THE MEASUREMENT OF UNDERSERVICE
AND PROVIDER SHORTAGE IN THE UNITED STATES:

A POLICY ANALYSIS

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

APPENDICES

EXECUTIVE SUMMARY

This policy analysis is the culmination of the first year of a two-year study that the North Carolina Rural Health Research Program is conducting for the US Office of Rural Health Policy to consider new approaches to identifying underserved rural communities and populations. During the second year of this study (which ends September 30, 1995) the Program is developing alternative proposals for ways to better identify rural areas as underserved and in need of extraordinary assistance to ensure access to primary care for rural residents. The history and experience of how we identify areas with provider shortages or as medically underserved are important to our development of new ways to identify such problem areas. This policy analysis reviews the ways in which health professional shortage areas (HPSAs) and medically underserved areas (MUAs) are presently identified, describes some of the history surrounding the use of these measures, and identifies some of the topics which must be considered in future attempts to improve the identification of these areas and populations.

The number of counties designated as either a whole or part-county primary care HPSA has increased from 1,209 in 1978 to 1,752 by the end of 1992. An area, population, or facility can be designated as a primary care HPSA if the population-to-primary care physician ratio is 3500:1 or greater for the relevant population, or 3000:1 or greater if the area in question is designated as an area of high need. As of June 30, 1994 there were 2,577 total whole- or part-county primary medical care HPSAs (including geographic area- [1,993], population group- [439], and facility-HPSAs [145]), with 45,188,521 persons living within them. We have also identified 352 whole nonmetropolitan counties (15.0% of all nonmetro counties) as chronic HPSAs. This means that the entire county has been designated for at least nine of the ten years for which we have data on HPSA designation from 1978 to 1992. This is primarily a nonmetropolitan phenomenon, as only 30 metropolitan counties are classified as chronic shortage areas (4.1% of all metro counties) over the same period of time. These chronic HPSAs represent areas for which designation as a HPSA, and any programmatic support that may have flowed to the area as a result of that designation, was not sufficient to end the county's designation as a chronic HPSA. This study does not examine the actual programmatic assistance these chronic HPSAs (or others) may have actually received. Programs using the HPSA methodology to designate areas eligible for assistance include the National Health Service Corps (NHSC), qualification of rural clinics for cost-based reimbursement, and bonus payments to physicians under Medicare.

Medically underserved areas (MUAs) are identified by a county's (or sub-county unit's) score on the Index of Medical Underservice (IMU). The IMU is an index that takes into account the population-to-primary care physician ratio, the Infant Mortality Rate (IMR), the percent of the population below the poverty level, and the percent of persons who are 65 years of age and older. We assessed the change in the number of whole counties in the United States that had an IMU score of 62.0 or less, the cutoff point for designation of an area as medically underserved. This cutoff was set because it represented

the median score on the IMU for all counties in the United States in the mid-1970s; this designation criterion remains unchanged. In 1980, there were 1,066 whole counties that had IMU scores of 62.0 or less. By 1990, this number had fallen to 784. The MUA methodology is primarily used to designate areas that can receive funds for Community Health Centers (CHCs), and to qualify rural health clinics for cost-based reimbursement from the federal government.

The continued use of both the HPSA and MUA methodologies has been criticized over the past 15 years on three main fronts: 1) they lack sufficient theoretical justification and basis; 2) they do not clearly define what it is they seek to measure; and 3) they are not necessarily tailored to identify the problems for which programs are designed to respond; there is not necessarily a good fit between the identifying methodologies and the programs.

We reached six major conclusions concerning the measurement of underservice and health professions shortage areas in the United States based on the first year of this study:

1. There are some conceptual problems with both the HPSA and MUA methodologies, but changes made to them could have large consequences.

2. Definitions of 'underservice' / 'provider shortage' should be made clear when developing any new methodology.

3. Policy goals of programs should fit the definition of underservice/provider shortage adopted to designate areas eligible for programmatic assistance.

4. The unit of analysis for these types of methodologies may begin to shift away from counties or other localized geographic areas and toward population access to a larger health care delivery system that may be geographically dispersed.

5. The biggest practical issue for any methodology is what data are needed and who is responsible for designation of areas as eligible for assistance using the methodology.

6. Any change in methodology for designating eligible recipients for assistance will probably create winners and losers, making any change politically difficult.

We feel that these issues should be addressed and considered in any future attempts to modify or alter the manner in which underservice and provider shortages are measured.

I. INTRODUCTION

This policy analysis reviews how the United States federal government has measured underservice and defined provider shortages, and suggests that there is a need for a re-examination of the process for identifying areas, populations, and institutions that should receive preferential treatment in public policies. There are two principle measures of underservice used by the federal government: the Health Professional Shortage Area (HPSA) designation which was intended to identify locations in which to place physicians under the National Health Services Corps Program, and the Medically Underserved Area (MUA) designation which was intended to identify areas where health maintenance organizations could receive federal assistance. Those designations are now used for a variety of programs as directed by statute or informally by the states. This analysis reviews those methodologies, and provides the context for a discussion of the relative merits and drawbacks of continued use of the HPSA and MUA methodologies for the identification of underserved populations. The policy analysis concludes with a discussion of relevant issues to be considered in attempts to develop an improved methodology to identify underserved populations in the future, should it be decided that such efforts are necessary.

Explicitly defining individual areas or populations as underserved with respect to primary health care has been a central part of American health care policy since the mid-1970's. Presently, the United States government uses the health professional shortage area (HPSA) and the medically underserved area (MUA) methodologies primarily to identify locations which are qualified to receive assistance under the National Health Service Corps (NHSC) program and the Community Health Centers (CHC) program (although there are other programs using these methodologies). These methodologies have been criticized as: 1) lacking sufficient theoretical basis, 2) for failing to explicitly define what assures adequacy in provider supply, and 3) for a lack of fit between the capabilities of the methodologies and the programs which use their designation to identify eligible areas. Despite these criticisms, these methods have remained the state-of-the-art for nearly 20 years and, to date, no viable alternatives have been offered in their place. During the past two decades there have been many changes in the environment of care that need to be considered in the formulation of any means of shortage designation, including an increase in the number of uninsured persons, a rise in managed care, and the development of new service delivery arrangements.

In the more recent past there have been concrete moves toward systematic change in the health care delivery systems of selected states. These programmatic reforms can cause significant changes in the distribution of underserved populations and their use of services. In the mid-1990s, during a time when health reform is more of an active pursuit than a theoretical exercise, there is an increasing sentiment among policy makers and researchers that the present federal methodologies are not capable of optimally identifying underserved populations. Senate Bill 1569 was introduced in the Congress in 1992 and passed the Senate March 25, 1994. This Bill called for the Department of Health and Human

Services to "conduct a study concerning the feasibility and desirability of, and the criteria to be used for, combining the designations of 'health professional shortage area' and 'medically underserved area' into a single health professional shortage area designation." This underscores the timeliness of looking at the present methodologies with a view towards developing a new methodology that will enhance the ability of policy makers to identify underserved populations eligible for programmatic assistance.

This policy analysis ends with discussion of issues that are likely to be relevant in future attempts to identify underservice and provider shortage areas. The analysis reached six basic conclusions concerning the future of measuring underservice and provider shortage:

- there are conceptual problems with both the HPSA and MUA methodologies, but changes in these methodologies could have large consequences and should not be undertaken lightly;
- definitions of underservice/provider shortage should be made clear;
- policy goals of programs should fit the definition of underservice/provider shortage adopted;
- the unit of analysis for underservice/provider shortage designations is likely to change from an areal perspective to a system of care focus;
- data needs and locus of designation will be key in determining the viability of any changes in methodology;
- changes in methodologies will create winners and losers—this makes the process of any change inherently political.

II. BACKGROUND

The construction of the HPSA and MUA designation methods was stimulated by specific needs in specific programs. These two designations were meant to identify areas that were underserved in some fashion and needed some form of assistance. The search for the best way to identify underservice has been both an academic and theoretical exercise as well as a more practical activity engendered by legislation or regulation. The two measures we focus on in this paper were developed in response to a need to designate particular areas as being underserved in order to make them eligible to host practitioners from the National Health Services Corps or to receive financial support to establish a health maintenance organization that would provide care for poor and underserved people. However, the search for indices of underservice had started well before these measures were passed into law and had engaged the academic community as well as those charged with implementing government policies.

Defining, measuring and seeking to remedy underservice and physician provider shortage is an activity that has been pursued through a variety of means for the better part of the century. The unequal distribution of providers and health care resources has been long recognized as problematic for rural America and for some people in large cities. The Sheppard-Towner Act, passed in 1921, which provided federal aid to states to support care and services for women and children, also directly targeted rural places as being in need (Starr, 1982). The Committee on the Costs of Medical Care (CCMC) illustrated the variations in the distribution of physicians, hospitals and public health facilities in its reports (CCMC, 1932). Unfortunately, only a minority saw this as a problem worthy of action and the prevailing policies favored professional control over training; the distribution of hospitals and providers was largely dictated by market forces. There were some exceptions, e.g., during the Depression the Farm Security Agency (FSA) set up and supported clinics and cooperatives for farm communities and migrant workers. The criteria for locating FSA rural service centers were based on the existence of a stable public health system rather than on the relative need of communities, although the FSA did target very poor and needy communities and served 1,120 counties in 1943 (Grey, 1994). By 1940, only 18.6 percent of the health professionals were in rural areas, which, at that time, included 43.5 percent of the U.S. population (Mott & Roemer, 1948). After the Second World War more attention was given to improving the distribution of resources at the federal level. The Hill-Burton Hospital Survey and Construction Act of 1945 required states to submit plans for the location of hospitals to meet their most pressing needs. Some guidance was given to states by the federal Public Health Service to help them plan but there was no set method for identifying places that were more or less needy than others. The Program did support 4,678 projects by 1965 with slightly fewer than half of the hospital projects located in towns of less than 10,000 population (Stevens, 1971). This program clearly had an impact on the distribution of health care services.

The allocation of programs and funding for medical services to needy or underserved areas was not directly linked to estimates of the number of providers needed by a given population in the development of the Sheppard-Towner, FSA, or Hill-Burton programs. The concept of *physician shortage* was related to ideal population–to–physician standards very early in medical service planning, but only at a national level. The classic early treatment was by Roger Lee and Lewis Jones, both physicians, who developed, through professional consensus, a standard of 134.7 physicians per 100,000 population (Lee & Jones, 1933). These were not applied to smaller areas like counties. In 1953 the President's Commission on the Health Needs of the Nation set standards for regions of the country and expressed the goal of having all regions meet the New England and Central Atlantic region physician–to–population ratios (Fein, 1967). The Public Health Service proposed a ratio of 141 physicians per 100,000 in 1959 (Physicians for a Growing America, 1959) and related the perceived shortage of physicians to growing demand. These and the many other studies of physician supply, need, and demand were developed on the basis of national standards and were concerned, primarily, with the production of new physicians and the expansion of medical schools. The flurry of studies and interest in this national production of physicians resulted in an expansion of federal support for medical education and the rapid growth of the overall physician supply through the 1970s. Little attention was paid to local supply and need criteria or standards.

The passage of the Medicare and Medicaid bills in 1965 produced mechanisms for much greater federal involvement in the allocation of health care resources, and programmatic responses to inequities within the U.S. health care system were developed. These efforts recognized that many persons still remained uninsured, and that some persons who were insured had special health care needs which were largely not addressed and could be expected to persist even if all persons were covered by health insurance. There was a subtle shift in perceptions from national and comprehensive programs to more focused projects. The new goal was to identify the exceptions, those not being well served by the existing system of organizing and financing health care in the United States. This meant a shift from national provider supply to more local supply.

In order to aid policy makers in their attempts to address these problems, a way of identifying such underserved populations or geographic areas was necessary. The Health Professional Shortage Area (HPSA) methodology and the Index of Medical Underservice (IMU) were developed to identify underserved populations in the early 1970s, and are still in use today. The development of these methodologies resulted, in part, from the American health care system's development of an "intervention by exception" approach to improving access to health care services. Instead of developing a cohesive national strategy or system of health care delivery or an insurance system that was centrally planned, a patchwork system was allowed to develop with the federal government serving as a type of "safety net", stepping in to address the needs of persons and groups within this loose-knit system who were identified as having specific health care problems.

The first formal, federal program to link funds or resources to identified shortage areas was the health professions student loan program of 1963, amended in 1964 and 1965. Public Law 89-290, the Health Professions Educational Assistance Act of 1965, allowed for forgiveness of up to 50 percent of student loans for service in areas determined by "the appropriate state health authority to have a shortage of physicians, dentists or optometrists" (Lee, LeRoy, Stalcup & Beck, 1976). A subsequent loan forgiveness bill passed in 1971 set shortage area standards based on a ratio of one physician per 1,500 persons with consideration given to distance to health services and the availability of transportation, economic conditions or income in the community, local health needs or age and incapacity, and the designation of the area as a critical health manpower shortage area by the National Health Service Corps (NHSC). The legislation that created the NHSC, the Emergency Health Personnel Act of 1970 (42 U.S.C. §233 *et seq.*), called for Corps physicians to be placed in "critical health manpower shortage areas". This prompted the development of the Health Service Scarcity Area Identification Program which was to create a Master Health Service Scarcity Area Database (Lewis, Fein & Mechanic, 1976). The Program criticized the emphasis on the use of "manpower" as the key to meeting community needs and this is reflected in its use of the term "service" rather than "professional" or "manpower" in the index proposed initially by the Health Services Administration working group (Health Services Administration, 1973). The contrast between services and manpower and our ability to determine need for one or the other was stated forcefully by Rashi Fein who wrote, "It is demand for physicians' services that is projected for we have data to do so. But though the data are available on the future supply of physicians, they are sparser on the quantity of services that may be available." (Fein, 1967) The use of services to identify shortage areas proved infeasible and subsequent methods to identify critical manpower shortage areas all were based on manpower ratios.

The Master Health Services Scarcity Database eventually identified 1,333 shortage areas as of December 31, 1972, and their designation process set a standard for the process that is used today with one major exception. At the beginning, the designation process required the endorsement of local providers and this proved to be an insuperable barrier in some very needy communities. In the South, for instance, there was stiff resistance to plans to recruit black providers into communities where the providers were predominantly white. A project to place a black dentist in Halifax County, North Carolina met with local and state dental society resistance that was never fully overcome and the project was withdrawn. The provision that required local provider endorsement was eventually dropped; professional societies were given the opportunity to comment in the process but could not preclude designation.

When a listing of Critical Health Manpower Shortage Areas was published in the *Federal Register* in 1974, the list had been compiled with the assistance of the new Comprehensive Health Planning Areas (HSAs) and their help was enlisted in the future designation process. The HSAs were given authority to plan for health professions distribution by calculating needs and demand for their

regions and sub-regions. The work done by the HSAs began to focus national supply models on local conditions, and the search for optimal methods to identify local shortages and criteria for their designation was enlarged to include almost all areas of the nation. The impetus for creating a national standard that could be applied at local levels was motivated by the enlargement of two important programs that continue to this day to serve the health care delivery needs of the underserved: the Community Health Centers program and the National Health Services Corps.

Community Health Centers (CHC) were developed to provide comprehensive health services and outreach to rural and inner-city communities; the National Health Service Corps (NHSC) was launched to provide physicians in rural and inner-city areas which could not obtain them otherwise; rural health clinics operating in certain areas defined as being medically underserved were eligible for special reimbursement rates from the federal government for services rendered; and various states developed programs which forgave medical school loans in return for physicians agreeing to practice for a specified length of time in their state's underserved areas (*Federal Register*, 1976; U.S. Department of Health, Education, and Welfare, 1980). Each of these programs relied on one of the two methodologies (HPSA and MUA) to identify eligible recipients of this assistance. While these programs (and others) differ in many ways, implicitly they were developed on the basis of two assumptions. First, that certain areas or groups of persons within the United States were underserved or lived in an area with inadequate health care resources and thus were not able to avail themselves of a level of health care services broadly seen as "normal, basic, or adequate"; and second, that this situation placed those persons at risk of poorer health outcomes. Being underserved or living in a shortage area (however defined) was seen as a negative determinant of health. This assumption provided much of the political support of efforts to ease, or end, underservice.

Now, more than 20 years after the development of the HPSA and MUA methodologies, they remain basically unchanged in the manner in which they identify underserved areas and populations. Recently, concern for underservice and underserved populations has intensified, fueling some of the recent debate over changes in the U.S. health care delivery system. As well, Congress has begun looking at these methods which are still used (HPSA and MUA) to identify underserved areas and populations with a view toward seeing if the two may need to be revised or combined to produce an improved way of designating underserved areas and populations (S.R 1569, 1994).[1] Given this renewed interest in the topic of underservice and the fact that the HPSA and MUA methodologies have not changed significantly since their inception, this is an opportune time to review each of these methods

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[1]S.R. 1569, co-sponsored by Orrin Hatch (R-Utah) and Edward Kennedy (D-Massachusetts) passed the Senate on March 25, 1994. The bill directs the Secretary of Health and Human Services to study the HPSA and MUA methodologies and to assess the feasibility and desirability of combining the two methodologies and adopting one way to identify underserved areas and populations for use in all federal programs. A similar bill did not pass the House during the 103rd Congress.

in order to see how well they meet the present needs of the federal government in identifying underservice.

III. DEFINITIONS OF UNDERSERVICE

Simply defining underservice is more difficult than might be imagined given the efforts undertaken to respond to it. While most persons probably have an intuitive notion of what the term means, identifying a consensus definition that can be adopted for discussion is nearly impossible. In a sense, the methodologies that are used to identify medically underserved areas or health professional shortage areas have come to define the terms underservice and provider shortage. Underservice has seemingly become the areas identified by these methods. But, there was little clear consideration of a definition of underservice in the development of the HPSA methodology, and an explicit failure to define the term in the development of the IMU. This section briefly reviews the *implicit* definition of underservice that is associated with these two methodologies. There are alternative ways to define underservice, but they will not be the focus of this work since they are not being used in health policy making at the present time.

The HPSA methodology and the Index of Medical Underservice, which are used in designating areas as being medically underserved, are the two most common means of identifying underserved areas. The HPSA methodology does not explicitly define underservice, but focuses instead on provider shortage, a concept that is often used synonymously with underservice. The implicit definition of underservice that comes from this methodology is a lack of primary care physicians sufficient to ensure that the population–to–primary care physician ratio is less than 3,500:1. This implies that not having enough primary care physicians in an area means that the persons living in that area will be hindered in obtaining the primary care that they need.

The definition of underservice assumed in the framework of the IMU is not as clear as might be expected from the name of the methodology. During the process of developing the IMU, the researchers that were working on this explicitly did not define underservice (Health Services Research Group, 1975; Wysong, 1975). However, the definition of underservice implied by the IMU is more comprehensive than the one implied by the HPSA methodology. The population–to–primary care physician ratio remains the centerpiece of the designation, but the population of a given area is not the only determinant of underservice as it is under HPSA. Instead, the IMU adds to the population–to–primary care physician ratio a measure of poverty in the area (percent of persons below the poverty level), the age structure of the area (proportion of persons 65 years of age and older), and a crude measure of health status or outcome (the infant mortality rate).

Table III.1

Implicit Definitions of Underservice, HPSA and IMU

HPSA: A rational service area[2] is seen as underserved if there are not enough physicians in the area such that the population-to-primary care ratio is greater than 3500:1, or 3000:1 if there is evidence of extreme need for health services. In this definition, need is determined solely by population, and two communities with equal populations are assumed to have equal need for physician services.

IMU: A rational service area is seen as underserved if the supply of primary care physicians in the area is inappropriate to meet the health needs of the population as measured by the population-to-primary care physician ratio, infant mortality rate, the proportion of persons below poverty, and the proportion of persons above 65 years of age. Different combinations of the variables indicated can define an underserved area.

These two methodologies are the primary ways in which underservice and underserved populations are identified in the United States, as well as how these areas qualify for programmatic assistance to respond to their underservice. These methodologies may or may not provide an adequate definition of underservice depending upon one's perspective, but they are what is presently being used to identify areas which can receive programmatic assistance. Those methods will now be fully discussed, and the programs and funds that are distributed as a result of these definitions discussed later.

IV. HEALTH PROFESSIONAL SHORTAGE AREA METHODOLOGY (HPSA)

Legislative History

The Health Manpower Shortage Area (HMSA [now HPSA, or Health Professional Shortage Area]) methodology was created by the Health Professions Educational Assistance Act of 1976, as set forth by Section 332 of the Public Health Service Act.[3] The primary purpose of the HPSA designation was to qualify these areas to be eligible to apply for National Health Service Corps physicians to practice in the area so designated. The Act established procedures to designate areas, population

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[2]A rational service area for both the HPSA and the IMU is a county, sub-county unit, or aggregation of counties whose population centers are within 30 minutes travel time.

[3]Health Manpower Shortage Areas (HMSA) were changed to Health Professional Shortage Areas (HPSA) in 1990. The only thing that changed about the methodology was the name. Hereafter, the term Health Professional Shortage Area, and the acronym HPSA will be used throughout.

groups, medical facilities, and other public facilities as HPSAs. This did not guarantee areas or other units of designation the placement of a National Health Service Corps physician in their locale, but was a necessary step in being able to apply to receive such a physician.

Process of Requesting a HPSA Designation

Any individual, public or private organization, or government entity can initiate a request for a HPSA designation. The applicant forwards the request to the Division of Shortage Designation, which assigns the review and processing of the application to an analyst who specializes in applications from that particular Public Health Service region. The analyst begins the review of the application and also sends copies of the application for the review and comment of the Governor's Office, the State Medical Society, and the organization federally designated to review all such applications from the applicant's state (may be the State Office of Rural Health, State Division of Health, State Office of Health Planning, or similar agency). If the Division of Shortage Designation receives no response from these review agencies, then the assumption is that there is no objection to the designation; otherwise, any or all of these agencies communicate their concerns to the analyst-in-charge. The responses from the three reviewers are formulated independently and there is no coordination of the responses at the state level. The analyst considers his/her own review of the application, which may include additional information or explanations requested of the applicant, plus the responses from the state reviewers. A decision is then made to accept or reject the request for designation. A designation, if granted, is in effect for three years. A new application is required to be re-designated and if none is received the area loses the designation. The preceding is a very simplified description of the process and understates the complexity and amount of work involved in an application's review. For example, many of the applications require additional data from the applicant, and the analyst also spends considerable time verifying the information in the application; these procedures are very important and require a considerable level of expertise, but they are also quite time-consuming and often tedious .

The application process is probably as important to the designation outcome as the criteria and method. An applicant's lack of familiarity or sophistication with health databases and with governmental procedures can result in a rejection. On the other hand, highly sophisticated applicants may know how to "game" the system to their advantage; fortunately, the Division of Shortage Designation has staffpersons who are experienced in handling these types of requests. But, the assumptions made about the information which is required in the application may not reflect present-day standards or realities. We compiled a chart (see Appendix A) which lists the application criteria and outlines some questions related to the designation process.

Identification of the HPSA Cutoff Rule

In 1974, the cutoff point for designating a rational service area as a HPSA was set at a population–to–primary care physician ratio of 3500:1 (with exceptions available down to 3000:1 for high-need communities). The 3500:1 ratio represented approximately 1.5 times the mean population–to–primary care physician ratio of all the counties in the United States (there was not a separate analysis carried out for rural and urban counties). The mean ratio was 2360:1 for all counties and 1.5 times this equaled 3540:1. The ratio that was chosen (3500:1) also identified about one-fourth of the counties in the country as falling above this cutoff (having a larger population–to–primary care physician ratio, meaning there were fewer physicians). Thus, 3500:1 corresponded closely with the 75th percentile of all counties in the United States, arrayed according to their population–to–primary care physician ratio. This standard has remained unchanged since its inception in 1974, and is still the primary criterion through which counties and other "rational service areas" are identified as HPSAs or not.

The county-level population–to–primary care physician ratio has been calculated for various years since 1974 (the data used to generate 3500:1 cutoff). Table IV.1 shows the change in the 75th percentile of the population–to–primary care physician ratio of all counties in the United States for the years 1974, 1979, 1985, 1988, 1989, 1990, and 1992.

Table IV.1

75th Percentile of Population–to–Primary Care Physician Ratio for All Counties in Selected Years

| | Percentile Ratio | | | | |
	12.5th	25th	50th	75th	87.5th
1974				3580:1	
1979	1713:1	2031:1	2700:1	3820:1	5125:1
1985	1636:1	1938:1	2585:1	3575:1	4750:1
1988	1500:1	1808:1	2400:1	3427:1	4500:1
1989	1475:1	1810:1	2375:1	3400:1	4767:1
1990	1447:1	1770:1	2340:1	3400:1	4650:1
1992	1336:1	1622:1	2220:1	3414:1	4850:1

Table IV.1 shows that the population–to–primary care physician ratio has not remained static in the years for which we have data.[4] From 1974, there was an increase in the ratio represented

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[4]The definition of primary care physician has been held constant in our analysis for each of the years in the comparison so the years could be comparable. We had to use the definition of primary care physician that was adopted in 1974 since data-reporting formats do not allow for the use of definitions later adopted because earlier data were not disaggregated in the manner necessary. Primary care physicians include general practitioners, family physicians, pediatricians, all internal medicine physicians, and OB/GYNs. Later definitions make distinctions between general

by the 75th percentile county[5], but since then a general trend of decrease in the ratio has occurred, until 1992 when there was a slight increase again. The lower quartile means that one-fourth of the counties in the nation have a population–to–primary care physician ratio that is larger than the number corresponding to that position in a given year. For example, in 1992 the 75th percentile county ratio was 3414:1, meaning that there were 3,414 persons per each primary care physician in that county corresponding to this percentile. One-fourth of the counties in the nation (approximately 770 of 3,080 counties) had larger ratios than 3414:1 in 1992, meaning they had relatively fewer primary care physicians given the population of the county.

These results must be considered in light of the general trend of an increase in the total number of primary care physicians per 100,000 persons in all but the smallest communities across the United States from 1975-1988.[6] In spite of these changes in overall physician supply, the population–to–primary care physician ratio of the 75th percentile county remains fairly similar to the 3500:1 set as the cutoff point for identifying a primary care physician shortage area. But, it appears that the increasing numbers of primary care physicians practicing over the past 20 years have not been moving proportionally into all counties in the U.S. At the 12.5th percentile, which identifies the county that has a better population–to–primary care physician ratio than 87.5 percent of all the counties in the nation, there has been a decrease in the population–to–primary care physician ratio from 1,713 in 1979 to 1,336 in 1992, an improvement of 22 percent. In contrast, the 87.5th percentile county has seen its population–to–primary care physician ratio improve from 5125:1 in 1979 to 4850:1 in 1992, an improvement of only 5.3 percent. The median county has seen an improvement in its population–to–primary care physician ratio of 17.7 percent over the same time period. Thus, it is clear that population–to–primary care physician ratios have been improving (getting smaller) over the past 15+ years throughout the nation, but the rate of improvement has been most rapid in the counties with the best situation vis-à-vis population–to–primary care physician ratios in the first place. This shows that the distribution of the increasing number of primary care physicians in the nation has not served to close the relative gap between the counties in the country with the most physicians per population, and those with fewer physicians per population. In fact, the number of counties in the nation with no primary care physicians practicing within them has increased (albeit not much) from 185 in 1979 to 204

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internal medicine physicians and other internal medicine specialties, but these data are not available for earlier years.

[5]The lowest quartile represents the "worst" quartile of counties in this case. Technically, it is the upper quartile since in this instance a larger ratio represents a situation which is worse, with worse meaning a larger population per physician.

[6]See HRSA. Study of Models to Meet Rural Health Care Needs Through Mobilization of Health Professions Education and Services Resources. HRSA Contract No. HRSA-240-89-0037, 1992, for a fairly detailed discussion of changes in physician supply from 1975 to 1988 across the United States.

in 1992. Table IV.2 shows the number of counties in the nation with no primary care physicians for selected years from 1979 to 1992.

Table IV.2

Number of Counties with No Physicians,
Selected Years from 1979 to 1992

Year	Counties
1979	185 (6.0%)
1985	174 (5.6%)
1988	180 (5.8%)
1989	193 (6.3%)
1990	180 (5.8%)
1992	204 (6.6%)

Note: Total counties = 3,080

Even though the number of counties with no primary care physician is higher in 1992 than in any other year for which data are available, it is difficult to discern a trend from these numbers since they are similar in comparison to the total number of counties in the nation. The percentage of the total counties in the nation with no primary care physicians varied from 5.6 percent in 1985 to 6.6 percent in 1992.

Number of HPSAs Designated, June 1994

There are three types of HPSA designations: geographic areas, population groups (such as migrant farm workers, homeless), and facilities such as prisons. An area, population, or facility can be classified as a HPSA with respect to primary medical care, dental care or mental health care. Table IV.3 below shows the number of HPSA designations and the population living in the designated areas; Table IV.4 shows the number of practitioners needed to remove the HPSA designations for the three currently designated categories of HPSA. The column headed "population living in designated HPSAs" is the total population in the designated areas, specified population groups, or served by the designated institutions.

Table IV.3

Health Professional Shortage Areas by Type of Designation, June 30, 1994

	# of Designations	Population Living in Designated HPSAs
PRIMARY MEDICAL HPSA TOTALS	2,557	45,188,521
Geographic areas	1,993	36,975,735
Population groups	439	7,899,016
Facilities	145	313,770
DENTAL HPSA TOTALS	1,115	21,858,962
Geographic areas	896	18,262,923
Population groups	185	3,415,275
Facilities	34	180,764
MENTAL HEALTH HPSA TOTALS	832	54,534,826
Geographic areas	658	53,959,905
Population groups	11	357,904
Facilities	163	217,017

Table adapted from: Division of Shortage Designation, Bureau of Primary Health Care, HRSA. June 30, 1994.

Table IV.4

Number of Practitioners Needed to Remove HPSA Designations and Estimated Underserved Population in HPSAs, June 30, 1994

	Number of Practitioners Needed to Remove Designations	Estimated Underserved Population[7]
PRIMARY MEDICAL HPSA TOTALS	5,085	22,407,894
Geographic areas	3,723	N/A
Population groups	1,190	N/A
Facilities	172	N/A
DENTAL HPSA TOTALS	2,234	10,730,604
Geographic areas	1,580	N/A
Population groups	568	N/A
Facilities	86	N/A
MENTAL HEALTH HPSA TOTALS	1,768	41,921,903
Geographic areas	1,146	N/A
Population groups	8	N/A
Facilities	614	N/A

Table adapted from: Division of Shortage Designation, Bureau of Primary Health Care, HRSA. June 30, 1994.

Table IV.5

Total Designations for Primary Care Health Professional Shortage Areas, November 13, 1994

	Number Designations	Number Physicians Short	Total Population Affected
US Total	2,684	5,257	47,415,422
County	886	1,111	15,134,729
Service Areas	1,150	2,634	23,101,094
Pop Groups	494	1,341	8,858,537
Facilities	154	171	320,462

Source: Bureau of Primary Care, HRSA, BHCDANET printout, November 13, 1994.

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[7]The Office of Shortage Designation, Bureau of Primary Health Care, HRSA, publishes lists of HPSAs of different types, as well as their estimate of the number of underserved persons in those HPSAs. They identify the proportion of those residing in HPSAs as underserved in the following way. The number of primary care practitioners in the area is multiplied by the target population-to-practitioner ratio (2,000:1 for Primary Care; 3,000:1 for Dental; 10,000:1 for Mental Health). This figure is then subtracted from the total area population to produce their estimate of underserved persons living in a HPSA.

Identification of Chronic HPSAs

It may be informative to identify areas that can be considered 'chronic' HPSAs, since these areas may contain populations which are particularly vulnerable and perhaps in need of other initiatives to improve access and health status. As well, these are counties and parts of counties that have been consistently designated as HPSAs for 10-15 years and eligible for the programmatic assistance that is available to localities classified in this way. These counties may reveal much about the efficacy of seeking to respond to underservice and physician shortage in the manner in which it has been done over the past 15 years. The number of chronically designated HPSAs will first be identified, and then these counties will be compared to other counties on the basis of several sociodemographic and simple health outcome statistics.

This paper defines chronic shortage areas as those which have been designated as a HPSA for at least 9 of the 10 years for which we have data regarding HPSA status.[8] This paper focuses on primary care HPSAs and not facility HPSAs.[9] A county or other geographic unit being designated as a whole- or part-county HPSA is not a guarantee that the county will always remain so designated. In fact, HPSAs that are designated are generally reconsidered every three years and may be de-designated if the area no longer meets the eligibility criteria. If de-designation is to occur, then a state government or local organization is able to re-apply for designation of the HPSA; if they do not, the designation will be removed. If the Division of Shortage Designation determines the designation is no longer warranted, the onus of action is upon the entity that originally applied for the HPSA to show that the HPSA designation is still warranted. This means that chronic HPSAs are *not* simply those which were so designated at some point and have remained so designated indefinitely, in spite of the status of the health care system in the county.

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[8]The September, 1993 Area Resource File (ARF) includes information on county HMSA status in 1978, 1984, 1985, 1986, 1987, and 1989. We have entered the data for the 1992 HPSA designations and merged 1980, 1982, and 1983 data into our existing data set. We do not have information on other years from the inception of the HPSA designation program in 1978 through the present, so the data do not make a complete time series. The source of the data on county HPSA status is the ARF, and HPSA shortage designation tapes from the Bureau of Primary Care, Health Resources and Services Administration. Note that physicians practicing in a county through the National Health Service Corps are not counted in the calculation of a population–to–physician ratio, which is the basis of the HPSA designation, since the physician would not be practicing there except for the NHSC program (*Federal Register*, Vol. 48, No. 234, Monday Dec. 5, 1983, page 54538).

[9]Facility HPSAs are generally federal or state prison facilities or state mental hospitals.

Chronic Rural HPSAs, 1978-1992

There are 352 (15.0%) rural[10] counties which were designated as whole-county HPSAs in *any nine* of the following ten years: 1978, 1980, 1982, 1983, 1984, 1985, 1986, 1987, 1989, and 1992. While we do not have a complete year-by-year accounting of these counties' HPSA status, it is reasonably clear that these counties can be classified as chronic shortage areas according to the HPSA definition, since the entire county was designated a HPSA in nine of ten years of the 15-year period between 1978 and 1992. There were another 458 (19.5%) rural counties which were designated as part-county HPSAs for nine of the ten years listed above. In total, at least portions of 810 (34.5%) rural counties were designated as HPSAs for nine of the ten years 1978, 1980, 1982, 1983, 1984, 1985, 1986, 1987, 1989, and 1992.

On the other side, there are 535 (22.8%) rural counties which were neither whole- nor part-county HPSAs during *any* of these same years. These counties were never declared either a whole- or part-county HPSA during the 10 years for which we have data. As noted before, it would be incorrect to assume that all of these counties were adequately served in terms of primary care physicians according to the HPSA designation methodology since the HPSA designation process is generally locally or state-initiated. The counties which were never designated will be further investigated to determine whether those counties never designated are those which have no problems with availability of primary care physicians, or whether some of those that have never been designated in fact appear to have problems with their primary care physician situation.

Chronic Urban HPSAs: 1978-1992

There are 30 (4.1%) urban counties which were designated as whole-county HPSAs for nine of the ten years 1978, 1980, 1982, 1983, 1984, 1985, 1986, 1987, 1989, and 1992. There were 246 (33.3%) urban counties which were designated as part-county HPSAs during any nine of the same ten years. Note that these urban, part-county primary care HPSAs are likely the result of neighborhood or population designations.[11] Of the urban counties, 17 were identified as chronic whole-county HPSAs. In total, 276 (37.4%) urban counties had at least a portion of their county designated as a HPSA during nine of the

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[10]Because designation of counties as rural changes over time, one year had to be picked to classify counties. The 1990 designations of counties as metropolitan/nonmetropolitan have been used in this analysis, with nonmetropolitan counties being those called rural in this analysis. There were 2,342 rural counties and 738 urban ones for a total of 3,080 counties in the United States.

[11]Part of the methodology for identifying a "rational service area" includes stipulations for "a portion of a county, or an area made up of portions of more than one county, whose population, because of topography, market or transportation patterns, distinctive population characteristics or other factors, has limited access to contiguous area resources, as measured generally by a travel time greater than 30 minutes to such resources." See Appendix A for more details on HPSA designation criteria.

ten years noted above, while 212 (28.7%) of all urban counties were not designated as either a whole- or part-county HPSA during any of the ten years noted above.

Table IV.6 shows the number of rural and urban counties that have been identified as chronic HPSAs. Table IV.7 shows a comparison of chronic HPSAs to others based on several sociodemographic and basic health outcome variables.

Table IV.6

Counties by Chronic HPSA Status Using 1990 Rural/Urban Designation

Rural

Chronic Whole	352 (15.0%)
Chronic Partial	458 (19.5%)
Non-Chronic	997 (42.5%)
Never Designated	535 (22.8%)

Urban

Chronic Whole	30 (4.1%)
Chronic Partial	246 (33.0%)
Non-Chronic	250 (33.8%)
Never Designated	212 (28.7%)

In these areas, the programmatic support made available as a result of the initial HPSA designation may not have been sufficient to attract and retain an adequate number of primary care physicians so that it no longer meets the criteria to be designated as a HPSA. It must be emphasized that being designated as a chronic HPSA does not tell us what services and support were actually made available in the HPSA. On the other hand, placement of NHSC physicians in an area could hinder the entry of private physicians wanting to practice in an area, since the NHSC physicians would pose a competitive threat to would-be private physicians.[12]

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[12]NHSC physicians are generally salaried and thus do not have to be as concerned with the insurance status of patients they see, while private physicians may find it more difficult to make a private practice work in a very impoverished area with many uninsured or underinsured persons living there.

Table IV.7

Comparison of Chronic HPSAs to Other County Types

	Rural				Urban			
	Chronic Whole	Chronic Part	Non-Chronic	Never	Chronic Whole	Chronic Part	Non-Chronic	Never
1990								
Mean IMU	58.1	69.8	67.3	74.1	66.7	82.6	80.6	83.5
% < Poverty	22.7	17.8	18.2	15.7	15.9	13.5	11.3	10.3
% 65 yrs +	15.1	15.3	16.3	16.2	10.9	12.6	11.9	11.3
IMR	10.7	9.8	10.1	9.7	10.2	10.3	9.8	9.4
pop/pc doc 100,000	26	50	47	54	26	75	67	70
1980								
Mean IMU	53.8	. 64.7	63.9	69.7	59.5	73.8	71.9	74.8
% < Poverty	21.9	16.8	17.2	14.3	17.2	12.5	11.0	9.6
% 65 yrs +	13.7	13.3	14.5	14.6	10.1	11.0	10.4	9.8
IMR	15.4	13.5	13.8	13.4	13.5	13.5	13.0	12.7
pop/ pc doc 100,000	21	39	38	45	18	57	50	52
% Jobs in Agriculture								
1980	11.4	9.5	10.2	8.3	4.8	1.9	2.5	2.5
1990	7.0	5.7	6.5	5.1	2.6	1.5	1.8	1.5
Per Capita Income								
1980	$6,092	7,559	7,488	7,896	6,321	10,214	9,827	10,471
1990	$12,213	14,451	14,427	15,294	13,883	19,809	19,735	20,907
% Persons < Poverty								
1980	21.8	14.9	15.8	13.4	17.1	12.5	9.8	8.3
1990	22.5	16.1	17.1	14.6	15.6	13.3	10.1	8.9
% Families < Poverty								
1980	18.0	11.8	12.6	10.6	14.2	9.9	7.6	6.4
1990	18.8	13.0	13.8	11.5	12.6	10.5	7.7	6.7
% < 9th grade								
1980	23.3	14.8	16.8	15.2	21.2	12	10.3	9.5
1990	20.8	12.9	14.8	13.5	15.0	10.1	8.3	7.7
% High School								
1980	47.2	61.3	58.3	59.7	53.4	67.8	70.2	71.3
1990	59.2	71.0	68.6	70.5	67.1	75.4	78.6	80.1
% Education College								
1980	7.6	11.4	10.7	11.6	8.8	17.4	17.9	19.7
1990	8.6	13.4	12.6	13.8	11.9	21.9	22.4	24.7
Unemployment Rate								
1980	9.0	8.7	7.8	7.2	7.6	7.2	6.7	6.1
1990	8.0	6.8	6.5	5.9	5.9	5.7	4.9	4.5
% Jobs White Collar								
1980	30.9	37.7	36.4	38.9	41.5	53.0	52.5	54.9
1990	34.8	41.9	40.3	42.6	49.3	56.5	57.7	59.2
% Work Out of County								
1980	31.3	18.4	18.4	17.4	50.4	16.8	23.4	30.5
1990	37.3	22.4	22.3	21.0	52.6	18.8	25.8	33.5

Table IV.7 shows that chronic HPSAs generally appear to be poorer, have less educated populations, be older, and have a larger proportion of both individuals and families living below the poverty level in both 1980 and 1990. The poverty indicators we compared (per capita income, families below poverty) appear to be highly associated with being a chronic HPSA. In general, this confirms an idea that counties which have been chronically designated as HPSAs will have an overall lower socioeconomic status than counties which are not chronically designated as HPSAs. Table IV.1 showed that there has been a general increase in the supply of physicians across the nation over the past 15 years, but these increases were not sufficient to keep a fairly large number of counties from remaining chronic HPSAs.

Yearly Changes in Number of HPSAs and Population in HPSAs

Table IV.8 shows the change over time in the number of HPSAs by type of designation (whole county, part county, or none) for selected years (1978, 1986, 1987, 1989, and 1992).

Table IV.8
Number of Counties Designated as HPSAs by Type and Year

	1978	1986	1987	1989	1992
RURAL					
Whole County	568	592	581	656	656
Part County	312	582	607	558	676
None[13]	1,381	1,087	1,073	1,047	929
URBAN					
Whole County	98	87	83	61	66
Part County	231	350	361	357	354
None	490	382	375	401	399
TOTAL	3,080	3,080	3,080	3,080	3,080

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[13]None refers to those counties which were not classified as whole- or-part-county HPSAs.

Table IV.9

Population by HPSA Designation Type and Year

	1978	1986	1987	1989	1992
RURAL					
Whole County	7,658,100	8,946,700	8,384,900	8,676,400	9,273,300
Part County[14]	9,797,000	16,727,300	17,412,000	17,082,500	18,500,000
None[15]	29,451,800	24,819,200	24,719,800	24,353,800	22,340,000
URBAN					
Whole County	4,737,000	3,886,700	3,857,200	2,573,300	3,297,000
Part County	97,644,700	126,084,100	128,444,400	132,585,000	130,500,000
None	69,052,900	60,650,500	60,658,200	63,528,600	64,800,000
TOTAL	218,341,500	241,114,500	243,476,500	248,799,600	248,799,600[16]

Tables IV.8 and IV.9 show that both the number of counties and the population of the counties classified as rural, whole-county HPSAs increased somewhat from 1978 to 1992, but not as much as both the number and population of rural counties classified as part-county HPSAs did. The population living in rural part-county HPSAs nearly doubled from 1978 to 1992, and the total rural population which did not live in a whole- or part-county HPSA actually decreased during the same period of time. The population figures indicated for part-county HPSAs include the total county population and do not necessarily reflect the population that lives in the underserved portion of the county. The change in population reflects more the demographic transitions in those counties as whole counties.

The number of counties as well as the population living in urban, whole-county HPSAs declined over the same period of time, but the number of counties and population of part-county HPSAs increased fairly substantially.

Comparison of HPSAs to Non-HPSAs

We have chosen several sociodemographic variables as indicators to compare counties designated as HPSAs to those not designated as HPSAs. All else equal, counties designated as whole-county HPSAs and counties with part-county HPSA designations would be expected to be "worse off" on average according to these indicators, which include infant mortality rate, percent of persons living

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[14]Part-county population totals represent the proportion of the population in a county living in the designated portion of the county only.

[15]None refers to those counties which were not classified as whole- or part-county HPSAs.

[16]Note that the total population for 1990 and 1992 are the same. This is because 1990 Census population figures are the latest available on the ARF.

below the poverty level, unemployment rate, and per capita income, since these are factors likely associated with the relative attractiveness of an area to physicians. We are not suggesting that these variables 'cause' the counties to be classified as HPSAs, but that they are used here as indicators or descriptors of the general socioeconomic status of HPSAs and non-HPSAs.

Per Capita Income

Lower levels of per capita income are associated with a relatively impoverished area, one that would not seem as attractive to potential locating physicians. Table IV.10 shows the average per capita income according to the HPSA designation status of the county. Table IV.10 shows that counties designated as whole-county HPSAs consistently had a lower per capita income over the four data years compared to counties that were not designated as any type of HPSA. This relationship holds true for rural and urban counties. The part-county HPSAs are more similar to the counties not designated as any type of a HPSA on this measure, and in some years part-county HPSAs are found to have a greater per capita income than counties not designated as a HPSA. Table IV.10 shows a consistent relationship between higher levels of poverty, as measured by per capita income, and chronic designation as a HPSA.

Table IV.10
Per Capita Income by HPSA Designation Type and Year

	1978	1986	1987	1989	1992
RURAL					
Whole County	5,664	9,635	10,238	11,708	12,504
Part County	6,633	11,227	11,872	13,601	14,547
None*	6,446	11,711	12,345	14,120	15,086
URBAN					
Whole County	6,510	10,275	10,949	12,736	14,691
Part County	8,535	15,576	16,342	18,416	19,514
None	8,176	15,829	16,975	19,128	20,758

*None refers to those counties which were not classified as whole- or part-county HPSAs.

Infant Mortality Rate (IMR)

The number of infant deaths per 1,000 live births (the infant mortality rate) is a classic indicator of the overall health status and functioning of the primary health care delivery system, even though it only captures the experience in the population of women who are having children. The infant mortality rate would be expected to be worse in areas that have shortages of primary care physicians,

or which were otherwise underserved with respect to primary health care. Table IV.11 compares the infant mortality rate of counties by their HPSA classification status. The infant mortality rate is consistently higher among whole-county HPSAs compared to non-designated counties, although the difference is often small.

Table IV.11[17]

Infant Mortality Rate by HPSA Designation Type and Year

	1978	1986	1987	1989	1992
RURAL					
Whole County	16.3	12.3	11.9	11.5	11.4
Part County	13.6	10.5	10.2	10.0	10.0
None*	15.1	10.6	10.4	10.0	10.0
URBAN					
Whole County	14.3	10.5	10.2	10.4	9.8
Part County	14.7	11.2	11.0	10.7	10.8
None	13.6	10.2	9.8	9.6	9.4

*None refers to those counties which were not classified as whole- or part-county HPSAs.

Persons Below Poverty

The percent of persons living below the federal poverty level in a county would also be expected to be associated with a county's HPSA designation, since the level of poverty of an area is thought to have an influence on the relative success of the area in attracting and retaining primary care physicians. As well, relatively impoverished populations are thought to have a greater level of health needs than populations which are not as impoverished. Table IV.12 shows the percent of persons living below the poverty level according to their county's HPSA designation status for the two years for which these data are available. Again, whole-county HPSAs have a higher percent of their population living below the poverty level than non-designated counties, with the part-county HPSAs falling in between the other two. Again, this points to the association between poverty and being classified as a HPSA.

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[17]Five-year infant mortality rates are shown instead of yearly rates due to the instability of yearly rates. So, the 1978 IMR is the 5-year rate for the years 1975-1979; 1986 rate is the 5-year rate for the years 1982-1986; the 1987 rate is the 5-year rate for the years 1983-1987; and the 1989 rate is the 5-year rate for the years 1984-1988. The 1992 rate is the rate for the years 1987-1991.

Table IV.12

Percent of Persons Living Below the Poverty Level
by HPSA Designation Type and Year

	1978	1989[18]
RURAL		
Whole County	19.7	22.3
Part County	13.6	16.0
None*	16.1	15.3
URBAN		
Whole County	13.1	14.6
Part County	12.4	13.0
None	10.4	9.4

*None refers to those counties which were not classified as whole- or part-county HPSAs.

Unemployment Rate

The unemployment rate of a county shows the number of persons who do not have a job, but who are seeking work. It is also thought to be associated with the overall economic vitality of a county, and hence that county's ability to attract and retain primary care physicians. Whole- or part-county HPSAs would be expected to have relatively high unemployment rates relative to non-designated counties given the association found between poverty and HPSA designation. Table IV.13 shows the unemployment rate by county HPSA designation status and year. This expected relationship is not borne out in all years; in some years, the unemployment rate in part-county HPSAs is higher than that of whole-county HPSAs in the same year.

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[18]The rural/urban breakdown provided here represents county designations in 1992. The poverty level data are only available for 1979 and 1989, but we have maintained a constant definition of rural throughout this policy analysis (1992 designation).

Table IV.13

Unemployment Rate by HPSA Designation Type and Year

	1978	1986	1987	1989	1992
RURAL					
Whole County	8.3	10.9	9.5	7.7	7.6
Part County	8.7	9.2	8.1	6.7	6.8
None*	7.7	8.7	7.6	6.0	6.0
URBAN					
Whole County	7.4	9.6	8.7	5.8	5.5
Part County	7.2	6.6	5.9	5.2	5.6
None	6.4	6.1	5.3	4.5	4.6

*None refers to those counties which were not classified as whole- or part-county HPSAs.

None of the indicators noted above is suggested as the 'cause' of a county being designated as a part- or whole-county HPSA. However, each of the measures is hypothesized to be associated with the degree of poverty or general health care system development of a county. These indicators show that the counties designated as whole-county HPSAs do appear to be worse off than those counties that are not classified as HPSAs, while the part-county HPSAs are more similar to the non-HPSA counties, but generally somewhere in-between the whole-county HPSAs and the non-designated counties. This lends some confidence to the assumption that this methodology does a reasonable job of differentiating relatively impoverished counties from those that are better off. The few measures of comparison we have are general measures of poverty, not more specific measures of access or development of the health care system. This does not prove that the persons living in those counties designated as HPSAs suffer from worse access to health care, or that any access problems they have result in worse health outcomes. Other research has identified deficiencies in the HPSA methodology's ability to differentiate among populations experiencing problems with access to health care, the underlying goal of the method (Berk et al., 1983; Kehrer & Wooldridge, 1983). It remains difficult to know exactly what the HPSA methodology measures. This uncertainty, along with the methodology's simplicity in relying only upon population–to–physician ratios and the origin of the population–to–physician ratios that are used in the methodology are reasons that the HPSA methodology should be reviewed to determine its continuing usefulness.

Are All Counties Never Designated as HPSAs Well Served?

As noted above, there are 535 (22.8%) rural and 212 (28.7%) urban counties which have never been designated as a whole- or part-county HPSAs for the 10 years for which we have data in the period 1978-1992. An important question to ask is: why have they never been designated as HPSAs? Are these counties adequately served with respect to primary care physicians and thus not in need of

the programmatic assistance that is available as a result of a designation as a HPSA, or do some of these counties have problems with respect to primary care physicians but still have not been designated. To investigate this question further, we looked at the rural and urban counties never identified as a HPSA to see how many of them had an Index of Medical Underservice score of 62.0 or less (which is the cutoff point for a county to be classified as a medically underserved area). Table IV.14 below shows the number of counties that have never been designated as a HPSA and which have an IMU score of 62 or less.

Table IV.14

Number of Counties Never Designated as a HPSA
with IMU Score of 62.0 or Less

Year	Rural	Urban
1980	123	5
1990	82	0

*Note: Never designated means they were not designated in 1978, 1980, 1982, 1983, 1984, 1985, 1986, 1987, 1989, and 1992.

This table shows that of the 535 rural counties never designated as a HPSA, 123 of them had an IMU score of 62.0 or less in 1980. Only 82 of them still had an IMU score of 62.0 or less in 1990. This phenomenon is much rarer among urban counties as only five of the 212 urban counties never designated as a HPSA had an IMU score of 62.0 or less in 1980 and in 1990 none still had an IMU score equal to or below the threshold which would have classified them as a medically underserved county. The 82 rural counties never designated as a HPSA but still having an IMU score low enough to classify them as a medically underserved county in 1990 deserve attention to see why these counties may not have been classified as a HPSA in spite of the fact that we have evidence that they were experiencing problems in health care outcomes if not health provider supply. Table IV.15 shows the distribution of the IMU scores in 1980 and 1990 for the counties which have never been classified as HPSAs.

Table IV.15

Range of IMU Scores for Counties Never Designated
as a HPSA, 1980 & 1990

IMU Score	Rural		Urban	
	1980	1990	1980	1990
37-49	9	7	0	0
50-59	71	39	2	0
60-62	43	36	3	0

Note: A IMU score of 62.0 or less is the cutoff point for designating an area as medically underserved according to the MUA methodology which is discussed in the next section. The lower the score, the more underserved the county. The IMU includes population–to–physician ratio, infant mortality rate, percentage of population living under poverty, and percentage of population older than 65 years.

Programs Using the HPSA Designation

Several programs use the HPSA methodology, which was developed in response to the Health Professions Educational Assistance Act of 1976 to designate areas or populations eligible for assistance through that particular program. The National Health Service Corps uses the HPSA methodology to designate areas which can receive a NHSC physician in an approved practice site. This includes the loan repayment as well as scholarship programs. While being designated as a HPSA does not guarantee that a NHSC physician will be sent to an area, it is a necessary first step in receiving this type of assistance. Other programs include a 10% Medicare bonus to physicians providing services to Medicare recipients in HPSAs. As well, new physicians practicing in a HPSA are allowed to have higher 'customary charges' in the setting of their Medicare reimbursement. While the HPSA methodology was originally designed (as the HMSA methodology) primarily to designate areas as eligible for NHSC placements, this methodology has been used by other programs developed for different purposes. See Appendix B for a list of those programs using the HPSA methodology to designate areas eligible to receive assistance.

Criticism of HPSA

Berk, Bernstein and Taylor (1983) examine the Health Professional Shortage Area (HPSA) methodology, and seek to determine the actual availability and utilization of care among persons living in HPSAs. These authors used the 1977 National Medical Care Expenditure Survey (NMCES) in much the same way Kleinman and Wilson (1977) used the NHIS to assess the IMU. They classified the 40,000 respondents to the survey according to their residence in a HPSA or not. Since HPSAs can be parts of counties, or aggregations of counties, this was more difficult than assigning respondents to the NHIS to their county. Therefore, the authors assigned, by hand, the HPSA status of the ZIP code in which

each respondent to the survey lived. They go on to compare respondents living in a HPSA to those respondents not living in a HPSA on the likelihood of having a physician visit in the past year, number of physician visits in the past year, travel time to usual source of medical care, and waiting time in a physician office for an appointment, and also conduct a series of regression analyses using these measures as the dependent variable. The authors find some differences in use of care and access to care between respondents to the survey who live in a HPSA compared to those who do not live in a HPSA, but these differences are not significant when the data are analyzed using multivariate methods. The multivariate models show that race, income and health insurance coverage differences among respondents are stronger predictors of the use and access measures than is residence in a HPSA, with the exception of travel time to care. Based on these findings the authors conclude, "...that the assumptions concerning access to care in manpower shortage areas should be reexamined. Our investigation suggests that residents of HPSAs do not appear to be using fewer physician services as a result of the low physician/population ratios in the areas in which they live." (Berk, Bernstein & Taylor, 1983) They suggest that new criteria are needed to identify areas eligible for receipt of programmatic assistance designed to improve access to care.

The volume *Evaluation of Health Manpower Shortage Area (HMSA) Criteria* (1980), produced for HRSA by Mathematica Policy Research, Inc., is an exhaustive review of the HMSA criteria which makes some criticisms of the process of shortage designation and sketches out some possible improvements for the future. The first criticism noted in this volume is the lack of a definition of what a health manpower shortage area is supposed to be. The authors note:

> Such a description would help applicants understand the principles underlying the present, rather complex, regulations and would likely facilitate the application process and allay misunderstandings of the significance of HMSA designation. Such a definition would also have been useful in this evaluation, in that it would have allowed us to address the issue of whether the criteria were successful in achieving their desired objectives.
>
> (US DHEW, 1980)

This report notes that in the absence of a specific adopted definition of what a manpower shortage area means, that other sources such as published accounts of the methodology (Lee, 1979) can provide clues regarding the purpose and emphasis of the HMSA methodology (to identify the portion of underservice attributable to provider shortages). To some extent, then, the methodology does focus solely on providers and does not take into account any other variables (as the IMU does), but Kehrer

and the authors[19] note that it is not clear whether a shortage of providers is a cause or an effect of underservice (or both).

The strongest criticism this volume makes of the HMSA designation methodology is the fact that service areas with very different market conditions for health care could be designated as health manpower shortage areas; this remains true today. Specifically, they suggest the existence of three types of service areas based on the relevant local market conditions for physician services: economic shortage areas, normative shortage areas, and non-shortage areas.

Economic shortage areas are those with lower physician availability (either because of numbers, productivity, or a combination of both) and excess effective demand for physician services. They further divide this type of area into those that: 1) could support a private practice physician(s) if they could be enticed to locate there; and 2) those that could support a private practice physician after a period of time. They identify sub-area 1 as ideal for loan repayment programs whereby a physician locates in an area in return for loan repayment, but receives no direct subsidy from government, and sub-area 2 as ideal for a limited period of direct government subsidy (2-4 years) after which time the expectation is that the area will be able to sustain a private practice.

Normative shortage areas are those which have high unmet needs, but limited effective demand (generally because of a poor population, which means need doesn't translate into effective demand). For this reason, they identify these areas as ones which will have difficulty in ever supporting extra private practice physicians; for these areas to receive care the only option may be indefinite government support of physicians through the NHSC or other programs.

Non-shortage areas are those in which there is neither high unmet need or excess effective demand. In general, the supply of physicians in this area fits the needs and demand of the population in this area. They argue that no attempt to increase the number of physicians practicing in these types of areas (or increasing productivity) is necessary or desirable. This approach would require more locally driven analysis of health care markets and does not lend itself to identifying a few simple indicators to designate areas.

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[19]The report referred to was completed by Mathematica Policy Research, Inc. and the principal authors were Barbara H. Kehrer, Judith Wooldridge, and Nathan Szapiro.

Table IV.16

Typology of Counties That Can Receive HPSA Designation

	Unmet Need	Effective Demand	Provider Availability	Remedy
Economic Shortage	Low	High	Low	Loan repayment or limited subsidy;; Eventual private practice physicians
Normative Shortage	High	Low	Low	Permanent subsidy to support physician or gov't increase in effective demand
Non-shortage	Very Low	Adequate	Adequate	No remedy needed; level of demand equals provider availability

Adapted from Department of Health, Education, and Welfare, 1980.

The point of their illustrating these three types of service areas is that they all could be designated as a HPSA because designation in the methodology is based primarily on population–to–provider ratio. Measures of excess demand for services in adjacent areas or high needs may be provided as part of a request to be designated as HMSA then or a HPSA now, but they are not required. Practically, they typically come into play for urban service areas which are seeking designation in the exception category (population–to–provider ratio is between 3000:1 and 3500:1). The fact that all of these areas can be designated as HPSAs sums up the largest criticism of the criteria discussed in this book. This inconsistency flows from the lack of definition of what manpower shortage areas were supposed to be. A prior evaluation of the HPSA criteria did find the HPSA to be more intellectually defensible than the IMU but recommended that "[in the HPSA process] greater consideration should be given to indicators of effective demand" (Department of Health, Education, and Welfare, 1980). In the end, in spite of difficulties that the authors note concerning the HPSA methodology, they did not recommend that the methodology be scrapped altogether but refined.

V. INDEX OF MEDICAL UNDERSERVICE

Legislative History

The origin of the Index of Medical Underservice (IMU) was the Health Maintenance Organization (HMO) Act of 1973. The purpose of this Act was to encourage the development of HMOs throughout the United States in an effort to improve both access to health care and the efficiency of the system. Proposed HMOs which had at least 30 percent of the people in their service areas in areas identified as medically underserved were eligible to receive special funds to encourage the provision of care via HMOs to poor populations. The HMO Act of 1973 stipulated that a methodology for identifying medically underserved areas be developed and the IMU was the methodology that resulted from this process (US DHEW, 1975). The IMU has remained in use even after the cessation of federal attempts to encourage HMO development, and has been used by various federal programs as a means of designating areas eligible for programmatic assistance such as the Community Health Center (CHC) program.[20]

Process of Designation as a Medically Underserved Area

The designation of medically underserved areas (MUAs) was first completed by the Secretary of the Department of Health, Education, and Welfare in 1975 using the IMU, as prescribed by the HMO Act of 1973. The list of MUAs was updated at various points over time, again using the IMU. (There is also a process of designating a medically underserved population (MUP) within a particular geographical service area that may or may not meet the criteria set forth to classify an entire area as a MUA, but the focus of this report will be on the MUA designation process.) The designation of an area as a MUA is based on the application of the Index of Medical Underservice (IMU) to a particular geographic service area. In theory, this service area could vary in size and in its adherence to political boundaries such as county lines, but in practice, geographic service areas are often counties because of data availability considerations. In order to classify an area as a MUA, a particular service area to be designated must be identified in terms of:

1) whole county(ies); or

2) groups of contiguous counties, minor civil divisions (MCD), census county divisions (CCD), or census tracts whose population centers are within 30 minutes travel time of each other and which represent communities with similar socioeconomic and demographic characteristics.[21]

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[20] A more complete listing of programs using the MUA designation as the means of identifying areas eligible for programs is contained later in this section.

[21] The measures of economic and demographic characteristics to be used to determine whether a proposed service area constituted a "community" are not given in the rules of the operation of the MUA designation.

As well, other information corresponding to the proposed service area is needed in order to determine whether the area in question is indeed qualified to be designated as a MUA. The data needed are as follows:

1. the resident civilian, non-institutionalized population of the service area (aggregated from the unit of analysis appropriate given the boundaries of the proposed service area).[22]

2. the percent of the service area's population with incomes below the poverty level.[23]

3. the percent of the service area's population that is over 65 years of age.

4. the infant mortality rate (latest 5-year average) for the service area in question.[24]

5. the current number of full-time equivalent (FTE) primary care physicians serving the service area, and their locations of practice.[25] This information is used along with the population of the service area to calculate the ratio of FTE primary care physicians per 1,000 population for the service area.

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[22]If a service area is a sub-county unit, then this information would be aggregated from minor civil divisions, census county divisions, or census tracts.

[23]While not entirely clear, we assume that this criterion refers to the percent of persons below poverty, as opposed to the percent of families below poverty.

[24]If the service area does not coincide with county boundaries, then calculation of the infant mortality rate for the service area in question will be difficult. The rules of the methodology allow for the use of the infant mortality rate for the unit of aggregation that is closest to the proposed service area, and for which data exist. The latest 5-year average available is used for the infant mortality rate because of the instability of infant mortality rates in areas with a small number of live births per year. In this circumstance, small changes (increases or decreases) in infant deaths will cause the infant mortality rate to jump up and down from year to year. The 5-year average reduces the volatility of the infant mortality rate. In fact, the methodology states that sub-county infant mortality rates should be used in the calculation of the Index of Medical Underservice (IMU) only if there are at least 4,000 births in the service area over the 5-year period of time in question. When only county-level data are available and the proposed service area contains parts of two counties, then the infant mortality rates in the respective counties should be weighted according to the proportion of the population in the service area made up by the respective counties to determine an estimate of the service area infant mortality rate. This, in effect, assumes that the infant mortality rate is uniform throughout each of the counties in question.

[25]Which type of physicians are to be counted as primary care physicians is not clear in the methodology. The HPSA designation counts general practitioners, family medicine, ob/gyns, general internal medicine, and pediatricians as primary care physicians.

6. Designation requests are also supposed to have a map of the service area requesting designation, with health care resources available in the service area identified. When seeking a designation for a service area other than a single, whole county, a case must be made for why the service area requested has been chosen. Information regarding travel patterns, work patterns, use of health resources, and linguistic, cultural or other population reasons that a non-county service area is appropriate should be provided to the Division of Shortage Designation.[26]

Once the service area has been delineated, calculation of the Index of Medical Underservice requires four variables: 1) primary care population–to–physician ratio; 2) infant mortality rate; 3) percentage of the population living below the federal poverty level; and 4) percentage of the population 65 years of age or older (Division of Shortage Designation, 1993; Health Services Research Group, 1975; Wysong, 1975). The IMU is then calculated for the service area using weighting factors provided by the Division of Shortage Designation, Bureau of Primary Health Care, Health Resources and Services Administration (HRSA). These weights translate the raw values for the measures of the variables which make up the IMU into scores which are summed to obtain the value of the IMU for a given service area. The weights to be used are contained in Appendix C.

In the original designation process, rural and urban counties were treated differently. In rural counties (defined as those classified as nonmetropolitan), county-level data were used for the infant mortality rate and population–to–primary care physician ratio. Minor civil division (MCD) and Census County Division (CCD) were used for the proportion of the population below poverty and the proportion who were age 65 or older along with the same county level data on infant mortality and population–to–primary care physician ratio to determine the IMU score for nonmetropolitan counties (*Federal Register*, 1976). In metropolitan counties, the same two county-level variables were used along with census tract level data on poverty and the elderly to develop an IMU score, and thus a designation of an area as medically underserved.

The IMU ranges from 0 to 100, with 0 representing a service area that is "completely" underserved, and 100 an area that is best served, or least underserved. All service areas with an IMU score of 62.0 or less are designated as a MUA. This cutoff level was adopted when the original calculation of the IMU showed the median IMU value for all counties in the United States to be 62.0; hence, the cutoff adopted identified half of the counties in the nation as medically underserved and the other half as not underserved (Health Services Research Group, 1975). This cutoff remains in effect today.

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[26]Because of data availability, and more explanation required for sub-county service areas, whole counties are more often identified as service areas in the seeking of MUA designations.

The IMU may appear to be a more comprehensive view of underservice than the HPSA methodology, since it adds to the idea of physician shortage the health status or level of need of a population, as well as the population's ability to seek care to address those health care needs (poor and old persons are assumed to have higher need and more barriers to the receipt of needed care). However, the MUA methodology typically focuses on service areas as counties, because of data difficulties, while the HPSA methodology more readily allows for identification of sub-county units or areas encompassing more than one county as HPSAs. The question of the appropriate service area for analysis remains unclear.

There is a procedure for making a request for a service area that does not have an IMU value of 62.0 or less to be designated as a MUA. As part of the provisions of Public Law 99-280, enacted in 1986, an area or population group can be declared a MUA or Medically Underserved Population (MUP) even if they do not have an IMU score of 62.0 or less. In order to be designated as a MUA or MUP on the basis of this exception clause, an applicant must make the case that the service area in question has "unusual local conditions which are a barrier to access to or the availability of personal health services" (Division of Shortage Designation, 1994). The methodology sheet put out by the Division of Shortage Designation states that service areas with IMU scores of 70.0 or above will have to have particularly convincing evidence that the area is experiencing unusual circumstances.

When a request is made to the Division of Shortage Designation (DSD), whether a normal request or an exception request, the DSD first determines if all the necessary information has been included in the application. If not, then the application is returned for additional information to be added. After the application is completed, there is a 30-day comment period, with copies of the application sent to the State's Governor's office, the State Primary Care Association, local health department or health planning agency, and the State cooperative agreement office (such as an Office of Rural Health). The decision to designate or deny the application is made in writing to the applicant organization. The time of the entire process is supposed to take between 60 and 90 days.

Change of MUA Over Time

Table V.1 shows the number of counties in the United States by the IMU value for 1980 and 1990 to illustrate the change in the number of whole, single counties that met the criteria for designation as a MUA.

Table V.1

Number of Counties With Given Index of
Medical Underservice Values, 1980 & 1990

IMU Value	1980	1990
0-20	1	0
21-40	68	27
41-60	819	622
61-80	1,916	1,612
81-100	276	819
62 or less	1,066	784
Over 62	2,014	2,296

Note: The IMU values above are calculated for single, whole counties. An Index of Medical Underservice of 62.0 (and below) designates an area or population as medically underserved.

Table V.1 shows that the number of single, whole counties with IMU values of 62.0 or less (which would qualify them as a MUA) decreased over the decade from 1980 to 1990. The table shows that there has been an across-the-board decrease in the severity of underservice in counties across the nation as measured by the IMU and using the county as the service area. The changes in these IMU values are obviously driven by changes in the variables used to calculate the index, since its definition has remained unchanged since its inception in the mid-1970s. We know that over this period of time there has been a general increase in the number of physicians in the nation, although the increase in the number of primary care physicians has not been as pronounced since the country continues to train far more specialists than primary care physicians. This general increase in the number of primary care physicians has surely contributed to the decrease in the number of counties with IMU scores of 62.0 or less. Table V.1 shows that the average IMU score for all counties in each category of county increased (signaling less severe underservice among those counties identified as underserved by the IMU) from 1980 to 1990. As well, the infant mortality rate has also been steadily declining in the United States since the 1950s, and continued to do so during the decade of the 1980s, albeit at a somewhat slower rate than in the past. The proportion of population living below the poverty level probably fluctuates more than any of the other variables used in calculating the IMU. During the 10 years between 1980 and 1990 this value likely varied somewhat for many counties in the nation, but the values in 1980 and in 1990 may have been quite similar since each year saw a period of economic stagnation and downturn. The proportion of the population above 65 years of age has increased generally throughout the nation (larger proportion of elderly makes a negative contribution to the Index, meaning an area has a greater degree of underservice) although the rate of increase of this segment of the population probably differs

quite a bit among counties. While there has been a general increase in IMU values, and a decrease in the number of counties with IMU values of 62.0 or less, this does not mean that all counties have experienced improvements in their degree of underservice as measured by the IMU. It remains unclear what the IMU measures. There is evidence that the IMU does not do an adequate job of identifying populations with serious access problems and/or levels of underservice.

Programs Using the IMU for Designation

As noted, originally the IMU was developed in order to identify medically underserved areas so that HMOs with at least 30 percent of their patients coming from such areas could receive priority consideration for receipt of HMO development grants. In addition, any health facility that primarily served medically underserved areas was also eligible for special funds under Section 1611(d) of Title XVI of the Public Health Service Act (*Federal Register*, 1976). Additionally, under Section 330 any public or private nonprofit group that planned, developed, operated, or maintained Community Health Centers (CHC) was eligible for special funding if it served or intended to serve medically underserved areas as defined by the IMU. Originally, HMOs, CHCs, or other local organizations wishing to access these funds available to those serving medically underserved areas had to consult the list of medically underserved areas produced by the Secretary of HEW to determine their eligibility to apply. An application (along with reason and documentation of data) for admission or deletion to the list had to be forwarded from a local health planning agency to the Division of Monitoring and Analysis, Bureau of Community Health Services, Department of Health, Education, and Welfare (*Federal Register*, 1976).

During Fiscal Year 1975, there were feasibility, planning, and initial development grants available for award, but there were a small number of federally-qualified HMOs. By the end of Fiscal Year 1975, only five HMOs nationally were federally qualified[27], although there were 178 "look-alike" organizations operating in 33 states, the District of Columbia, and Guam (Department of Health, Education, & Welfare, 1975). By June 30, 1975 there were approximately 50 organizations believed to be interested in being designated as federally-qualified HMOs. One of the five originally qualified HMOs (they met all criteria as set forth in the Act) was located in Greenville, South Carolina and had two facilities located in underserved areas to provide care to the underserved community in this area (Department of Health, Education, & Welfare, 1975). The number of HMOs

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[27]Any legal entity or organization was eligible to apply for grants and/or loans under the HMO Act of 1973. In order to receive any federal funds, a prospective HMO had to agree to comply with the regulations as stipulated in the Act. Briefly, this meant comprehensive care had to be available 24 hours a day, 7 days a week; the governing board of the HMO had to be comprised of at least one-third consumers; and the HMO had to develop grievance procedures to deal with concerns of patients.

receiving grants increased over the next few years, but this program has not continued to the present. So, the program for which the IMU and MUA methodology were specifically developed does not exist any longer, but the IMU is still used for other purposes.

The CHC grant program still relies upon the MUA methodology as the means for determining eligibility for receipt of grants for planning, development, and operation of CHCs, which can only be awarded to CHCs that serve populations designated as medically underserved by the Secretary of Health and Human Services. As well, organizations or systems of organizations that meet the qualifications for CHCs under Section 330 of the Public Health Service Act, but which do not receive funding from that Act, are designated as Federally Qualified Health Centers (FQHCs) as long as they serve medically underserved areas and/or medically underserved populations. This designation of a FQHC qualifies them for cost-based reimbursement of Medicaid-eligible patients. Finally, health clinics which serve rural areas and/or populations designated as medically underserved via the MUA methodology are eligible for certification as Rural Health Clinics (RHCs) by the Health Care Financing Administration, which enables them to receive several reimbursement advantages including direct billing of Medicare and Medicaid for services provided by mid-level practitioners such as Nurse Practitioners (NPs) and Certified Nurse Midwives (CNMs). See Appendix B for a complete list of the programs which use the MUA methodology to designate areas eligible for programmatic assistance.

Criticisms of the MUA Designation

Wysong (1975) outlines the major theoretical difficulties with the Index of Medical Underservice. While he comments on the "almost unprecedented" degree to which this research represents health services researchers playing a direct role in health policy making, he concludes "that there are serious problems associated with the meaning of the concepts 'medical underservice' and 'health services scarcity' [as the concept was originally formulated at Wisconsin] and in the interpretation of the values obtained when the index is applied" (Wysong, 1975). Wysong identifies the lack of a definition of medical underservice as the biggest problem with the methodology. He also notes that a distinction between underservice, availability and accessibility was not made and that many persons remain confused regarding the relationship between these terms. He argues that without a clear definition of the concept driving the research which developed the IMU, the IMU will not approach its potential as a health policy tool since it is unclear what it measures.

Kleinman and Wilson (1977) compare respondents to the 1973 and 1974 National Health Interview Survey (NHIS) who lived in rural MUAs to rural counties not classified as MUAs (what they call ASAs, adequately served areas). Each of these groups were compared with all respondents living in metropolitan counties, to determine if the groups were different in terms of health status, access, and utilization of health care. They find no differences in number of physician visits per year among those rural residents living in MUAs compared to those living in ASAs, slight differences in the percentage

with at least one visit in the past year (71.0 in MUA vs. 73.4 in ASA), slightly lower utilization of preventive services by those living in MUAs, and higher rates of non-surgical hospitalization for those in MUAs compared to those in ASAs. Even among the measures for which they are able to detect a difference, the practical significance of the difference remains in doubt. They conclude that, "in terms of reported problems with access to medical care, the differences between MUAs and ASAs were not large" (Kleinman & Wilson, 1977). Generally, the respondents to the 1974 NHIS living in rural counties appear to be similar, regardless of whether they live in a MUA or not. Kleinman and Wilson conclude that these findings imply that the concept of medical underservice needs to be closely examined, defined, and then operationalized if a better methodology to identify underserved populations is to be developed. They say that, ideally, appropriate standards of care should be agreed upon and that deviations from this standard should be defined as underservice.

Kviz and Flaskerud (1984) attempted to determine the ability of the IMU to differentiate among the underservice or degree of need for health services of individuals living in MUAs compared to those who did not. They focused their study on counties in which at least 50 percent of the population was rural (based on percent of population residing in places with a population less than 2,500) in DHHS Region V (Illinois, Indiana, Michigan, Minnesota, Ohio and Wisconsin). They then stratified the counties according to IMU scores as follows: less than 50, 50-62, 63-67, 68-72, and 73 and more. The cutoffs were determined in order to make the strata approximately equal in terms of number of counties in each. In each state, one county was randomly selected from each stratum with probability proportionate to the number of housing units in the county. The median value of the IMU for included counties was 66.3 which was fairly close to the national median of 62.0 identified in 1974. A systematic random sample of households was taken from each county selected.

To this sample, a questionnaire was administered which was designed to measure the need for health services, and to, as the authors put it, "examine the degree to which consumers' relative assessments agree with the experts' consensus assessments as predicted by the IMU" (Kviz & Flaskerud, 1984). The questionnaire sought to measure access and availability to care, utilization of care, health status, and satisfaction with care. Analysis of variance was carried out on the county score for the IMU for each respondent and six items: whether they had a usual source of care, whether they traveled out-of-county for care, number of physician visits, the symptoms they experienced, their self-assessed health status, and their satisfaction with care. The results show that the IMU explained less than 10% of the variance for each of the six criterion measures listed above, and less than three percent for the likelihood of a person having a usual source of care, number of physician visits, and number of symptoms experienced (measure of need). They find that when the counties are collapsed into dichotomous MUA/not-MUA format (as they are in practice) that the predictive power of the IMU to identify underserved areas becomes even weaker. The authors conclude that both the MUA methodology as used and the IMU applied in a more exact manner were "not found to be an effective

discriminator among levels of need for health services as reported by the survey respondents" (Kviz & Flaskerud, 1984).

VI. CONCLUSIONS REGARDING FUTURE OF SHORTAGE / UNDERSERVICE DESIGNATION

The United States Congress, and the nation in general, have recently engaged in a debate regarding changes in the financing and delivery of health care in America. Universal health insurance coverage was the focus of much of the debate. While the 103rd Congress passed no health reform bill, the need to be able to identify underserved populations and those persons living in areas where shortages of necessary health care resources affect health status remains. Even if the American health care system were changed in such a way that each American were covered by relatively similar health insurance, underserved and vulnerable populations would continue to exist and resources above and beyond the basic level of health insurance would likely be necessary to increase access to care and maximize the health care status and well-being of these citizens. Even under the British National Health Service (NHS) identification of a type of physician shortage area and the use of an Index of Underprivilege are important health policy tools which try to respond to those in danger of slipping through the cracks (Exworthy, 1994; Jarman, 1984). This means that improvements in the various methodologies for identification of underserved persons remain important for federal health care policy making, regardless of the outcome of the debate over health care reform. Better ways of identifying such populations with greater specificity may become more important given that the costs of the overall health care system continue to rise, which in turn applies increasing pressure to programmatic responses aimed at improving access to care for underserved and vulnerable populations; quite simply, there are finite dollars available for this type of assistance. Some programs may find themselves operating with smaller numbers of dollars and larger numbers of persons eligible or in need of care based on the traditional views of eligibility for this type of assistance.

The last section of this policy analysis lays out our conclusions about key issues that must be addressed in future attempts to identify underserved populations. We have six main conclusions based on our study of the HPSA and MUA methodologies that we believe are important to consider in any effort to develop a new way of identifying underserved populations:

I.   There are conceptual problems with both the HPSA and MUA methodologies, but changes in these methodologies could have far-reaching consequences.

II. Definitions of underservice/provider shortage should be made clear when developing any new methodology.

III.   Policy goals of programs should fit the definition of underservice/provider shortage adopted to designate areas eligible for programmatic assistance.

IV.   The unit of analysis for these types of methodologies may begin to shift away from counties or other localized geographic areas, and toward population access to a larger health care delivery system that may be geographically dispersed.

V.   The biggest practical issue for any methodology is what data are needed, and who is responsible for designation of areas as eligible for assistance using the methodology.

VI.   Any change in methodology for designating eligible recipients for assistance will probably create winners and losers, making any change intensely difficult and inherently political.

I. There are conceptual problems with both the HPSA and MUA methodologies, but changes in these methodologies could have large consequences and should not be undertaken lightly.

There is evidence that both the HPSA and MUA methodologies are deficient in their ability to demarcate between populations that are underserved and those that are adequately served. This means that there is room for improvement if a methodology (or methodologies) could be developed which better measured the concepts identified as important. But, a change in the methodologies should not be undertaken lightly. Whatever their theoretical and operational shortcomings, the HPSA and MUA methodologies have played an important role in distributing finite health care resources to those populations and areas identified as being underserved over the past 20 years. Changing the manner in which decisions are made regarding the use of federal health policy resources targeted at underserved populations or persons living in shortage areas could have severe consequences, potentially altering the flow of millions of federal dollars. Depending on how different the results of a new methodology proved to be, some areas which now receive funding might not in the future, and some which do not presently may become identified as eligible. Since the use of these two methodologies is well entrenched in federal health policy making and because those now identified as eligible for programs by the present methodologies will benefit from the status quo, changes in the methodology will likely be difficult. And, if any new methodology does not have as a starting point a clear definition of what it is supposed to measure, it is unlikely that it will constitute a major improvement in the ability to identify underserved populations and provider shortage areas.

II. Definitions of underservice/provider shortage should be made clear.

Much of the difficulty in writing or thinking about the designation of populations as underserved stems from the fact that the key terms in the debate are poorly defined. This should not be

underestimated as a problem. You cannot begin to successfully talk about measuring a concept without first defining it. We see three basic types of definitions of underservice or provider shortage.

1. Provider-Based Methods. This type of definition views underservice primarily as a lack of access to providers in a given area or for a given group. Within a provider-based definition of underservice or provider shortage a definition can set a standard level of providers that should be present, or can use a relative approach whereby a cutoff is set so that a certain proportion of persons or areas are identified as underserved or suffering from a provider shortage.

2. Population-Based Methods. This type of definition looks to the population in a given area to determine the degree of underservice or provider shortage. This type of definition could take a normative approach and focus on the need of the population, or a more market-based approach and focus on demand for health care in an area. In each instance, these terms must be defined to further clarify the definition of underservice or provider shortage that is being adopted.

3. A Mixture of the Two. This type of definition seeks to tie the experience of the population in a given area to the primary health care delivery system to which the population has access. This approach defines underservice or provider shortage as an inappropriate primary health care delivery system given the population.

We do not suggest that there is one particular definition of underservice or provider shortage that should be adopted, although we suggest that most methodologies seeking to identify underserved populations or areas of provider shortage are implicitly seeking to identify places and populations with systematic barriers in access to primary care. We think this is the best way to think generally about what is meant when we discuss underservice or provider shortage areas. Taking this approach to defining underservice or provider shortage still leaves much ambiguity given the large number of definitions and conceptualizations of access that have been offered. The key to better developing future methods to identify underserved areas and provider shortage areas is to clearly define what is meant by the important terms. Even if there is disagreement among definitions, at least people will know what a particular methodology sets out to measure and identify.

III. Policy goals of programs should fit the definition of underservice/provider shortage adopted.

This conclusion is closely tied to conclusion II. One problem in the area of identifying areas eligible for programmatic assistance is that many programs now use methodologies for designation (HPSA and MUA) that were developed for other purposes. The use of existing methodologies to

identify areas eligible for a new program is easy, but may result in the mis-allocation of finite resources available to respond to these types of problems. In order to determine if a program and a methodology for designating areas are an appropriate match, both the definition of underservice or provider shortage that methodology seeks to operationalize and the goals of the program must be clear. This means that Congress or the appropriate administrative agency need to make clear the goals of a particular program *before* deciding the appropriate means of designating those eligible for the program.

IV. The unit of analysis for underservice/provider shortage designation may begin to change to a health care system approach as opposed to an areal one.

In the past, designations of underserved areas or areas which are experiencing a shortage of health care providers have focused primarily on the lack of primary care physicians who were practicing in a particular area, often a county. We believe that a shift in focus of unit of analysis for underservice and provider shortage could occur as a result of increasing interest in the concept of a more unified system of care. There is a rise in focus on the *health care system* as a larger unit, and not simply on the number of individual physicians practicing in a particular area in relation to the number of persons living there. Networks of loosely-linked groups of professionals, large comprehensive facilities, and highly organized and linked health systems which can offer a broad spectrum of primary health care services are increasingly being seen as key to improving quality of care and controlling costs. Under this new perspective, the full range of health care services that a population can be expected to need and demand do not have to all be available within a given area (e.g., a county) for the area to be adequately served by an essential community provider. For instance, a Community Health Center could be considered as a conduit for residents of an isolated rural community to a larger system of care and thus residents within the health center's service area could be considered to be adequately served even if there were no hospital within that same county because the people in the CHC's service area have an entry point into the "system." The CHC can have set referral patterns for its patients in need of hospitalization. This means that the CHC (or other similar organization or network of providers) is functioning as a part of an overall health care delivery system which is designed to deliver the broad scope of health care services that a population will typically need during a given period of time. Identifying populations who do not have access to this type of arrangement may become important in future attempts to identify populations for which the health care system is not functioning properly.

V. Data needs and locus of designation will be key in determining the viability of any changes in methodology.

Availability of data is a limiting factor in being able to operationalize any methodology. In particular, finding data at the level of aggregation desired for identification of the underserved area is often very difficult.[28] Even if a clear definition of underservice or provider shortage is offered, and the goals of a program made explicit, it may be impossible to obtain the data necessary to operationalize a methodology. At present, decisions regarding the definition of a concept or term that is key in research are often driven by the availability of data. This is inevitable but we feel that clear definitions of underservice and program aims remain important, even if we have difficulty finding data to operationalize these concepts.

Who should designate areas as being eligible for programmatic responses to underservice and provider shortage areas is an issue directly related to the data needs of or difficulty of carrying out a methodology. There are often cross purposes of a desire to more exactly identify the degree of underservice or provider shortage of an area, while at the same time wanting to keep the process as simple as possible for local area health planners or whomever is responsible for designation at the local level. Another option would be to take any locus of activity away from local areas in applying to have areas designated as underserved or suffering from provider shortages. This might allow for a more detailed, uniform process of designation, but would cut out local knowledge in knowing what areas and groups might be getting left out who were in need of assistance, and might imply that the designation be done centrally by a governmental or other agency. Who should be responsible for designation is a policy decision that should explicitly be made by the Congress in determining how it want areas to become eligible for assistance, or by the appropriate administrative agency. The ultimate responsibility of designation may differ according to program.

VI. Changes in methodologies will create winners and losers and makes the process of any change very political.

In many ways, political realities surrounding the designation of areas as underserved should be first, not last, in a list of issues to consider. Given that the HPSA and MUA methodologies are used to disburse federal funds to localities, the process of designation and of changing the designation methodology is inherently political. Individuals, organizations and communities which benefit from

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[28]Ecological fallacy is when an individual is assigned, or assumed to possess, a particular characteristic because the aggregate area in which an individual lives is characterized by that characteristic. This means that classifying an area as underserved does not mean that all persons living in that area are underserved, and vice-versa. See: Greenland, S, Robins J. Invited Commentary: Ecologic Studies—Biases, Misconceptions, and Counterexamples. American Journal of Epidemiology 139(8):747-760, 1994.

the present regulations and flows of money will likely resist any change in the status quo; they have a vested interest in keeping the programs functioning as they are presently. Future methodologies will likely preserve the funding and designation of some localities as underserved, de-designate others, and designate some which do not presently qualify for money or other assistance. The view of any new methodology that persons or groups adopt likely depends on which group they find themselves in, and how they will be affected by any changes. Responses to both the present and future methodologies will vary. On the one hand, some persons may feel that not enough areas are now classified as underserved. On the other hand, some may feel that the present methodologies designate too many locales as underserved, and that a new methodology must be more specific in identifying the areas which receive support, thereby reducing the total number identified.

A subtle but important consideration among the political issues is whether an identification of underservice will be used for distributive or re-distributive purposes (Alford, 1975; Lasswell, 1936). If a policy is merely distributive in the sense of providing extra resources to underserved areas over and above those already provided, then the likelihood of acceptance of the approach is much greater than if a redistributive policy is suggested. This type of approach is likely to be painted as robbing Peter to pay Paul, and the societal consensus that something must be done to help the poor and underserved in our nation will likely evaporate quickly. Whether the policy response that is likely to flow out of any new methodology to identify underserved populations is merely distributive or re-distributive will determine, in part, the degree of criticism that the methodology will receive.

The process of changing the methodologies for designating underserved areas will likely prove intensely political, and this fact could overwhelm even the best reasoning and analysis which argue in favor of using some new methodology. Just coming up with the right answer (if some such animal exists) is not enough to change the manner in which underserved populations are designated.

ACKNOWLEDGMENTS

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Appendix A:

HPSA Designation Criteria

I. Issues Pertaining to the Process of the HPSA Application Process

The application process raises a few policy questions that are relevant to consider for the HPSA methodology and really any type of process whereby local officials, state agencies and federal agencies each work on designations:

1. *Is the application process too complicated, too expensive, or too time-consuming for underserved communities?*

   We have demonstrated earlier in this report that areas which are "underserved" tend to be economically poorer, have poorer health status, have higher unemployment, have fewer white-collar jobs and, therefore, generally, might have fewer resources, less capability, and less experience in dealing with federal or state bureaucracies. Is it reasonable to expect a member(s) of this type of community to: (a) be familiar with the number and type of data sources needed for the application; (b) be proficient in data analysis; (c) know how to collect data that are not available; and (d) know who to turn to for help? Are we penalizing poor communities for their lack of sophistication in complicated bureaucratic matters such as these? Does the application process discourage applications from the neediest communities?

2. *Should the application process originate with the community or be centralized at the state or national level?*

   It is very likely that many of the poorer and more geographically remote communities (and therefore many of the most needy communities) are not submitting applications because they are not aware of the underservice designation which would qualify them for needed resources and services. Is it reasonable to expect that such communities would be aware of underservice designations or know how to initiate the process?

3. *Why do communities default on their re-designation?*

   There are two points of view on why an area may not apply for continued designation: (1) the area's resources have improved considerably, to the extent that it is no longer underserved and does not wish to have the designation; (2) the area's resources have worsened considerably, to the extent that it no longer has the capability to apply for the designation. The second case can arise from many different types of scenarios: for example, the community leader who initiated the original application may have left; if initiated by a community hospital, the hospital may have closed or merged or a new administration may not have been aware of its previous responsibility for the designation. As far as we have been able to discern, there has been no follow-up on de-designated areas.

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4.   *How reliable and consistent are applicants in how they gather and report data?*

In the early and mid-1980s, due largely to public and business concerns about rising health care costs, there was a movement toward public accountability which spurred states to require hospital reporting of utilization and costs and state medical database commissions were born. This movement directed attention to the availability, accessibility, and reliability of health care databases in general. Medical licensing boards have not expanded or improved their databases as much. What has resulted, however, is a high degree of variability among states in the amount and type of data that are available to complete an application for HPSA designation. Are applicants from certain states at more or less advantage data-wise and how do we account (or discount) for these situations?

Basic Criteria for the Application

The basic criteria for the application are broad and aim to describe the area through its geography, demography, health care resources, and intensity of use of health care resources. Specifically, the criteria are:

1.   Boundaries of the area for which designation is requested;

2.   Number of persons in the required area (or population group) based on latest available population estimates;

3.   Supply of health professionals available to serve the area's population;

4.   Availability and accessibility of resources in contiguous areas;

5.   Indicators of unusually high needs of the population or insufficient capacity of health care resources in the area.

Documentation of the information is requested in the form of maps and data sources, and a rationale is needed for the particular service area (or population) which is defined as underserved in the application.

The information needed is very specific and comprehensive and is outlined in the chart at the end of this section. We have added our own comments and criticisms to these requirements. For example, we question the appropriateness, usefulness, or currency of some of the information, and we also raise questions about the sources of "standards" (e.g., a 0.25 weighting factor) which we could not uncover from our search of the extant literature. Our questions are not posed to criticize a process which has obviously benefited numerous communities, but to emphasize certain areas for discussion of needed changes and to remind ourselves of the history, derivation, and rationale of these items.

Criterion 1: Boundaries of the area for which designation is requested

Above all, the defined area must be rational for the delivery of health services. For HPSA designation purposes, a "rational" service area could be one of three basic geographic configurations:

(1) a whole county or group of counties whose populations are within 30 minutes travel time of each other; (2) one portion or a group of portions of a county or counties whose population travels 30 minutes or more to health care resources; (3) established neighborhoods within metropolitan areas with a population of at least 20,000. These configurations allow considerable flexibility for applicants to define their particular service area; moreover, these options do not confine rural applicants to county-level service area definitions, which is a historically convenient unit of definition, i.e., for political reasons and for data availability. Applicants are permitted fairly wide latitude in applying county-level social and demographic data to the sub-county level, and this may explain why there are so many part-county HPSAs; in fact, there are more part-county than whole-county HPSAs. However, data at the sub-county level are becoming increasingly available and it would be interesting to compare the actual versus the county-extrapolated data for the same geographic area. Would the part-county HPSA designations hold? Would the availability and requirement for using service area-specific data result in unusual service area configurations and stretch the definition boundaries of "rational"?

For a metropolitan "neighborhood" service area definition, there is a requirement for a minimum population of 20,000. For rural service areas, there are no population measures specified, only travel time indicators. Why specify a minimum population for an urban area and why 20,000? Is there an underlying assumption that rural physicians are in areas of lower population but will spend a greater portion of their time traveling to their office or to see inpatients in a hospital or nursing home?

A travel time of at least 30 minutes is given as one of the conditions for determining the rational service area. This travel time corresponds to 15 to 25 mile distances, depending upon terrain, normalcy of conditions, and mode of transportation. Are these particular travel times and distances still good guidelines to determine a population's access to primary care? How has the improvement of the primary roads infrastructure affected rural travel times since these guidelines were developed?

Criterion 2: Population in the proposed service area

The level of detail in calculating the "total permanent resident civilian population" of the service area is impressive, and it is this apparent drive for exactness that begs even more detail and attempt at further exactitude.

The Division of Shortage Designation provides a table of physician visit rates for 12 age-sex population cohorts that is used with a U.S. average per capita visit rate to calculate the "adjusted population" for an area. How often are the average per capita visit rate and the table of visit rates updated, and when was the last time they were updated? But, more importantly, because urban and rural utilization of health care services differ, separate tables for urban and rural populations might be considered. State-level databases generally do not yet have outpatient utilization data, but there are several national databases that do now or will soon have urban-rural and regional data. These include the AMA Masterfile and the National Health Interview Survey.

It is not obvious that the data needed for some of the calculations of transient populations would be available, thus applicants would be using in their calculations estimates which would vary widely in their approximation of reality. For example, "other" tourists (i.e., who are not counted as seasonal residents) may be included with a weight of 0.25 in the following formula:

Other tourists = 0.25 x (fraction of the year tourists are present) x (average daily number of tourists during portion of the year they are present)

What is the origin of the 0.25 weighting factor? How exact would the other two multiplicands be?

Criterion 3: Supply of health professionals

As shown on the chart, numerous questions arise in the calculation of the number of FTE primary care physicians in a service area. The first issue which must be addressed is the definition of primary care physician. Four specialties are counted: general or family practice, general internal medicine, pediatrics, and obstetrics/gynecology. The source of this information for most applicants will be the local or state medical society or the state licensing board—would these sources distinguish "general" internal medicine practitioners in their databases?

Finding family practice physicians who are willing to deliver babies in rural areas is becoming increasingly difficult; finding obstetricians/gynecologists who are willing to practice in rural areas is becoming increasingly impossible. The problem is now at the critical stage. Is it time to consider separate designations for obstetrics shortage areas to focus more attention on the issue and thus more state or local policy and funds to ameliorate this problem?

The full-time equivalency figures for interns and residents, international medical graduates, ambulatory or inpatient care may need to be reconsidered. Their source is unknown to us.

Physicians in emergency rooms are excluded from the count of primary care physicians, yet it is widely known that, particularly in rural and inner-city areas, hospital emergency rooms are filled with patients seeking non-emergency primary care services, primarily because of a declining number of physicians willing to treat Medicaid and Medicare patients. Perhaps some effort in the application process should be directed to counting the number of physicians who accept new patients, and particularly Medicaid and Medicare patients.

Non-physician primary care providers, or "mid-levels", such as nurse practitioners, physician assistants and nurse midwives are known to be important members of the primary health care delivery system, but the HPSA regulations provide no guidance regarding how they might be included in the total primary health care practitioners. These providers are seen as important as shown by the fact that an area's designation as underserved can:

(1) qualify it for Rural Health Clinic (P.L. 95-210) reimbursement: a major requirement for RHC reimbursement is that the clinic be staffed at least 50% of its operating hours by a mid-level practitioner;

(2) qualify it for placement of mid-levels by the National Health Service Corps: in 1993, over 20% of the Corps' field strength was comprised of mid-level practitioners;

(3) qualify it as a site for a federally-subsidized community or migrant health center (C/MHC): on average, there are 1.1 mid-levels in rural C/MHCs and 2.2 in urban C/MHCs, representing an important contribution to the staffing of these health centers.

C/MHCs determine productivity of mid-level providers at 50% of a physician's productivity, according to federal BCRR reporting requirements, suggesting a full-time physician equivalency rate for the underservice physician supply calculations. While the role of these providers likely varies from state to state, it seems prudent to make explicit how they should be counted in determining the total supply of primary care practitioners.

Criteria 4: Availability and accessibility of resources in contiguous areas

Applicants provide information on health care resources in contiguous areas, but need only prove one of three conditions of either excessively distant, over-utilized, or inaccessible primary care professionals in each of the surrounding areas. Availability and accessibility of physicians in the contiguous areas do not consider that, even if the population–to–physician ratio does not exceed 2,000:1 (and therefore the assumption is that there is some unfilled capacity in the system), these physicians may not accept new Medicaid and Medicare patients.

Criteria 5: Presence of indicators of unusually high needs of the population or insufficient capacity of health care resources in the area

Applicants need to prove *insufficient capacity* of existing primary care providers for at least two of the six criteria given. We have not been able to uncover the derivation of some of these standards, e.g., two-thirds non-acceptance of new patients by physicians and a population visit rate at an average of 2.0 or fewer office visits per year. Where are applicants expected to get these data? If it is expected that they will survey the physicians, how reliable would the information be? What incentives or disincentives would the physicians have to give this information? In Criteria 2, national population visit rates were required to be used in population counts seemingly because of the unavailability of state or more local data. Yet, in Criteria 5, the onus is put on the applicant to obtain local utilization data and, presumably (because it is written into the rules), these would be valid data to use to prove insufficient health care services capacity.

Also, "evidence of excessive use of emergency room facilities for routine primary care" can meet the criteria for proving insufficient capacity, yet the provision of primary care in emergency rooms by   .

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physicians was excluded from consideration in Criteria 3. It appears that this example and the example in the previous paragraph suggest contradictions among these criteria.

An area can try to prove a case for having *unusually high needs* for health care services. One of three criteria need to be met and these are based on birth rates, infant mortality rates, and percent of households with incomes below poverty level. Two of the three criteria are directed toward measuring shortages of physicians to tend to births. At least one measure might be added to capture physician shortages for adult populations, e.g., cardiovascular-, stroke-, or cancer-related death rates.

Summary

As stated earlier in this section, our purpose was to raise questions to stimulate discussion about the HPSA application process and information requirements. We hope the preceding discussion and the accompanying chart will help stimulate debate on the current criteria. Through such a debate, it is possible that the current process and criteria may be validated, or perhaps it will stimulate ideas for a new process and criteria.

Basic Criteria: Applications should contain information on:	Assumptions (from 42 CFR Ch. 1 (10-1-92 edition)	Comments/Criticisms	Notes
1. Boundaries of the area for which designation is being requested	Boundaries must be rational for the delivery of health services. Can be: (1) a county, or a group of contiguous counties whose population centers are within 30 minutes travel time of each other. (2) a portion of a county, or an area made up of portions of more than one county, whose population, because of topography, market or transportation patterns, distinctive population characteristics or other factors, has limited access to contiguous area resources, as measured generally by a travel time greater than 30 minutes to such resources. (3) established neighborhoods and communities within metropolitan areas which display a strong self-identity (as indicated by a homogeneous socioeconomic or demographic structure and/or a tradition of interaction or interdependency), have limited interaction with contiguous areas, and which, in general, have a minimum population of 20,000. Distances used as guidelines in determining distances corresponding to 30 minutes travel time: (1) under normal conditions with primary roads available: 20 miles (2) in mountainous terrain or in areas with only secondary roads available: 15 miles (3) in flat terrain or in areas connected by interstate highways: 25 miles (4) within inner portions of metro areas, info on the public transportation system will be used to determine the distance corresponding to 30 minutes travel time.	Are listed examples sufficient to be reasonably descriptive of the term "rational"? Should minimum population counts or population density measures be specified for rural areas? Sources and appropriateness of travel time and distance measures?	

| 2. Number of persons in the requested area (or population group), based on the latest available population estimates. | Population count will be the total permanent resident civilian population of the area, excluding inmates of institutions with the following adjustments, where appropriate: (1) adjustments to the population for the differing health service requirements of various age-sex population groups will be computed using a table (provided) of visit rates for 12 age-sex population cohorts. The table will be used to compute an expected visit rate and will then be divided by the U.S. average per capita visit rate of 5.1 to obtain the adjusted population for the area. (2) the effects of transient populations will be taken into account, including: (a) seasonal residents must be weighted in proportion to the fraction of the year they are present in the area. (b) other tourists (non-residents) may be included but only with a weight of 0.25, using the following formula: Contribution to population of other tourists = 0.25 x (fraction of the year tourists are present) x (average daily number of tourists during portion of the year they are present). (c) migratory workers and their families may be included using the following formula: Migrant contribution to population = fraction of year migrants are present in area x average daily number of migrants during portion of year they are present. | Source of visit rates by age and sex groupings? Need for updating? Source of 5.1 as the U.S. average per capita visit rate? Need for updating? Consider regional or state or local data on per capita visit rates instead of using U.S. averages. Does the occupation and/or age of seasonal residents matter, e.g., retirees Vs farm workers? Source of 0.25 weighting factor? Need for updating? If national weighting factor, consider use of regional, state, or local data alternatives? Are migrant workers in greater need of services or are they at greater health risk? | |

3. Supply of health professionals available to serve the area's population, i.e., the number of FTE primary care physicians	All non-federal doctors of medicine and doctors of osteopathy providing direct patient care who practice principally in one of the four primary care specialties — general or family practice, general internal medicine, pediatrics, and obstetrics and gynecology will be counted. Those physicians engaged solely in administration, research, and teaching will be excluded. Adjustments for the following factors will be made in computing the number of FTE primary care physicians: (a) interns and residents = 0.1 FTE physician (b) grads of foreign med schools who are not citizens or lawful permanent residents of the U.S. are excluded (c) grads of foreign med schools who are citizens or lawful permanent residents of the U.S., but do not have unrestricted licenses to practice medicine, will be counted as 0.5 FTE physicians. (d) physician who provide patient care services on less than a standard 40 hour work week will be discounted through the use of FTE figures: Every 4 hours (one-half day) spent providing patient care in either ambulatory or inpatient settings = .1 FTE. Physicians providing more than 40 hrs of care per week = 1 FTE (e) allowances for physicians who may not be accessible to the population of the area under consideration are made on a case-by-case basis. (f) hospital staff physicians involved exclusively in inpatient care are excluded. FTE physicians in organized outpatient departments and primary care clinics will be included, but those in emergency rooms are excluded. (g) physicians who are suspended under provisions of the Medicare-Medicaid Anti-Fraud and Abuse Act for a period of 18 months or more are excluded.	Decide appropriateness of primary care definition, e.g., should general surgeons be included? Separate OB/GYNs from primary care and give their own specialty shortage designation? Do state licensing data typically distinguish between DOs and MDs? Do state licensing data distinguish "general" internal medicine physicians? Source and appropriateness of FTE for interns and residents and IMGs? Do state licensing data typically include number of hours devoted to patient care? Source and appropriateness of FTE for 4 hrs patient care = .1 FTE? Should physicians providing > 40 hours = > 1 FTE? Other comments: Include midlevel practitioners? (in some practices, will expand number of patients but in others will substitute for physician who wishes to decrease patient care hours)	

4. Availability and accessibility of resources in contiguous areas.	Primary care professionals in areas contiguous to the applicant area will be considered excessively distant, overutilized, or inaccessible to the applicant area if ONE (note emphasis) of the following conditions prevails in each contiguous area: (1) primary care professionals in contiguous areas are more than 30 minutes travel time from the population center(s) of applicant area (2) the contiguous area population-to-FTE primary care physician ratio is in excess of 2,000:1, indicating that the physicians in contig areas cannot be expected to help alleviate the shortage in the applicant area (3) primary care professionals in the contig area are inaccessible because of (a) signif differences between the demographic or socioeconomic characteristics of the applicant & contig areas, e.g., high proportion of non-English speaking persons; (b) lack of economic access, e.g., where more than 20% of the pop. or house holds have incomes below poverty level, and Medicaid covered or public primary care services are not available in the contig area.	Sources of criteria?	

5. Presence of indicators of unusually high needs of the population or insufficient capacity of health care resources in the area.	An area's existing primary care providers will be considered to have insufficient capacity if at least TWO of the following criteria are met: (1) more than 8,000 office or outpatient visits per year per FTE primary care physician serving the area. (2) unusually long waits for appointments for routine medical services (i.e., more than 7 days for established patients and 14 days for new patients) (3) excessive average waiting time at primary care providers (longer than 1 hr where patients have appointments or 2 hrs where patients are treated on a first come, first served basis. (4) evidence of excessive use of emergency room facilities for routine primary care (5) a substantial proportion (2/3rds or more) of the area's physicians do not accept new patients (6) abnormally low utilization of health services, as indicated by an average of 2.0 or less office visits per year on the part of the area's population. An area will be considered as having unusually high needs for primary health services if at least ONE of the following criteria is met: (1) the area has more than 100 births per year per 1,000 women aged 15-44 (2) the area has more than 20 infant deaths per 1,000 live births (3) more than 20% of the population (or of all households) have incomes below the poverty level	What kind of documentation, if any, must accompany application to support these determinations? What are the sources of these standards, e.g., 8,000 office visits per year, 2/3rds non-acceptance of new patient rates of physicians, low utilization = 2.0 or less office visits per year for an area's pop. Is each criterion reasonable and, collectively, are they comprehensive? What are the sources for some of these criteria? Is each criterion reasonable and, collectively, are they comprehensive? Is there a measure of "excess mortality" that should be added to these criteria which would capture MD shortages for adult populations?	
Applications should also include: (1) a map showing the location of resources within the area and in contiguous areas (2) data sources should be cited, and adjustments to practitioner supply or area population figures should be explained. (3) rationale for the selection of a particular service area definition, in terms of travel times, composition of the population, etc., particularly for non-whole-county service areas and population groups.		Is there any validation process to data and claims submitted with applications? What about reliability/consistency in how individual states gather and report data in their applications?	

Appendix B:

List of Programs Using the HPSA and MUA Methodologies for Designation of Areas Eligible for Assistance

Programs Using HPSA and MUA Methodologies For Designation of Eligible Areas

Program	HPSA			MUA/MUP	
	Geographic	Population	Facility	Area	Population
Recruitment of Health Professionals Through National Health Service Corps	Yes	Yes'	Yes	No	No
Educational Loan Repayment for Health Care Professionals Through the National Health Service Corps	Yes	Yes	Yes	No	No
Rural Health Clinic Certification Through Medicare	Yes	Yes	Yes	Yes	Yes
Medicare 10% Bonus for Physicians	Yes	No	No	No	No
Higher Customary Charges for New Physicians vis-a-vis Medicare Reimbursement	Yes	No	No	No	No
Community Health Center (Funded Under Section 330 of PHS Act).	No	No	No	Yes (in)	Yes
Federally Qualified Health Center Look-Alike	No	No	No	Yes (serving)	No
J-1 Visa Program for International Medical Graduates					

Appendix B

Appendix C:

Specifics of MUA Methodology

SUMMARY - PROCEDURES FOR MUA/MUP DESIGNATION

Two methods currently exist for designation of medically underserved areas (MUAs) or populations (MUPs):

I. Application of the Index of Medical Underservice (IMU) to data on counties or subcounty rational service areas to obtain a score for each area.

The IMU involves four variables - primary medical care physician-to-population ratio, infant mortality rate, percentage of the population with incomes below the poverty level, and percentage of the population over age 65. The value of each of these variables for an area is converted to a partial score, according to established criteria; these four scores are summed to obtain the IMU score for the area. The IMU scale is from 0 to 100, where 0 represents completely underserved and 100 represents best served or least underserved. Under the established criteria, counties or other rational service areas found to have an IMU of 62.0 or less qualify for designation of MUAs.

The MUA designation process requires the following information:

(1)   Definition of a rational service area in terms of
        (a) one or more whole counties, (b) one or more census county
        divisions (CCDs) within non-metropolitan areas, or (c) groups of
        contiguous census tracts (C.T.s) within metropolitan areas.

(2)   The latest available data on the resident civilian, non-institutional
        population of the service area. (For groups of CCDs or C.T.s, this
        should be aggregated from the individual CCD or C.T. population data.)

(3)   The latest available data on the percent of the service area's
        population with incomes below the poverty line.

(4)   The latest available data on the percent of the service area's
        population over age 65.

(5)   The latest available infant mortality data for the service area, or
        for the county or a larger subcounty area which includes it. The
        latest five-year average should be used to ensure statistical
        signifiance. (If the service area includes portions of two or more
        counties, and only county-level infant mortality data is available,
        the different county rates should be weighted according to the
        fraction of the service area's total population residing in each
        county.)

(6)   The current number of full-time-equivalent (FTE) primary care
        physicians serving the service area, and their locations of practice.

(7)   The computed ratio of FTE primary care physicians per thousand
        population for the service area (from items 2 and 6 above).

The IMU for the service area is then computed from the above data using conversion Tables V_1-V_4 which translate the values of each of the four indicators into a score. The IMU is the sum of the four scores.

MUA designation requests should include a map showing the boundaries of the service area involved and the location of resources within this area. In addition, for non-single-county service areas, the rationale for the selection of a particular service area definition (in terms of market patterns, travel time to resources in contiguous areas, composition of population, etc.) should also be provided.

II. Under the provisions of Public Law 99-280, enacted in 1986, an area or population group which does not meet the established MUA criteria can be considered for MUP designation if "unusual local conditions which are a barrier to access to or the availability of personal health services" exist and are documented, and if such a designation is recommended by the chief executive officer and/or local officials of the State where the requested population resides.

Requests for designation under these "exceptional" MUP procedures should still include the data elements listed above for MUA designation requests, including the computed IMU, but should in addition describe the unusual local conditions/access barriers/availability indicators which led to the recommendation for MUP designation.

Requests for MUA or MUP designation are reviewed by the Bureau of Primary Health Care's Division of Shortage Designation (DSD), and should be addressed as follows:

> Division of Shortage Designation
> Bureau of Primary Health Care
> West Tower, Room 9-1D1
> 4350 East-West Highway
> Rockville, Maryland 20857
> (Telephone: 301-594-0200)

The review process for both MUA and MUP requests includes an initial DSD staff review of the submission (to determine if the request is complete) followed by a 30-day comment period, with copies of the request provided to the Governor's office; the State cooperative agreement office, health planning agency or health department; the State primary care association; and appropriate local officials for review and possible comment. A final decision to designate or deny the request is made and the applicant is informed of the result by letter. Efforts are made to complete action on each request within 60 to 90 days from the date of receipt by DSD, depending on current caseload.

BPHC/DSD
October 1993

PROGRAMS USING MUA/MUP DESIGNATIONS

1. Recipients of Community Health Center (CHC) grant funds are legislatively required to serve areas or populations designated by the Secretary of Health and Human Services as medically underserved. Grants for the planning, development, or operation of community health centers under section 330 of the Public Health Service Act are available only to centers which serve designated MUAs or MUPs.

2. Systems of care which meet the definition of a community health center contained in Section 330 of the Public Health Service Act, but are not funded under that section, and are serving an MUA or MUP, are eligible for certification as a Federally Qualified Health Center (FQHC) and thus for cost-based reimbursement of services to Medicaid-eligibles.

3. Clinics serving rural areas or populations designated as MUAs or MUPs are eligible for certification as Rural Health Clinics by the Health Care Financing Administration under the authority of the Rural Health Clinics Services Act (Public Law 95-210, as amended).

DSD/BPHC
July, 1993

TABLE V_1

PERCENTAGE OF POPULATION
BELOW POVERTY LEVEL

In the left column find the range which includes the percentage of population below poverty level for the area being examined. The corresponding weighted value found opposite in the right column, should be used in the formula for determining the IMU.

Percent Below Poverty	Weighted Value V_1
0	25.1
0.1 - 2.0	24.6
2.1 - 4.0	23.7
4.1 - 6.0	22.8
6.1 - 8.0	21.9
8.1 - 10.0	21.0
10.1 - 12.0	20.0
12.1 - 14.0	18.7
14.1 - 16.0	17.4
16.1 - 18.0	16.2
18.1 - 20.0	14.9
20.1 - 22.0	13.6
22.1 - 24.0	12.2
24.1 - 26.0	10.9
26.1 - 28.0	9.3
28.1 - 30.0	7.8
30.1 - 32.0	6.6
32.1 - 34.0	5.6
34.1 - 36.0	4.7
36.1 - 38.0	3.4
38.1 - 40.0	2.1
40.1 - 42.0	1.3
42.1 - 44.0	1.0
44.1 - 44.0	0.7
46.1 - 48.0	0.4
48.1 - 50.0	0.1
50+	0

TABLE V$_2$

PERCENTAGE OF POPULATION
AGE 65 AND OVER

In the left column find the range which includes the percentage of population age 65 and over for the area being examined. The corresponding weighted value, found opposite in the right column, should be used in the formula for determining the IMU.

Percent Age 65 and Over	Weighted Value V$_2$
0 - 7.0	20.2
7.1 - 8.0	20.1
8.1 - 9.0	19.9
9.1 - 10.0	19.8
10.1 - 11.0	19.6
11.1 - 12.0	19.4
12.1 - 13.0	19.1
13.1 - 14.0	18.9
14.1 - 15.0	18.7
15.1 - 16.0	17.8
16.1 - 17.0	16.1
17.1 - 18.0	14.4
18.1 - 19.0	12.8
19.1 - 20.0	11.1
20.1 - 21.0	9.8
21.1 - 22.0	8.9
22.1 - 23.0	8.0
23.1 - 24.0	7.0
24.1 - 25.0	6.1
25.1 - 26.0	5.1
26.1 - 27.0	4.0
27.1 - 28.0	2.8
28.1 - 29.0	1.7
29.1 - 30.0	0.6
30+	0

TABLE V_3

INFANT MORTALITY RATE

In the left column find the range which includes the infant mortality rate for the area being examined or the area in which it lies. The corresponding weighted value, found opposite in the right.

Infant Mortality Rate	Weighted Value V_3
0 - 8	26.0
8.1 - 9	25.6
9.1 - 10	24.8
10.1 - 11	24.0
11.1 - 12	23.2
12.1 - 13	22.4
13.1 - 14	21.5
14.1 - 15	20.5
15.1 - 16	19.5
16.1 - 17	18.5
17.1 - 18	17.5
18.1 - 19	16.4
19.1 - 20	15.3
20.1 - 21	14.2
21.1 - 22	13.1
22.1 - 23	11.9
23.1 - 24	10.8
24.1 - 25	9.6
25.1 - 26	8.5
26.1 - 27	7.3
27.1 - 28	6.1
28.1 - 29	5.4
29.1 - 30	5.0

TABLE V

RATIO OF PRIMARY CARE PHYSICIANS

Per 1,000 Population

Ratio	Weighted Value V
0 - .050	0
.051 - .100	0.5
.101 - .150	1.5
.151 - .200	2.8
.201 - .250	4.1
.251 - .300	5.7
.301 - .350	7.3
.351 - .400	9.0
.401 - .450	10.7
.451 - .500	12.6
.501 - .550	14.8
.551 - .600	16.9
.601 - .650	19.1
.651 - .700	20.7
.701 - .750	21.9
.751 - .800	23.1
.801 - .850	24.3
.851 - .900	25.3
.901 - .950	25.9
.951 -1.000	26.6
1.001 -1.050	27.2
1.051 -1.100	27.7
1.101 -1.150	28.0
1.151 -1.200	28.3
1.201 -1.250	28.6
over 1.250	28.7