonomies is limited by the availability of data at various geographic scales (e.g., county, Census tract, residential ZIP code area, block, and phone number codes). The confidentiality of data for small geographic units often makes access to these data either difficult or impossible.

There are some taxonomies that are based on sub county units. There has been more interest in sub county units during the last 2 decades (Dahmann and Fitzsimmons, 1995). The oldest and most used such geographic taxonomy is that of the U.S. Census Bureau. They utilize their Census tract data to define Urbanized Areas and Urban Clusters (described below). The other taxonomy that has gained significant use, especially related to health care, is the Rural-Urban Commuting Areas (RUCAs). In this taxonomy, Census tracts are grouped using some of the Census Bureau’s urban place size information coupled with Census Bureau work commuting information. This taxonomy has 33 categories that can be aggregated in various ways to meet specific needs. There is also a ZIP code approximation of the RUCAs.

There are many different types of rural and frontier definitions. Many of these definitions were developed in response to specific needs. Unfortunately, in such worlds as federal legislation and funding and in research, the origins and meanings of the definitions are far too often not thought about when they are applied to other tasks and different purposes.

Comparisons of geographic areas using various taxonomies all have the problem related to the fact that the fastest growing rural areas often have population increases that cause them to be reclassified as urban or Metropolitan (Artz and Orazem, 2006). This can create artifacts in comparisons across time and perpetuate incorrect perceptions. Remedies in longitudinal studies that use geographic taxonomies can involve using the taxonomy as designated at the beginning, middle, or end of the study period, with clear explanation of how such a choice influences the analyses results. (Hart, Larson, and Lishner, 2005).

There are many good descriptions of the economics, migration patterns, settlement patterns, poverty, esthetic nature, culture, and other aspects of rural frontier/remote areas (e.g., Hart, 1998; Conzen, 1994; Cushing, 1999 to cite but a few). A good bibliography of frontier-related publications, including Peter Beesons' rural reading list and bibliography, can be found National Center for Frontier Communities web site (accessed on 5/8/10: <http://www.frontierus.org/>).

### **Geographic Taxonomy Development Concerns**

An appropriate rural and urban geographic taxonomy should: (1) measure something explicit and meaningful; (2) be replicable; (3) be derived from available, high-quality data; (4) be quantifiable and not subjective; and (5) have on-the-ground validity (Hart, Larson, and Lishner, 2005). In addition, a taxonomy should be (6) objective, (7) reliable, (8) practical and straightforward, (9) policy relevant but independent of specific program biases, and (11) considered one of several toolkit geographic taxonomies.

"The concepts of 'rural' and 'urban' exist as part of a continuum, but Federal policies generally rely on dichotomous urban/rural differences based on designations of OMB or the Bureau of the Census" (Hewitt, 1989). Many of the rural and frontier definitions use a single rural classification and fail to distinguish sub categories of rural. Rural areas are not homogeneous across the nation and aggregating rural areas of differing sizes and levels of remoteness frequently obscures emerging problems at the local level. As a result, policies may fail to include appropriate intra rural targeting (Hart, Larson, and Lishner, 2005).

Another problem associated with rural health research and policy analysis involves the geographical level of available data. Typical units used for the collection of health and demographic data include states, counties, municipalities, census tracts, and residential ZIP codes. The county is a convenient and frequently used unit of analysis, and many health-related data are collected at this level. However, the large geographic size of counties, and the failure to distinguish between the demographic and economic heterogeneity that often exists within counties, can weaken the meaningfulness of policy analyses. Both the strengths and weaknesses of any given definition are strongly rooted in the underlying geographic unit used in the definitions (Larson and Hart, 2003). As already noted, some degree of over bounding and under bounding is inherent in any definition of rurality. It is important to consider which way the "error" goes when evaluating data and policy. The more the mixing of diverse groups within units of analysis, the more difficult it is to show real differences between groups (Hart, Larson, and Lishner, 2005).

In the health care field, the monograph entitled *Defining "Rural" Areas: Impact on Health Care Policy and Research* by Maria Hewitt (1989) stands as a milestone work. It summarizes the literature to that point, contrasts the most used taxonomies, characterizes those factors most often employed in rural-related taxonomies, and describes the consequence such taxonomies play in health care policy. This thoughtful and insightful monograph is included in the Appendix.

## **Frequently Used and Recent Rural, Frontier, and Island Taxonomies**

Each of these geographic taxonomies is briefly discussed below. See Table 1 for a concise tabular comparison of these taxonomies. The definitions are interdigitated because many principally rural definitions can also be used to measure some aspects of frontier.

### **Office of Management and Budget (OMB) Metropolitan Taxonomy**

The federal government most frequently uses the county-based OMB Metropolitan and Non Metropolitan classifications as policy tools. These county-based definitions are the foundation for other, more detailed taxonomies and are used when determining eligibility and reimbursement levels for more than 30 federal programs, including Medicare reimbursement levels, the Medicare Incentive Payment Program, and programs designed to ameliorate provider shortages in rural areas. Metropolitan Areas were defined in 2003 as central counties with 1 or more urbanized areas (cities with a population greater than or equal to 50,000) and outlying counties that are economically tied to the core, which were measured by commuting to work. Of the United States' 3 141 counties, 1 100 are metropolitan counties (in 366 metropolitan statistical areas) and 2 041 are non metropolitan counties (686 micropolitan in 573 micropolitan statistical areas and 1 355 non core counties).

Per 2009 Census Bureau estimates, there are 239 million metropolitan and 49 million non metropolitan residents, of whom 29 million lived in micropolitan counties and 20 million lived in non core counties. Micropolitan counties are those non metropolitan counties with a rural cluster with a population of 10,000 or more. Non core counties are the residual. The most significant problem with this taxonomy is that county boundaries both over bound and under bound their urban cores. The metropolitan and non metropolitan taxonomy was most recently updated in 2003 in accordance with the 2000 census data.

This definition has changed names over the decades. It was originally called Standard Metropolitan Statistical Areas (SMSAs) and then Metropolitan Statistical Areas (MSAs) and are now called Metropolitan Areas (MAs). The 2000 Census methods were especially different (Slifkin, Randolph, and Ricketts, 2004; Hart, Larson, and Lishner, 2005). Micropolitan counties were added to the definition for the 2000 Census data.

Major Strengths: Much data are available by county. This taxonomy is widely used for many federal and state programs and is widely known. The underlying county unit is very stable across time. The methodology and county assignments were significantly changed in 2003.

Major Weaknesses: The taxonomy is county-based. There are only 3 categories. There is substantial under and over bounding of cities. The large area of many counties often obscures intra county differences.

Frontier Identification Feasibility: None.

## **U.S. Census Bureau Urbanized Area, Urban Cluster, and Rural Taxonomy**

The Census Bureau partitions urban areas into Urbanized Areas and Urban Clusters. The same Census tract-based criteria are used for both; however, the Urbanized Areas have cores with populations of 50 000 or more, and the Urban Clusters have cores with populations that range from 2 500 to 49 999. All other areas are designated as rural. The nation has more than 65 000 census tracts that are made up of blocks and block groups. In 2000, 59 million residents, 21% of the U.S. population, were deemed rural by the Census Bureau taxonomy. The Census Bureau's rural and urban taxonomy is the source of much of the available demographic and economic data. A weakness of this system with regard to health care policy is the paucity of health-related data at the census tract level. The Census Bureau and others often aggregate urban clusters with urbanized area data. Depending on the purpose at hand, this may be misleading for rural health policymakers. For example, a town with a population of 3 000 in a very remote area is considered urban under the Census Bureau definition, but that same town is often non metropolitan under the OMB definition.

Major Strengths: Extensive and varied data are available from Census Bureau at Census tract. This taxonomy is widely used. They system helps to reduce problems of under and over bounding county-based schemes.

Major Weaknesses: The taxonomy is county-based. Census tracts are only subdivided into 3 categories. There is a lack of familiarity by most data users with Census tract geography and terminology. Census tracts are not stable over time, with the most significant changes for the 2000 Census.

Frontier Identification Feasibility: None.

## **ERS Rural-Urban Continuum Codes (RUCCs)**

This county-based taxonomy that is often referred to as the Beal codes distinguishes metropolitan counties by the population size of their metro area. Nonmetropolitan counties are characterized by degree of urbanization (size of their urban population -- living in places of 2,500 or more) and adjacency to a metropolitan area or areas that have at least 2% of their workforce commuting to the metropolitan area. The RUCCs were first created in 1974 and were last updated in 2003. The 10 categories (i.e., 4 metro and 6 non metro) are as follows: metro -- 0) central counties of metro areas of 1 million population or more; 1) fringe counties of metro areas of 1 million population or more; 2) counties in metro area of 150,000 to 1 million population; 3) counties in metro areas of fewer than 250,000 population; non metro -- 4) urban population of 20,000 or more, adjacent to a metro area; 5) urban population of 20,000 or more, not adjacent to a metro area; 6) urban population of 2,500 to 19,999, adjacent to a metro area; 7) urban population 2,500-19,999, not adjacent to a metro area; 8) completely rural or fewer than 2,500 urban population, adjacent to a metro area; and 9) completely rural or fewer than 2,500 urban population, not adjacent to a metro area. The split between the metropolitan and non metropolitan codes is the same as for the OMB metropolitan taxonomy. The most rural of the codes (e.g., codes 7 and 9 or some other combination) can be considered

frontier-like. See detailed description on the ERS web site (<http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/>)

Major Strengths: There is much regular data available by counties and they seldom change boundaries. Using counties is easily understood by the public and others.

Major Weaknesses: The definition uses county as its geographic unit with all the associated problems. The taxonomy uses the total Census Bureau defined urban population (towns of 2,500 or more) as a criterion. While this may be appropriate for some uses the criterion used for the UICs is more likely to be appropriate for most uses.

Frontier Identification Feasibility: The most rural and remote of the RUCC categories could be used for identifying frontier-like areas depending on the purpose.

### **ERS Urban Influence Codes (UICs)**

This 12 code county-based taxonomy is similar to the RUCC taxonomy. It distinguishes metropolitan counties by the population size of their metro area. Nonmetropolitan counties are characterized by degree of urbanization (number of population living in the largest urban place) and adjacency to a metropolitan area or areas that have at least 2% of their workforce commuting to the metropolitan area. Versions of the UICs are available for 1993 and 2003 (the coding criteria has changed between these code versions -- e.g., there were only 9 codes in 1993). The 9 categories (i.e., 2 metro and 7 non metro) are as follows: metro: -- 1) large metro with population of 1 million or more; 2) small metro area of less than 1 million population; non metro: 3) micropolitan area adjacent to large metro area; 4) non core area adjacent to large metro area; 5) micropolitan area adjacent to small metro area; 6) non core adjacent to small metro area and contains a town of at least 2,500 residents; 7) non core adjacent to small metro area and does not contain a town of at least 2,500 residents; 8) micropolitan area not adjacent to a metro area; 9) non core area adjacent to a micropolitan area and contains a town of at least 2,500 residents; 10) non core area adjacent to micropolitan area and does not contain a town of at least 2,500 residents; 11) non core area not adjacent to a metro or micropolitan area and contains a town of at least 2,500; and 12) non core area not adjacent to a metro or micropolitan area and does not contain a town of at least 2,500 residents.

The split between the metropolitan and non metropolitan codes is the same as for the OMB metropolitan taxonomy. The most rural of the codes (e.g., codes 10 and 12 or some other combination) can be considered frontier-like. Details on the UICs are available at <http://www.ers.usda.gov/Briefing/rurality/UrbanInf/>

Major Strengths: There is much regular data available by counties and they seldom change boundaries. The public and others easily understand using counties.

Major Weaknesses: The definition uses county as its geographic unit with all the associated problems. The taxonomy uses the total Census Bureau defined urban population (towns of 2,500 or more) as a criterion. While this may be appropriate for some uses the criterion used for the UICs is more likely to be appropriate for most uses.

Frontier Identification Feasibility: The most rural and remote of the UIC categories could be used for identifying frontier-like areas depending on the purpose.

### **National Center for Frontier Communities Frontier Consensus Definition**

This National Center for Frontier Communities county-based definition was developed through a multidisciplinary consensus process started by the Frontier Education Center in 1997 and was most recently updated in 2007. "A matrix of weighted elements was developed based on density, distance, and travel time. The consensus group created a typology in which density of counties was coded <12, 12-16, 16-20 persons per square mile. Distance to a service/market was coded >90, 60-90, 20-60 and <30 miles. Travel time to service/market was coded >90, 69-90, 30-60, and <30 minutes. A unique aspect of the application of the consensus definition is the involvement of states throughout the process. The matrix and a list of potential counties is provided to state which could then analyze local conditions and provide a list of frontier areas in their state. This final definition was developed to be inclusive of extremes of distance, isolation, and population density." (Center for Rural Health, University of North Dakota, May, 2006).

Major Strengths: The methodology includes relevant demographic and health care related data and the state respondents have on-ground experience with their rural areas.

Major Weaknesses: The taxonomy is based on counties and creates a dichotomy. The methodology is subject to subjectivity that is likely to be influenced by the fiscal and other benefits of classification category status.

### **Federal Community Health Center Frontier Taxonomy (6 Persons Per Square Mile)**

"In the mid-1980's, the federal Community Health Center program decided to consider as frontier those counties with a population less than or equal to 6 persons per square mile located at considerable distance (greater than 60 minutes travel time) to a medical facility able to perform caesarian section delivery or handle a patient having a cardiac arrest. These latter criteria were forgotten through the years and programs began to define frontier counties with only the single criteria -- population density of less than or equal to 6 persons per square mile." (National Center for Frontier Communities web site accessed on 5/8/10: <http://www.frontierus.org/>). This county-based definition has endured and been used in a myriad of federal programs to identify "frontier" counties



for the purposes of resource allocations of assorted types. Nearly all the designated counties are west of the Mississippi.

**Major Strengths:** It is simple to implement and easy to understand.

**Major Weaknesses:** The taxonomy is based on counties and is a dichotomy. The taxonomy has significant flaws. For instance, 2 counties can have exactly the same rural settlement pattern and associated populations but if one has part of an essentially empty state forest within its boundaries and the other does not the former will be designated frontier and the latter will not. This would be true even if the latter were much farther from a larger city or town than the former.

Most recently, the population less than or equal to 6 persons per square mile criteria was used as part of the criteria for selecting 4 states to qualify for the **Frontier Community Health Integration Project (F-CHIP)** demonstration project (Alaska, Montana, North Dakota, and Wyoming) (Putnam, 2011). These 4 states qualified because they had the highest percentage of their counties with 6 persons or fewer per square mile and other states. The demonstration tests a new “Medicare Health System” model designed for the most frontier of communities. The demonstration project tests a set of modified regulations that create a patient-centered medical home that aggregates the local patient care volume and expands the services that can be reimbursed by local health care providers. In all likelihood, if the F-CHIP demonstration were to be successful and subsequently enacted on a broader scale, the state selection criteria probably would be honed to include additional states by dipping deeper on the original criteria state listing or tweaking the criteria (e.g., percentage of the population residing in counties with fewer than 6 persons per square mile).

### **Isserman Urban-Rural Density Typology**

Recently a county-based taxonomy entitled the Urban-Rural Density Typology was introduced by Andrew Isserman (2005). The taxonomy, based on 2000 Census data, has 4 categories of counties (number of counties): rural (1,790), urban (171), mixed rural (1,022), and mixed urban (158). The categories are differentiated by overall county population density and the percentage of the county's population residing within high-density areas of various population numbers and density thresholds.

Major Strengths: It blends rural and urban well and overcomes many of the issues that many other county-based taxonomies exhibit.

Major Weaknesses: The taxonomy is based on counties with their associated problems and has only 4 categories.

Frontier Identification Feasibility: None.

## **Telehealth Frontier Definition**

This definition was developed by the University of North Dakota Center for Rural Health through the use of an expert panel and associated analyses for the federal Office for the Advancement of Telehealth (OAT). The definition was specifically targeted for the needs of the OAT. The definition designates as telehealth frontier ZIP code areas that meet the following criteria: "ZIP code areas whose calculated population centers are more than 60 minutes or 60 miles along the fastest paved road trip to a short-term non federal general hospital of 75 beds or more, and are not part of a larger rural town with a concentration of over 20 000 population." (Center for Rural Health, University of North Dakota, May, 2006). The dichotomous taxonomy designated a population of 6,971,386 as telehealth frontier.

The definition was based on various data sources for from 1998-2002 data and was subsequently updated to 2002-2005 data. The definition has not been approved for OAT use by HRSA.

Major strengths: It is likely to work well for the specific purpose for which it was designed -- telehealth funding. The definition uses residential ZIP code areas as its basis.

Major weaknesses: The taxonomy is a dichotomy and is aimed specifically for telehealth uses and would be difficult to use for other uses. The use of distance to hospitals of specific sizes is susceptible to rapid change and could induce policy adaption.

## **Frontier and Remote (FAR) Methodology and Codes**

The FARs were developed and are maintained by the Department of Agriculture's Economic Research Service (Dr. John Cromartie) and through funding from the federal Office of Rural Health Policy (Dr. Gary Hart, Center for Rural Health, University of North Dakota). When the methodology is finalized per comments on the *Federal Register* notice, the data are updated to the 2010 Census, and Alaska and Hawaii are added, a section will be inserted here in this literature review describing the new Frontier and Remote (FAR) codes.

## **Rural-Urban Commuting Areas (RUCAs)**

This taxonomy uses Census tract-level demographic and work-commuting data to define 33 categories of rural and urban Census tracts. The RUCAs were developed and are maintained by the Economic Research Service (Dr. John Cromartie) and through funding from the federal Office of Rural Health Policy to the WWAMI Rural Health Research Center (Drs. Gary Hart and Richard Morrill).

The RUCA categories are based on the size of the settlements and towns as delineated by the Census Bureau and the functional relationships between places as measured by tract-level work commuting data. For example, a small town where the majority of commuting is to a large city is distinguished from a similarly sized town where there is commuting connectivity

primarily to other small town. Because 33 categories can be unwieldy, the codes were designed to be aggregated in various ways that highlight different aspects of connectivity, rural and urban settlement, and isolation, aspect that facilitate better program intervention targeting. The census tract version of the RUCAs has been supplemented by a ZIP code-based version. There are more than 30,000 ZIP code areas.

RUCAs range from the core areas of urbanized areas to isolated small rural places, where the population is less than 2,500 and where there is no meaningful work commuting to urbanized areas. While the ZIP code version of the RUCAs is slightly less precise than the census tract version, the RUCA ZIP codes have the advantage in the health field because they can be used with ZIP code health-related data. The RUCAs are widely used for policy and research purposes (e.g., by the Centers for Medicare and Medicaid Services, the federal Office of Rural Health Policy, and many researchers). RUCAs can identify the rural portions of metropolitan counties and the urban portions of nonmetropolitan counties. RUCAs are flexible and can be grouped in many ways to suit particular analytic or policy purposes. There is a good chance that the RUCA methodology may be tweaked in its next update owing to changes in the Census Bureau's data system.

Major Census Tract Version Strengths: Voluminous and varied data are available from Census Bureau for Census tracts. This taxonomy is widely used by ORHP, other federal programs, and health researchers.

Major Census Tract Version Weaknesses: There are 33 categories but they should usually be aggregated. The codes are difficult to apply to most health-related data. The codes are not uniform across time. The complex structure of the codes is not easy to master for casual users.

Census Tract Version Frontier Identification Feasibility: Depending on the purpose, categories of RUCA codes can be used separately or in combination to identify some types of frontier/remote Census tracts.

Major ZIP Code Version Strengths: Voluminous and varied data are available from Census Bureau and other sources for ZIP code areas. This taxonomy is widely used by CMS, ORHP, other federal programs, and health researchers.

Major ZIP Code Version Weaknesses: There are 33 categories but they should usually be aggregated. The codes are not uniform across time. The complex structure of the codes is not easy to master for casual users.

ZIP Code Version Frontier Identification Feasibility: Depending on the purpose, categories of RUCA codes can be used separately or in combination to identify specific types of frontier/remote ZIP code areas.

The RUCA taxonomy is in the process of being updated with 2010 Census data to Version 3.0.

### **Veterans Health Administration Office of Rural Health Classification**

This 2009 classification is a modification of the Census Bureau's Urbanized Area, Urban Cluster, and Rural Taxonomy. It is based on Census tracts. The classification has 3 categories. Urban is defined the same as the Census Bureau's Urbanized Areas. Rural is defined as those places not located within Urbanized Areas. The Highly Rural category is defined as those places that qualify as "Rural" and that are located within counties that have fewer than 7 civilians per square mile. The use of this classification results in veterans being divided as follows: Urban, 62.2%; Rural, 36.3%; and Highly Rural, 1.5%.

Major strengths: It is based on a Census Bureau definition. The categorization is used by a large federal agency – the Department of Veterans Affairs.

Major weaknesses: The taxonomy designates its Highly Rural category using county as the unit of analysis, with the associated problems of using counties as described above. The use of only 3 categories does not allow fine intra rural distinctions.

### **Index of Relative Rurality (IRR)**

This Index of Relative Rurality (IRR) is scaled from 0 to 1 (zero equals most urban and 1 equals most rural) and has 4 data components: population, population density, extent of urbanized area, and distance to the nearest metro area (Waldorf, 2006). The description of the IRR utilizes counties as the unit of analysis. However, the IRR could be applied to different geographic units such as aggregations of counties or Census tracts. The IRR is the result of dividing creating the unweighted mean re-scaled to a 0-1 scale for each factor and then the sum is divided by 4.

Major strengths: The IRR does employ 4 of the most commonly used frontier-related factors in combination. This aggregate index of 4 relevant frontier factors creates a continuous index that can be used to advantage in many situations where purely categorical measures cannot.

Major weaknesses: While the IRR can be applied to different geographical units or aggregations of units, this must be done cautiously when the numbers within those units are low (e.g., problems of small numbers and variability). The IRR has only been used on the associated web site, though the state and national maps are informative. There is no theoretical basis of weighting each of the 4 factors the same in the Index.

## **Island Geographic Taxonomies**

An objective of this Project is to create a geographic taxonomy that categorizes islands and parts of islands as frontier/remote. If the Project developed taxonomy works well for islands there will not be a need to create a separate taxonomy. If the developed taxonomy does not appropriately categorized islands and parts of islands, the project team will create a second taxonomy that works better for them. As proposed in the *Federal Register* notice the FAR methodology is proposed to adequately handle island frontier designations.

The review of the literature dealing with island taxonomies related to frontier/remote status was performed. While there were some materials that deal with culture, race/ethnicity, histories and the like, no taxonomies associated with frontier/remote status were located. One document that was obtained in the literature search was a policy statement by the Hawai'i Primary Association entitled *Island Designation* (3/2008). The advocacy brief argues that an island designation is necessary because: the ocean is a significant barrier to accessing services ("... would qualify as frontier"), air transportation is expensive and often not frequent, in bad weather air and ferry traffic stop, the Pacific island populations are scattered over an immense area, many of the islands have few health care services (e.g., primary care providers, hospitals, and pharmacies -- along with dependable electricity and water), lack of well-prepared administrators, many islands and jurisdictions significantly have underfunded health care services, many of the islands are extremely culturally diverse, health status on many of the islands is extremely poor, many serious infectious diseases remain significant health threats, and the costs of medical supplies and facility construction and upkeep are expensive. The brief further quotes the Senate Appropriations Committee Report (July 2005) as follows:

"Island Designation: The Committee recognizes the unique needs of frontier and rural populations and applauds the Department for establishing competitive grants specifically aimed at programs with those designations. The Committee likewise recognizes the limited accessibility of island communities, whether rural or urban, and urges the department to include an island designation to promote programs in areas geographically isolated from the mainland and neighbor islands. Criteria for island designation include a clinic, federally qualified health center, or hospital located on a land mass surrounded by water and greater than 2,000 miles from the United States Mainland."

On March 22, 2010 an island taxonomy stakeholder meeting was held in Seattle that provided significant input regarding the attributes that such a taxonomy should incorporate (a full summary of the Project's other regional stakeholder meetings is contained in another document on this web page). Because of the lack of literature on island taxonomies, that meeting is summarized here.

The general recommendations from the meeting were consistent with those reported regarding the frontier/remote taxonomy (e.g., need for multiple category and objective

taxonomy). However, the discussion did focus on issues more unique to islands. The islands being discussed included those from places such as Massachusetts, Alaska, Washington, Hawaii, Puerto Rico, and the U.S. associated jurisdictions of the Pacific (e.g., Palau, Marshall Islands, American Samoa, Guam, Northern Mariana, Chuuk, Yap, Pohnpei, and Kosrae). The lack of literature on island geographic frontier/remote taxonomies was discussed and none of the attendees knew of any additional relevant literature. There was agreement that if the project base initial taxonomy handled the islands well that a second taxonomy would not be necessary but that if it did not a second taxonomy would be necessary. The concept that the project definition was to be one that not only focused on health care but also was more general in its applications. It was explained that the involvement of the Economic Research Service was important to the ongoing updates and broad implementations of the developed taxonomy or taxonomies. The developed taxonomy or taxonomies can be retrofitted to include health care access attributes.

There was general agreement that any island definition should take into consideration both the travel distances/times within the island from communities to the larger communities (and the populations of those communities) and the travel distances/times to larger urban places on other islands or the mainland. There seemed to be consensus that standard ways of measuring what constitutes a town or city should be used in any developed definition. There was an extensive discussion about how to and whether to exclude certain islands from qualifying as frontier/remote per the developed taxonomy or taxonomies. For instance, one island's situation was discussed wherein the island certainly qualified as an island (i.e., land surrounded by water without a connecting bridge). However, the island was only 100 yards from the coast of Florida and a small ferry/barge brought passengers and vehicles across the 100 yards in a very short ride. Several such examples were brought up during the discussion. Some of the mentioned islands were adjacent to Urbanized Areas. There was general agreement that the taxonomy criteria ought to exclude such places from being designated frontier/remote. And finally, there was quite a supportive discussion of the utilization of criteria that would make island places more remote by adding in travel air and/or ferry times into computations (e.g., adding 60 minutes of travel time if air travel was necessary to reach a larger community and if that was a criterion in the new taxonomy or taxonomies).

## **Older and Infrequently Used Rural, and Frontier Taxonomies**

### **Rural Composite Index**

The Frontier Mental Health Service Resources Network, a project sponsored by the Federal Center for Mental Health Services, suggested a designation of frontier-like areas (a Rural Composite Index) that interdigitates 3 density related variables and thereby produced a continuum of counties classified from the most rural (frontier) to the most urban. It would have designated frontier counties as those counties with small populations (generally less than 10,000 – 5 groups), low population density (generally less than 7 persons per square mile – 5 groups) and which were predominately rural (75 % or more of the county's population resides in territory designated as rural by the Census Bureau – 5 categories). Each county can obtain a

score between 3 and 15. A 3 indicates frontier and a 15 indicates the most urban category, with all the gradations in between (Zelarney and Ciarlo, 2005).

### **Goldsmith Rural Modification for Metropolitan Counties**

The 1993 creation of this modification of OMB Metropolitan counties was created to identify parts of Metro counties that were rural using 1980 Census data (Goldsmith, Puskin, and Stiles, 1993). The modification includes all Metro counties with 1,225 square miles or more (called Large Metro Counties (LMCs)). For some time, this modification was used for federal rural programs to qualify the designated portions of Metro areas for rural programs (e.g., selected programs of the federal Office of Rural Health Policy). Using the 1983 Metro definitions, 73 counties qualified as LMCs (this number increased to 77 per the updated Metro definition related to the 1990 Census). Based on the 1980 Census, rural Census tracts of the LMCs were “... classified as open-country or small town (rural neighborhoods) if there were no persons living in central areas (operationally, a city of 50,000 or more persons plus the surrounding densely settled suburbs, i.e, urbanized areas) or in cities of 25,000 or more persons” (Goldsmith, Puskin, and Stiles, 1993). Other specific criteria were used to clean the definition up (e.g., under specific circumstances prison populations were excluded from the analyses – allowing an area to be considered rural if it qualified except for the large population of inmates in a prison). The Goldsmith modification resulted in approximately 2 million persons being reclassified as rural that were not per the OMB definition.

### **Bluestone County Rurality Classification**

This county-based definition (circa early 1970s) is based on population density and extent of urbanization (Hewitt, 1987). Urbanization is determined as the percent of the county's population residing in places of 2,500 population or greater combination with the county's population per square mile (e.g., less than 50 or 100 or greater than 500 people per square mile) (see Hewitt, Table 11 on page 21 of the Appendix document). This classification's 6 county categories are as follows: metropolitan, urban, semi-isolated urban, densely settled rural, sparsely settled rural with some urban population, and sparsely settled rural with no urban population. There have been no recent updates.

### **Clifton Rurality County Classification**

This taxonomy (circa early 1970s) is an adaption of the Bluestone taxonomy (see Hewitt, Table 11 on page 21 of the Appendix document). In this classification scheme, there are 4 county categories (i.e., urban, semi-urban, densely settled rural, and rural). These categories are based on categories of county population density and the percent of the population in towns/cities of 2,500 population or greater. There have been no recent updates.

### **Hathaway County Population-Proximity Index**

This county-based index is based on the size of Census Bureau defined Metropolitan Statistical Area (MSA) and the distance a place is from the closest MSA (see Hewitt, Table 11 on pages 21-23 of the Appendix document). The index ranges from 1 to 100, where the higher the index the more urbanized a county. There have been no recent updates.

### **Smith and Parvin County Population-Proximity Index**

This county-based index was scaled to range from 1 to 100, where the higher the index the more urbanized a county. This index was created in 1973 (Smith and Parvin, 1973). It utilizes 9 data elements (i.e., population density; percent of persons living in rural areas; total population; percent employment in agriculture, forestry, fisheries, and mining; percent of persons living on farms, average annual percent change in population, 1940-1970; percent employment in medical and dental professions; percent employment in entertainment and recreation services; and percent employment in service work (except private house holds). There have been no recent updates.

### **Pickard Economic Development County Classification**

This 11 category non metropolitan county-based taxonomy is based on county economic bases, land uses, worker commuting, and population characteristics (Pickard, 1988). 5 of the codes are metro and 6 of the codes are non metro. The categories vary greatly in their types and are as follows: metro (metro centers, metro satellites, metro commuting satellite, metro suburban, and metro dormitory); and non metro (centers, satellites, commuting counties with center, small centers, rural commuting counties, and rural counties). Each of these categories have specific criteria (e.g., the non metro satellite counties must have less than 30% and at least 15% of workers working outside the county, the urban population living in towns of 2,500 or fewer must total 5,000 or more, have a total population of 10,000 or more, and have a .70 or higher ratio of workers working in the county divided by the total number of workers residing within the county) (see Hewitt, Tables 13 and 14 on pages 23 and 24 of the Appendix document). This taxonomy has not been updated since 1988.

### **Long and DeAre Typology**

This county-based taxonomy utilizes the OMB Metropolitan definition in combination with adjacency wherein the largest settlement in a county is the relevant measure (Long & DeAre, 1982). The classification includes 14 categories ranging from Metropolitan Areas of 3 million and greater to non adjacent counties with no settlement of 2,500 or greater (see Hewitt, Table 10 on page 20 of the Appendix document). This taxonomy has not been updated since 1982.

### **Frontier Extended Stay Clinic Definition**

This county-based taxonomy was developed in 2005 for a specific program eligibility criterion (i.e., Frontier Extended Stay Clinic eligibility). An eligible facility was defined as one located



greater than 75 miles from a Critical Access Hospital (CAH) or hospital, or inaccessible via public road (see web site: <http://www.alaskafesc.org>.)

### **NRHA Proposed Classification (circa 1989)**

This county-based proposed taxonomy described by Patton (1989) consisted of 4 groups based on adjacency to metropolitan counties, county population, and counties with fewer than 6 persons per square mile. The 4 categories are as follows: adjacent rural areas (counties contiguous to or within Metropolitan Statistical Areas (MSA)); urbanized rural areas (counties with populations of 25,000 or more but distant from a MSA); frontier areas (counties with population densities of fewer than 6 persons per square mile); and countryside rural areas (all counties not included in the 1 of the previous 3 categories) (Patton, 1989). The NRHA does not currently use this definition

The current position of the NRHA regarding rural definitions is "... that definitions of rural be specific to the purposes of the programs in which they are used and that these are referred to as programmatic designation and not as definitions." (NRHA web site: <http://www.ruralhealthweb.org/> which was accessed on 5/5/10). The NRHA position on frontier definitions is similar. The NRHA indicates that "... Definitions of frontier for specific state and federal programs vary depending on the purpose of the project being funded. Some of the issues that may be considered in classifying an area as frontier include population density, distance from a population center or specific service, travel time to reach a population center or service, functional association with other places, availability of paved roads, and seasonal changes in access to services. Frontier may be defined at the county level, by ZIP code or by census tract." (NRHA web site: <http://www.ruralhealthweb.org/> which was accessed on 5/5/10). The NRHA list of taxonomies that might be used is made up of RUCAs, Frontier Education Center Consensus Designation Frontier Counties, Frontier Areas for Community Health Center Purposes, Frontier Extended Stay Clinic definition, and the proposed OAT Telehealth designation.

### **CMS Super Rural Bonus Definition**

This 2002 Centers for Medicare and Medicaid (CMS) definition was used by CMS regarding rural ambulance services reimbursements. Areas under this definition include all OMB-defined Non Metropolitan Counties and selected ZIP code areas of Metropolitan Counties. The ZIP code areas of the Metropolitan Counties included are those designated by the Goldsmith Modification (described below and designated as selected Census Tracts in counties with 1,225 square miles or more). However, RUCA ZIP code area codes 4-10 were used to replace the Goldsmith modification Metropolitan Census Tracts. The population density of all the Non Metropolitan Counties and the Metropolitan Census Tracts with codes 4-10 were computed and arrayed from highest to lowest. The 25% of the areas with the lowest densities qualified for increased funding as Super Rural Bonus Areas. Other ZIP code areas with RUCA codes of 4-10 were designated as Rural.

Major strengths: The taxonomy does recognize population density as an important factor and does incorporate RUCAs into its methodology.

Major weaknesses: County-level density can be misleading. 2 counties can have identical population densities (and settlement patterns) but if 1 includes a large unpopulated area (e.g., national forest away from the population) the 1 county would qualify while the county next to it with essentially the same population pattern would not. Some of the RUCA codes that are generally categorized as urban are included in the rural definition (e.g., code 4.1). The taxonomy does not take into account the settlement pattern (number of population living in settlements of various sizes and the distances between them) and how this relates to the miles that the ambulances from their central sites must travel (i.e., increases and decreases in mean travel miles per ambulance pickup).

### **Selected Other Useful General Taxonomies**

#### **ERS Economic County Typology Codes**

This county-based taxonomy is designed to characterize a county's economic and social characteristics. The taxonomy was created in 1989 and was updated and modified in 2004 (Cook and Mizer, 1994). The 2004 version of the taxonomy has 13 codes that are divided into 2 groups.

6 of the codes act as a set of economic activities that are mutually exclusive. The 6 codes (% of all counties, % of non metro counties) are as follows: farming-dependent (14.0%, 19.6%), mining-dependent (4.1%, 5.5%), manufacturing-dependent (28.8%, 28.5%), federal/state government-dependent (12.1%, 10.8%), service-dependent (10.8%, 5.6%), and non specialized (30.2%, 30.0%). Each of these categories has a very specific definition (e.g., the mining-dependent criterion is that 15% or more of average annual labor and proprietors' earnings derived from mining during 1998-2000).

7 of the thirteen codes relate to the social characteristics of the counties and these codes are not mutually exclusive (i.e., a county can be designated as none or all of them). These 7 codes are as follows (% of all counties, % of non metro counties): housing stress (17.1%, 14.7%), low-education (19.8%, 24.3%), low-employment (14.6%, 19.3%), persistent poverty (12.3%, 25.9%), population loss (19.1%, 25.9%), non metro recreation (11.7%, 16.3%), and retirement destination (14.0%, 13.5%). Each of these categories has a very specific definition (e.g., the persistent poverty county criteria require that 20% or more of residents were poor as measured by each of the last 4 censuses, 1970, 1980, 1990, and 2000).

A more detailed description of the ERS County Typology Codes can be found at: <http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/>

## **Purdue University Center for Regional Development Regional Economic Clusters**

These county-based (and regional aggregates of counties) rural and urban regional economic clusters were first described in 2007. Clusters were created to measure common perceptions of regional variation in economic activity. The 17 clusters are as follows: advanced materials; agribusiness, food processing and technology; apparel and textiles; arts, entertainment, recreation and visitor industries; biomedical/biotechnical (life sciences); business and financial services; chemicals and chemical-based products; defense and security; education and knowledge creation; energy (fossil and renewable); forest and wood products; glass and ceramics; information technology and telecommunications, manufacturing super cluster (sub clusters: primary metals, fabricated metal products, machinery, computer and electronic products, electrical equipment, appliance and components, and transportation equipment; mining; printing and publishing; and transportation and logistics. The construction of these clusters and maps and other materials related to them for states and for the whole nation on the following web site: <http://www.ibrc.indiana.edu/innovation/data.html>

## **ERS Natural Amenities Scale**

In many studies of rural America, the ERS' Natural Amenities Scale (NAS) can be helpful. This county-based scale was designed in 1999 to take into consideration the physical characteristics of counties regarding their appeal as a place to live (or work) (McGranahan, 1999). The scale was created within the context of explaining U.S. population change.

The 6 factors that make up the scale are: warm winter, winter sun, temperate summer, low summer humidity, topographic variation, and water area. The scale is a simple additive one that ranges from a high (high amenities) of over 3.0 to a low of less than -3.0 (low amenities). Alaska and Hawaii are not scaled.

## **Vulnerability and Resiliency Index**

This rural and urban socioeconomic Vulnerability and Resiliency Index (VRI) was created in 2011 by Halverson and Hendryx ([http://wvrhrc.hsc.wvu.edu/docs/2009\\_halverson\\_policy\\_brief.pdf](http://wvrhrc.hsc.wvu.edu/docs/2009_halverson_policy_brief.pdf)) ([http://wvrhrc.hsc.wvu.edu/docs/2009\\_halverson\\_final\\_report.pdf](http://wvrhrc.hsc.wvu.edu/docs/2009_halverson_final_report.pdf)) at the West Virginia Rural Health Research Center. This index was designed to use social and economic information associated with health outcomes to characterize the nation's counties.

The 6 variables were used to generate the VRI are unemployment variability over time, social capital, percent of persons living in poverty, persons aged 25 and older who have completed 4 or more years of college, percent employed in white collar occupations, and the percent of the population living in urban areas (the last a measure distinct from rural or urban county classification). Each of these variables was ranked in order across the nation's 3,074 counties (1 being better and 3074 being worse). The 6 ranks for each county were summed to create the VRI. Alaska and Hawaii are not included in the VRI.

In descriptive and correlation analyses that used the ERS Rural-Urban Continuum Codes the VRI creators found that the:

“VRI scores on average were worse in more rural settings. Worse VRI scores are concentrated in rural areas of the Southeast, Appalachia, and some parts of the West. Better VRI scores were associated with better health outcomes (lower heart disease, cancer, and stroke death rates) across the rural-urban continuum. These analyses provide evidence to support the development of programs and policies that foster educational development, and economic diversity and vitality, as means of public health improvement, especially in rural areas in selected regions of the country.”

([http://wvrhrc.hsc.wvu.edu/docs/2009\\_halverson\\_policy\\_brief.pdf](http://wvrhrc.hsc.wvu.edu/docs/2009_halverson_policy_brief.pdf))

### **Dartmouth Primary Care Service Areas**

The Primary Care Service Areas (PCSAs) are primary care utilization areas created through the use of Medicare data about where beneficiaries live and obtain their primary care using residential ZIP code areas as the geographic unit (Goodman et al., 2003). The project identified 6,542 PCSAs across the U.S. Basically ZIP code areas with primary health care providers were identified as PCSAs and all other ZIP areas were then assigned to the ZIP code area where the plurality of visits traveled (also see <http://pcsa.dartmouth.edu/pcsa.html>)

### **Dartmouth Hospital Service Areas**

The Dartmouth Institute for Health Policy and Clinical Practice has produced a huge volume of work related to hospital service areas from varied sources and for different purposes (e.g., *The Dartmouth Atlas of Health Care* (1996), which uses developed hospital utilization areas to show on maps variations in such things as workforce, surgery types, outcomes, expenditures, and much more). For more information go to <http://www.dartmouthatlas.org/>.

### **HRSA Designated Health Provider Shortage Areas**

Federal Health Professional Shortage Areas (**HPSAs**) are used by the federal government to allocate federal resources. HPSAs were initially developed in 1978 for use in the National Health Service Corps (NHSC) program to determine areas where loan providers could work off their service obligations. HPSAs are used in various fashions to determine eligibility for dozens of federal programs, including NHSC, Medicare bonus payments, and grants for health professions education programs. There are 3 types of HPSAs: health professional shortage areas (e.g. a whole county, a combination of contiguous counties, or a part of a county defined by various boundaries), health professional shortage populations -- (e.g., low income populations within a county), and health professional shortage facilities (e.g., prisons). Variations of the HPSAs not only address primary health care physicians but other provider types (e.g., dentists). In September 2009, there were 6,204 primary care HPSAs, 4,230 dental HPSAs, and 3,291 mental health HPSAs.

The basic methodology for geographic HPSAs requires a justified as a rational service area that has a primary care physician to population ratio 3,500 or more to 1 and that providers in adjacent or close proximity are either overused or too distant for effective care. Areas are scored and various programs use different cutoffs for eligibility. There have been recent changes regarding making some designations automatic (e.g., Federally Designated Community Health Centers (CHCs)).

From the very beginning there have been many weaknesses described with the HPSA methodologies (e.g., GAO, 2008; GAO, 1995; Alber and Butar, 2005, and Lee, 1991). There have been 2 major attempts to revise the HPSA methodology (1998 and 2007) that have been significantly resisted by various stakeholders and the proposed changes were eventually withdrawn (Ricketts et al., 2007).

The Medically Underserved Areas (**MUAs**)/Medically Underserved Populations (**MUPs**) have been used by several federal programs in the same manner as HPSAs and are most often used in combination with HPSAs. The MUAs were first used in federal programs in 1973. In 2005 there were 3,443 MUAs and 488 MUPs. Designation of an MUA depends on a formula that weights the following factors: primary care physicians to population rate, infant mortality rate, percentage of the population below poverty level, and percent of the population 65 and older. An area is designated if it has a score above designated cutoff levels.

As part of the 2010 Accountable Care Act (ACA), a mandated Negotiated Rulemaking Committee on Designation of MUPs and HPSAs was created in 2010 (for information on the Committee's mandate, activities, and membership see <http://www.hrsa.gov/advisorycommittees/shortage/index.html>) and is staffed by the Health Resources and Services Administration's (HRSA's) Bureau of Health Professions (BHPr). The Committee held a multitude of meetings and the final report of the Committee was issued on 10/31/11 (see above web site for the final report and various other information including minutes of the meetings). Basically the purpose of the Committee was to make recommendations regarding new methodologies for designating shortages of health professionals. A good discussion of the rural issues that need to be addresses in the new shortage designation methodologies are described by Coburn et al., 2010. Progress on these issues and others are available on the Committee web site cited above. Because the Committee did not come to consensus regarding most of its recommendations, HRSA now has the obligation to make adjustments to the recommended methodologies and to publish them in the *Federal Register* for comment. Then any additional adjustments that seem prudent will be made by HRSA and the new designation process will become part of the ACA mandated law. As of 2/14/12, HRSA is preparing the modified methodologies for *Federal Register* publication.

The federal designation of shortage areas is extremely important because dozens of federal programs allocate resources based on the current HPSA and MUA designations and the current methodologies are notably flawed.

## **Selected Other Relevant Geographic Methods**

There are a group of indexes that have been developed that measure degree of access to health care services. While these indexes are not specifically aimed at defining frontier/remote areas, they are generally relevant to this project in that they do measure poor access to health care services. Many of these methods make use of geographic information systems (GIS) and associated methodologies. A sample of them will be mentioned here but not evaluated and described fully.

Index of Relative Disadvantage: The Index of Relative Disadvantage (IRD) combines measures of relative primary care need and access (Field, 2000; Morris and Carstairs, 1991).

### Primary Care 2-Step Floating Catchment Areas

This is a gravity model-based GIS-based method (Luo and Qi, 2009 (includes good review of associated research); Langford and Higgs, 2006; Luo, 2004). Yang, George, and Mullner (2006) provide a comparison study of the 2-step floating catchment area method versus the kernel density method. The kernel density method creates a statistical surface based on equally sized area squares wherein the density of providers (e.g., physicians).

Wang and Luo (2005) explore the integration of spatial and non spatial factors when defining health professional shortage areas. Their methods involve the 2-step floating catchment area method combined with factor analysis that creates 3 factors: socioeconomic disadvantages, socio cultural barriers, and high healthcare needs.

Integrated Approach to Measuring Potential Spatial Access to Health Care Services (i.e., Access Index): This is an integrated index wherein it is based on the gravity model and combines both the past work on regional availability and regional accessibility (Khan, 1992).

Physician Availability Index: Wing and Reynolds, 1998) developed an index that measures physician availability at the ZIP code area level. Basically the method allocates a portion of the services of physicians in their own areas and in other areas based on the travel time to those places.

In addition, new work has demonstrated the usefulness of GIS techniques applied to primary care access (e.g., analytical hierarch process, multi attribute assessment, and evaluation in the case of the Dulin et al. (2010) work. Other methods use GIS to determine access through the use of travel time (Elleboj et al., 2006). A more ambitious GIS approach to describing the hierarchical nature of health care provision for efficient administrative purposes comes from Britain employees utilization information in combination with such factors as administrative units, journey to work information, school information, and primary care offices and providers (Bullen, Moon and Jones, 1996).

Geographic Information Systems: Examples of GIS analysis of access to and need for primary care providers are available (e.g., Dulin et al., 2010; Bazemore, Phillips, and Miyoshi, 2010). And finally, there is a long history of the use of location-allocation geographic methods to

estimate optional locations of health-related facilities and services within the context of various functional constraints. Among other things, such methods can be applied to contrast the optimal distributions of providers with the actual distributions of providers relative to the population.

*A paragraph or two are planned to be added here on new geographic methods relevant to this document.*

Many studies of geographic access to medical care estimate travel distance based on linear distances (Phibbs and Luft, 1995). However, the accuracy of linear distances, or Manhattan distances for that matter, depend on the settlement and road patterns of states. There are suggested methods of imputing non geocoded addresses (Curriero, Kulldorff, Boscoe, and Klassen, 2010). It was shown that geocoding addresses is more error prone for rural addresses than urban ones (Kravets and Hadden, 2007). There are many useful geographic regionalization schemes that are not referenced in this review (ERS Commuting Zones and Labor Market Areas (<http://www.ers.usda.gov/Briefing/Rurality/LMACZ/>)). In addition to national taxonomies there are a myriad of regional, state, and sub state regionalization categorizations. They are not included because they have a different purpose and stray too far from this paper's theme.

## **Comments**

As mentioned at the beginning of this review, this document is aimed at providing background materials for those involved and interested in the development of new frontier/remote, rural, and island remote taxonomies. This review will be updated as new sources are uncovered, new taxonomies are developed, and regarding comments that are made about its contents. There clearly have been few and inadequate frontier/remote definitions upon which to base significant federal and state resource allocations. To check whether there is a newer version of this review, go to the following web location:  
<http://ruralhealth.und.edu/pdf/frontierreview.pdf>

## Cited and Selected Relevant Web Site Addresses

**Census Bureau Urbanized Area, Urban Cluster, and Rural:**

<http://www.census.gov/geo/www/tiger/glossary.html#UR>

**Department of Agriculture Rural Information Center:**

[http://ric.nal.usda.gov/nal\\_display/index.php?tax\\_level=1&info\\_center=5](http://ric.nal.usda.gov/nal_display/index.php?tax_level=1&info_center=5)

**ERS Economic County Typology Codes:**

<http://www.ers.usda.gov/Briefing/Rurality/Typology/>

**ERS Commuting Zones and Labor Market Areas:**

<http://www.ers.usda.gov/Briefing/Rurality/LMACZ/>

**ERS Rural-Urban Commuting Areas (RUCAs):**

<http://www.ers.usda.gov/Data/RuralUrbanCommutingAreaCodes/>

**ERS Rural-Urban Continuum Codes (RUCs):**

<http://www.ers.usda.gov/Data/RuralUrbanContinuumCodes/>

**ERS Urban Influence Codes (UICs):**

<http://www.ers.usda.gov/Briefing/Rurality/UrbanInf/>

**Federal Office of Rural Health Policy (ORHP):**

<http://www.hrsa.gov/ruralhealth/>

**HRSA Data Warehouse Rural Advisor:**

<http://datawarehouse.hrsa.gov/RuralAdvisor/>

**Index of Relative Rurality (IRR) and Regional Cluster (Department of Agricultural Economics, Purdue University, Lafayette, Indiana et al.):**

<http://www.ibrc.indiana.edu/innovation/data.html>

**National Advisory Committee on Rural Health and Human Services (NACRHHS)**

<http://ruralcommittee.hrsa.gov/>

**National Center for Frontier Communities:**

<http://frontierus.org/index-current.htm>

**National Organization of State Offices of Rural Health (NOSORH):**

<http://www.nosorh.org/>

**National Rural Health Association:**

<http://www.ruralhealthweb.org/>



**OMB Metropolitan and Non Metropolitan:**

<http://www.census.gov/population/www/metroareas/metroarea.html>

**RAC -- Am I Rural By Different Definitions:**

<http://maps.rupri.org/circ/racrural/amirural.asp>

**RUPRI Build Your Own Rural Maps:**

<http://www.frontierus.org/index.htm>

**Rural Assistance Center (RAC):**

<http://www.raonline.org/>

**Rural Health Gateway:**

<http://www.ruralhealthresearch.org/contact/>

**Rural Policy Research Institute (RUPRI):**

<http://www.rupri.org/>

**Vulnerability and Resiliency Index**

[http://wvrhrc.hsc.wvu.edu/docs/2009\\_halverson\\_policy\\_brief.pdf](http://wvrhrc.hsc.wvu.edu/docs/2009_halverson_policy_brief.pdf)

[http://wvrhrc.hsc.wvu.edu/docs/2009\\_halverson\\_final\\_report.pdf](http://wvrhrc.hsc.wvu.edu/docs/2009_halverson_final_report.pdf)

**WWAMI RHRC Rural-Urban Commuting Areas (RUCAs):**

<http://depts.washington.edu/uwrhrc/index.php>

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## **Appendix**

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# Defining “Rural” Areas: Impact on Health Care Policy and Research

by

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This Staff Paper is part of OTA's assessment of Rural Health Care

Carol Guntow prepared this paper for desk-top publishing.

The views expressed in this Staff Paper do not necessarily represent those of the Technology Assessment Board, the Technology Assessment Advisory Council, or their individual members.

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## FOREWORD

The problems of health care in rural areas have long occupied a special niche in policies designed to advance the Nation's health. Programs for recruitment, training, and deployment of health care personnel, for constructing health-care facilities, and for financing health care often have included special provisions for rural areas. These programs have often also included attempts to mitigate the negative impacts on rural areas of policies primarily designed for and responsive to the needs of urban areas. However, some rural areas continue to have high numbers of hospital closures, ongoing problems in recruiting and retaining health personnel, and difficulty in providing medical technologies commonly available in urban areas. Mounting concerns related to rural residents' access to health care prompted the Senate Rural Health Caucus to request that OTA conduct an assessment of these and related issues. This Staff Paper was prepared in connection with that assessment.

Rural definitions may greatly influence the costs and effects of health policies, because the size and composition of the U.S. rural population and its health care resources vary markedly depending on what definitions are used. There is no uniformity in how rural areas are defined for purposes of Federal program administration or distribution of funds. This paper examines dichotomous designations used to define rural and urban areas and discusses how they are applied in certain Federal programs. In addition, several topologies are described that are useful in showing the diversity that exists within rural areas. These topologies may be helpful in identifying unique health service needs of rural subpopulations.

A second OTA paper, *Rural Emergency Medical Services*, will also precede the publication of OTA's full assessment on *Rural Health Care*.

  
JOHN H. GIBBONS  
Director



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It is difficult to quantify rural health problems and to make informed policy decisions without a clear definition of what and where “rural” areas are. Small population, sparse settlement, and remoteness are all features intuitively associated with “rural.” These features exist on a continuum, however, while Federal policies usually rely on dichotomous definitions.

Urban and rural areas are often defined using the designations of either the Office of Management and Budget (OMB) or the Bureau of the Census. Rural areas are the remaining areas that are not captured in either OMB’s “metropolitan statistical area” (MSA) designation or in Census’ urban or urbanized area definitions. Counties are the building blocks of OMB’s MSAs and are easy to use, because county-based data are readily available. One or more counties form an MSA on the basis of population size and density, plus the degree of area-wide economic integration as reflected in commuting patterns. The Census’ urban and urbanized area definitions rely on settlement size and density without following county boundaries, making them more difficult to use. Both methods identify about a quarter of the U.S. population as rural or “nonmetropolitan,” but these populations are not identical. For example, about 40 percent of the Census-defined rural population live within MSAs, and 14 percent of the MSA population live in Census-defined rural areas. The Census’ rural population includes residents of small towns and cities but excludes those living in towns larger than 2,500, many of whom might be considered rural. MSAs can include areas that are sparsely populated and could be considered rural, while nonmetropolitan areas show significant within-area variation.

There is no uniformity in how rural areas are defined for purposes of Federal program administration or distribution of funds. Different designations may be used

by the same agency. For example, Congress directed the Health Care Financing Administration to use Census’ nonurbanized area designation to certify health facilities under the Rural Health Clinics Act, but to use OMB’s MSA/nonMSA designations to categorized hospitals as urban or rural for purposes of hospital reimbursement under Medicare. In general, rural hospitals are reimbursed less than their urban counterparts. While persistent differences between metropolitan and nonmetropolitan hospital costs have been observed, hospital location may be a correlate rather than a determinant of cost differences. Therefore, hospital-specific measures are being sought that might replace the present MSA adjustments to the basic prospective payment formula. Topologies that categorize counties according to their degree of urbanization or their employment and commuting patterns could be used to refine the definition of labor market areas, an important component of the Medicare formula.

There have been calls to develop a standard rural typology that would capture the elements of rural diversity and improve the use and comparison of nationally collected data. These topologies usually are based on the following features: population size and density; urbanization; adjacency and relationship to an MSA; and principal economic activity. Although a standard typology may be desirable, it will be difficult to arrive at, because the different topologies have merit for various purposes. Nevertheless, there continues to be a need for a standardized nonmetropolitan topology. It is especially important to display vital and health statistics in a standardized way, because markedly different conclusions can be reached, depending on the definition of rural used. Better measures of population concentration or dispersion within counties would be helpful--especially for sparsely settled “frontier” areas --to distinguish between urban and rural areas within the same counties.

## 2. INTRODUCTION

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Although there has been widespread concern regarding a "health care crisis" in rural areas, there is little agreement as to what rural areas are. How rural areas (or rural populations) are defined is far from academic, since urban/rural designations are basic to participation in certain Federal programs and to payment rates from Federal sources. Indeed, the perceived magnitude of rural health care problems and the impact of any change in public policy depend on how rural is defined.

The features most intuitively associated with rurality are small populations, sparse settlement, and remoteness or distance from large urban settlements. Historically, rural populations have been distinguished from urban ones by their dependence on farming occupations and by differences in family size, lifestyle, and politics (13). However, because of dramatic improvements in transportation and communication, migration to and from rural areas, and diversification of the rural economy, these clear distinctions no longer exist. The presence of farms, mining areas, and forests in rural areas contribute to persis-

tent differences, most notably lower population densities (13). By 1980, however, over two-thirds of the work force both inside and outside of metropolitan areas were employed in three industries--service, manufacturing, and retail trade (49).

The purpose of this staff paper is to:

1. describe the principal "rural" definitions applied by the Federal Government that affect health programs and policies -- i.e., urban and rural areas (and populations) as defined by the Bureau of the Census and metropolitan statistical areas as defined by the Office of Management and Budget;
2. describe the classifications used to distinguish different types of rural areas;
3. discuss how Federal agencies have used these definitions to compile vital and health statistics and to implement programs; and
4. discuss the strengths and weaknesses of rural definitions and classifications currently in use.

### 3. DELINEATING "RURAL" AND "URBAN" AREAS

The concepts of "rural" and "urban" now exist as part of a continuum. While few would argue about the extremes of that continuum--e.g., an isolated farming community in Texas at one extreme and New York City at the other--where to draw the line between urban and rural has become more difficult. Many Federal policies, however, rely on dichotomous rural/urban designations. This section describes the two most important dichotomous geographic designations: the Bureau of the Census' urban and rural areas (and populations), and the Office of Management and Budget's (OMB) metropolitan statistical areas and residual nonmetropolitan territory. Several geographic classification schemes are then described that portray the urban-rural continuum.

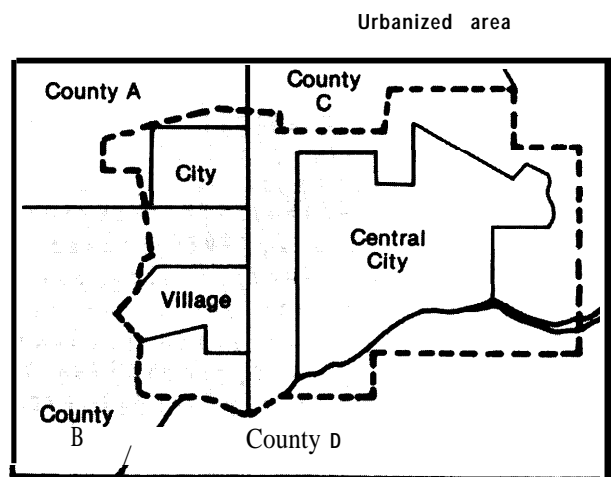
#### U.S. Bureau of the Census

According to the Census Bureau, urban and rural are "type-of-area concepts rather than specific areas outlined on maps" (50). The *urban population* includes persons living in urbanized areas (see below) and those living in places with 2,500 residents or more outside of urbanized areas. The population *not classified as urban* comprise the *rural population*; i.e., those living outside of urbanized areas in "places" with less than 2,500 residents and those living outside of "places" in the open countryside. Census-recognized "places" are either: 1) incorporated places such as cities, boroughs, towns, and villages; or 2) closely settled population centers that are outside of urbanized areas, do not have corporate limits, and have a population of at least 1,000.<sup>1</sup>The rural population is divided fur-

ther into farm (see below) and nonfarm populations.

*Urbanized areas* consist of a central core (a "central city or cities") and the contiguous, closely settled territory outside the city's political boundaries (the "urban fringe") that combined have a total population of at least 50,000 (48). The boundary of an urbanized area is based primarily on a residential population density of at least 1,000 persons per square mile (the area generally also includes less densely settled areas, such as industrial parks) (49). The boundaries of urbanized areas are not limited to preexisting county or State lines; rather they often follow the boundaries of small Census-defined geographic units such as census tracts and enumeration districts. Many urbanized areas cross county and/or State lines (see figure 1).

Figure 1---Urbanized Areas



SOURCE: U.S. Department of Commerce, Bureau of the Census, "Census and Geography-Concepts and Products," *Factfinder* CFF No. 8 (Washington, DC: U.S. Government Printing Office, August 1985).

<sup>1</sup> The minimum population of these unincorporated areas, called census designated places, is lower in Alaska and Hawaii.

Table 1--- Urban and Rural Population by Size of Place (1980)

	Number of places	Population	Percent of Us.
U.S. total	22,529	226,545,805	100.0%
Urban areas	8,765	167,050,992	73.7
Places of 1,000,000 or more	6	17,530,248	7.7
Places of 500,000-999,999	16	10,834,121	4.8
Places of 250,000-499,999	34	12,157,578	5.4
Places of 100,000-249,999	117	17,015,074	7.5
Places of 50,000-99,999	290	19,786,487	8.7
Places of 25,000-49,999	675	23,435,654	10.3
Places of 10,000-24,999	1,765	27,644,903	12.2
Places of 5,000-9,999	2,181	15,356,137	6.8
Places of 2,500-4,999	2,665	9,367,826	4.1
Places of less than 2,500	1,016	1,260,246	0.6
Other urban area <sup>a</sup>		12,662,718	5.6
Rural areas	13,764	59,494,813	26.3
Places of 1,000-2,499	4,434	7,037,840	3.1
Places under 1,000	9,330	3,863,470	1.7
Other rural area <sup>b</sup>		48,593,503	21.4

<sup>a</sup>Includes urban residents not living in Census-designated places.

<sup>b</sup>Includes rural residents not living in Census-designated places and residents of the rural portion of extended cities.

SOURCE: 1980 Census of Population, Volume 1, Characteristics of the Population, 1981, table 5, p. 1-37.

The 1980 Census identified 373 urbanized areas in the United States and Puerto Rico (52).<sup>2</sup>

The Census definition of urban areas has changed considerably over time. Prior to 1900, the lower population limit for the size of places considered urban was set at either 4,000 or 8,000. The limit was lowered to 2,500 residents in 1900(47). This definition worked well until suburban development outside corporate boundaries became extensive. To improve the definition, people living in fairly densely populated areas (at least 1,000

persons per square mile) in the immediate vicinity of cities of 50,000 or more population were counted as urban instead of rural beginning in 1950 (21). With the exclusion of these suburban residents, the size of the 1950 rural population dropped from 62 million to 54 million (47).

The *rural population* has been divided by the Census Bureau into the farm and nonfarm populations. The *farm population* includes people living in rural-areas on properties of 1 acre of land or more where \$1,000 or more of agricultural products were sold (or would have been sold) during the previous 12 months.<sup>3</sup> In 1987, the farm population was

<sup>2</sup> Since 1970, rural areas have been recognized within certain cities whose corporate limits include large areas lacking urban development. The rural portion of these "extended cities" is at least 5 square miles in area and has a population density of less than 100 persons per square mile. Together, such areas must constitute at least 25 percent of the land area of the legal city or include at least 25 square miles (50). In 1980 there were 87 extended cities with a total of 161,140 rural residents (41).

<sup>3</sup> From 1960 to the mid 1970s, the farm population consisted of all persons living in rural territory on places of 10 or more acres, if at least \$50 worth of agricultural products were sold from the place during the preceding 12 months. Persons living on places of under 10 acres were also included if agricultural sales totaled \$250 or more (55).

**Table 2.--Ten States With The Largest Rural Population (1980)**

State	Rural population (in 1,000s)	Percent of State
Pennsylvania a	3,643	30.7
North Carolina	3,059	52.0
Texas	2,896	20.4
Ohio	2,879	26.7
Michigan	2,711	29.3
New York	2,700	15.4
California	2,060	8.7
Georgia	2,054	37.6
Indiana	1,965	35.8
Illinois	1,908	16.7

SOURCE: U.S. Department of Commerce, Bureau of the Census, County and City Data Book: 1983 (Washington, DC: U.S. Government Printing Office, 1983).

estimated at 4,986,000, or about 8 percent of the rural population and 2 percent of the total resident U.S. population. In contrast, farm residents represented 30 percent of the population in 1920(55).

According to the 1980 Census, 73.7 percent of the U.S. population was urban, but the proportion ranged from a low of 33.8 percent in Vermont to 100 percent in the District of Columbia (51). Table 1 shows the distribution of the 1980 urban and rural population by size of place. Over 85 percent of the rural population live in places or areas with fewer than 1,000 residents. Table 2 shows the ten States with the largest rural populations. Table 3 shows the seven States with more than one-half of their population residing in rural areas.

The Census Bureau's "urbanized" area concept does not apply to towns, cities, or population concentrations of less than 50,000. Those living nearby, but outside of the limits of smaller cities or towns are not counted as being part of an "urbanized" area, even though the "suburban" population may be large and economically integrated with the town. For example, the population surrounding the incorporated village of Hayward, Wisconsin (county seat of Sawyer County), ex-

ceeds the 1,456 population of Hayward. The residents of the surrounding area use Hayward's facilities such as a nursing home and fire station but are not included in the village population. This "undercount" has hampered the village's ability to obtain grants to improve area services (13). Numerous areas such as Hayward, that are considered "rural" by virtue of the fact that they are outside of an urbanized area and have a population of 2,500 or less, would be considered urban if the population immediately surrounding the corporate area were included. Many towns and villages have resolved this problem by annexing surrounding developed territory (12).

**Table 3--- States With More Than One-Half of Their Population Residing in Rural Areas (1980)**

State	Rural population (in 1,000s)	Percent of State
Vermont	339	66.2
West Virginia	1,244	63.8
South Dakota	370	53.6
Mississippi	1,328	52.7
Maine	591	52.5
North Carolina	3,059	52.0
North Dakota	334	51.2

SOURCE: U.S. Department of Commerce, Bureau of the Census, County and City Data Book: 1983, (Washington, DC: U.S. Government Printing Office, 1983).

### The Office of Management and Budget: Metropolitan Statistical Areas

**A metropolitan statistical area (MSA)<sup>4</sup> is an economically and socially integrated geographic unit centered on a large urban area. In general terms, an MSA includes a large population center and adjacent communities that have a high degree of economic and so-**

4 From 1959 to 1983, MSAs were called Standard Metropolitan Statistical Areas (SMSAs) (53 FR 51175). The term MSA is used throughout this paper, even when referring to 1980 Census data.

cial integration with that center (54). This contrasts with Census' urban area, which is defined solely on the basis of where people reside (i. e., population size and density). MSAs are defined by OMB<sup>5</sup> and are used by Federal agencies for collecting, tabulating, and publishing statistical data. Some Federal agencies also use MSA designations to implement programs and allocate resources although OMB does not define them with such applications in mind. The business community uses MSA data and rankings extensively, for example to make investment decisions and to assess the desirability of markets (38).

The official standards that are used to define MSAs are reviewed prior to each decennial Census.<sup>6</sup> According to standards adopted for the 1980 Census, an MSA must have:<sup>7</sup>

- a city with 50,000 or more residents; or
- an urbanized area (as defined by the Census Bureau) with at least 50,000 people that is part of a county or counties that have at least 100,000 people.

In most areas, counties are the building blocks of MSAs. In the six New England States, MSAs are composed of cities and towns, rather than whole counties.<sup>8</sup> MSAs

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<sup>5</sup> The metropolitan area concept appeared in U.S. Census publications as early as 1910 but was not widely incorporated or used until the 1950 census when the concept was generalized to county lines (12,47) .

<sup>6</sup> The Office of Management and Budget's Statistical Policy Office, Office of Information and Regulatory Affairs, reviews and revises MSAs with advice from the interagency Federal Executive Committee on Metropolitan Statistical Areas (56).

<sup>7</sup> See appendix A for a summary of the 1980 MSA standards.

<sup>8</sup> New England USA standards are based primarily on population density and commuting patterns (56). The six New England States are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

often include more than one county; i.e., one or more central counties containing the area's main population concentration and outlying counties that have close economic and social relationships with those central counties. To be included in the MSA, the outlying counties must have a specified level of commuting to the central counties and must also meet certain standards regarding metropolitan character, such as population density (see appendix A). Consolidated MSAs (CMSAs) are large metropolitan complexes within which individual components are defined, designated as primary MSAs (PMSAs) (see appendix A).

Problems in MSA classification may occur when county boundaries do not conform closely to actual urban or suburban development. An MSA may inappropriately include nonsuburban areas located in the outlying sections of some counties. For example, in a spatially large county with a concentrated metropolitan area, a large, sparsely populated area maybe included in the MSA. This problem occurs more frequently in the West, where counties are bigger than those in the East. On the other hand, an MSA may exclude suburban areas just across the county line. For example, a county with a suburban population that commutes to a neighboring MSA may be excluded from that MSA because it also includes a large, sparsely populated section and therefore has a low average population density.<sup>9</sup> While these problems occur, they occur infrequently (56).

About three-quarters (76.6 percent) of the U.S. population lived in the 275 MSAs designated as of 1983.<sup>10</sup> These MSAs represent only 16.2 percent of the total U.S.

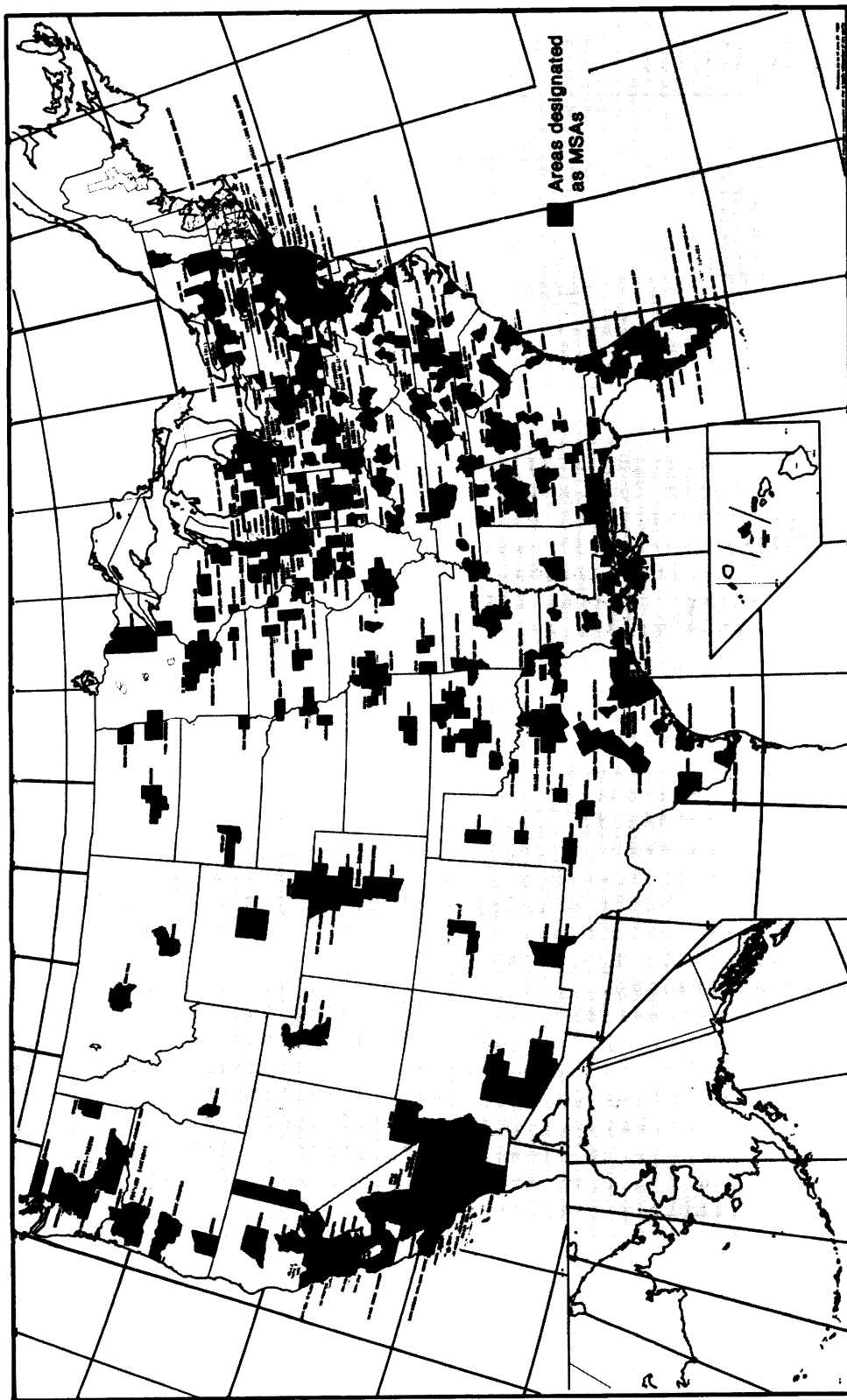
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<sup>9</sup> See appendix B for a description of criteria used in including outlying counties in an USA.

<sup>10</sup> By June 30, 1988, intercensal population estimates or special census population counts had been used to add seven newly qualified MSAs and to designate three new central cities within existing MSAs (12).



Figure 2.--Metropolitan Statistical Areas (June 30, 1986)



SOURCE Adapted from U.S. Department of Commerce, Bureau of the Census, "Metropolitan Statistical Areas (MSAs), PMSA's, and MSA's" (GE-50, No. 84) Stock No. 003-024-06506-1 (Washington, DC: U.S. Government Printing Office, 1986).

**Table 4---Ten States With The Largest Nonmetropolitan Population (1986)**

State	Nonmetropolitan population (in 1,000s)	Percent of State
Texas	3,209	19.2
North Carolina	2,847	45.0
Ohio	2,277	21.2
Georgia	2,182	35.7
Illinois	2,033	17.6
Kentucky	2,033	54.5
Mississippi	1,837	70.0
Pennsylvania a	1,830	15.4
Michigan	1,811	19.8
Indiana	1,760	32.0

SOURCE: U.S. Bureau of the Census, Statistical Abstract of the United States: 1988, 108th ed. (Washington, DC: 1987), table 33.

land area (figure 2.--MSA map). Seventy-seven percent of U.S. counties (2,422 of 3,139 counties and county equivalents) are non-metropolitan. <sup>11</sup> Table 4 shows the 10 States with the largest nonmetropolitan populations. Table 5 shows the 15 States with more than one-half of their population residing in non-metropolitan areas.

Before 1970, an MSA's "recognized large population nucleus" had to include a central city of at least 50,000 population or twin cities with a total population this large. Now there is no minimum population size for an MSA's central city, and it is easier to include contiguous populations in the urbanized area (6). With the relaxation of MSA criteria, some of the 58 MSAs designated following the 1970 and 1980 censuses are demographically dissimilar from those MSAs meeting earlier standards. For example, of the 33 MSAs newly designated after the 1980 census that lacked a city of 50,000 or more residents, 25 had rural population percentages that were closer to nonmetropolitan norms (62 percent) than metropolitan norms (15 percent) (6). Furthermore, many of these do not have facilities and services traditionally associated

<sup>11</sup> There were 717 metropolitan counties (excluding New England) as of June 30, 1988 (12).

**Table 5---States With More Than One-Half of Their Population Residing in Non-metropolitan Areas (1986)**

State	Nonmetropolitan population (in 1,000s)	Percent of State
Idaho	809	80.7
Vermont	416	76.9
Montana	619	75.6
South Dakota	508	71.8
Wyoming	361	71.2
Mississippi	1,837	70.0
Maine		63.9
West Virginia	1,217	63.4
North Dakota	426	62.7
Arkansas	1,439	60.7
Iowa	1,629	57.1
Alaska	299	56.0
Kentucky	2,033	54.5
Nebraska	848	53.1
New Mexico	776	52.5

SOURCE: U.S. Bureau of the Census, Statistical Abstract of the United States: 1988, 108th ed. (Washington, DC: 1987), table 33.

with metropolitan areas, such as hospitals with comprehensive services, a 4-year college, a local bus service, a TV station, or a Sunday paper (6).

A few counties that have not qualified for MSA status on the basis of demographic characteristics have become designated as MSAs through the Federal legislative process. Specifically, since 1983, one new MSA (Decatur, Alabama) has been created (comprising two counties)<sup>12</sup> and the boundaries of two existing MSAs have been enlarged by statute (62).<sup>13</sup> The proponents of the bill to create the Decatur, Alabama MSA argued that "MSA status would encourage a measure of economic recovery to this area... without any additional financial burden on the Federal Government" (45). Hospitals located in the newly designated MSA of Decatur, Alabama are expected to receive an additional \$3 million per year in Medicare reimbursements be-

<sup>12</sup> Public Law 100-258.

<sup>13</sup> Public Law 100-202, Sec. 530 and Public Law 99-500.

cause of this change from nonmetropolitan (rural) to metropolitan status. The increase in Medicare outlays for these two counties would in aggregate decrease reimbursement to other hospitals because the total amount of funding for the Medicare program was not changed by this act (44).

The MSA definition is designed strictly for statistical applications and not as a general-purpose geographic framework. In fact, according to official standards, "no Federal department or agency should adopt these statistical definitions for a nonstatistical program unless the agency head has determined that this is an appropriate use of the classification" (56). The OMB does not take into account or attempt to anticipate any nonstatistical uses that may be made of the MSA definitions and will not modify the definitions to meet the requirements of any nonstatistical program (62). Nonetheless, Federal agencies often use MSA designations to implement their programs. Table 6 contains a partial list of Federal programs that use MSAs for the administration of programs or the distribution of funds.

**Table 6---Selected Federal Department/Agencies Using MSA Designations for the Administration of Programs or the Distribution of Funds<sup>a</sup>**

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Department of Agriculture
Farmers Home Administration
Rural Housing Assistance
Department of Education
Higher Education Assistance
Federal Impact Payments for Education
Summer Food Service Program
Department of Health and Human Services
Federal Grants for Residency Training
Aid to Organ Procurement Organizations
Medicare Prospective Payment System
Juvenile Delinquency Treatment Grants
Provision of Services to Medicare Beneficiaries by Health Maintenance Organizations (HMOs)
Department of Housing and Urban Development
Enterprise Zones
Public Housing Development
Community Development Block Grant Program
Urban Development Action Grants
Assisted Housing Fair Market Rents
Rental Rehabilitation Awards
Department of the Interior
Recreation Areas
Wastewater Treatment Works Grants
Department of Labor
Job Training Partnership Act

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<sup>a</sup>Most USA applications listed were identified by searching the U.S. Code and the Code of Federal Regulations (CFR) for the term "MSA." This list is not comprehensive.

SOURCE: Bea, K., "Metropolitan Statistical Area Standards: Applications in Federal Policy," (CRS Draft), 1989; U.S. Department of Commerce, OFSPS, "Report on the Impact of Standard Metropolitan Statistical Areas on Federal Programs," 1978.

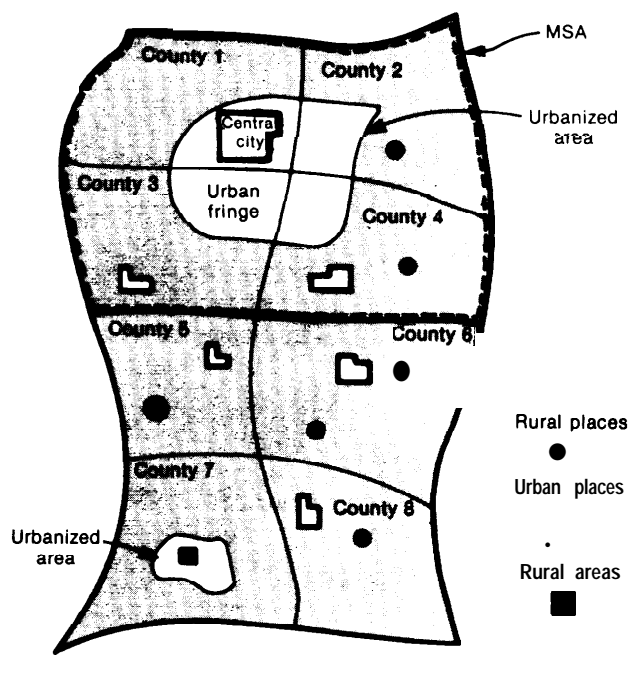
## 4. RELATIONSHIP BETWEEN URBAN/RURAL AND METROPOLITAN/NONMETROPOLITAN DESIGNATIONS

Conceptually, the urban/rural and metro/nonmetropolitan designations are quite different. Urban/rural are geographic designations based on population size and residential population densities, while the MSA concept embodies both a physical element (a city and its built-up suburbs) and a functional dimension (a more-or-less unified local labor market) (21). The Census-defined urban population and the MSA population intersect but are by no means identical; they are even less congruent geographically. Common to both are residents of most urbanized areas, the densely settled area that forms the nucleus of the MSA (see figure 3).<sup>1</sup> The Census' urban population includes the urbanized area population and those living outside urbanized areas in places with 2,500 or more residents. The MSA population generally includes all those living in the county or counties that contain the urbanized area and the residents of additional counties that are economically integrated with that metropolitan core. Forty percent of the 1980 rural population lived in MSAs, and 14 percent of the MSA population lived in rural areas (see table 7). About one-fourth of farm residents live in MSAs (55).

"Rural area," "nonurbanized area," and "nonmetropolitan area" have all been used to display vital and health statistics or to implement Federal policies in health and other areas. These "rural" definitions can be analyzed in terms of how well they include "rural areas" and how well they exclude "urban areas." The Census-defined "rural area" is the most specific measure, since it excludes urbanized areas and places with 2,500 residents or more. Thus, few would argue that an area designated as rural according to the Census definition is really urban. However, some might argue that the Census definition would

incorrectly classify as urban small towns which are located far from a large population center. In contrast, the "nonurbanized area" definition includes as rural all territory outside of its densely populated area, regardless of population size. Thus, while all "rural areas" would be included, some cities and towns of as large as 40,000 residents would also be included, as well as some outer suburbs of large urban areas.

**Figure 3---The Relationship Between Metropolitan Statistical Areas (MSAs), Urbanized Areas, and Urban and Rural Areas**



Counties 1 through 4 comprise the MSA.

Urbanized areas form the nucleus of the MSA and can span two or more counties (e. g., counties 1 through 4). There are a few urbanized areas in non-MSA counties (e. g., county 7).

Urban areas include urbanized areas and places (e. g., cities and towns) with 2,500 or more residents. Such places are called urban places.

Rural places are located outside of urbanized areas and have fewer than 2,500 residents.

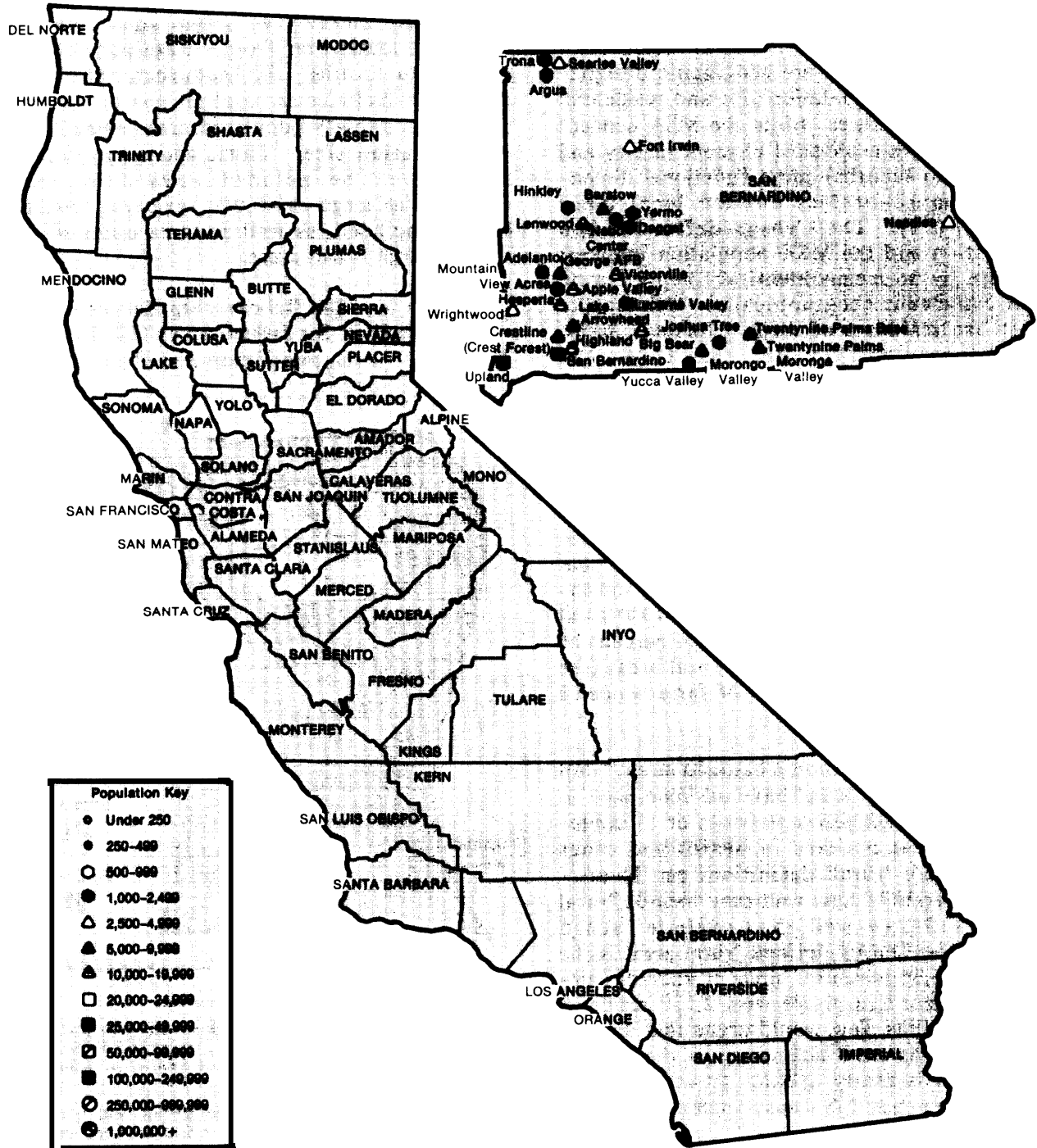
Rural areas are the residential territory (shaded gray) left after urbanized areas and urban places are excluded. The MSA has rural areas within it.

SOURCE: Office of Technology Assessment, 1989.

<sup>1</sup> There are a few urbanized areas outside of MSAs.

<sup>2</sup> A small number of rural residents of extended cities are excluded from the urban and urbanized area population.

Figure 4--- Map of California Counties: San Bernardino County



SOURCE: American Map Corporation, Business Control Atlas 1988 (Maspeth, New York: American Map Corporation, 1988).

The nonMSA designation falls in between the other two designations. If nonMSAs are used to define rural areas, some large towns and cities located outside of MSAs<sup>3</sup> would be included as rural while small towns and sparsely populated areas within MSAs would be excluded from the rural category. This exclusion is less a concern in the Eastern United States, where counties are relatively small,<sup>4</sup> and such towns would generally be expected to be relatively close to an urbanized area. However, in some of the large counties in the West, some areas within an MSA are far from an urbanized area (e.g., San Bernardino County--figure 4).

**Table 7.--Population Inside and Outside of MSAs by Urban and Rural Residence (1980)**

	Population	Percent of MSA/nonMSA
U.S. total	226,545,805	
Inside MSAs	149,430,623	100.0
Urban	145,442,528	85.8
Urbanized areas	137,481,718	81.1
Central cities	66,222,207	39.1
Urban fringe	71,259,511	42.1
Rural	23,988,095	14.2
Outside MSAs	57,115,182	100.0
Urban	21,608,464	37.8
Rural	35,506,718	62.2

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Volume 1. Characteristics of the Population, 1981, table 6, pp. 1-39.

<sup>3</sup> There are at least 100 places with populations of 25,000 or more outside of MSAs.

<sup>4</sup> A typical county in the East has a land area of 400 to 600 square miles. West of the Mississippi River there are great variations, but the average county land area is just over 1400 square miles excluding Alaska (29).

## 5. UNDERSTANDING DIVERSITY WITHIN RURAL AREAS: URBAN/RURAL TOPOLOGIES

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Dichotomous measures of urbanity/rurality not only obscure important differences between urban and rural areas but also wide variations within rural areas. Consequently, there have been recommendations to implement a standard rural typology that would capture the elements of rural diversity and improve use and comparison of data (14). In the absence of such standardized data, it is difficult to quantify rural health problems and to make informed policy decisions.

In this section, several county-based rural/urban topologies or classification schemes are described that incorporate one or more of the following measures:

- population size and density;
- proximity to and relationship with urban areas;
- degree of urbanization; and principal economic activity.

Only county-based topologies are considered here, because the county is generally the smallest geographic unit for which data are available nationally. Counties also have several other characteristics that make them useful units of analysis: county boundaries are generally stable; counties can be aggregated up to the State level; and counties are important administrative units for health and other programs. For small-area analyses and for research purposes, ZIPCodes may be useful units of analysis. However, ZIPCodes boundaries are not stable and sometimes cross county lines.

### Topologies Used To Describe Nonmetropolitan Areas

Several topologies have been developed to classify nonmetropolitan counties. Nine county-based topologies are described below.<sup>1</sup> These topologies are generally used for re-

search purposes and have not yet been used by Federal agencies to implement health policies or to present vital and health statistics. Before discussing specific topologies, four geographic/demographic measures common to most of the topologies are briefly described: 1) population size, 2) population density, 3) adjacency to metropolitan area, and 4) urbanization.

**Population Size.**--Population size can refer to the total population of the county or to the largest settlement in the county. Presentation of an area's population by settlement size helps to illustrate how the population is distributed. In 1980, 43 percent of the U.S. population lived in places of less than 10,000 population or the open countryside (see table 1). The Census Bureau's urban definition depends in part on population size (i.e., those living in places of 2,500 or more outside of urbanized areas).

**Population Density.**--Population density is calculated by dividing the resident population of a geographic unit by its land area measured in square miles or square kilometers. In 1980, half of the U.S. population (excluding Alaska and Hawaii) lived in counties with less than 383 persons per square mile (21). Population density ranges from 64,395 persons per square mile in New York County, New York (Manhattan) to 0.1 per square mile in Dillingham Census Division,<sup>2</sup> Alaska. Figure 5 shows how the U.S. population is distributed. Urbanized areas are defined primarily by population density (i.e., territory with at least 1,000 residents per square mile). One drawback of population density is that it doesn't describe how the population is distributed within an area. For example, a spatially large county that includes both small, densely settled urban areas and large, sparsely populated areas would have a population density that masks such extremes.

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<sup>1</sup> Not all rural topologies that have been proposed are described in this section. Excluded from discussion are several economic indices developed in the 1960s that associated economic underdevelopment with rurality.

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<sup>2</sup> There are no counties in Alaska. The county equivalents are the organized boroughs and "census areas" (U. S. Dept. of Commerce, 1980 Census of Population, Volume 1, 1981).

Figure 5.--1980 Population: Distribution (United States)



SOURCE: U.S. Department of Commerce, Bureau of the Census, "Population Distribution in the United States: 1980 (GE-70 No. 4) Washington, DC, 1984.



**Adjacency to Metropolitan Area.** --A county's adjacency to a metropolitan area can be measured geographically (e.g., sharing a boundary) or functionally (e.g., proportion of residents commuting to an MSA for work). Many residents of these adjacent counties, however, live some distance from an urban center, particularly in large counties in the West. Furthermore, natural geographic barriers or an absence of roads may impede access to metropolitan areas.

Urbanization ---Some topologies use various measures of the level of urbanization to differentiate nonmetropolitan counties. Sometimes, urbanization is measured by the absolute or relative size of the Census-defined urban population. For nonmetropolitan counties this generally means the population living in places with 2,500 or more residents or proportion of the county's population that is urban. In other topologies, an urbanized county is defined by the size of the county's total population (e.g., counties with 25,000 or more residents).

Urbanization/Adjacency to Metropolitan areas

Analysts at the U.S. Department of Agriculture (USDA) have classified nonmetropolitan counties on two dimensions: 1) the aggregate size of their urban population and 2) proximity/adjacency to metropolitan counties (see table 8) (22).<sup>3</sup>The urban population follows the Census Bureau's definition. Urbanized counties are distinguished from less urbanized counties by the size of the urban population (i.e., urbanized counties have at least 20,000 urban residents and less urbanized counties have 2,500 to 19,999 urban residents). A nonmetropolitan county's adjacency to an MSA is defined both by shared boundaries (i.e., touching an MSA at more

<sup>3</sup> This classification also includes three types of metropolitan counties based on MSA total population - small (under 250,000 population), medium (250,000 to 999,999), and large (1 million or more).

**Table 8--- Classification of Nonmetropolitan Counties by Urbanization and Proximity to Metropolitan Areas (2,490 counties as of 1970)<sup>4</sup>**

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<b>Urbanized adjacent</b> (173 counties)
■ Counties with an urban population of at least 20,000 which are adjacent to a metropolitan county.
<b>Urbanized nonadjacent</b> (154 counties)
■ Counties with an urban population of at least 20,000 which are not adjacent to a metropolitan county.
<b>Less urbanized adjacent</b> (565 counties)
■ Counties with an urban population of 2,500 to 19,999 which are adjacent to a metropolitan county.
<b>Less urbanized nonadjacent</b> (734 counties)
Counties with an urban population of 2,500 to 19,999 which are not adjacent to a metropolitan county.
<b>Rural adjacent</b> (241 counties)
Counties with no places of 2,500 or more population which are adjacent to a metropolitan county.
<b>Rural nonadjacent</b> (623 counties)
■ Counties with no places of 2,500 or more population which are not adjacent to a metropolitan county.

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<sup>4</sup>Classification of nonmetropolitan areas using 1980 Census data is forthcoming from the Department of Agriculture (McGranahan, personal communication, 1989).

SOURCE: McGranahan et al., 1986, "Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-1980."

than a single point) and by commuting patterns (i.e., at least 1 percent of the county's labor force commutes to the central county(ies) of the MSA).<sup>4</sup>Nearly 40 percent of the nonmetropolitan counties are adjacent to MSAs, and just over one-half of the nonmetropolitan population resides in these adjacent counties (see table 9).

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<sup>4</sup> The classification scheme was introduced in 1975 by Hines, Brown, and Zimmer of USDA. Calvin Beale and David Brown, also at USDA, later modified the classification to include the 1 percent commuting requirement for adjacent counties (13). A 2 percent commuting level is used in a more recent version of the typology (5).

This typology still masks differences among nonMSA counties. For example, both a county with one town of 20,000 and a county with eight towns of 2,500 would be considered urbanized under this typology. The county with several small towns is unlikely to have the level of services of a county with its population concentrated into larger towns.

Adjacency to Metropolitan Areas/Largest Settlement Size

Another county typology groups non-metropolitan counties by adjacency to MSAs and by size of the largest settlement (21) (table 10). Size of largest settlement is a useful parameter to include when analyzing health services since large settlements are more likely to have hospitals and specialized health care providers. However, the presence

Table 9-- Nonmetropolitan County Population Distribution by Degree of Urbanization and Adjacency to an MSA (1980)

	Population <sup>a</sup> ( 1,000s)	Percent <sup>b</sup> of nonMSA
U.S. total	226,546	
<u>MSA counties</u>	163,526	
<u>NonMSA counties</u>	63,020	100.0%
Urbanized		
Adjacent to MSA	14,802	23.5
Not adjacent to MSA	9,594	15.2
Less urbanized		
Adjacent to MSA	15,350	24.4
Not adjacent to MSA	15,529	24.6
Totally rural		
Adjacent to MSA	2,737	4.3
Not adjacent to MSA	5,008	7.9

<sup>a</sup>Total MSA/nonMSA populations differ from those in table 7 because this typology relies on 1970 MSA designations.

<sup>b</sup>Percent does not sum to 100 due to rounding.

SOURCE: D. A., McGranahan, et al., "Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-1980.11

of a large town or city does not guarantee easy access to facilities for all residents of a spatially large county.

Population Density: Incorporation of the Frontier Concept

The National Rural Health Association (NRHA) has proposed a classification system that includes four types of rural areas (27)

- adjacent rural areas--counties contiguous to or within MSAs which are very similar to their urban neighbors;
- urbanized rural areas--counties with 25,000 or more residents but distant from an MSA;
- frontier areas--counties with population densities of less than 6 persons per square mile, which are the most remote areas;

Table 10--- U.S. Population by County's Largest Settlement and Adjacency to an MSA (1980)

	Population (1,000s)	Percent of U.S.
U.S. total	226,505	100.0
<u>NonMSA counties</u>	60,512	26.7
Counties not adjacent to an MSA		
Largest settlement		
Under 2,500	4,543	2.0
2,500 to 9,999	10,255	4.5
10,000 to 24,999	7,120	3.1
25,000 or more	4,124	1.8
Counties adjacent to an MSA		
Largest settlement		
Under 2,500	3,157	1.4
2,500 to 9,999	13,236	5.8
10,000 to 24,999	12,467	5.5
25,000 or more	5,610	2.5
<u>MSA counties</u>	165,994	73.3
Largest settlement		
Under 100,000	3,611	1.6
100,000 to 249,999	18,461	8.2
250,000 to 499,999	24,883	11.0
500,000 to 999,999	28,640	12.6
1,000,000 to 2,999,999	50,524	22.3
3,000,000 or more	39,875	17.6

SOURCE: Adapted from L., Long, and D., DeAre, "Repopulating the countryside: A 1980 Census Trend," Science, vol. 217, Sept. 17, 1982, pp. 111-116.

- countryside rural areas--the remainder of the country not covered by other rural designations.

This typology includes some important concepts not covered by other topologies, such as the concept of the "frontier" area. This typology also differs from other topologies because it includes some counties within MSAs (i.e., in the adjacent rural area category). Since the categories are not mutually exclusive, however, some counties will fall into more than one group. For example, under this typology 3 of 14 counties in Arizona would be both "urbanized rural areas" and "frontier areas" because the counties' populations exceed 25,000 residents and the population density is less than 6 persons per square mile.<sup>5</sup> County population size is a poor indicator in the West because many counties there are much larger than elsewhere.

### Urbanization/Population Density

Two other rural topologies incorporate population density and urbanization. The first is a classification developed by Bluestone<sup>6</sup> and the second is a modification by Clifton of that classification (see table 11).<sup>7</sup> Urbanization is defined in terms of the proportion of the county that is urban (i.e., lives in towns of 2,500 or more). An advantage of using the percent of a county's population that is urban is that it is not influenced much by the size of the county, or by a county's including a large stretch of unpopulated territory. Density is heavily affected by these conditions. Combining mea-

<sup>5</sup> The three Arizona counties are Apache, Coconino, and Mohave.

<sup>6</sup> Herman Bluestone, "Focus for Area Development Analysis: Urban Orientation of Counties," Economic Development Division, Economic Research Service, USDA as cited in Sinclair and Manderscheid.

<sup>7</sup> Ivery Clifton, Agricultural Economist, Economic Research Service, USDA, unpublished manuscript as cited by Sinclair and Manderscheid.

**Table 11--Bluestone and Clifton County Classifications Based on Urbanization and Population Density**

	Percent urban	Population per square mile
<b>Bluestone classification</b>		
Metropolitan	GT 85 percent	GT 100
	GT 50 percent	GT 500
Urban	LT 85 percent	100-500
Semi - isolated urban	GT 50 percent	LT 100
Densely settled rural	LT 50 percent	50-100
Sparsely settled rural with some urban population	LT 50 percent	LT 50
Sparsely settled rural with no urban population	0 percent	LT 50
<b>Clifton's classification</b>		
Urban	GE 50 percent	GE 200
Semi - urban	GE 50 percent	30-200
Densely settled rural	LT 50 percent	GT 30
Rural	LT 100	LT 30

ABBREVIATIONS: GT=greater than; GE=greater than or equal to; LT=less than.

SOURCE: B., Sinclair, and L., Manderscheid, "A Comparative Evaluation of Indexes of Rurality--Their Policy Implications and Distributional Impacts," contract report, Department of Agricultural Economics.

asures of urbanization and density provides some indication of the degree of population concentration or dispersion. However, as with the USDA typology, a county with one town of 20,000 and a county with eight towns of 2,500 may not be distinguished under this scheme.

### Distance From an MSA or Population Center

Two rural indexes<sup>8</sup> are based on distance from an MSA or population center. Hathaway et al., developed a size-distance index that

<sup>8</sup> These rural indexes are different from topologies in that they are continuous (e. g., a scale from 1 to 100) rather than categorical measures.

includes two measures: miles from an MSA and the population of that MSA (39). Smith and Parvin considered three county characteristics in their rural index: population-proximity; population density; and employment in agriculture, forestry, or fisheries (40,43). A county's population-proximity indicates the relative access to adjacent counties' populations.

Population-proximity is measured as the county population plus the size-distance ratio of surrounding counties.<sup>9</sup>To illustrate, the population-proximity for County A of size 20,000 surrounded by four counties B through E is as follows:

**Table 12--- Population-Proximity: A Measure of a County's Relative Access to Adjacent Counties' Populations**

count y	Distance between County A and the indicated county population	Ratio of population to distance (miles) <sup>a</sup>	(pop./mile)
A	20,000		
B	15,000	30	50:
C	60,000		1,500
D	250,000	100	2,500
E	100,000	10	10,000
Sun of ratios .....			14,500
Add population of County A.....			20,000
Population-proximity for County A....			34,500

<sup>a</sup>Distance is the number of miles between the county seat of County A and the county seat of the indicated county.

SOURCE: Adapted from Select Committee on Aging, 1983 "Status of the Rural Elderly."

The combination of distance to adjacent population centers and size of that population in a typology is attractive because distance is

<sup>9</sup> The population-proximity is "the sun of the total population in the reference county and the sun of the ratios of the number of persons in all counties within 125 miles of the reference county divided by the distance in miles between the county seat in the reference county and the county seat in each county within the specified distance (43)."

a good access indicator and population size indicates service availability. The topologies incorporating these measures may be most informative for geographically small counties. For large counties, however, the distance from one county seat to the next is unlikely to be applicable to those living at a distance from the county seat.

Commuting-Employment Patterns

A relatively new county classification system incorporates measures of population size, urbanization, commuting patterns of workers, and the relationships between workplace and place of residence (28). The classification criteria are shown in table 13 and the distribution of U.S. counties according to this typology is shown in table 14. The inclusion of employment and commuting measures may allow this typology to identify groups of counties that are economically related such as service and labor market areas.

Economic and Socio-Demographic Characteristics

Nonmetropolitan counties have also been classified according to their major economic bases, land uses, or population characteristics (table 15) (7).<sup>10</sup>Fifteen percent of nonmetropolitan counties (370 of 2,443 counties in the 48 conterminous States) remain unclassified using this approach. Among the counties that are classified, 70 percent fall into only one of the seven categories; the remaining 30 percent fall into two or more categories (37).

Some of the data used to develop this classification are now a decade old (e.g., farm employment), and it is likely that with continued diversification of the rural economy

<sup>10</sup> These represent the nonmetropolitan counties as defined in 1974.

**Table 3.--County Typology Based on Employment, Commuting, and Population Characteristics**

County type	Key to Metropolitan Types			Total population
	E/R ratio <sup>a</sup>	percent of workers working outside county	percent of population that is urban	
<b>Nonmetro centers</b>	(a) .98 or higher OR (b) 85 or higher	less than 30%	(Place or cluster 10,000 or more (Place or cluster 10,000 or more	25,000 or more 10,000 or more
<b>Nonmetro satellites</b> Does not qualify for nonmetro center AND <b>Nonmetro commuting with center</b> Would qualify for nonmetro center, nonmetro satellite or nonmetro small center but has more outcommuting	.70 or higher	less than 30% and at least 15%  30% or more	5,000 or more	10,000 or more 10,000 or more
<b>Nonmetro small centers</b> Does not qualify for nonmetro center, nonmetro satellite or nonmetro commuting with center AND  <b>Rural commuting counties</b> Does not qualify for nonmetro center, nonmetro satellite or nonmetro small center, but has more outcommuting than nonmetro rural.	(a) 1.20 or higher OR (b) 98 or higher OR (c) between .85 and .97 inclusive	less than 30%  less than 30%  less than 30%	2,000 or more  If less than 3,500 must have ----->	2,000 or more
<b>Nonmetro rural counties</b> Does not qualify for any of the other nonmetro categories				

County type	Key to Metropolitan Types	
	E/R ratio	percent of workers working outside county
<b>Metro centers</b>	0.98 or higher	less than 30%
<b>Metro satellites</b>	between 0.70 and 0.97, inclusive	less than 30%
<b>Metro commuting satellites</b>	0.70 or higher	30% or more
<b>Metro suburban</b>	between 0.50 and 0.69, inclusive	
<b>Metro dormitory</b>	lower than 0.50	

<sup>a</sup>E/R ratio represents the number of workers working in the county divided by the number of workers residing in the county. SOURCE: J. Pickard, "A New County Classification System," *Appalachia* 2:(3), summer 1988, pp. 19-24.

**Table 14---Distribution of U.S. Counties by Typology Based on Employment, Commuting, and Population Characteristics (1986)**

	Number of counties	Percent of U.S.
<b>Nonmetropolitan county types</b>	<b>2393</b>	<b>23.2</b>
Centers	543	11.1
Satellites	212	2.4
commuting counties with center	239	2.7
Small centers	565	3.7
Rural commuting counties	333	1.7
Rural counties	501	1.6
<b>Metropolitan county type</b>	<b>745</b>	<b>76.8</b>
Metro centers	295	44.7
Metro satellites	91	10.0
Metro commuting satellites	193	15.0
Metro suburban	133	6.6
Metro dormitory	33	less than 1

SOURCE: J., Pickard, "An Economic Development County Classification for the United States and its Appalachian County Types," Appalachian Regional Commission, Washington, DC June 1988.

since the late 1970s, even fewer counties<sup>11</sup> would be classified into one of these groups. On the other hand, many rural economies remain small and dependent on a single industry or occupation despite the economic diversification(7).

### Conclusion

In summary, several topologies for nonmetropolitan counties have been developed incorporating measures of population size and density, urbanization, adjacency and relationship to MSA, and principal economic activity (see table 16). While it is desirable to have a standardized typology to portray the diversity of rural areas, the potential uses of

topologies are varied and require inclusion of different measures. For example, to study the geographic variation of access to health care, a typology that includes population size, density, and distance to large settlements is of interest. To study health personnel labor market areas, however, a typology based on economic areas, market areas, or worker commuting patterns is preferable. On the other hand, rural economists or sociologists may be more interested in identifying counties with economies dependent on farming, mining, or forestry.

While no one typology meets all potential needs, there are several desirable features of any typology. For example, for many purposes it is helpful to have topologies with mutually exclusive (i.e., nonoverlapping) categories. The National Rural Health Association's typology includes frontier (less than 6 persons per square mile) and urbanized rural counties (population of 25,000 or more and not adjacent to an MSA). Yet it is possible for counties to meet both criteria.

The concept of urbanization is incorporated into several of the topologies. In some cases, urbanization is determined by the absolute or relative size of a county's urban population and in others, by the size of a county's largest settlement. When the size of the urban population is used, a county with one large city with the balance of the county sparsely populated, would be indistinguishable from a county with several smaller towns. As level of resources are likely to be city-size dependent, topologies using this measure of urbanization may not discriminate well for some applications. On the other hand, while largest settlement size might be indicative of level of services available in the county, it is not informative of how remote those services might be for all county residents. In geographically small counties, large settlements are likely to be accessible to all county residents. In the West, however, counties can be as large as some Eastern States, and some measure of proximity would be useful to indicate physical access. Measures of how

<sup>11</sup> If the classification scheme were updated, the proportion of nonmetropolitan counties either not classified or falling into more than one group would likely be greater than the present 43 percent.

**Table 15.--Classification of Nonmetropolitan Counties by Economic and Socio-Demographic Characteristics<sup>a</sup>**

- **Farming-dependent counties**  
702 counties concentrated largely in the Plains portion of the North Central region.  
Farming contributed a weighted annual average of 20 percent or more of total labor and proprietor income over the five years from 1975 to 1979.
- **Manufacturing-dependent counties**  
678 counties concentrated in the Southeast.  
Manufacturing contributed 30 percent or more of total labor and proprietor income in 1979.
- **Mining-dependent counties**  
200 counties concentrated in the West and in Appalachia.  
Mining contributed 20 percent or more to total labor and proprietor income in 1979.
- **Specialized government counties**  
315 counties scattered throughout the country.  
Government activities contributed 25 percent or more to total labor and proprietor income in 1979.
- **Persistent poverty counties**  
242 counties concentrated in the South, especially along the Mississippi Delta and in parts of Appalachia.  
Per capita family income in the county was in the lowest quintile in each of the years 1950, 1959, 1969, and 1979.
- **Federal Lands counties**  
247 counties concentrated in the West.  
Federal land was 33 percent or more of the land area in a county in 1977.
- **Destination retirement counties**  
515 counties concentrated in several northern Lake States as well as in the South and Southwest.  
For the 1970 to 1980 period, net immigration rates of people aged 60 and over were 15 percent or more of the expected 1980 population aged 60 and over. Retirement counties are disproportionately affected by entitlement programs benefiting the aged.

<sup>a</sup>The number of nonmetropolitan counties does not add to the total number (2,443), because the categories are not mutually exclusive and 370 counties do not fit any of the categories.

SOURCE: Bender, L.D., Green, B.L., Hady, T.F., et al., Economic Research Service, U.S. Department of Agriculture, *The Diverse Social and Economic Structure of Nonmetropolitan America*, Rural Development Research Report No. 49 (Washington, DC: U.S. Government Printing Office, September 1985).

**Table 16---Features of the Nine County-Based Topologies**

Typology	Measures					
	Population size	Density	Urbanization	Adjacency	Distance	Economy
USDA-1 <sup>a</sup>	..	..		■	..	..
Long and DeAre <sup>b</sup>	■	..	..	■	..	..
NRHA <sup>c</sup>	■	■	..	■	..	..
Bluestone <sup>d</sup>	..	■	■	..	..	..
Clifton <sup>e</sup>	..	■	■	..	..	..
Parvin and Smith <sup>f</sup>	■	..	..	..	■	..
Hathaway <sup>g</sup>	■	..	..	..	■	..
Pickard <sup>h</sup>	■	..	■	..	..	■
USDA-2 <sup>i</sup>	..	..	..	..	..	■

<sup>a</sup>McGranahan, D.A. et al., USDA, 1986.

<sup>b</sup>Long, L. and DeAre, D., 1982.

<sup>c</sup>National Rural Health Association, as cited in Sinclair, B., and Manderscheid, L.V., 1974.

<sup>d</sup>Bluestone, H. as cited in Sinclair, B., and Manderscheid, L.V., 1974.

<sup>e</sup>Clifton, I. as cited in Sinclair, B., and Manderscheid, L.V., 1974.

<sup>f</sup>Parvin, D.W. and Smith, B.J. as cited in U.S. Congress, House of Representatives, Task on the Rural Elderly of the Select Committee on Aging, 1983.

<sup>g</sup>Hathaway, D.E. as cited in Sinclair, B., and Manderscheid, L.V., 1974.

<sup>h</sup>Pickard, J., *Appalachia* 21(3):19-24, Sumner, 1988.

<sup>i</sup>Bender, L.D. et al., USDA, 1985.

SOURCE: Office of Technology Assessment, 1989.

evenly the population is distributed might also be useful for large counties.<sup>12</sup> Several of the topologies incorporate an adjacent-to-MSA measure, which is an indicator of access to level of services. The proportion of a county's population that is urban is a useful measure in large Western counties because unlike population density, it is a measure that is not influenced much by size of county or by population distribution.

Nonmetropolitan county data can also be disaggregate regionally by State or groups of States (e.g., the four Census regions or nine Census divisions), or by economic areas (e.g., Bureau of Economic Analysis Areas or BEAs). The Bureau of the Census defines "county groups" that are usually contiguous counties that combined have a population of 100,000 or more.<sup>13</sup> These counties are generally grouped according to meaningful State regions such as planning districts (50).

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**12** The Hoover index is a measure of population concentration or dispersion. The index ranges from zero, which indicates a perfectly uniform distribution in which each subarea has the same proportion of total population as it does of land area, to 100, which represents the concentration of all the population into a single subarea (21). To estimate county population dispersion, subcounty geographic areas would be used. Other methods to measure population concentration or dispersion include the nearest-neighbor statistic or the quadrant technique, but both require a geographic information system incorporating longitude and latitude measures (9, 17,24) .

**13** These county groups are only defined in public use data files.

A new category of nonmetropolitan area called "micropolitan area" has recently been described (42a). While not a typology, the new category does distinguish nonmetropolitan areas that exert similar social and economic influences on their regions as metropolitan areas do on a larger scale. Most micropolitan areas are single counties but a few span two counties or are independent cities. Micropolitan counties are relatively large (40,000 or more residents) and include a central "core city" with at least 15,000 residents.<sup>14,15</sup> Many micropolitan areas are College towns, sites of military bases, and retirement areas. More than 15 million people or about one-quarter of nonmetropolitan residents live in the 219 identified micropolitan<sup>16</sup> areas.

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**14** If a nonmetropolitan city of 15,000 or more residents has at least 40 percent of its population in each of two counties, the micropolitan area includes both counties.

**15** In four States (Maryland, Missouri, Nevada, and Virginia) some cities (called independent cities) have the same status as counties and are considered micropolitan if they have 15,000 or more residents and are larger than 15 square miles. If the city is areally smaller, it is joined with the adjacent county to form the area.

**16** A list of micropolitan areas is available from Niagara Concepts, P.O. Box 296, Tonawanda, New York 14151-0296.



## 6. THE AVAILABILITY OF VITAL AND HEALTH STATISTICS FOR NONMETROPOLITAN AREAS

Given the diversity of nonmetropolitan areas, it is important to present vital and health and statistics by State, region, or by nonmetropolitan typology. Data from the decennial Census and national vital statistics (e.g., natality and mortality data) are published for nonmetropolitan areas by State and degree of urbanization, but few other sources of health information are published along these dimensions. For example, the National Center for Health Statistics does not publish detailed nonmetropolitan data (e.g., cross-tabulated by Federal region) in their reports on National Health Interview and National Medical Care Utilization and Expenditure Surveys. Sometimes, limitations of the way in which the data are collected (e.g., the sample size or frame) limit the extent to which nonmetropolitan data can be displayed. In general, however, survey data files are available for public use and can be analyzed by area.

The choice of definition of "rural" used to present demographic and health data can make a substantive difference. For example, whether a disproportionate number of rural residents are elderly depends on how rural is defined. Table 17 shows the proportion of

**Table 17---Proportion of the Population 65 and Older by Metropolitan/Non metropolitan and Urban/Rural Residence**

Area	U.S. population	Percent age 65 and over
Metropolitan	169,430,577	10.7
Nonmetropolitan	57,115,228	13.0
Urban	167,054,638	11.4
Rural	59,491,167	10.9
Metropolitan		
Urban	145,451,315	10.9
Central cities	67,854,918	11.8
Not central cities	77,596,397	10.2
Rural	23,979,262	9.0
Nonmetropolitan		
Urban	21,603,323	14.3
Rural	35,511,905	12.2

SOURCE: U.S. Department of Commerce, Bureau of the Census, 1980 Census: General Social and Economic Characteristics.

the population aged 65 and older according to metro/nonmetropolitan and urban/rural designations. The elderly appear to make up a larger proportion of the total population in nonmetropolitan than metropolitan areas (13.0 v. 10.7 percent). Using the urban/rural categories, however, the opposite is true--there is a greater proportion of elderly residents in urban than rural areas (11.4 v. 10.9). The explanation of this discrepancy appears to be that there are proportionately more persons 65 and older living in urban nonmetropolitan areas (14.3 percent) and fewer in rural metropolitan areas (9.0 percent). Moreover, when nonmetropolitan county MSA-adjacency and size of the urbanized population are considered, the aged appear to be over-represented in the less urbanized and non-adjacent counties (see table 18).

**Table 18---Proportion of Nonmetropolitan Population Age 65 and Older by Level of Urbanization and Adjacency to an MSA<sup>a</sup> (1980)<sup>b</sup>**

	U.S. Population ( 1,000s)	Percent age 65 and older
U.S. total	226,546	11.2
Metropolitan counties	163,526	10.7
Nonmetropolitan counties	63,020	12.8
Urbanized		
Adjacent to metro area	14,802	11.9
Not adjacent	9,594	11.0
Less urbanized		
Adjacent to intro area	15,350	13.3
Not adjacent	15,529	13.5
Totally rural		
Adjacent to metro area	2,737	13.7
Not adjacent	5,008	14.6

<sup>a</sup>Urbanized counties are those with an urban population of at least 20,000; less urbanized counties are those with an urban population of between 2,500 to 19,999; and totally rural counties are those with no populations of 2,500 or more.

<sup>b</sup>1980 Census information is displayed using the 1970 classification of counties.

SOURCE: D. A., McGranahan, et al., "Social and Economic Characteristics of the Population in Metro and Nonmetro Counties, 1970-80," USDA, ERS, Rural Development Research report 58, appendix, table 2.

Infant mortality is also better understood by looking beyond metropolitan/nonmetropolitan comparisons. Department of Health and Human Services (DHHS) publishes data on infant mortality for urban and "not urban" places within metropolitan and nonmetropolitan counties (nonmetropolitan urban places are defined as those with populations of 10,000 or more).<sup>1</sup> Table 19 shows that within U.S. nonmetropolitan areas (1985-1986), white infant mortality rates were *lower* in nonurban places than in urban places (9.3 versus 9.9). Black infant mortality, in contrast, is *higher* in non urban places (17.8 versus 16.5). In some nonmetropolitan areas (e.g., Alabama), infant mortality is higher in the more rural areas for both whites and blacks (see table 19).

In summary, quite different conclusions about the rural population may be reached by changing the definition of rural areas. Furthermore, important within-area variations are obscured when national data are not published for sub nonmetropolitan areas.

The problem of limited rural data is not a new one for policy makers. In 1981, the National Academy of Sciences addressed the issue in a report, *Rural America in Passage: Statistics for Policy*. A panel on Statistics for Rural Development Policy comprised of agricultural economists, statisticians, geographers, sociologists, and demographers made a number of recommendations to improve the perceived poor availability and quality of rural statistical databases. The panel recommended that the Federal Government "take a more active role in the coordination of statistical activities and in developing and promulgating common definitions and other statistical standards that are appropriate for implementation at the Federal, State, and local levels." The panel concluded that a single definition of "rural" is neither feasible nor desirable but

<sup>1</sup> DHHS defines urban places in USA counties as those with populations of 10,000 or more but less than 50,000. This urban definition differs from the Bureau of the Census definitions of urban or urbanized areas.

**Table 19.--Nonmetropolitan Infant Mortality Rates by Urban Area and Race, U.S. Total and Alabama (1986)**

	Infant mortality rate (no. deaths) (deaths under age 1 per 1,000 births)	
	United States	Alabama
Nonmetropolitan	10.4 (17,926)	12.7 (553)
Urban places <sup>a</sup>	10.8 (4,075)	10.9 (115)
White	9.9 (3,019)	7.4 (47)
Black	16.5 (958)	16.3 (67)
Other	7.1 (98)	7.6 (1)
Balance of area	10.3 (13,851)	13.3 (438)
White	9.3 (10,644)	10.5 (228)
Black	17.8 (2,632)	19.2 (210)
Other	10.7 (575)	.. (0)

<sup>a</sup>Urban places in nonMSA counties are those with populations of 10,000 or more.

SOURCE: Department of Health and Human Services, Public Health Service, Vital Statistics of the U. S.: 1986, 1985, Vol. 1, Natality, Pub. No. 88-1123, 88-1113 (Washington, DC: U.S. Government Printing Office, 1988, 1987); 1986, 1985, Vol. 2, Mortality, Pub. No. 88-1114, 88-1102 (Washington, DC: U.S. Government Printing Office, 1988, 1987).

recommended that data be organized in a building-block approach so that different definitions and topologies could be constructed. The panel recognized the need for a common aggregation scheme for counties. It recommended the development of a standard classification of nonmetropolitan counties related to the level of urbanization. The panel recommended that if possible, the county classification should be supplemented by a distinction between urban and rural areas within counties (13).

The lack of consistent county coding poses difficulties for those interested in developing county-based definitions and topologies. Unique county identifiers called county FIPS (Federal Information Processing Standards) codes are provided by the National Institute of Measurement and Technology

<sup>2</sup> The National Institute of Measurement and Technology was formerly the Bureau of National Standards.

but are not universally used (8). The panel recommended that Federal and State data be recorded with such county codes to permit tabulations for individual counties and groups of counties. Adherence to a county coding system would facilitate aggregation of information regardless of how rural is defined. Since the report was issued in 1981, few of its recommendations have been implemented (8).

The relative merits of the county-based topologies for health service planning and research can be evaluated using the Area Resource File (ARF), a county-level data base maintained by the Health Resources and Services Administration (61). The file contains data necessary for the Bureau of Health Professions to carry out its mandated program of research and analysis of the geographic distribution and supply of health personnel. Population, economic, and mortality data, and measures of health personnel, health education, and hospital resources, are included in the file (61).

The ARF has been used to show how the availability of physician and hospital resources varies by type of nonmetropolitan area (table 20) ( 18). For example, when physician availability is examined by type-of-county, wide variations in physician-to-population ratios are evident. The average physician-to-population ratio is 64 per 100,000 in nonmetropolitan counties<sup>3</sup> but it ranges from 131 per 100,000 in high-density counties to a low of 45 per 100,000 in persistent poverty counties (see table 20). Somewhat surprisingly, there appear to be relatively more physicians in nonadjacent than adjacent nonmetropolitan counties (67 compared to 59 per 100,000). A possible explanation is that physicians serving many of the residents of the adjacent nonmetropolitan counties are

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<sup>3</sup> This analysis was limited to nonmetropolitan counties of less than 50,000 population in 1985. Only physicians engaged in patient care are included.

preferentially locating in the outlying suburban areas of MSAs.

Maps effectively illustrate geographic variation in health status and access to health care resources. U.S. cancer atlases have been published at the county level providing a visualization of geographic patterns of cancer mortality not apparent from tabular data (60).<sup>4</sup> Rural women in the lower socioeconomic classes have high rates of cervical cancer and for white women, maps show concentrations of cervical cancer throughout the South, especially in Appalachia (see figure 6).

Maps of the United States by county show higher death rates due to unintentional injury (e.g., housefires and drownings) and motor vehicle crashes in rural areas, particularly in Western, sparsely populated counties (see figures 7-8). The large volume of travel on major routes traversing rural areas does not account for the high rural death rates. Instead, road characteristics, travel speeds, seat-belt use, types of vehicles, and availability of emergency care are factors that may contribute to the excess of motor vehicle crash deaths in rural areas (3).

Maps of nonmetropolitan county variation in health indicators (e. g., infant mortality) and the distribution of health care resources (e.g., physicians, hospitals) will soon be published in the *Rural Health Atlas*.<sup>5</sup> A typology of rural medical care is being developed for the Atlas, which incorporates measures of access to primary care physicians and health facilities. Such a typology will help identify isolated communities with limited access to health care (35).

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<sup>4</sup> The U.S. Cancer Atlas maps cancer mortality by county groupings called State Economic Areas (SEA). 506 SEAs were delineated by the Bureau of the Census in 1960. SEAs are geographic units with similar demographic, climatic, physiographic, and cultural features (60).

<sup>5</sup> The atlas is scheduled to be published by researchers at the University of North Carolina by October, 1989 (35).

**Table 20.--Characteristics of Different Categories of U.S. Nonmetropolitan Counties (2,092 nonmetropolitan counties of less than 50,000 population in 1985)<sup>8</sup>**

Category (number of counties)	1985 M.D.+ DO/100,000	1986 hospital beds/1,000	1986 hospital days per 1,000	1980 Age over 65	1979 X in poverty
U.S. total (2092)	64.2	5.0	962	14.2	17.6
Urbanized (83)	113.7	6.4	1421	12.5	15.2
Less urban (1239)	71.9	5.5	1081	13.9	16.7
Rural (770)	46.5	4.1	721	15.1	19.3
MSA adjacent (751)	58.6	4.3	858	13.9	16.4
MSA nonadjacent (1341)	67.3	5.4	1021	14.8	18.2
1980 population density					
3 or less (194)	48.9	4.9	<b>838</b>	13.1	17.9
>3 and < 6 (181)	59.2	7.2	1382	14.7	16.5
>6 and < 9 (123)	63.4	6.1	1035	15.9	16.1
>9 and < 50 (1235)	60.5	4.6	858	14.8	18.5
>50 and < 100 (320)	80.5	4.9	1053	12.5	15.7
more than 100 (39)	130.5	7.7	1959	11.4	12.0
East (59)	115.7	5.5	1443	13.5	12.8
South Atlantic (324)	60.7	4.2	<b>866</b>	12.7	20.7
South (624)	54.4	4.3	<b>680</b>	14.8	22.0
Central (799)	64.9	5.9	1193	16.0	14.3
West (286)	75.4	5.1	942	11.5	14.3
Agricultural only (464)	52.2	5.7	1011	16.6	17.1
Agricultural total (680)	49.1	5.1	944	15.9	18.8
Manufacturing only (290)	68.3	4.5	847	13.2	15.2
Manufacturing total (500)	62.4	4.3	824	13.4	16.8
Mining only (97)	61.2	5.1	774	12.2	16.0
Mining total (183)	57.1	4.3	689	11.8	16.5
Federal Lands only (35)	106.8	3.8	698	10.0	12.0
Federal lands total (210)	75.8	3.9	643	11.4	14.8
Government only (75)	76.5	9.9	2382	13.4	18.0
Government total (246)	66.6	7.0	1603	13.2	19.4
Poverty only (41)	45.3	3.4	535	13.5	29.9
Poverty total (238)	43.0	3.3	575	13.6	28.3
Retirement only (140)	79.1	4.5	841	16.9	16.0
Retirement total (420)	67.5	4.0	743	15.6	17.6

<sup>8</sup>282 nonmetropolitan counties with 50,000 or more population were excluded from analyses.

SOURCE: Kindig, D.A., et al., "Nonmetropolitan County Typology and Health Resources;" unpublished manuscript, Dec. 15, 1988.

**Figure 6--- Areas With Cervical Cancer Mortality Rates Significantly Higher Than the U.S. Rate, and in the Highest 10% of all SEA Rates  
(White Females, 1970-1980)**

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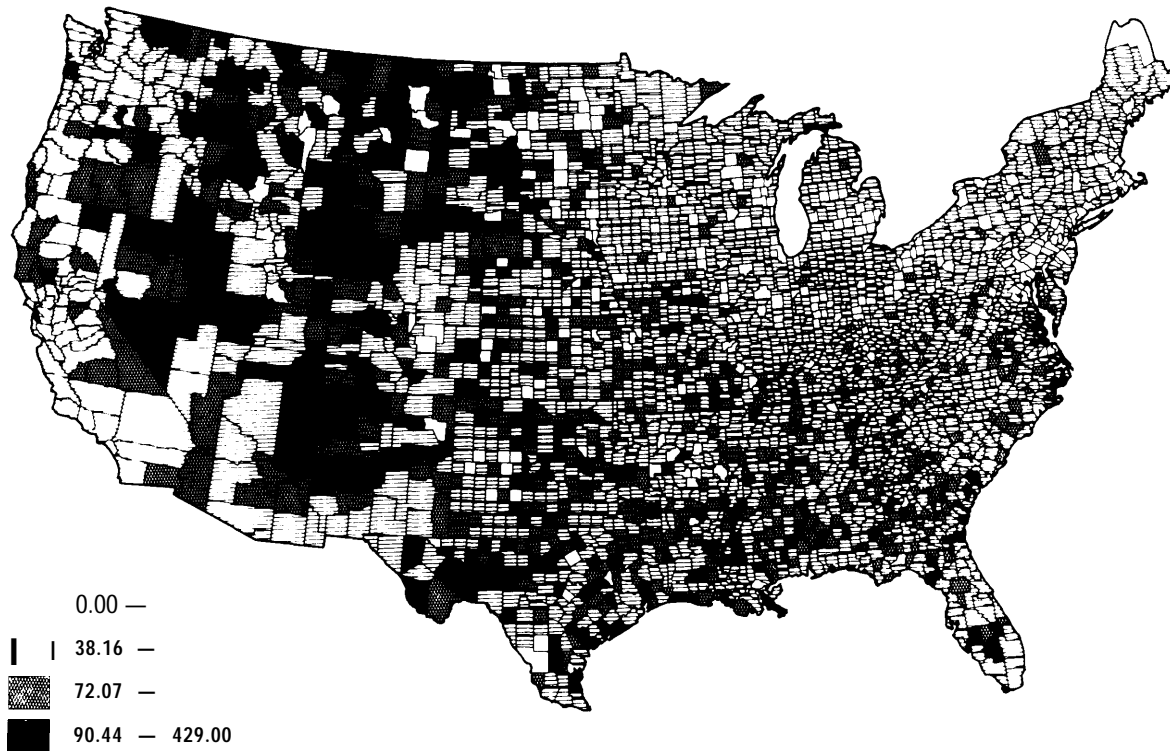


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SOURCE: U.S. Department of Health and Human Services, Public Health Service, National Institutes of Health, Atlas of U.S. Cancer Mortality Among Whites: 1950-1980, DHHS Pub. No. (NIH) 87-2900 (Bethesda, MD: 1987).

Figure 7---Death Rates Due to Unintentional Injury by County

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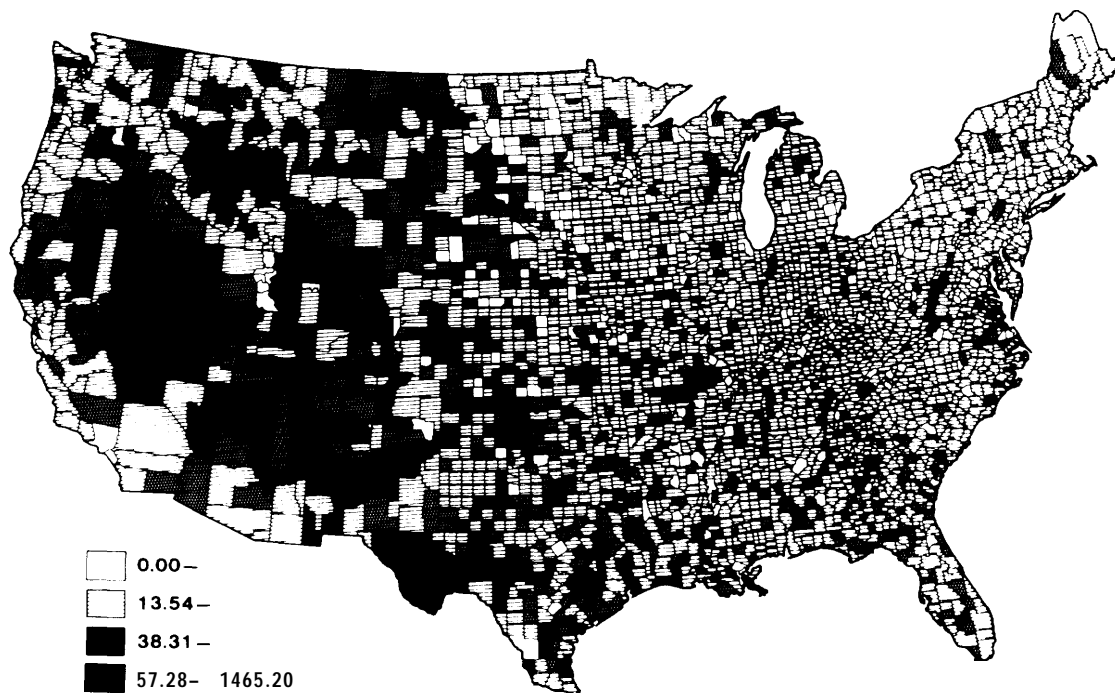


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SOURCE: Baker, S. P., Whitfield, R. A., and O'Neill, B., "County Mapping of Injured Mortality," The Journal of Trauma 28(6):741-745, June 1988.

Figure 8--- Death Rates Due to Motor Vehicle Crashes by County

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SOURCE: Baker, S. P., Whitfield, R.A., and O'Neill, B., "Geographic Variations in Mortality From Motor Vehicle Crashes," *New England Journal of Medicine* 316(22):1384-1387, May 28, 1987.

## 7. USING OMB AND CENSUS DESIGNATIONS TO IMPLEMENT HEALTH PROGRAMS

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There is no uniformity in how rural areas are defined for purposes of Federal program administration and distribution of funds. Even within agencies different definitions maybe used. This may occur when agencies implement programs or policies for which rural areas have been defined legislatively. For example, the MSA/nonMSA designations are used to categorize hospitals as urban or rural areas for purposes of hospital reimbursement under Medicare. On the other hand, in the case of clinics certified under the Rural Health Clinics Act, "rural" is defined as Census Bureau-designated nonurbanized areas. Certified clinics receive cost-based reimbursement from Medicare and Medicaid. These two examples of how the MSA and Census designations are used are described in more detail in the following section. Finally, the definition of "frontier" areas is described as it is used by the Department of Health and Human Services (DHHS).

### Medicare Reimbursement: Using MSAs To Define Urban and Rural Areas

Several geographic designations affect hospital reimbursement under Medicare's prospective payment system (PPS). Different reimbursement rates are calculated for hospitals located in rural, large urban (population of more than a million),<sup>1</sup> and other urban areas. Under PPS, Congress directed the Health Care Financing Administration (HCFA) to define "rural" and "urban" hospitals as those located in nonmetropolitan and metropolitan areas, respectively.<sup>2</sup> On average, urban hospital per-case payments are 40 percent higher than those of rural hospitals

because of differences in urban and rural standardized amounts, average wage and case-mix indexes, and other factors.

Rural hospitals designated as "sole community hospitals" are not subject to the same reimbursement methods as other rural hospitals.<sup>3</sup> These hospitals are "by reason of factors such as isolated location, weather conditions, travel conditions, or absence of other hospitals, the sole source of inpatient hospital services reasonably available in a geographic area to Medicare beneficiaries." An exception is also made for large nonmetropolitan hospitals that serve as "rural referral centers" for Medicare patients. These hospitals are reimbursed at the same rate as urban hospitals (58).

The rural/urban reimbursement differential has not been well-accepted by some hospitals. In some cases, the concerns of nonmetropolitan hospitals have prompted legislators to change the designation of the county in which the hospital is located from nonmetropolitan to metropolitan. The HCFA metropolitan/nonmetropolitan hospital reimbursement standards were modified by the Omnibus Reconciliation Act of 1987.<sup>4</sup> Some hospitals located in nonMSAs were reassigned to the urban (MSA) category. Accordingly, a hospital located in a nonmetropolitan county adjacent to one or more metropolitan area is treated as being in the metropolitan area to which the greatest number of workers in the county commute, if:

- the nonMSA county would otherwise be considered part of an MSA area but for the fact that the nonMSA county does not meet the standard relating to the

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<sup>1</sup> In New Engl and County Metropol i tan Areas (NECMAs), a large urban area includes a population of more than 970,000.

<sup>2</sup> Certain nonmetropolitan New England counties were deemed to be parts of metropol i tan areas for purposes of PPS.

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<sup>3</sup> The prospective payment rates for sole *community* hospitals equal 75 percent of the hospital-specific base payment rate plus 25 percent of the appropriate regional prospective payment rate (58).

<sup>4</sup> Public Law 100-203 Sec. 4005.



rate of commutation between the non MSA county and the central county or counties of any adjacent MSA; and

- either 1) the number of residents of the non MSA county who commute for employment to the central county or counties of any adjacent MSA is equal to at least 15 percent of the number of residents of the nonMSA county who are employed; or 2) the sum of the number of residents of the nonMSA county who commute for employment to the central county or counties of any adjacent MSA and the number of residents of any adjacent MSA who commute for employment to the nonMSA county is at least equal to 20 percent of the number of residents of the nonMSA county who are employed.

Thirty-nine non MSA counties meet these standards (53 FR 38498).

Some hospitals dissatisfied with the rural/urban reimbursement differential have resorted to lawsuits in order to receive urban rates. For example, 28 hospitals in Missouri nonMSAs have sued DHHS, contending that MSA designations are not related to the costs of providing medical care and that DHHS underpays for the services provided to Medicare patients. Under the current regulations, a hospital in Jefferson City, for example, is paid less than a hospital in Columbia 30 miles away, because the first hospital is located outside an MSA ( 15). The National Rural Health Association has filed a class action suit against DHHS, charging that rural hospitals' Fifth Amendment rights to due process are being violated on two counts related to "unreasonably low reimbursement for rural hospitals" (16).

In a congressionally mandated study, DHHS examined the feasibility and impact of phasing out or eliminating separate urban and rural payment rates, retaining regional or hospital-specific rates, refining the wage index, and other alternatives to separate urban/rural rates (58). The study suggests that

the PPS formula should be refined so that continuous measures are used to adjust a single reimbursement rate. HCFA is examining the feasibility of using severity measures as a more sensitive alternative to geographically based separate rates (65).

The Prospective Payment Assessment Commission (ProPAC), a body formed to make recommendations to the Congress on PPS, has stated that before it can make a recommendation to either maintain or eliminate separate urban and rural rates, it must better understand why there is an approximate 40 percent difference in average Medicare cost per case between urban and rural hospitals. This cost difference was present when the PPS rates were first established and has persisted through at least the first three years of PPS. The PPS rural/urban payment differential reflects poorly understood geographic practice pattern variations that cannot be attributed to measurable differences in patient characteristics, quality of care, or market area features. The issue is complicated by the unknown relationship between practice pattern variations, revenues, costs, and quality (34).

#### **Defining Rural Labor Market Areas ---**

The PPS formula includes a wage index adjustment that takes into account geographic differences in labor costs. A different wage index is applied to urban and rural labor market areas. Labor market areas are rather precisely defined for urban areas--each MSA is defined as a labor market area. In contrast, there is one rural labor market area defined for each State, which includes all nonMSA counties in that State.

Recognizing wide variation in hospital wage levels within these broadly defined labor markets, ProPAC has recommended that rural hospital labor market areas be redefined to distinguish between urbanized rural counties and other rural counties within each State. Accordingly, urbanized rural counties would be defined as counties with a city or town having a population of 25,000 or great-

er<sup>5</sup>(33). Analyses of 1982 data show average hospital wages in State's "urbanized rural counties" to be 8.5 percent higher than wages in "other rural counties" (\$7.54 v. \$6.95) (32). DHHS asserts that wage differentials are already taken into account to some degree through other PPS adjustments (i.e., the indirect medical education and disproportionate share adjustments) and the special treatment for rural referral centers (53 FR 38498).

ProPAC has also recommended (31,32,33) that definitions of urban hospital labor market areas be modified to include a distinction between an MSA's central urban and outlying areas. They suggest that urbanized areas within an MSA, as defined by the Bureau of the Census, could be distinguished from nonurbanized areas. DHHS has rejected this proposal, in part because of the difficulty of assigning a hospital to an urbanized area, the boundaries of which are defined below the MSA level. Determining whether or not a hospital is inside or outside of an urbanized area involves pinpointing the hospital location in terms of the smallest units of Census geography (the block or block group). In a study conducted for ProPAC ( 1), a process is described whereby the location of a hospital can be specified in terms of Census geography and then mapped to urbanized area boundaries. According to DHHS, however, defining labor markets below the county level would be confusing and difficult to administer.

#### The Rural Health Clinics Act

Ambulatory services can be reimbursed on an at-cost basis by Medicare and Medicaid if facilities and providers meet certification requirements of the Rural Health Clinics Act (Public Law 95-210). To be certified, a practice must be located in a rural area that is designated either as a health manpower

shortage area (HMSA) or a medically underserved area (MUA). The practice must use a mid-level practitioner (physician assistant or nurse practitioner) at least 60 percent of the time that the practice is open. There has been renewed interest in this Act following an increase in the ceiling of reasonable costs reimbursed by Medicare and Medicaid programs. The payment cap is indexed to the Medicare Economic Index (36).<sup>6</sup>

Rural areas, for purposes of the Rural Health Clinics Act, are "areas not delineated as urbanized areas in the last census conducted by the Census Bureau." Nonurbanized areas encompass a larger area than either the non MSA or Census-defined rural areas. Therefore, Rural Health Clinics can be located within an MSA (see figure 3) or in a nonMSA town with a population of 2,500 or more (such a town is urban according to the Census Bureau).

In summary, for purposes of hospital reimbursement under Medicare, the MSA designation is used (with certain specific exceptions) to distinguish urban from rural hospitals. Persistent MSA/nonMSA hospital cost differences have been noted since the PPS rates were first established, but it is likely that MSA location is an indirect measure of hospital cost. Hospital-specific measures are being sought to replace the MSA adjustment in the PPS formula.

Geographic designations are also used to define urban and rural labor market areas. Dissatisfaction with having only one rural labor market area per State (i.e., one labor market for all non MSA counties) has led ProPAC to recommend two labor market areas for nonMSA counties. They have suggested recognizing as urbanized, nonMSA counties with a city or town with a population of 25,000 or greater (33). The average

<sup>5</sup> This definition of an urbanized rural county should not be confused with the Bureau of the Census definition of an urban or urbanized area.

<sup>6</sup> These changes to the Rural Health Clinics Act were contained in the Budget Reconciliation Act of 1987.

hospital wage is 8.5 percent higher in urbanized rural counties than in nonurbanized rural counties (32). There are less than 125 nonMSA towns with 25,000 or more population, so few of the 2,393 nonMSA counties would be classified as urbanized (49). In fact, this distinction would create only 37 new areas (32).

Although HCFA has chosen not to use urbanized areas to refine labor market areas, HCFA does use urbanized area designations when certifying hospitals and clinics under the Rural Health Clinic Act. Rural Health Clinics must be located in nonurbanized areas that are designated as either a health manpower shortage area or a medically undeserved area. This liberal interpretation of "rural" (e. g., it includes some areas within MSAs) seems appropriate, given the requirement that the area must also be medically undeserved. This allows some medically undeserved areas within MSAs--but isolated from an urbanized area by factors other than distance--to be certified.

#### Providing Services in "Frontier" Areas

Health services may be difficult to provide in large, sparsely populated areas. Areas with a population density of 6 persons per square mile or less, called "frontier" areas, are common West of the Mississippi river (30) (figure 9). In 1980, by this definition, there were at least 378 frontier counties with a total population of nearly 3 million persons (42). It may take an hour or more for residents of frontier areas to reach health providers and facilities. Frontier physicians tend to be generalists, solely responsible for a large service area, and have limited access to hospitals and health care technology (11). Recognizing the unique characteristics of frontier areas,<sup>7</sup> DHHS in early 1986 agreed to use different criteria to evaluate Community

<sup>7</sup> The Frontier Task Force of the National Rural Health Association (established in 1985) was instrumental in documenting the unique health care needs of rural areas (63).

Health Center (CHC) grantees (and new applicants for CHC support) and National Health Service Corps sites.<sup>8</sup> Frontier areas were defined as (59):

Those areas located throughout the country which are characterized by a small population base (generally 6 persons per square mile or fewer) which is spread over a considerable geographic area.

To be eligible for Bureau of Health Care Delivery and Assistance (BHCDA) support as a frontier area, the following service area criteria must be met (59):<sup>9</sup>

**Service Area:** a rational area in the frontier will have at least 500 residents within a 25-mile radius of the health services delivery site or within the rationally established trade area. Most areas will have between 500 to 3,000 residents and cover large geographic areas.

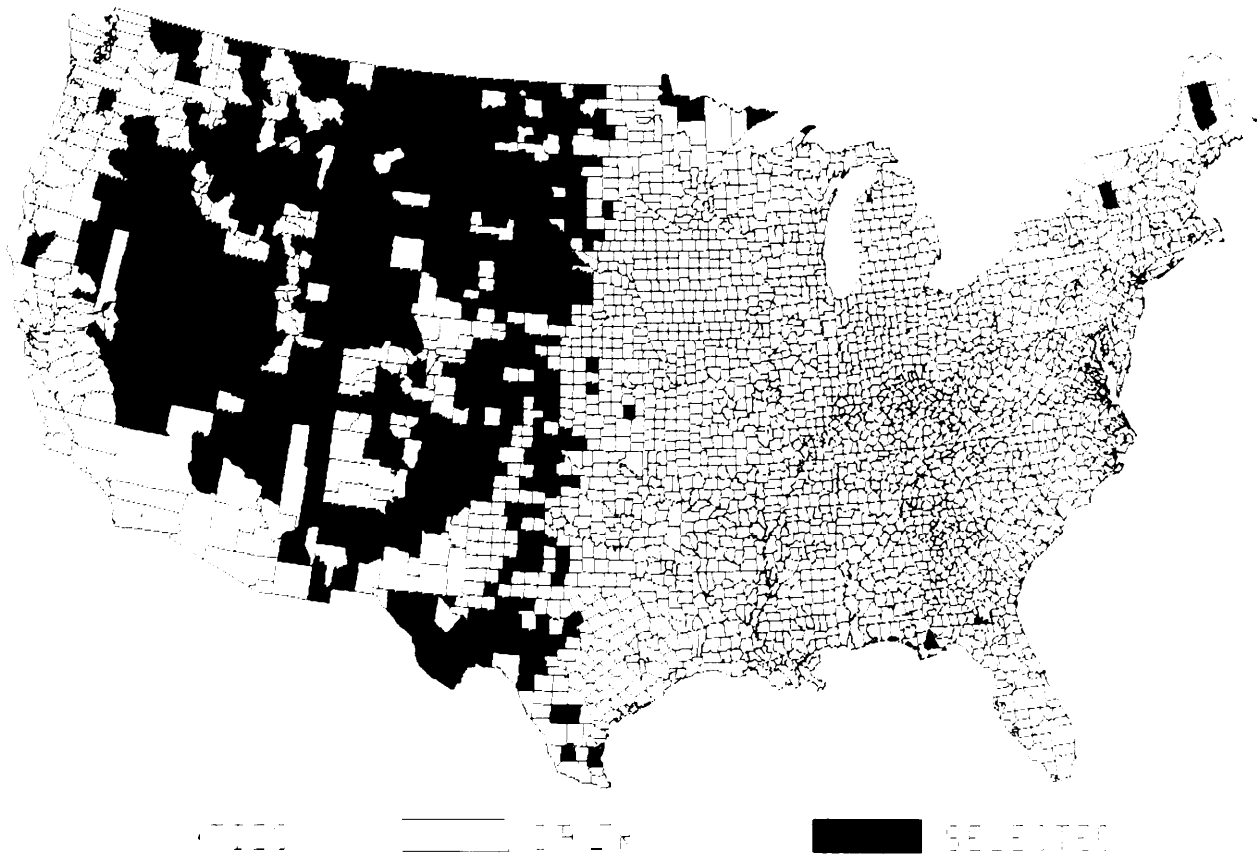
**Population Density:** the service area will have six or fewer persons per square mile.

**Distance:** the service area will be such that the distance from a primary care delivery site within the service area to the next level of care will be more than 45 miles and/or the average travel time more than 60 minutes. When defining the "next level of care," we are referring to a facility with 24-hour emergency care, with 24-hour capability to handle an emergency caesarean section or a patient having a heart attack and some specialty mix to include at a minimum, obstetric, pediatric, internal medicine, and anesthesia services.

<sup>8</sup> The 1988 authorizing legislation for Public Health Service programs of assistance for primary health care included recommendations for DHHS to support primary health care planning, development, and operations in frontier areas (46).

<sup>9</sup> If the eligibility criteria are not strictly met, an organization may justify any unusual circumstances which may qualify them as frontier, for example, geography, exceptional economic conditions, or special health needs (59).

Figure 9--- Frontier Counties: Population Density of 6 or Less



SOURCE: U.S. Department of Health and Human Services, Public Health Service, Health Resources and Services Administration, Bureau of Health Professions, Office of Data and Management, Area Resource File, June 16, 1986.

Some State Health Departments have had trouble identifying service areas meeting these criteria (26). Whole counties can be identified as frontier areas on the basis of population density, but available sub-county geographic units are sometimes inadequate for identifying health service areas. Population data from the 1980 Census are available for sub-county areas such as Census County Divisions (CCDs), and Enumeration Districts (EDs) (see appendix D) but these areas can be large and may not represent a rational health service area.<sup>10</sup> ZIP Codes<sup>11</sup> may be aggregated to form a rational service area, but this poses some technical difficulties (19). Following the 1990 Census, Block Numbering Areas will be available for all nonurbanized areas (see appendix D.--1980 Census geography).<sup>12</sup>

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10 Some States have defined primary care service areas (e. g., New York).

11 population data from the Census are available by ZIP Code. Some investigators have used ZIP Code-level census data to describe three types of rural area based upon density within zip code: semi-rural (density of 16 to 30 per square mile); rural (density 6 to 15 per square mile); and frontier (density less than 6 per square mile) (10).

12 In 1980, Block Numbering Areas were only available for nonurbanized places with over 10,000 population.

It is useful to distinguish frontier area counties with evenly distributed small settlements from counties with one or two large population settlements and large areas with little or no settlement. For example, the health service needs of two frontier counties in New Mexico with similar population densities differ because of the way the populations are distributed. One county has a total population of approximately 8,000, of whom about 6,000 live in one town. In contrast, the other county has a total population of 2,500 living in six widely dispersed towns. If suitable sub-county areas were available, the Hoover Index, which measures population concentration or dispersion, could be used to distinguish between these counties. An automated geographic information system called TIGER (Topologically Integrated Geographic Encoding and Referencing System) has been developed<sup>13</sup> that will enhance the ability to conduct spatial analyses of population data from the 1990 decennial census (23).

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13 TIGER has been developed jointly by the U.S. Geological Survey and the U.S. Bureau of the census.

The concepts of "rural" and "urban" exist as part of a continuum, but Federal policies generally rely on dichotomous urban/rural differences based on designations of the Office of Management and Budget (OMB) or the Bureau of the Census. OMB's MSA designation includes a large population center and adjacent counties that have a high degree of economic and social integration with that center. Census' urban areas include densely settled "urbanized areas" plus places with populations of 2,500 or more outside of urbanized areas. "Rural" areas are designated by exclusion: i.e., those areas not classified as either MSA or urban. About one-quarter of the U.S. population resides in nonMSAs and Census' rural areas. The identified populations are different but overlapping. Forty percent of the 1980 Census' rural population lived in MSAs, and 14 percent of the MSA population lived in rural areas.

"Nonmetropolitan area," "rural area," and "nonurbanized area" have all been used to display vital and health statistics or to implement Federal policies. These "rural" definitions can be analyzed in terms of how well they include "rural areas" and how well they exclude "urban areas." For example, we intuitively associate farming with "rural" but about one-fourth of farm residents live in MSAs (55). Some might argue that isolated towns with just over 2,500 residents are inappropriately excluded from the Census' rural definition. Others may argue that when non-MSAs are defined as rural, over 100 towns with populations of 25,000 or more are inappropriately included. Moreover, when MSAs are used to define "urban" in spatially large counties, small towns that are far from an urbanized area are inappropriately called urban.

Dichotomous measures of urbanity/rurality obscure important differences between urban and rural areas and wide variations within a rural area. Consequently, there

have been recommendations to implement a standard rural typology that would capture the elements of rural diversity and improve use and comparison of data. Nine county-based rural/urban topologies or classification schemes that incorporate one or more of the following measures are reviewed in this paper: population size and density; proximity to and relationship with urban areas; degree of urbanization; and principal economy. While a standard typology may seem desirable, it will be difficult to arrive at, because the different topologies are designed and have merit for various purposes, some of which conflict.

For purposes of health services planning and research, a typology based on largest settlement size is useful, because the level of available health resources is likely to be related to the size of a city. In spatially small counties, large settlements are likely to be quite accessible to all county residents. In the West, however, counties can be several times as large as in the East, and some measure of proximity would be useful. A measure of population concentration and dispersion, or distance to a large settlement, could serve as an indicator of access to those services. Of the topologies reviewed in this paper, the one likely to best measure both level of and **access to services is a** typology that incorporates a county's largest settlement and the county's adjacency to an MSA. Other topologies that categorize counties according to employment and commuting patterns could be used to refine the definition of labor market areas, an important component of the Medicare prospective payment system (PPS) formula.

Rural areas are not defined uniformly for purposes of Federal program administration or distribution of funds. Different designations may, in fact, be used by the same agency. For example, Congress has directed the Health Care Financing Adminis-

tration to use OMB's MSA designations to categorize hospitals as urban or rural for purposes of hospital reimbursement under Medicare, but to use Census' nonurbanized area designation to certify health facilities under the Rural Health Clinics Act.

The relative merits of county-based topologies for particular applications can be evaluated by using the Area Resource File (ARF), a county-level data base maintained by the Health Resources and Services Administration. In addition, visual aids such as maps can effectively serve as an analytic device to illustrate geographic variation in health status and access to health care resources and could further the development and evaluation of topologies. In the spatially

large Western counties, sub-county geographic units need to be employed to help identify health service areas with special characteristics such as those that are 'frontier' (i.e., have 6 or fewer persons per square mile).

The choice of definition for "rural" that is used to present demographic and health data can make a substantive difference. For example, whether a disproportionate number of rural residents are elderly depends on how rural is defined. Furthermore, wide variations in health status indicators within non-metropolitan areas will not be apparent unless nonmetropolitan data are disaggregate by region, urbanization, proximity to urban areas, or other relevant factors.

# APPENDIX A: SUMMARY OF THE STANDARDS FOLLOWED IN ESTABLISHING METROPOLITAN STATISTICAL AREAS

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This statement summarizes in nontechnical language the official standards for designating and defining metropolitan statistical areas. It omits certain exceptions and unusual situations that are covered in the standards themselves or in the detailed statement of the procedures followed in applying the standards.

## Population Size Requirements for Qualification (Section 1)

To qualify for recognition as a metropolitan statistical area, an area must either have a city with a population of at least 50,000 within its corporate limits, or it must have a U.S. Bureau of the Census urbanized area of at least 50,000 population, *and* a total metropolitan statistical area population of at least 100,000. A few metropolitan statistical areas that do not meet these requirements are still recognized because they qualified in the past under standards that were then in effect.

The Census Bureau defines urbanized areas according to specific criteria, designed to include the densely settled area around each large city. An urbanized area must have a population of at least 50,000. The urbanized area criteria define a boundary based primarily on a population density of at least 1,000 persons per square mile, but also include some less densely settled areas within corporate limits, and such areas as industrial parks, railroad yards, golf courses, and so forth, if they are adjacent to dense urban development. The density level of 1,000 persons per square mile corresponds approximately to the continuously built-up area around the city, for example, as it would appear in an aerial photograph.

Typically, the entire urbanized area is included within one metropolitan statistical area; however, the metropolitan statistical area is usually much larger in areal extent than the urbanized area, and includes terri-

tory where the population density is less than 1,000 persons per square mile.

## Central County(ies) (Section 2)

Every metropolitan statistical area has one or more central counties. These are the counties in which at least half the population lives in the Census Bureau urbanized area. There are also a few counties classed as central even though less than half their population lives in the urbanized area because they contain a central city (defined in Section 4), or a significant portion (with at least 2,500 population) of a central city.

## Outlying Counties (Section 3)

In addition to the central county(ies), a metropolitan statistical area may include one or more outlying counties. Qualifications an outlying county requires a significant level of commuting from the outlying county to the central county(ies), and a specified degree of "metropolitan character." The specific requirements for including an outlying county depend on the level of commuting of its resident workers to the central county(ies), as follows:

1. Counties with a commuting rate of 50 percent or more must have a population density of at least 25 persons per square mile.
2. Counties with a commuting rate of 40 to 50 percent can qualify if they have a density of at least 35 persons per square mile.
3. Counties with a commuting rate of 25 to 40 percent typically qualify through having either a density of at least 50 persons per square mile, or at least 35 percent of their population classified as urban by the Bureau of Census.
4. Counties with a commuting rate of 15 to 25 percent must have a density of at least 50 persons per square mile, and in



**addition must meet two of the following four requirements:**

- the population density must be at least 60 persons per square mile;
- at least 35 percent of the population must be classified as urban;
- population growth between 1970 and 1980 must be at least 20 percent; and
- a significant portion of the population (either 10 percent or at least 5,000 persons) must live within the urbanized area.

There are also a few outlying counties that qualify for inclusion in a metropolitan statistical area because of heavy commuting from the central county (ies) to the outlying county, or because of substantial total commuting to and from the central counties.

#### **Central Cities (Section 4)**

Every metropolitan statistical area has at least one central city, which is usually its largest city. Smaller cities are also identified as central cities if they have at least 25,000 population and meet certain commuting requirements.

In certain smaller metropolitan statistical areas there are places between 15,000 and 25,000 population that also qualify as central cities, because they are at least one-third the size of the metropolitan statistical area's largest city and meet commuting requirements.

Most places that qualify as central cities are legally incorporated cities. It is also possible for a town in the New England States, New York, or Wisconsin, or a township in Michigan, New Jersey, or Pennsylvania to qualify as a central city. The town or township must, however, be recognized by the Bureau of the Census as a "census designated place" on the basis of being entirely urban in character, and must also meet certain population size and commuting requirements.

#### **Consolidating or Combining Adjacent Metropolitan Statistical Areas (Sections 5 and 6)**

These two sections specify certain conditions under which adjacent metropolitan statistical areas defined by the preceding sections are joined to form a single area. Section 5 consolidates adjacent metropolitan statistical areas if their commuting interchange is at least 15 percent of the number of workers living in the smaller of the two areas. To be consolidated under Section 5, each of the metropolitan statistical areas must also be at least 60 percent urban, and the total population of the consolidated metropolitan statistical area must be at least a million.

Section 6 provides for combining as a single metropolitan statistical area those adjacent metropolitan statistical areas whose largest cities are within 25 miles of each other, unless there is strong evidence, supported by local opinion, that they do not constitute a single area for general social and economic purposes.

#### **Levels (Section 7)**

This section classifies the prospective metropolitan statistical areas defined by the preceding sections into four categories based on total population size: Level A with a million or more; Level B with 250,000 to a million; Level C with 100,000 to 250,000; and Level D with less than 100,000.

Under this section, the metropolitan statistical areas in Levels B, C, and D (those with a population of less than 1 million) receive final designation as metropolitan statistical areas.

#### **Area Titles (Section 8)**

This section assigns titles to the metropolitan statistical areas defined by the preceding sections.

### **Primary and Consolidated Metropolitan Statistical Areas (Sections 9 through 11)**

Within the metropolitan statistical areas classified as Level A, some areas may qualify for separate recognition as primary metropolitan statistical areas. A primary metropolitan statistical area is a large urbanized county, or cluster of counties, that demonstrates very strong internal economic and social links, in addition to close ties to the other portions of the Level A metropolitan statistical area.

Section 9 through 11 provide a framework for identifying primary metropolitan statistical areas within metropolitan statistical areas of at least 1 million population. A metropolitan statistical area in which primary metropolitan statistical areas have been identified is designated a consolidated metropolitan statistical area.

### **Metropolitan Statistical Areas in New England (Sections 12 through 14)**

These sections provide the basic standards for defining metropolitan statistical areas in New England.

Qualification for recognition as a metropolitan statistical area in New England is on much the same basis as in the other States. A few modifications in the standards are necessary because cities and towns are used for the definitions. In New England each Census Bureau urbanized area of at least 50,000 normally has a separate metropolitan statistical area, provided there is a total metropolitan statistical area population of at least 75,000 or a central city of at least 50,000. The total metropolitan statistical area population requirement is lower than the 100,000 required in the other States because the New England cities and towns used in defining metropolitan statistical areas are much smaller in areal extent than the counties used for the definitions in the other States. This makes it possible to define New England metropolitan statistical areas quite precisely on the basis of

population density and commuting.

For users who prefer definitions in terms of counties, a set of New England County Metropolitan Areas is also officially defined. However, the official metropolitan statistical area designations in New England apply to the city-and-town definitions.

In order to determine the cities and towns which could qualify for inclusion in a New England metropolitan statistical area, section 12 defines a *central core* for each New England urbanized area, consisting essentially of cities and towns in which at least half the population lives in the urbanized area or in a contiguous urbanized area.

Once the central core has been defined, Section 13 reviews the adjacent cities and towns for possible inclusion in the metropolitan statistical area. An adjacent city or town with a population density of at least 100 persons per square mile is included if at least 15 percent of its resident workers commute to the central core. Towns with a density between 60 and 100 persons per square mile also qualify if they have at least 30 percent commuting to the central core. However, the commuting to the central core from the city or town must be greater than to any other central core, and also greater than to any nonmetropolitan city or town.

If a city or town has qualifying commuting in two different directions (e.g., to a central core and to a nonmetropolitan city) and the commuting percentages are within five points of each other, local opinion is solicited through the appropriate congressional delegation before assigning the city or town to a metropolitan statistical area. Some New England communities also qualify for inclusion in a metropolitan statistical area on the basis of reverse commuting or total commuting.

Once the qualifying outlying towns and cities have been determined, Section 14 qualifies the resulting area as a metropolitan statistical area provided it has a city of at

least 50,000 or a total population of at least 75,000. This section also specifies that several of the standards used in the other States are also applied to the New England States:

1. The central cities of each area are determined by Section 4.
2. Two adjacent New England metropolitan statistical areas may be consolidated under Section 5.
3. New England areas are categorized into levels according to Section 7A. Those in Levels B, C, and D are given final designation as metropolitan statistical areas, and are assigned titles according to Section 8.

**Primary and Consolidated Metropolitan Statistical Areas in New England (Sections 15 and 16)**

Section 15 is used to review each Level A metropolitan statistical area in New England for the possible identification of primary

metropolitan statistical areas. It follows the same general approach as is used for identifying such areas outside New England (Section 9). Finally, Section 16 provides that level and titles for New England primary and consolidated metropolitan statistical areas are determined by much the same standards as for the remaining States.

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Note: OMB is reviewing the **MSA standards and will publish them with some revisions before Apr. 1, 1990 (12).**

SOURCE: Excerpt from "The Metropolitan Statistical Area Classification: 1980 Official Standards and Related Documents," The Federal Committee on Standard Metropolitan Statistical Areas.

## APPENDIX B: THE CENSUS BUREAU'S URBANIZED AREA DEFINITION

The major objective of the Census Bureau in delineating urbanized areas is to provide a better separation of urban and rural population and housing in the vicinity of large cities. An urbanized area consists of a central city or cities and surrounding closely settled territory or "urban fringe."

There are 366 urbanized areas delineated in the United States for the 1980 census. There are seven urbanized areas delineated in Puerto Rico.

The following criteria are used in determining the eligibility and definition of the 1980 urbanized areas.<sup>1</sup>

An urbanized area comprises an incorporated place<sup>2</sup> and adjacent densely settled surrounding area that together have a minimum population of 50,000.<sup>3</sup> The densely settled surrounding area consists of:

1. Contiguous incorporated places or census-designated places having:
  - a population of 2,500 or more; or
  - a population of fewer than 2,500 but having either a population density of 1,000 persons per square mile, closely settled area containing a minimum of 50 percent of the population, or a cluster of at least 100 housing units.
2. Contiguous unincorporated area which is connected by road and has a popula-

tion density of at least 1,000 persons per square mile.<sup>4</sup>

3. Other contiguous unincorporated area with a density of less than 1,000 persons per square mile, provided that it:
  - eliminates an enclave of less than 5 square miles which is surrounded by built-up area;
  - closes an indentation in the boundary of the densely settled area that is no more than 1 mile across the open end and encompasses no more than 5 square miles; and
  - links an outlying area of qualifying density, provided that the outlying area is:
    - connected by road to, and is not more than 1½ miles from, the main body of the urbanized area; and
    - separated from the main body of the urbanized area by water or other undevelopable area, is connected by road to the main body of the urbanized area, and is not more than 5 miles from the main body of the urbanized area.
4. Large concentrations of nonresidential urban area (e.g., industrial parks, office areas, and major airports), which have at least one-quarter of their boundary contiguous to an urbanized area.

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<sup>1</sup>All references to population counts and densities relate to data from the 1980 census.

<sup>2</sup>In Hawaii, incorporated places do not exist in the sense of functioning local governmental units. Instead, census-designated places are used in defining a central city and for applying urbanized area criteria.

<sup>3</sup>The rural portions of extended cities, as defined in the Census Bureau's extended city criteria, are excluded from the urbanized area. In addition, for an urbanized area to be recognized, it must include a population of at least 25,000 that does not reside on a military base.

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<sup>4</sup>Any area of extensive nonresidential urban land use, (e.g., railroad yards, airports, factories, parks, golf courses, and cemeteries) is excluded in computing the population density.

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Note: The Census Bureau is reviewing the urbanized area rules and will publish them with some revisions by 1990.






SOURCE: Excerpt from 1980 *Census of Population Vol. 1, Characteristics of the Population*, Appendix A. Area Classifications.

## CENSUS GEOGRAPHY-CONCEPTS

### INTRODUCTION

It is important for anyone using census data to be aware of the geographic concepts involved in taking the census and allocating the statistics to States, counties, cities, and smaller areas down to the size of a city block. Preparing for and taking a census also results in a number of geographic tools or products that are helpful to the data user as well as to the Census Bureau, in activities such as computerized location coding, mapping, and graphic display. They also allow users to interrelate local and census statistics for a variety of planning and administrative purposes. This Factfinder explains the Census Bureau's geographic concepts and products.

Except where noted, the definitions and references below are those used for the 1980 Census of Population and Housing. Figure 10 on page 6 summarizes the geographic areas for which data are available from other Bureau censuses and surveys.

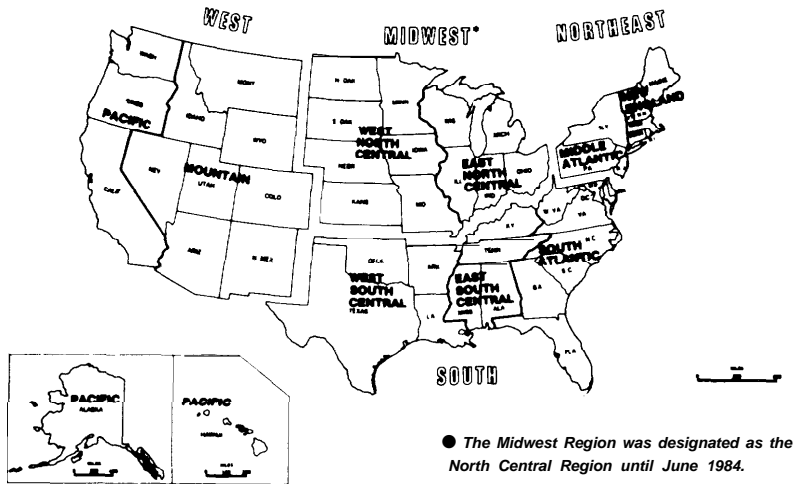
Data summaries are presented in printed reports , microfiche , and computer tapes  and flexible diskettes , based on tabulations for the geographic and statistical levels discussed below. Maps  are also available. The symbols ● and +, keyed to the legend on page 3, indicate how to obtain the items described in this brochure.

### REPORTING AREAS

There are a number of basic relationships, illustrated below, among the geographic areas the Census Bureau uses as "building blocks" in its reports. Some of the areas are governmental units, i.e., legally defined entities, while other areas are defined specifically for statistical purposes. (The statistical areas are italicized in the diagrams; all others are governmental.)

- **United States**-The 60 States and the District of Columbia. (Data also are collected separately for Puerto Rico and the outlying areas under U.S. sovereignty or jurisdiction.)
- **Regions/divisions**-There are four Census regions defined for the United States, each composed of two or more geographic divisions. The nine divi-

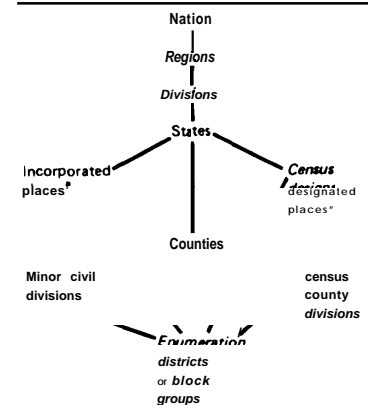
Figure 1. CENSUS REGIONS AND GEOGRAPHIC DIVISIONS OF THE UNITED STATES



sions are groupings of States. (See fig. 1.)

- **Governmental units of the Nation**—States (50) and the District of Columbia  
Counties and their equivalents (3,139, plus 78 in Puerto Rico)  
Minor civil divisions (MCD's) of counties, such as towns and townships (approximately 25,000)  
Incorporated places (about 19,100), e.g., cities and villages
- **census county divisions (CCD's)**-In 20 States where MCD's are not adequate for reporting subcounty census statistics, Bureau and local officials delineated 5,512 CCD's (plus 37 census subareas in Alaska) for this purpose.
- **Census designated places (CDP's)**—Formerly referred to as "unincorporated places," CDP's (about 3,500) are closely settled population centers without legally established limits, delineated with State and local assistance for statistical purposes, and generally have a population of at least 1,000.

Figure 2. NATIONAL GEOGRAPHIC RELATIONSHIPS



Note that places (incorporated and census designated) are not shown within the county and county subdivision hierarchy, since places may cross the boundaries of these areas. A few census reports and tape series do show places within MCD or CCD within county, but in these cases data pertain only to that part of a place which is within a Particular higher-level area. Enumeration district and block-group summaries do recognize place boundaries, making ED's and BG's important as the lowest common denominator for the higher-level entities.

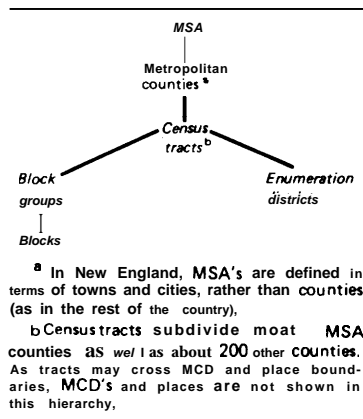
- Census tracts—These statistical subdivisions of counties (approximately 43,350, including 463 in Puerto Rico), average 4,000 inhabitants. They are delineated (subject to Census Bureau standards) by local committees for metropolitan areas and roughly 200 other counties.
- Blocks—Generally bounded by streets and other physical features, blocks (approximately 2.5 million) are identified (numbered) in and adjacent to urbanized areas, most incorporated places of 10,000 or more population, and other areas that contracted with the Census Bureau to collect data at the block level. (Fig. 8 illustrates the extent of block-statistics coverage in part of a State.) Five States are completely block-numbered.
- Block-numbering areas (BNA's)—Areas (approximately 3,400, including over 100 in Puerto Rico) defined for the purpose of grouping and numbering blocks where census tracts have not been established.
- Block groups (BG's)—Subdivisions of census tracts or BNA's, BG's (about 200,000) comprise all blocks with the same first digit in a tract or BNA. Averaging 900 population, BG's appear in areas with numbered blocks in lieu of ED's (see below) for tabulation purposes.
- Enumeration districts (ED's)—An ED is a Bureau administrative area assigned to one census enumerator. ED's (about 100,000 nationwide) were used for census tabulation purposes where census blocks were not numbered. ED size varies considerably, but averages 500 inhabitants.

**Metropolitan Areas**

- Standard metropolitan statistical areas (SMSA's)—An SMSA (defined by the Office of Management and Budget) comprised one or more counties around a central city or urbanized area with 50,000 or more inhabitants. Contiguous counties were included if they had close social and economic links with the area's population nucleus. There were 323 SMSA's, including 4 in Puerto Rico.
- Standard consolidated statistical areas (SCSA's)—SCSA's (17, including 1 in Puerto Rico) were composed of two or more adjacent SMSA's having a combined population of 1 million or more, and with close social and economic links.

After the relationships between central urban core(s) and adjacent counties were

Figure 3. GEOGRAPHIC RELATIONSHIPS IN AN MSA



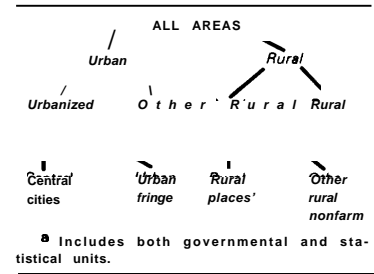
analyzed on the basis of the 1980 population census and a revised set of criteria, these areas were redefined and the word "standard" was dropped from the titles. Thus, on June 30, 1983, SMSA's and SCSA's were redesignated as

- Metropolitan statistical areas (MSA's)
- Consolidated MSA's (CMSA's) and
- Primary MSA (PMSA's)

As the 1982 Economic Censuses covered calendar year 1982, prior to the June 1983 date for adopting the changes, the 1982 SMSA and SCSA designations and nomenclature were retained for those censuses. Some data from the 1980 Census of Population and Housing were retabulated by MSA and issued in special reports, and the new definitions were used in preparing population and migration estimates and in presenting current statistics from 1983 onward.

- Urbanized areas (UA's)—A UA (them are 373, including 7 in Puerto Rico) consists of a central city and surrounding densely settled territory with a combined population of 50,000 or more inhabitants. (See fig. 5)
- Metropolitan/nonmetropolitan—"Metropolitan" includes all population within MSA's; "nonmetropolitan" comprises everyone elsewhere.
- Urban/rural—The urban population consists of all persons living in urbanized areas and in places of 2,500 or more inhabitants outside these areas. All other population is classified as rural. The urban and rural classification cuts across the

Figure 4. URBAN/RURAL GEOGRAPHIC RELATIONSHIPS



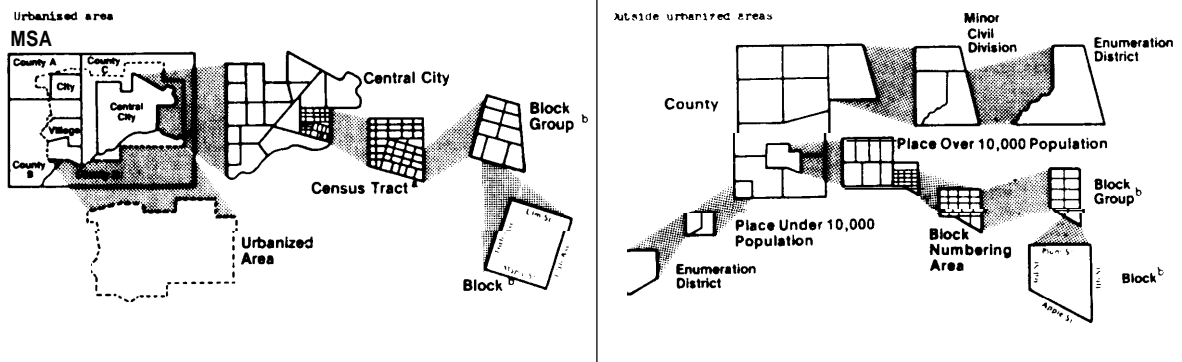
other hierarchies; there can be both urban and rural territory within metropolitan as well as nonmetropolitan areas.

There are other geographic units for which data may be obtained from the 1980 Census of Population and Housing. Some appear in regular publications and data files: American Indian reservations (278, both State and Federal, including 3 administered by or for more than one tribe), Alaska Native villages (209), congressional districts (435), and election precincts in some States. Data are prepared for neighborhoods in almost 1,300 areas and by ZIP Code areas nationwide. Data for other areas are generated in special tabulations prepared at cost, for example, school districts.

Two types of areas are defined specifically for the economic censuses:

- central business districts (CBD's)—CBD's are areas of high land value, traffic flow, and concentration of retail businesses, offices, theaters, hotels, and service establishments. In the 1982 Census of Retail Trade, 456 CBD's were defined in (1) any SMSA central city and (2) any other city with a population of 50,000 or more and a sufficient concentration of economic activity. CBD's also are shown in place-of-work data from the 1980 Census of Population and Housing.
- Major retail centers (MRC's)—MRC's are concentrations of retail stores located in SMSA's, but outside the CBD's. For 1982, 1,545 MRC's were defined areas with at least 25 retail establishments and one or more large general merchandise or department stores.

**Figure 6. GEOGRAPHIC HIERARCHY INSIDE AND OUTSIDE URBANIZED AREAS (UA's)**  
 (See figures 7-10 for maps exhibiting most of these features.)



<sup>a</sup> The entire MSA is subdivided into census tracts.  
<sup>b</sup> Blocks and block groups do not have symbolized boundaries as do the other areas, but are identified by number. (See discussion on page 2.)

SOURCE : U.S. Department of Commerce, Bureau of the Census, "Census and Geography-Concepts and Products," Factfinder\_CFF No. 8 (Rev.) Washington, DC: U.S. Government Printing Office, August 1985).

The Bureau collects and publishes data for two kinds of sub-state areas:

Governmental, such as--

- incorporated places (e.g., cities, villages) and minor civil divisions (MCDs) of counties (e.g., townships),
- congressional districts and election precincts, and
- American Indian reservations and Alaska Native villages.

Statistical, including--

- standard metropolitan statistical areas (SMSAs) and standard consolidated statistical area (SCSAs) were used in the 1980 decennial and 1982 economic censuses. In 1983, SMSAs and SCSAs were replaced by metropolitan statistical areas (MSAs), primary MSAs (PMSAs), and consolidated MSAs (CMSAs);
- census county divisions (CCDs) in States where MCD boundaries are not satisfactory for statistical purposes;
- census-designated places (formerly called "unincorporated places");
- urbanized areas;
- census tracts (subdivisions of counties, primarily in metropolitan areas) and block numbering areas (BNAs), averaging about 4,000 people each;
- census blocks--generally equivalent to city blocks in cities, but are very large in rural areas;
- enumeration districts (EDs)--census administrative areas, averaging around 700 inhabitants, used where block statistics are not available;
- block groups (BGs)--counterparts to EDs averaging 900 population, in areas with census blocks;
- neighborhoods--subareas locally defined by participants in the Bureau's Neighborhood Statistics Program; and
- ZIPCodes--Postal Service administrative areas independent of either governmental or other statistical units.

In the 1982 Census of Retail Trade, the Bureau published data for central business districts (CBDs) and major retail centers

(MRCs) outside CBDs; in the Census of Governments, for school districts and other special districts; and in foreign trade and international research, for countries and world areas.

Generally, survey data are published only for the larger areas, such as the United States, its regions, and some States, while census data are made available for smaller areas as well.

## Population and Housing

The decennial census of population and housing is the most important source of data for small communities, not only on a wide variety of subjects but in finer geographic detail than from any other statistical base. It provides a uniform set of data for inter-community comparisons as well.

Table A-1 shows the items collected in the census. The basic data, called "complete count" or "100 -percent," come from the questions asked for every person and housing unit. Other items are obtained only at a sample of households and housing units in order to keep response burden to a minimum.

The 100-percent data provide the basic population and housing counts and certain characteristics --e.g., age, sex, and race for people; and value or rent, and vacant or occupied status for housing units--for all tabulation areas, even down to census blocks. Since they are estimates rather than complete counts, the sample statistics for small communities must be used with caution.

In general, the higher the geographic or statistical level of tabulation, the greater amount of detail there is available in the census reports. With respect to small communities, more data usually are contained in the printed reports at the county level than for the county subdivisions and places. (This difference seldom occurs on summary tape files or selected microfiche). Only limited county- and subcounty-level data are available on flexible diskettes and through CENDATA.



Table A-1.--Items Collected in the 1980 Census

**100-percent population items**

Household relationship  
Sex  
Race  
Age  
Marital status  
Spanish/Hispanic origin or descent<sup>a</sup>

**Sample population items**

School enrollment  
Education attainment  
State or foreign country of birth  
Citizenship and year of immigration  
Current language and English proficiency  
Ancestry<sup>b</sup>  
Place of residence 5 years ago  
Activity 5 years ago  
Veteran status and period of service  
Presence of disability or handicap<sup>a</sup>  
Children ever born  
Marital history  
Employment status last week  
Hours worked last week  
Place of work  
Travel time to work<sup>b</sup>  
Means of transportation to work<sup>a</sup>  
Persons in carpool<sup>b</sup>  
Year last worked  
Industry  
Occupation  
Class of worker  
Amount of income by source in 1979<sup>a</sup>  
Work in 1979 and weeks looking for work in 1979<sup>a</sup>

**100-percent housing items**

Number of housing units at address  
Complete plumbing facilities  
Number of rooms in unit  
Tenure (whether the unit is owned or rented)  
Condominium identification  
Value of home (for owner-occupied units and condominiums)  
Rent (for renter-occupied units)  
Vacant for rent, for sale, etc., and period of vacancy

**Sample housing items**

Number of units in structure  
Stories in building and presence of elevator  
Year unit built  
Year moved into this house<sup>a</sup>  
Source of water  
Sewage disposal  
Heating equipment  
Fuels used for home heating, water-heating, and cooking  
Costs of utilities and fuels<sup>a</sup>  
Complete kitchen facilities  
Number of bedrooms and bathrooms  
Telephone  
Air conditioning  
Number of automobiles  
Number of light trucks and vans<sup>b</sup>  
Homeowner shelter costs for mortgage, real estate taxes, and hazard insurance<sup>b</sup>

<sup>a</sup>Changed relative to 1970.<sup>b</sup>New item for 1980.**Derived items (illustrative examples)**

Families	Household size
Family type and size	Persons per room ("overcrowding")
Family income	Institutions and other group quarters
Poverty status	Farm residence
Population density	

Note: This information pertains to the 1980 census and does not reflect changes in data presentation and availability following the 1990 census.

SOURCE: Adapted from "Data for Small Communities," U.S. Bureau of the Census--FACTFINDER for the Nation, CFF No. 22 (Rev.) January 1986.

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