

Improving the Operational Definition of "Rural Areas" for Federal Programs

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Synopsis

A strategy is presented in this paper that permits a more equitable distribution of resources to develop and maintain health services in rural areas than existing county based procedures. Operationally, nonmetropolitan counties have been considered to lack easy geographical access to the big cities and their suburbs (central areas) of metropolitan areas. Under the usual market conditions, central areas are most likely to have concentrations of health services. Generally, this means that the residents of metropolitan counties have easy access to the services in central areas, and that the residents of nonmetropolitan areas do not have such access unless services are encouraged and supported. However, some metropolitan counties are so large that they contain small towns and rural areas that like most nonmetropolitan areas, lack easy geographical access to the central areas and consequently their health services.

This paper uses decennial census data to demonstrate a method that can be used to identify small town and rural parts of large metropolitan counties (counties with at least 1,225 square miles) that most likely do not have easy access to central areas. Applying the methodology to 1980 decennial census data, it was found that, of the slightly over 32 million persons who lived in large metropolitan counties in 1980, approximately 2 million of these persons lived in small towns and rural areas without easy geographical access to central areas. Because the procedures presented improve the precision with which areas that lack easy geographic access to the central areas of metropolitan counties can be identified, it was recommended that they be more widely used in Federal and State rural grant programs.

Notes

a. This monograph describes the methodology of the Goldsmith rural modification for metropolitan counties designated by the U.S. Office of Management and Budget.

b. The authors would like to express their gratitude to Richard Forstall who carefully reviewed and evaluated the methodology of the paper. They would also like to thank Jake Culp, Glenda Koby, Ronald Manderscheid and Patricia Taylor for their helpful comments on earlier drafts of the paper.

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c. Minor edits to update this monograph were made in 1997.

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Problem

This paper describes a method that can be used to significantly improve the operational definition of rural populations lacking easy geographical access to health and mental health services (hereafter, simply health services). The procedure, already being used to expand the eligibility for one Federal program, an outreach grant program sponsored by the Office of Rural Health Policy (see Federal Register, Feb. 27, 1992), was developed because rural areas, with their small populations, sparse settlement and remoteness, often needed Federal government assistance in order to maintain a variety of essential health services. Under usual market conditions, health and related services tend to be concentrated in big cities and their suburban areas (see United States General Accounting Office, Nov. 1992, and Goldsmith et al. in press). Thus, residents of small towns or the open country (rural residents) are considerably less likely than the residents of big cities and their suburbs to have easy geographical access to health services unless the development of such services is encouraged and supported.

When Federal programs are implemented to provide health services to rural areas, they immediately encounter the problem that there are no operational definitions of "rural areas" which precisely divide the population of the United States into "rural residents" and "urban residents". The two most commonly used dichotomous definitions are rural areas and urban areas, a Bureau of the Census (BC) designation based on density, and metropolitan areas and nonmetropolitan areas, an Office of Management and Budget (OMB) designation based on the integration of counties with big cities (see Hewitt 1989, and OMB 1990). Both definitions are useful but imperfect. Thus, a sizable percentage of the population of metropolitan areas reside in rural areas (in 1980, approximately 14 percent) and a sizable percent of the population of nonmetropolitan areas reside in or near large towns (in 1980, approximately 34 percent of the nonmetropolitan population resided in counties with urban populations of 20,000 or more) (see Goldsmith et al., 1996, and Wagenfeld, et al., 1994).

Because of its ease of use, OMB's designation of counties as either metropolitan or nonmetropolitan is the definition in widest use by Federal programs providing aid to rural residents. Metropolitan counties are socially and economically integrated on a daily basis with big cities or their suburbs, whereas nonmetropolitan counties are very likely to contain small-town and open-country regions that generally lack easy geographical access to services that are concentrated in big cities and their suburban areas (collectively central areas). (1)

While the designation of counties as either metropolitan or nonmetropolitan has proved to be a useful procedure for identifying areas with and without easy geographical access to health services in central areas, the strategy may be viewed as unfair to the rural residents of geographically large metropolitan counties. Some metropolitan counties are so large that one cannot assume that all residents of the county have easy geographical access to services in central areas. Thus, even though the most populous part of a geographically large metropolitan county may be metropolitan in character, other parts are clearly not integrated with central areas. San Bernardino County, California, is a good example of a such a county. This county stretches from the city of San Bernadino, approximately 50 miles from the Pacific Ocean, through the

Mojave Desert to the Nevada border over 150 miles away. While San Bernardino covers over 20,000 square miles, the densely settled parts of this county, including the city of San Bernardino, are in a comparatively small area in the southwestern corner of the county. The remainder of the county consists of sparsely settled desert and mountains. It is unlikely that residents of the sparsely settled areas have easy geographical access (less than 30 minutes) to the city of San Bernardino or its suburbs.(2)

Thus, some residents of small-town and open-country parts of large metropolitan counties (LMC's) are in a similar position to residents of nonmetropolitan counties, i.e., have limited geographical access to health services concentrated in the central areas of metropolitan counties. Recognizing this fact, the Office of Rural Health Policy decided late in 1991 to expand rural health outreach grant eligibility to include parts of LMC's that do not have easy geographical access to the central areas. This paper describes how this task was accomplished and underscores the value of continuing and expanding such efforts.

Methods

The data for this analysis are from the 1980 Health Demographic Profile System (1980 HDPS). This is a general purpose Statistical Analysis System (SAS) data base developed by the National Institute of Mental Health in cooperation with the National Center for Health Statistics and the U.S. Department of Agriculture. It provides a wide range of 1980 social and economic decennial census data for subcounty areas (census tracts, minor civil divisions), counties, States and the nation. (See Goldsmith, et al., 1984 for a detailed description of the data base).

Using the 1980 HDPS, the task was to identify the parts of LMC's that were small town or open-country without easy geographical access to central areas. This was accomplished by first identifying LMC's, then identifying small town and open country areas (rural neighborhoods) within these LMCs, and last identifying the rural neighborhoods with limited geographical access to central areas of these counties (isolated rural neighborhoods). The specific steps in this process are summarized below:

1. Large Metropolitan Counties (LMCs). Using the OMB's 1983 designations of metropolitan counties (see Beale 1983), an LMC was defined as one with at least 1,225 square miles. The designation of a metropolitan county with at least 1,225 square miles as a LMC was based on the suggestions of demographers and health professionals, as well as an empirical examination of potential LMC's.(3) In 1980, there were 73 such counties (see Table 1, and also see Goldsmith, et al., 1992). It should be noted that by 1990, 4 additional counties designated by OMB as metropolitan counties had sufficient geographic area to be labeled LMC's (see Table 1). (Between 1990 and 1996, 12 of the counties newly designated by OMB as metropolitan counties had sufficient geographic area to be labeled LMC's (see Table 3).
2. Rural Parts of Large Metropolitan Counties. The rural status of small subcounty residential areas was based on an evaluation of 1980 census tracts. Census tracts (i.e., comparatively homogeneous subcounty areas typically with populations of 3 to 4 thousand persons) in LMC's 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.(4) The remaining tracts--those containing a part of the urbanized area or a city of 25,000 or more--were excluded from further consideration.

3. Tracts with Large Institutional Populations or No Population. Rural Census tracts with a large number of persons in institutional or group quarters (75 percent or more) were excluded from the analysis. This was because the populations of such tracts were not likely to use the services of the central areas and because detailed decennial data were not available for persons in institutional group quarters. In addition, tracts with no population were excluded from the analysis.
4. Isolated Rural Census Tracts. For rural tracts in LMC's (see 2 above), isolated rural census tracts were identified using a measure of the volume of the labor force of a tract that commuted to central areas and a measure of the average time that it took such persons to commute. The volume of commuting indicator (i.e., percent of the labor force of a tract that commutes to central areas) was selected as a variable because commuting is a key criterion used by the OMB and the Bureau of the Census to determine if counties are socially and economically linked to big cities (see Forstall and Fitzsimmons, 1991). In this study, the county criterion was adapted to census tracts. Accordingly, in a manner similar to counties, tracts in which comparatively few persons commuted to work in the central areas (less than 15 percent) were considered to be isolated rural tracts (i.e., not socially and economically integrated with central areas).(5) Of the approximately 7,000 tracts in 1980 LMC's, 390 were classified as isolated rural tracts on the basis of a low percent of the labor force commuting to work in the central areas.

Often, few employment opportunities exist in rural communities. Thus, it is possible that a large percent of the labor force of the remaining rural tracts would be willing to spend a significant amount of time commuting to work in central areas. Taking this possibility into account, if a high percentage (15 percent or more) of the labor force of a tract commuted to work in central areas, and commuting time was high (over 45 percent of the labor force commuted 30 minutes or more to work), a tract was considered a likely candidate to be designated as an isolated rural tract in LMC.(6) One additional criterion was employed. It was also necessary for a tract to be outside the Rationally Metropolitan Areas (RMA's) (see Rand McNally 1990). Like New England metropolitan areas, RMA's are based on subcounty units such as minor civil divisions. Consequently, the RMA's are unlikely to be overbounded (include area not really integrated with central areas). It was felt that this additional step guaranteed that the population of rural tracts with a large volume of their labor force commuting for long periods of time to central areas did have limited geographical access to the central areas.

For the counties that became LMC's between 1983 and 1990, a slightly different procedure had to be used to identify isolated rural tracts. Detailed census tract data were not available in the 1980 HDPS for these tracts. Accordingly, in these four counties, a tract was considered an isolated rural tract if it was outside 1980 central areas, did not contain part of a city of 25 thousand or more persons, and was outside an RMA.

Results

The results of this analysis are summarized in Table 2. An examination of this table reveals that slightly over 32 million people lived in LMC's in the 20 States with at least one such county, and that 6.2 percent of the population of LMC'S (approximately two million persons) resided in isolated rural areas. This represents an increase of nearly 4 percent in the number of persons considered to be residing in areas eligible for a Federal outreach grant to develop health services for rural communities (from approximately 54 million persons when only the residents of nonmetropolitan counties are so considered to about 56 million when the isolated rural residents of metropolitan counties are included). The largest number of isolated rural neighborhoods in LMC's (nearly one million) was in California and the smallest was in Wyoming (nearly three thousand).

Conclusion

This paper demonstrated that 1980 decennial census data can be used to identify parts of LMC's that, like nonmetropolitan counties in general, lack easy geographical access to central areas. Given the concentration of services in central areas, the strategy developed permits a more equitable distribution of outreach grant funds to persons living in rural areas. Prior to this analysis, funds were made available only to that part of the population of rural areas that lived in nonmetropolitan counties. This paper demonstrates that it is feasible to identify, in a practical manner, the isolated rural residents of LMC's. This permits such areas, also, to be eligible for Federal rural grant programs.

In conclusion, it should be noted that this analysis was possible because a data base (the 1980 HDPS) existed that was both easy to use and contained the county and subcounty indicators necessary to identify the isolated rural parts of metropolitan counties. While a similar data base for 1990 has not yet been prepared, the requisite data can be extracted from existing 1990 decennial census tapes. To maintain the same equity of access to grant funds for health services that was achieved using the procedures outlined in this paper, it is suggested that methods presented in this paper be applied to 1990 decennial census data. Further, modifications in the original procedures should be considered that would improve the identification of isolated rural areas. Such revisions might include identification of isolated rural areas in all metropolitan counties (not just the LMC's), and identification of nonmetropolitan counties that are very metropolitan in character (contain fairly large cities).

EndNotes

(1). The designation of counties as being metropolitan or nonmetropolitan in character is made officially by the Office of Management and Budget, with the technical support from the Bureau of the Census, on the basis of size of the largest urban aggregation in a county and patterns of commuting between counties. Generally, counties socially and economically integrated with an urban cluster of at least 50,000 or more persons have been designated as metropolitan counties and the remainder as nonmetropolitan counties (Federal Committee on Standard Metropolitan Statistical Areas, 1980. Also see Forstall and Fitzsimmons, 1991).

(2). Commuting 30 minutes or more to a big city or its suburbs (center areas) is a time period considered to index areas that have limited access to the employment or health services that tend to be concentrated in central areas (see *Federal Register*, November 17, 1980).

(3). A number of demographers and health professionals familiar with census geography were asked what they would consider to be large metropolitan counties. They included in their list such counties as Riverside (7,214 square miles), San Bernardino (20,064 square miles), and San Diego (4,212 square miles) Counties in California; Collier (1,994 square miles) and Dade (1,955 square miles) Counties in Florida; St. Louis County (6,125 square miles) in Minnesota; Herkimer County (1,416 square miles) in New York; and Lycoming County (1,237 square miles) in Pennsylvania. The smallest of these counties had approximately 1,225 square miles. An empirical examination of counties with at least 1,225 square miles suggested that they tend to be at least 25 by 50 miles and that commuting time between their rural and small town areas and their central areas was often 30 minutes or more. As noted, this is a time period that was considered to index areas that had limited access to the employment or health facilities of central areas (Federal Register, November 17, 1980). Based on the above conditions, the selection of 1,225 square miles to indicate LMC's appeared to be reasonable.

(4). Just as for central cities and urbanized areas, cities of 25 to 50 thousand residents were included in the criteria that designates rural neighborhoods because such cities are often designated as sub-metropolises (see Hewitt 1989, King 1984). While the volume and range of service in such cities may not be as large as that available in central areas, they still are likely to have significant amounts of health and related services located within their boundaries.

(5). One of the criteria for a county to be considered socially and economically integrated with the county that contains a central city is that "15 percent of the workers living in the county work in the county or counties containing the central cities of the [MSA]" (Forstall and Fitzsimmons 1991). Some modifications in the criteria for designating metropolitan counties were made in 1990 (see Forstall and Fitzsimmons, 1991).

(6). The statistic "over 45 percent of the labor force commuting 30 minutes or more to work" was considered to index high commuting time between central areas and rural tracts for several reasons. First, the statistics approximates an average commuting time of 33 to 35 minutes. This time period exceeds the period considered to index limited access to the employment or health services of central areas -- i.e., 30 minutes. Second, most residents of metropolitan areas commute less than 30 minutes to work (see Bureau of the Census, 1984).

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Table 1.
Large 1980 Metropolitan Counties[Counties in 1980 Standard Metropolitan Statistical Areas (SMSAs) with at least 1,225 square miles]

Federal Information Processing System (FIPS) Codes	County/ Parish/Borough	Metropolitan Statistical Area	State
01 003	Baldwin	Mobile	Alabama
01 097	Mobile	Mobile	
125	Tuscaloosa	Tuscaloosa	
02 020	Anchorage	Anchorage	Alaska
04 013	Maricopa	Phoenix	Arizona
04 019	Pima	Tucson	
06 007	Butte	Chico	California
06 017	El Dorado	Sacramento	
06 019	Fresno	Fresno	
06 029	Kern	Bakersfield	
06 037	Los Angeles	Los Angeles-Long Beach	
06 053	Monterey	Salinas-Seaside-Monterey	
06 061	Placer	Sacramento	
06 165	Riverside	Riverside-San Bernardino	
06 071	San Bernardino	Riverside-San Bernardino	
06 073	San Diego	San Diego	
06 077	San Joaquin	Stockton	
06 083	Santa Barbara	Santa Barbara-Santa Maria-Lompoc	
06 085	Santa Clara	San Jose	
06 089	Shasta	Redding	

Table 1.
Large 1980 Metropolitan Counties[Counties in 1980 Standard Metropolitan Statistical Areas
(SMSAs) with at least 1,225 square miles]

Federal Information Processing System (FIPS) Codes	County/ Parish/Borough	Metropolitan Statistical Area	State
06 097	Sonoma	Santa Rosa-Petaluma	
06 099	Stanislaus	Modesto	
06 107	Tulare	Visalia-Tulare-Porterville	
06 111	Ventura	Oxnard-Ventura	
08 001	Adams	Denver-Boulder	Colorado
08 041	El Paso	Colorado Springs	
08 069	Larimer	Fort Collins-Loveland	
08 101	Pueblo	Pueblo	
08 123	Weld	Greeley	
12 021 *	Collier	Naples	Florida
12 025	Dade	Miami-Hialeah	
12 083	Marion	Ocala	
12 097	Osceola	Orlando	
12 099	Palm Beach	West Palm Beach-Boca Raton- Delray Beach	
12 105	Polk	Lakeland-Winter Haven	
20 015	Butler	Wichita	Kansas
22 079	Rapides	Alexandria	Louisiana
22 109	Terrebonne	Houma-Thibodaux	
27 137	St. Louis	Duluth	Minnesota
27 145	Stearns	St. Cloud	

Table 1.
Large 1980 Metropolitan Counties[Counties in 1980 Standard Metropolitan Statistical Areas
(SMSAs) with at least 1,225 square miles]

Federal Information Processing System (FIPS) Codes	County/ Parish/Borough	Metropolitan Statistical Area	State
30 013	Cascade	Great Falls	Montana
30 111	Yellowstone	Billings	
32 003	Clark	Las Vegas	Nevada
32 031	Washoe	Reno	
35 013	Dona Ana	Las Cruces	New Mexico
35 049 *	Santa Fe	Santa Fe	
36 043	Herkimer	Utica-Rome	New York
38 015	Burleigh	Bismarck	North Dakota
38 017	Cass	Fargo-Moorhead	
38 035	Grand Forks	Grand Forks	
38 059	Morton	Bismarck	
40 113	Osage	Tulsa	Oklahoma
41 005	Clackamas	Portland	Oregon
41 029	Jackson	Medford	
41 039	Lane	Eugene-Springfield	
42 081	Lycoming	Williamsport	Pennsylvania
46 103 *	Pennington	Rapid City	South Dakota
48 029	Bexar	San Antonio	Texas
48 039	Brazoria	Brazoria	
48 201	Harris	Houston	
48 215	Hidalgo	McAllen-Edinburg-Mission	

Table 1.
Large 1980 Metropolitan Counties[Counties in 1980 Standard Metropolitan Statistical Areas
(SMSAs) with at least 1,225 square miles]

Federal Information Processing System (FIPS) Codes	County/ Parish/Borough	Metropolitan Statistical Area	State
48 451	Tom Green	San Angelo	
48 479	Webb	Laredo	
49 049	Utah	Provo-Orem	Utah
53 005	Benton	Richland-Kennewick-Pasco	Washington
53 021	Franklin	Richland-Kennewick-Pasco	
53 033	King	Seattle-Everett	
53 053	Pierce	Tacoma	
53 061	Snohomish	Spokane	
53 073	Whatcom	Bellingham	
53 077	Yakima	Yakima	
55 031	Douglas	Duluth	Wisconsin
55 073	Marathon	Wausau	
56 021 *	Laramie	Cheyenne	Wyoming
56 025	Natrona	Casper	

* Large counties in metropolitan areas established after 1983 but before 1990.

Table 2.
The Distribution of All Persons and Persons in Isolated Rural Areas in Large Metropolitan
Counties (LMCs), 1980

State	Populations in LMCs	Number	Percent of total
Alabama	580,804	50,870	8.76
Arizona	2,040,484	41,277	2.02
California	15,817,264	987,928	6.28
Colorado	953,962	59,673	6.26
Florida	2,695,864	165,906	6.15
Kansas	44,782	23,256	51.93
Louisiana	229,675	21,251	9.25
Minnesota	330,286	126,211	38.21
Montana	188,731	18,500	9.80
Nevada	656,710	22,188	3.38
New Mexico	96,340	6,355	6.60
New York	66,714	34,331	51.46
North Dakota	234,335	24,352	10.39
Oklahoma	39,327	25,063	63.73
Oregon	649,601	71,250	10.97
Pennsylvania	118,416	3,700	3.25
Texas	4,034,613	158,720	3.93
Washington	2,854,750	128,776	4.59
Wisconsin	155,580	30,305	19.48
Wyoming	140,505	2,767	1.97
United States	31,928,743	2,002,679	6.27

Table 3.
 Large Metropolitan Counties (Excluding Counties in New England) Designated as Metropolitan
 Counties between January 2, 1990 and June 23, 1996 that Contain Rural Areas per the Goldsmith
 Rural Modification*

State	County	Sq. Miles
Arizona	Coconino	18,608
	Mohave	13,285
	Pinal	5,343
	Yuma	5,510
California	Madera	2,145
	Merced	1,944
	San Luis Obispo	3,008
Colorado	Mesa	3,309
Minnesota	Polk	1,981
Nevada	Nye	18,155
New Mexico	Sandoval	3,707
Utah	Kane	3,898

* For the grant programs of the Federal Office of Rural Health Policy, the tract or BNA designations used in applying the Goldsmith rural modification to these 12 counties are from the 1990 census.