

## HEALTH CARE WORKFORCE SUPPLY IN UNDERSERVED RURAL AREAS OF THE UNITED STATES

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### INTRODUCTION

One of the most enduring characteristics of the United States (US) health care landscape is the uneven geographic distribution and relative shortage of medical care providers in many areas. Provider maldistribution and shortage are not of trivial importance given that well over 50 million of the US population live in areas that are considered rural or non-metropolitan by various definitions (Ricketts, Johnson-Webb, Randolph, 1999). Likewise, large numbers of the inner city populations are geographically isolated from providers. Access to health care in the US is affected dramatically by where physicians locate. The tendency for physicians to practice in affluent urban and suburban areas creates barriers to care for people living in rural and inner city areas. When provider maldistribution and shortage are coupled with large numbers of people who are uninsured and underinsured, the consequences are reflected in preventable pain and suffering, functional limitation, despair, death, and economic hardship. Despite considerable emphasis by federal and state policy makers and educators over the last three decades of the 20<sup>th</sup> century, the relative shortage and maldistribution of generalist medical care and other providers in the US has persisted. The Council on Graduate Medical Education (COGME) has studied the supply of physicians in the US across the dozen years of its existence. Even as surpluses of certain specialties are beginning to have an influence on selected health care service areas across the nation, many inner city and rural communities struggle to recruit an adequate supply of health professionals. This is a great health care system paradox: shortages amid surplus (COGME, 1998a). Many rural and inner city residents experience a lack of basic health services, while the larger society cannot absorb all the health care professionals that are produced.

As we enter into the first decade of the 21<sup>st</sup> century, geographic access to health care providers for rural and inner city populations remains a high priority. Of course, geographic proximity is but one of a myriad of factors that determine the access of individuals and populations to the medical care delivery system, and their outcomes of care (Aday,

Anderson, Fleming, 1980; Kindig, 1997). Poverty, race, education, culture, social circumstances, to name but a few of the factors, all have their influence. However, the geographic availability of medical care providers is a critical and necessary condition without which care is much less likely to occur.

Because of the enormity of the task of meaningfully addressing the issue of medical care provider supply in underserved areas of the US within the conference page constraints, this discussion must be limited. This paper focuses on generalist physician supply in the rural subset of the US, at the expense of a discussion of inner cities, specialist physicians, and non physician providers. While this choice is somewhat arbitrary, rural areas do typify most of the USs' provider shortage issues in a context where spatial remoteness is more easily identified. Furthermore, the rural US population numbers around 55 million. Finally, the focus on generalist physicians is appropriate given their pivotal role in local medical care delivery. The decision to focus on rural geographically underserved areas does not in any way diminish the importance of the issues concerning inner cities, specialist physicians, and non physician providers. Even with these limitations only a fairly cursory introduction to workforce supply in underserved areas is possible.

## **BACKGROUND**

Though the rural population of the US is approximately the same as that of the total rural and urban population of France, relatively little is known about the health care delivery milieu within the rural US (Ricketts, Johnson-Webb, Randolph, 1999). Approximately 80 percent of the US population is located within urban areas. National research resources are primarily focused on the more populous urban areas and most recently on the managed care experiment. Federal policy is largely designed to address urban medical care problems. Rural interests are left in the backwash to appeal for policy and regulatory patches that can lessen the inadvertent adverse rural consequences (Hart, Taylor, 2001). The prevailing national view is that the rural population is utterly bound to urban areas for nearly all of its medical care. This trivialization of the rural health care delivery system is of serious concern. It creates the environment in which federal and state policy decisions are made. In this time of dynamic health care delivery change with its emphasis on cost containment, decisions made within this context have the potential to profoundly influence the viability of the rural health care delivery system along with local economic development and, at a personal level, to intrusively degrade personal access to quality care while increasing the personal costs of care (Hart, Taylor, 2001). Policy makers and regulators need to adopt a more realistic view of the rural health care delivery system to facilitate more appropriate federal policies.

On average, rural US populations have relatively more elderly and children; unemployment and underemployment; poor, uninsured and underinsured residents; and are more vulnerable to economic downturns because of their economic specialization, than their urban counterparts. Moreover, between 1991 and 1998 the percentage of the rural population under 65 without insurance increased some 11 percent to approximately 7 million (15.7% of the rural population) (RUPRI, 2000a). The nation's rural environment is incredibly diverse across its economic, social, environmental, demographic, and epidemiologic

dimensions. Rural populations live in affluent ski resorts as well as in amenity-challenged poor farming towns. Rural cities and towns vary from tens of thousands to handfuls of residents, with different racial and ethnic minority populations concentrated in various regions. In contrast to popular misconception, the nation's aggregate rural population is slowly growing, though some specific areas are rapidly losing or gaining population (Hart, Salsberg, Phillips, 2000).

The rural environment in which the physician practices varies enormously both across rural areas and between rural and metro areas (Ricketts, Johnson-Webb, Randolph, 1999). Physicians practicing in smaller and more remote rural towns become a part of a medical care delivery system and general milieu that is characterized by low population density, vulnerable and fragile organizations, small populations, long distances to other cities and towns and their health care providers, relatively few local health care providers and facilities, and high fixed costs per service, to name but a few unique features. This milieu conspires to create special difficult circumstances for rural providers (see Rosenblatt, 2001). Rural physician issues concerning such aspects of practice as patient privacy in small towns, the clinical adaptations of small town rural providers when there are no nearby specialists, quality assurance programs, and continuing medical education (CME) are different than those of their large city contemporaries. For example, recent studies demonstrated that there were substantial differences in clinical prenatal and intrapartum practice styles between rural and urban physicians for similar low-risk patients, without apparent differences in outcome (Hart et al., 1996), and that women who booked for prenatal care with rural physicians were not at adverse risk when compared with those who visited urban physicians (Larson et al., 1997). However, there were certainly threats to adequate perinatal care during the late 1990s for some rural population groups (Lishner, et al., 1999). While there are many common threads between urban clinical medicine and its rural cousin, there are many substantive differences (Geyman, Norris, Hart, 2001; Yawn, Bushy, Yawn, 1994).

The rural medical care system has strengths, critical needs, and is extremely varied and vulnerable. Because rural environments and residents are diverse, it is not possible that "one size fits all" federal regulations will adequately address health care issues in both rural and urban venues, or even across varied rural areas. Because of their unique sites, as well as their varied histories, cultures, racial mixes, economies, settlement patterns, and health status, rural underserved populations present problems that even extremely complicated administrative regulation systems based on national policies cannot adequately resolve. In fact, complicated regulations in and of themselves place a disproportionately large burden on the rural health care delivery system relative to its urban counterpart. As reimbursement administrative burdens increase, lower volume providers (eg., smaller remote rural hospitals and solo and small provider groups) expend a greater proportion of their reimbursement revenue on administrative and accounting overhead than do their larger volume urban counterparts (Hart, Salsberg, Phillips, 2000). They also have a more difficult time procuring fiscal reimbursement and accounting expertise at affordable costs.

There are other circumstances that are unique to rural health care delivery systems, such as low population densities, high rates of fixed overhead per patient revenue, and local singular social environments (Hassinger, Hobbs, 1992). The rural population is proportionately older than the urban population, and the ethnic and social character of rural populations vary dramatically from one part of the nation to another. These and other circumstances make it crucial that health services be locally available. Just as in inner cities, rural areas have pockets of persistent poverty with all of their attendant problems. When local medical care services are not available, the long travel distances with their concomitant delays in obtaining acute care increase patient suffering and can often result in detrimental outcomes (eg., Nesbitt et al., 1990). Locally available medical services reduce the travel time and expenses that local rural residents incur when they obtain care. Federal policy makers who examine the costs and benefits of public medical care programs usually account for the costs to the government only and seldom consider the costs to rural residents associated with extended travel and delay and lost time, especially for the poor and elderly. Such additional costs to low-income rural residents have the added detrimental effect of reducing the appropriate care they seek and receive.

Rural residents experience greater delays in obtaining care, travel farther and spend more time travelling (Schur, Franco, 1999). Rural health status is generally similar to that of urban areas, but rural residents experience increased health risks from auto accidents, gun accidents, farm accidents, exposure to pesticides and herbicides, and they experience more chronic disease (Ricketts, 2001). A special concern is the status of rural health care in areas that have large numbers of migrant and immigrant workers with major care needs, but who remain underserved (Ricketts et al., 1999). While rural residents generally have as many contacts with medical care personnel as do urban ones, subgroups of rural residents receive less and different care. For example, rural elderly residents in Washington State remote small towns obtain fewer ambulatory physician visits per year than their urban and rural counterparts, and have about half the number of average visits to each subspecialty of internal medicine (eg., cardiology and gastroenterology), in spite of universal Medicare health insurance (Hart et al., in press). These effects are exacerbated for persistent poverty, underserved, and minority concentration areas. In general, rural minorities have poorer health status and less comprehensive prevention services than their white counterparts and are on par with the non white urban population (Slifkin, Goldsmith, Ricketts, 2000; Hicks, 1992). For instance, rural American Indian and Alaska Natives are 30 percent less likely to receive adequate prenatal care and 23 percent more likely to have postneonatal deaths than their urban peers (Baldwin et al., 1999).

Finally, a critical aspect of the health care delivery system in small and remote rural towns is its vulnerability. These local systems, with their small numbers of providers and sparse resources, are tenuously balanced to meet the needs of their residents while providing adequate income and quality of life for their providers. Heavy handed federal policies have often upset this balance, leaving local rural populations with no place to obtain their care other than from distant providers. Once local health care delivery systems are dismantled, few rural towns are able to reestablish them. Rural residents in towns that are already underserved, poor, and remote are most vulnerable.

## **RURAL PHYSICIANS**

The COGME has studied the supply of health professionals in the US during the decade and a half of its existence. As surpluses of certain physician specialties are beginning to increase access in many health care service areas across the nation, many inner city and rural underserved communities struggle to recruit an adequate supply of health professionals. Severe rural physician shortages were the primary stimulus behind the development of many federal workforce programs, and the persistence of rural-urban and intra rural disparities continues to fuel federal and state educational and service efforts. The first national effort to remedy these shortages was the rapid increase in the production of physicians in the US starting in the late 1960s. Despite these efforts, a shortage of rural physicians and their geographic maldistribution have been particularly recalcitrant problems.

Physicians are the largest group of medical care providers in rural areas with the exception of licensed practical and registered nurses. In 1998, there were approximately 70,000 physicians located in the rural US (Hart, Salsberg, Phillips, 2000). Whereas 20%-27% of the US population resides in rural areas, only 11% of the physicians practice there (AMA, 2000). There are approximately equal numbers of generalist and specialist physicians within rural areas.

### **Overarching macro workforce trends**

Geographic maldistribution perseveres, despite the rapid expansion of the US's physician supply during the past decade. Three major factors make remote underserved rural communities difficult to staff with physicians: widespread and persistent poverty; lack of conventional recreational, social, professional, and cultural amenities; and the presence of concentrations of ethnic and racial minority subgroups, with combinations of these factors intensifying the effects. Because life in these towns can be arduous and often culturally dissident with the background of trained physicians, it is difficult for them to attract and retain health professionals of any kind, including physicians.

Two overriding national circumstances contribute considerably to shortages of rural providers. The first is the long-term trend in the US physician workforce toward increased specialization. Geographic maldistribution cannot be untangled from the specialty choices made by the nation's medical students. COGME has concluded: "Nothing affects the location decision of physicians more than specialty. Unfortunately for rural areas, the more specialized the physician, the less likely it is the physician will settle in a rural area" (COGME, 1998a). Physicians who enter into the generalist care disciplines of family medicine, general paediatrics, and general internal medicine are considerably more likely to practice in remote rural and underserved areas than specialist physicians (Rosenblatt, Hart, 1999). Many private and governmental medical education interventions designed to increase the production of generalist physicians who locate in rural and underserved areas have struggled to fight this trend and have met with measured success. Programs such as the National Health Services Corps (NHSC), the Community Health Centers (CHCs), Area Health Education Centers (AHECs), and targeted financial incentives provided through Medicare and Medicaid, provide means to bring physicians to areas where they could not otherwise practice.

While federal programs (and much discourse) have attempted to increase generalist physician numbers, their success in turning the tide of narrow specialization has stalled. As illustrated in Figure 1, the generalist percentage of the physician workforce has not appreciably changed during the past two decades. Figure 2 illustrates the increases in generalist and specialist physicians per population over 30 years. The modest increase in generalists (15%) is dwarfed by the 132 percent increase in specialists per capita. However, the results from the 2000 National Resident Matching Program (NRMP) (medical student and specialty residency program match) show "...interest in family practice and, in fact, in all primary care specialties, has declined. Market factors, lifestyle choices by medical students, escalating educational debt, and the general turbulence of the health care environment all contribute to this trend" (Pugno et al., 2000). The number of generalist residency matched medical students has decreased for the third year in a row. Moreover, the number of family medicine matches is the lowest it has been since 1994. The large increase in the nation's physician workforce and all the programs to promote generalist production are resulting in only a modest increase in generalist physician production, which now appears to be threatened.

The second overarching national trend that is inexorably interlaced with the issue of rural geographic maldistribution of health providers is health insurance coverage. Ten million rural residents are uninsured and easily that number are underinsured (Schur, Franco, 1999). On the one hand, well insured population subgroups can experience physician shortages for many reasons including amenity-challenged locales, poor recruiting, inadequate educational programs, and inadequate support systems. On the other hand, population subgroups who do not have ample insurance coverage have only a limited capacity to purchase health services and to support local generalist physicians. In either case, the result is that rural underserved residents often forego care, obtain care late, or travel long distances for care. Governmental and private programs address the former situation with mixed results. While the implementation of the Medicare (coverage for elderly), Medicaid (coverage for poor), and other categorical federal insurance programs is important, the introduction of some form of universal health insurance coverage remains politically problematic, even though it is a key element in reducing rural physician shortages in underserved areas. However, even if some form of universal or nearly universal health insurance was adopted, it would not completely solve shortage problems for those areas perceived as most unattractive. Circumscribed federal and state programs designed to ensure adequate geographical access to care still would be necessary.

### **Numbers, geographic distribution and specialty distribution**

The supply of rural physicians is far from uniform in terms of specialty, geographic location, and population distribution. Increases in the aggregate supply of physicians have begun to translate into an increased number of physicians in rural areas, but the response is directly related to the size of the community and its proximity to urban areas. As shown in Figure 3, there are wide disparities between generalist physician supply per capita across urban and rural areas of different types. In all types of rural counties, generalists are about half or less as available per person as in large urban areas, with the exception of counties that are not adjacent to urban counties that have towns of 10,000 or more. The counties that are most

remote from urban medical care and that have the smallest populations have few generalists per their populations (39 generalists per 100,000 population). By way of comparison, in a ZIP code-level analysis of federally designated primary care shortage areas, there were 47 generalists per 100,000 population (Knapp, Hardwick, 2000). In a study of staff-model HMOs where physician supply was measured in full-time equivalent (FTE) generalist physicians, 78 per 100,000 enrollees was reported (Hart et al., 1997).

How the changes in the per capita numbers of physicians have played out during the last 60 years is illustrated in Figure 4. While there have been increases in physician numbers per capita across the rural-urban spectrum, the increases have been much less pronounced in smaller rural counties (ie., they have gained in an absolute sense but lost ground in a relative sense compared with urban areas). The most critical problems affect rural towns of less than 10,000 population that are distant from urban centers. The physician supply in these towns is only slightly higher than it was six decades ago. National specialty production plays a significant role in this equation. The propensity of different specialties to practice across the rural-urban continuum differs dramatically (Figure 5). As shown, the smaller and more remote an area, the more likely it is that generalist physicians make up a larger proportion of its physicians. Generalist physicians, obstetrician-gynaecologists, and general surgeons are more evenly distributed across the county groups, with family physicians/general practitioners (FP/GPs) distributed most evenly relative to the population. When the smallest and most remote rural places are broken out, the FP/GPs represent a much higher percentage of the local physicians than illustrated in Figure 3. COGME (1998a) concluded that specialty choice was the most powerful predictor of rural practice location, with FPs being much more likely than other specialties to locate in rural areas. COGME recommended increasing Title VII support of FP training programs that demonstrate a successful track record of placing physicians in rural and underserved areas. As places become even more remote and small, FPs become virtually the only physicians available (not illustrated in figure) because of the smaller population base needed to support them given their wide scope of practice (eg., care of children, obstetrics, elderly, and emergencies) (Rosenblatt, Hart, 1999).

COGME has also recommended the promotion of training programs in general internal medicine, general paediatrics, obstetric/gynaecology, and general surgery toward the same ends. Generally, these four specialties are only found in larger rural communities with populations of 10,000 or greater because of the population numbers needed to support their scope of practices (eg., general pediatricians' concentration on children and adolescents) and because of difficulties in providing cross call coverage (see COGME (1998a) for discussion). Of particular concern is the modest decrease in the supply of general surgeons in rural areas given their importance to the financial bottom line of small rural hospitals. There are very few training programs in these specialties based in rural areas (eg., there are no rural-based general surgery residencies).

### **Distribution by region**

There is a regional dimension to the maldistribution of physicians across the rural landscape. The Northeast has the highest rate of generalist physicians per 100,000

population of the nation's regions but also the largest gap between its urban and rural rates (106 as compared with 59 per 100,000) (Figure 6) (Larson, Hart, 2001). The lowest supply of generalists is in the rural South where the ratio per 100,000 is 45. The West has a comparable ratio of 56 in its rural areas and the narrowest rural/urban differential (56 versus 76). These differences illustrate how, even at the regional level, generalist physician supply varies dramatically.

Even when Census regional deviations are taken into account, they mask the great variation in physician supply. For example, analysis of the ratios of generalist physicians by rural subcategories (eg., non adjacent to an urban area with no town of 10,000 or greater) and Census region reveals even greater disparities (very low generalist supplies are most pronounced in the Midwest and South (Larson, Hart, 2001)). As would be anticipated, the greatest variations are at the state rural and local levels, where it is little consolation to underserved local residents to know that, on average, their state or region has an adequate supply of generalist providers (Ricketts et al., 1994). Policy and analyses of underservice needs should be performed for small areas as well as at the national, regional, and state levels.

### **Gender distribution**

Women physicians have historically made up only a small percentage of the USs' physician workforce. However, during the last decade the percentage of women graduating from medical schools and residency programs has increased dramatically, and it is estimated that women will represent 30% of the physician workforce by 2010 (Schmittziel, Grumbach, 1999). Women made up 7.1 percent of the workforce in 1970, and 15.3 percent by 1986 (Doescher, Ellsbury, Hart, 2000). American Medical Association (AMA) data indicate that in the year 2000, 45 percent of first-year residents will be women (Kletke, 1999). The number of women allopathic physicians more than quadrupled between 1979 and 1991 and has continued to rise (COGME, 1998a).

Rural medical care was historically almost exclusively provided by male physicians. This was a result of the paucity of women in medicine and the tendency for few women graduates to locate in rural areas, especially in remote small towns. Despite the increase in the number of women physicians, women of the most recent graduation cohorts remain substantially less likely to locate within rural areas than male physicians (Doescher, Ellsbury, Hart, 2000). If this trend to not locate in small and remote rural towns persists while the percentage of all practicing physicians who are women increases, physician shortages in already underserved areas will be exacerbated. While the ratio of rural male to female physicians is substantially more in balance for more recently graduating cohorts, in small and remote towns the ratio is still nearly 3 to 1 (Figure 7).

Furthermore, the geographic distribution of women physicians is very uneven across the states relative to their male counterparts. There are generalist male to female ratios higher than 10 to 1 for some states and lower than 3 to 1 in others (Doescher, Ellsbury, Hart, 2000a). This variation is also mirrored in the rural generalist male to female ratios of graduates of US medical schools (Ellsbury, Doescher, Hart, 2000).

The continuing choice by women to practice in urban areas will increasingly pose problems for the recruitment of rural physicians. Women physicians have been found to differ from men physicians in terms of their patient demographics, patient satisfaction, practice characteristics and employers, case-mix, and other factors. In addition, the women residing in rural underserved areas often have no or few opportunities to choose women physicians. Issues related to women and rural practice have substantial health workforce ramifications for underserved rural populations.

### **Quality of care**

In spite of assumptions by some that rural provider care is of poorer quality than that of urban providers, the scant research literature is far from conclusive and shows mixed results. In thinking about the quality of rural physician care, especially when comparing rural and urban physicians, scope of service and quality of care should be differentiated (ie., the types of services a physician provides versus how well those services are provided) (Hart, Salsberg, Phillips, 2000). It is a given in many small and remote rural towns that the scope of local services will be limited by both appropriate and inappropriate economic and other factors (eg., low volumes with their high fixed equipment and personnel costs, and lack of insurance). It is not clear why similar students who train in the same medical schools and residency programs and then locate in rural and urban areas would be expected to differ in the quality of their care, except to the extent that local environmental constraints influence clinical care. For instance, a rural FP in a remote town that has a severe shortage of generalist providers might compensate by performing shorter visits so more patients can be treated. Quality of care in rural underserved areas should be examined in the context of the local environment. Measuring quality in these towns by applying criteria based on an ample supply of providers and easy access to high level technology is not instructive. Appropriate and practical programs need to address shortages when that is the problem and clinical skills when they are the problem.

While much has been made of the positive relationship between outcomes and procedural volume, the procedures commonly performed by rural physicians have been shown to have little or no such relationship once a very minimal number of these procedures are performed. If a group of procedures that had a slightly higher complication rate in rural compared with urban areas were reassigned to urban providers, it could turn out that the net result would be poorer overall outcomes for the community. This could result because some of the procedures would either still need to be performed on an emergency basis by local physicians and staff who would be less prepared to perform them, or the patients needing the emergency procedures would have to endure deleterious transport delays.

Regardless of whether the quality level of health care is lower, the same, or higher in rural compared with urban areas, it is important to the health of rural populations to be vigilant regarding the quality of their care. To this end, additional research is needed to enhance the quality of rural health care provision. Quality of care research, performance-based evaluations, and quality assurance and improvement programs are difficult to implement but critical to the well-being of rural individuals (Moscovice, Rosenblatt, 1999; Coombs, 2001). Just as for urban populations and providers, it is crucial to examine issues related to quality

of care and the selection of appropriate scope of medical services to optimize local health outcomes. Such analyses are complicated within rural areas because of such factors as the small numbers of cases, sometimes severe environmental constraints, and the scarcity of adequate data. Ensuring high quality care within rural health systems is not only important for the health of rural populations but also for creating an environment conducive to recruitment and retention of rural physicians.

### **Recruitment and retention**

Recruitment and retention research, programs, and training have been among the most active areas within rural health over the past several decades. Recruitment and retention are not synonymous and the factors that are related to one are not necessarily related to the other (Pathman, Konrad, Agnew, 1994; Rabinowitz et al., 1999a, 1999b; Conte et al., 1992). Moreover, they are interrelated with various aspects of physician satisfaction (Pathman, Williams, Konrad, 1996). In sum, various studies show that such characteristics as rural background, FP specialty, rural training, proximity to family, matches between personal interests and local opportunities, professional opportunities that match aspirations, good local K-12 schools, and the like increase recruitment success.

Crandall, Dwyer, and Duncan (1990) provide a conceptual framework for recruitment and retention. They classify and describe recruitment and retention in terms of affinity (eg., rural background of physician), economic incentive (eg., Medicare shortage area bonus payments), practice characteristics (eg., telehealth continuing medical education programs), and indenture (eg., National Health Service Corps obligations) models. This conceptualization is useful for examining the various efforts by communities and state and federal governments to recruit and retain rural providers. Rural provider training is the basic foundation for any rural system where recruitment and retention are successful. Three persistent fundamentals of rural success in physician recruitment and retention are a reduction in the number of rural uninsured, underinsured, and poor; creation of a stable and financially sound rural health care delivery system; and provision for physicians to have rewarding professional and personal lives.

The bottom line is that there is considerable knowledge regarding recruitment but less about retention. The recruitment and retention educational efforts of organizations such as the National Rural Health Association and American Hospital Association make available systematic information on the practical processes that rural communities can implement to be more effective in obtaining and keeping rural providers (Tilden, Tilden, 1995; AHA, 1992). State governments and federally funded AHECs provide technical assistance and furnish provider and community matching services. However, there is little information on strategies to recruit or retain women physicians in smaller rural towns or in towns that are persistently poor and amenity challenged. Factors such as the practice and community economic environment are critical to recruitment and retention efforts. Recruitment and retention research and local technical assistance can only go so far before the larger structural limitations associated with such factors as health care financing and the size of the possible pool of potential recruits dramatically impede these efforts. A better research

and policy understanding of the interface between physician retention and these macro federal and state issues is clearly needed.

### **Rural training**

During the past two decades, a variety of strategies have been introduced by federal and state governments and by medical education programs in an effort to ameliorate rural physician maldistribution problems and to promote the choice of rural practice by physician graduates. A review of the rural training literature shows that rural physician production success in predoctoral medical education is associated with admission of medical students with rural backgrounds and interests, a favorable explicit medical school mission, presence of a family medicine department, visibility of credible faculty role models with rural experience, sequential required educational experiences in rural settings, availability of advising programs to effectively create a bridge to residency training, and length of required family medicine curriculum (Geyman et al., 2000; Blackman, 2001; Rabinowitz et al., 1999a, 1999b).

Factors associated with successful graduate medical education training programs include rural training tracks (RTTs), fellowships, explicit program rural mission, rural location, procedural orientation, and a director with rural experience. Successful programs emphasize training in advanced obstetrics, emergency care, general trauma care, pre- and postoperative care, surgical assisting, geriatrics, medical specialties, counselling, practice management and informatics, and community assessment (Geyman et al., 2000; Geyman, 2001). These programs are dependent on many external factors, including the general well-being of the rural health care delivery system. For example, Rosenthal et al. (1998) indicated that RTTs are dependent on the financial viability of rural hospitals. CME for rural physicians is also an integral part of the educational process that serves to hone skills, instruct on up-to-date medical advances (Stearns, 2001), and reduce professional isolation. Because minority physicians are almost twice as likely to practice in underserved areas and because they are underrepresented among physicians, efforts are needed to facilitate increasing their participation in training programs, in general, and in generalist training programs, in particular (COGME, 1998b).

These findings support what Talley (1990) describes as the four basic “truths” of rural health: (1) students with rural origins are more likely to train in primary care and return to rural areas, (2) residents trained in rural areas are more likely to choose to practice in rural areas, (3) family medicine is the key discipline of rural health care, and (4) residents practice close to where they train. To the extent that these relationships are accurate, modifications of the training milieu to incorporate these factors make sense (COGME, 1998a). Much of the federal support incorporated within the Title VII programs is based on the premise that the production of rural generalists is an achievable goal through emphasis on these “truths” (Rosenblatt, Hart, 1999).

Although this type of intervention does not lend itself to controlled experiments, there is ample evidence that the affinity model works. The enormous difference in the extent to which medical schools send physicians into rural practice is powerful indirect proof of

Talley's postulates (Rosenblatt et al., 1992). Publicly-owned medical schools in rural states have high proportions of their graduating classes practicing in rural areas. By contrast, research-intensive private schools in metro areas with no commitment to family medicine have virtually no rural graduates (Rosenblatt et al., 1992).

The reliance on urban hospitals to train the physician workforce has several consequences for rural underserved communities. First, the location of training is a major factor in determining where a physician eventually practices. Second, urban teaching hospitals tend to value specialization over generalism, leading many physicians to select non-generalist specialties. Third, physicians trained in urban hospitals have little or no exposure to the needs of rural communities. Fourth, their students may develop practice patterns inappropriate for rural practice, such as a reliance on sub-specialists for a wide range of services. For these reasons, there have been modest federal policy changes to encourage a shift of training to ambulatory settings and, in some cases, to rural communities.

The production of rural physicians is often portrayed as a pipeline in which there are programs to encourage rural generalist practice from K-12 through medical school and residency. It is quite clear that quality rural training programs are successful (Geyman et. al., 2000). Some argue that this is because of student selection bias, but careful selection and matching processes should be part of such programs. The real question is the extent to which their expansion would be efficient. As students with less initial interest in rural practice were involved in these programs, would the marginal production of rural generalists be worth the added expenditures? Further, even if the rural programs did not increase rural physician production, there is significant value in training physicians appropriately to practice more optimally in the rural environments in which they will practice. Rural clinical practice in small towns is substantively different than in urban practices (Geyman et. al., 2001). If generalist physicians are to locate and remain in rural underserved areas, they need to be exposed to these environments and be taught the appropriate clinical and other tools to provide quality care that is culturally competent and within their comfort zones.

The key seems to be the creation of a pipeline that reaches out to rural communities to encourage the selection and success of rural students, gives them opportunities throughout medical school and residency to work in rural settings, and supports them in practice after they settle in rural areas. This coupled with a medical school and residency training environment that values generalism, community-responsive practice, and rural life is a recipe for improving the flow of medical practitioners to underserved rural areas. Federal and state investments in these areas have been very effective, a fact reflected in the popularity and ubiquity of these programs. Nevertheless, the production of rural physicians by US medical schools varies widely from 2 percent to 41 percent (Rosenblatt et. al., 1992).

There are three major barriers to rural residency training: inadequate funding, stringent Residency Review Committee (RRC) accreditation requirements, and an unhealthy rural health care delivery environment. Although there are thousands of rural hospitals, many of which have hundreds of beds and are located in non metro cities of over 20,000 population, only 70 of these hospitals received Medicare graduate medical education (GME)

reimbursement in 1994, and their reimbursement amounted to less than 1 percent of all such reimbursement (Slifkin, Popkin, Dalton, 1998). RRC requirements also severely limit rural residency training (Saver et. al., 1998). For instance, rural training is strictly limited for general paediatricians because of their RRC's requirements related to neonatal intensive care unit rotations and paediatric subspecialty rotations. And finally, training cannot take place in underserved remote small towns if their health care delivery systems are stressed to the breaking point as the result of reimbursement and other issues.

### **Productivity and income**

Contrary to a widespread perception, rural FPs do not generally average substantially lower incomes from their practices than do their urban counterparts. Rural FP/GPs averaged \$130,000 per year in 1995 (net income after expenses but before taxes) as compared with \$131,000 for their urban counterparts (AMA, 1997, p. 104). This parity of salaries carries across all physician specialties. There is limited and mixed evidence about the relative costs of practice. However, rural FP/GPs averaged seven hours more per week of professional hours than urban FP/GPs and performed, on average, over 20 percent more patient visits (AMA, 1997, pp. 56, 70). Thus, rural providers worked substantially more hours and performed more visits for approximately the same net income. There are substantial variations in rural physician incomes, with some physicians having their incomes limited by small population bases, low reimbursement levels, low levels of insurance coverage and high levels of poverty, and high insurance discount levels (Wright, 2001). A critical current issue is the extent to which the Balanced Budget Act of 1997 (BBA97) and managed care in all its forms will influence the real income of rural generalist and specialist physicians. This issue goes beyond the direct payments to physicians to the fiscal health of local facilities with whom the local physicians often are strongly tied, both financially and in terms of their clinical scope of services. In addition, the business of rural physician practice has become more difficult and requires significant expertise and business acumen as reimbursement sources have tightened (Larimore, Rehm, 2001).

### **Reimbursement and managed care**

It is no surprise that federal and other reimbursement policies and the emergence of managed care greatly influence physician behaviour and satisfaction - not to mention the health and access of rural underserved populations. Medicare and Medicaid reimbursement policies have a profound influence on many rural physicians because they can often represent on average half of their incomes (Federal Office of Rural Health Policy, 1997) and in many places, such as Iowa where the population is much older than the norm, much more. The BBA97 and the Balanced Budget Refinement Act of 1999 (BBRA99) are dramatically altering the fiscal realities of rural clinical practice and nearly all other aspects of the rural health care delivery system environment, including the training of physicians (Hart, Salsberg, Phillips, 2000). These changes are playing out in an environment in which managed care and network growth are also developing. These changes are too pervasive and complex to describe in detail here but are described more fully elsewhere (eg., for recent updates see managed care: Casey, 1999; see network development: Wellever, 1999; see Medicare: Mueller, Schoenman, Dorosh, 1999; see Medicaid: Slifkin, Casey, 1999; see BBA97 and BBRA99: RUPRI, 1999a, 1999b, 1999c; and see GME funding:

Slifkin, Popkin, Dalton, 1998; Henderson, 1999). For example, there is likely to be substantial loss of income for the rural health care delivery system associated with hospital outpatient prospective payment, home health prospective payment, and skilled nursing facilities payment, although the BBA99 has moderated or delayed the most harmful BBA97 consequences, and further changes are being considered in Congress. The rural health care delivery system is clearly in fiscal distress because of the BBA97. For rural physicians and other providers, this means that they are practicing in a hostile fiscal environment where their reimbursement, and that of other rural facilities, is complicated, uncertain, and often poor. For illustration, during the stress of rural hospital closures in the 1980s a loss of local physicians was realized (Hart, Pirani, Rosenblatt, 1994).

Managed care has diffused into rural areas much more slowly than into urban areas and its share of the rural market varies greatly from state to state - from highs in the range of ten percent to lows near zero (Rural Health Research Center, University of Minnesota, 1997). In general, managed care market penetration decreases as counties become more rural. In 1997, commercial HMO enrolment was estimated to be much lower than 8%. In 1996, about 11% of rural Medicaid recipients were in some form of managed care plan and, as of 1998, fewer than 3% of rural Medicare beneficiaries were in risk plans (Casey, 1999; RUPRI, 1999c). The increase in Medicare managed care plans has been extremely slow (RUPRI, 2000b). During this same period, rural providers entered into networks with each other and urban providers (Wellever, 1999) and physicians were increasingly involved in these networks (eg., 42% of rural hospital networks involve physicians). In order to survive in the business side of rural practice, physicians are having to not only deal with payment discounts, staff, and changing federal reimbursement schemes, but must also be involved in negotiating and participating in networks, risk evaluation, and managed care guidelines. Physicians must choose between the advantages of networks and managed care (eg., economies of scale and better on-call coverage) and loss of local independence and control (eg., cutbacks in local charity care and scope of service) (Larson, Hart, 2001).

The extent to which Medicare and Medicaid make managed care more or less attractive in rural areas will have an immense influence on the supply of rural physicians in underserved areas. Most rural places are too small to have more than one or two clinics offering care. The plurality and choices that exist in urban areas are often simply unavailable in rural areas, and individual rural areas are at risk for losing what little autonomy and local control they currently enjoy. In the world of underserved remote rural areas where resources are scarce and needs are great, the code has been one of cooperation and not competition. It is not clear that there is much to be gained in these areas in terms of dramatic managed care changes and potentially a great deal to lose, especially at the individual and town levels.

Many now believe that the present reimbursement system is not the definitive one or even a long-term one. There is a large array of proposed and possible reimbursement adjustments and alternative systems. The most important rural health-related question facing the US Congress and rural residents is the extent to which federal and state policy makers will invest in the rural health care delivery system (Hart, Taylor, 2001). Will elderly rural

residents of remote small towns obtain nearly all of their primary care in distant urban centers in 2010 or will they have local access to care? To what extent will the growing administrative overhead (eg., paperwork) related to quality assurance, fraud and abuse monitoring, and reimbursement regulations make small rural practices economically impractical? Will incremental expansion in governmental insurance coverage increase and how will this influence generalist physician supply in currently underserved communities? A cornucopia of questions need to be answered concerning federal and state reimbursement that will shape the care for underserved rural populations.

### **Federal ameliorative programs**

When recruitment, retention, and training programs and economic incentives fail to remedy geographic maldistribution, federal response has been to create programs that more directly address specific issues. The most costly programs sponsored by the federal and state governments aimed at providing needed provider services in rural areas can be categorized as either indirect or direct service programs. The indirect programs like Medicare and Medicaid provide insurance funding that allows rural practitioners to be reimbursed for services that otherwise would go unpaid or would not be sought or provided. Supplementary Medical Incentive Payments (ie., Medicare HPSA bonus payments) to providers in designated rural shortage areas and cost-based reimbursement for authorized Rural Health Clinics are other examples. The larger direct service or infrastructure support programs include, but are not limited to, the CHCs, Migrant Health Centers (MHCs), Rural Health Clinics (RHCs) and Federally-Qualified Health Centers (FQHCs), NHSC (physician scholarship and loan repayment programs), AHECs, Title VII and VIII health professional training funding, Rural Health Services Outreach Grants, Indian Health Service, Rural Network Development Grants, and the Critical Access Hospital Program (Ricketts, 1999b; Capital Area Rural Health Roundtable, 2000; Hart, Taylor, 2001). Many other federal programs are not aimed specifically at rural underservice issues but do differentially provide relief in rural areas (eg., federally funded State Children's Health Insurance Program (S-CHIP)). Each of these programs substantially influence the distribution of rural physician supply, especially related to underserved areas.

It is not important here to discuss each of these programs in detail but to note that there is a patchwork quilt of programs that attempt to mitigate underservice in rural areas that are often called the formal "safety net." These programs, although not without flaws, are critical tools whose purpose is to rectify the most troublesome problems. For instance, the NHSC places health care providers in rural shortage areas in an effort to provide care where it otherwise would not be available. Besides providing scholarships and loans to students and medical care in shortage areas in exchange for service in underserved areas, the NHSC now encourages retention of physicians in underserved rural areas with varying degrees of success (for examples see Pathman, Konrad, Ricketts, 1992; Rosenblatt et al., 1996). The NHSC has been criticized over the years because a relatively small percentage of those assigned remain for long periods after the fulfillment of their obligation (General Accounting Office, 1995; Pathman et al., 1992). But it is also clear that a substantial number of physicians remain in or fairly close to their original assignment sites and provide a substantial amount of obligated and non obligated community service where it is often

needed most (Cullen et al., 1997; Rosenblatt et al., 1996). The federally funded rural CHCs have over 2,367 sites that provided care for approximately 4 million residents in 1996 (COGME, 1998a).

These programs not only influence the physicians directly involved in them, but also the other community physicians whose case-mixes, visit volumes, and the like are blended with them within the local health care delivery milieu. Little is understood about how these programs influence other physicians and providers and patient access, quality, and cost of care over the long-term. As indicated above, tightened funding of these programs will directly and indirectly create a rural health care delivery system environment that is not conducive to recruitment, retention, provision of formal and informal care to the indigent, and effective practice within rural areas.

Many of these programs, including the NHSC, utilize the designation of shortage areas to target resources. The importance of these designations has far exceeded their original purposes and they are now the linchpin to a cornucopia of federal resources. Evidence seems to indicate that the designation tools currently in use do an inadequate job of allowing government to target its resources to places with the most underservice and need. A brief description of the Health Professional Shortage Areas (HPSA) history and methodology is pertinent.

The Critical Health Manpower Shortage Area (CHMSA) was created as part of the first legislation that created the NHSC (Pub Law No. 91-623). The initial designation was based on the physician-to-population ratio wherein areas with fewer than one physician for every 4,000 people were designated as shortage areas. The CHMSA was replaced by the primary care HPSA (Pub Law No. 94-484), which has evolved over the years to reflect the increasing supply of physicians and changes in the nature of the more than 30 federal programs that use the designation as a way to target resources (COGME, 1998a). Since 1978, designation as a HPSA has required a ratio of one full-time equivalent primary care physician per 3,500 population, subject to detailed exclusions (eg., other current NHSC assignees). In addition, areas with specified extenuating circumstances can be designated with ratios of 1 to 3,000. Although the initial designations were limited to geopolitical areas, current law allows the designation of any area, population group, or facility if the requesting entity can demonstrate unusually high needs or access barriers such as poverty and language.

The number of rural designations has increased from 1350 in 1980 to 1916 in 1999, despite increases in overall physician supply (Hart, Salsberg, Phillips, 2000). As the Government Accounting Office and other researchers have pointed out, many designated HPSAs are located in areas with adequate numbers of physicians (Berk et al., 1983; General Accounting Office, 1995; Ricketts, Taylor, 1996; Taylor et al., 1995). Although the populations so designated may or may not have ready access to those physicians, the original HPSA designation process has become less useful to the government as a tool for prioritizing the use of scarce federal resources. Because the process of designation has become more malleable and a growing number of federal programs are linked to it, places

may be designated more on their methodological or political sophistication than on their relative need for scarce federal resources (COGME 1998a). Nevertheless, HPSA designations are periodically reviewed, and designations can be removed based on changes in the area's data. It is estimated that in 1999 the designated areas had a rural underserved population of over 22 million, and that it would take nearly 2,500 physicians to bring them up to a ratio of one physician per 3,000 population. Even when targeting is not optimal, placed physicians still provide valuable service to the underserved.

A second major type of designation, Medically Underserved Areas and Populations (MUA/Ps), has a similar history and problems. MUAs add measures of need (eg., infant mortality) to the designation process. A major effort is currently underway to significantly revise, link, and update the MUA and HPSA designation process (eg., counting generalist physician assistants and nurse practitioners toward an area's supply). However, proposals to revise the designation process meet with remarkable political resistance. Without increased appropriations, reallocations of shortage designations necessarily result in the loss of resources for some states and areas. In addition, the methods and data related to small area supply estimation are generally flawed and not well developed.

Other federal policies also directly influence the supply of rural physicians in underserved communities. Federal policies regarding non US citizen international medical graduates (IMGs) are extremely controversial. Non US citizen IMGs are physicians who enter the US via the Physician Exchange Visitor Program to receive residency and other medical training. The number of IMGs has increased precipitously during the 1990s, accounting for much of the growth in physician numbers, although the 2000 medical student-residency match showed a large drop in non US IMG matches (American Association of Medical Colleges, 2000). This decline may be attributable to new eligibility requirements including the Clinical Skills Assessment exam. Inner city hospitals have become dependent on IMGs for staffing. A high percentage of non US IMGs eventually settle permanently in the U.S. and become a small but growing proportion of the rural physician workforce. The J-1 Visa Waiver Program allows these IMGs to locate within designated rural underserved areas. Although IMGs are less likely than US medical graduates to locate in rural locales, they are somewhat more likely to locate in those rural areas where there are greater shortages of providers (Mick, Lee, 1997; Mick, Sutnick, 1996; Mick, Lee, 1999). The General Accounting Office (1996) indicates that the problem with increased use of IMGs to address geographic undersupply is that it contributes to the impending general physician oversupply and deprives other countries of talented clinicians. The future of IMG policy is clouded given the cap on US medical school graduates, COGME's recommendations to limit federal Medicare funding of IMGs, and urban hospitals lobbying for a continuation of the critical IMG staffs they need to serve their underserved residents.

There are numerous and varied state programs designed to facilitate the production, recruitment, and retention of generalist physicians within rural towns (Slifkin, 1999). One of the largest of these consists of non federal state-funded scholarship and loan repayment programs wherein recipients are obliged to make repayments by practicing in a rural

underserved town designated by the state. With the increases of the last decade, these state programs may be larger in aggregate than the federal NHSC.

### **Safety net**

The formal and informal rural safety net is under stress as a result of factors such as the growing number of rural residents who are uninsured and underinsured, rising health care costs, the difficult economic times farmers are experiencing, and the fiscal realities affecting providers as a result of the BBA97 and BBRA99. For example, in many rural agricultural towns, local farmers and ranchers have either dropped their health insurance or have converted it into high deductible policies – the less expensive “save the farm \$5,000 deductible” policy (Hart, Salsberg, Phillips, 2000). For local generalists, such high deductible policies are tantamount to no insurance in most cases. Rural populations have over 20 percent more uninsured than do urban populations (NRHA, 1999). The role of the CHCs and Medicaid in providing care for rural indigents is essential, as are many other formal government (federal, state, and local), private, and foundation endeavours. In small and remote rural towns, much of the safety net workload is dependent on the less formal provision of uncompensated care by generalist physicians and other providers. While there is little doubt that informal safety net activity is extremely common and consequential, there is little systematic information on the volume and patterns of this care. Likewise, little is known about the number of communities where needy local residents have no access to formal safety net health services. Determination of the extent to which there is unmet medical care need in rural towns is especially relevant as a prerequisite to implementation of effective remedies. Often the weight of providing this care in underserved small and remote rural towns falls disproportionately on a few local providers. However, as generalist physicians are fiscally stressed by the changing reimbursement system and increased numbers of uninsured and underinsured, they may severely ration their charity work or move to more lucrative areas.

### **Telehealth**

During the 1990s, technology has developed rapidly to produce more economical, more reliable, and higher quality telehealth technology, with the federal government funding numerous demonstration projects (Norris, 2001). Few private and governmental medical care insurers provide reimbursement for telehealth services with the exceptions of radiology and pathology. While it is certain that the technology is available to perform telehealth services and while there are reasons to believe that care can be of good quality, there remain many unanswered questions. For instance, there are significant issues related to protocol and equipment standardization, reimbursement, credentialing, liability, licensure, and patient confidentiality and information security (Norris, 2001). Questions about the quality of clinical care and how it differs across specific medical conditions and physician specialties and circumstances are just starting to be addressed (Hart, Taylor, 2001).

In small and remote rural towns with the greatest relative need to overcome isolation, the most pertinent question is whether financing will be available and adequate for these potential low volume telehealth users. Furthermore, in circumstances where generalist physicians are in short supply, can telehealth become standard if it does not save them

time, regardless of whether it saves insurers resources, patient time and resources or results in other improvements? For an overly busy FP in an underserved area, writing a referral takes little time. How will clinical telehealth be combined with other services that use the technology, such as medical education and hospital and clinic administration? Some argue that these non clinical uses should carry the cost load and that clinical uses can be thought of as an extra benefit. How successful will system designers be at integrating telehealth clinical care into the normal routine of rural providers and remote specialty physicians, and how readily will rural providers adapt to these new technologies? Can telehealth help with the retention of rural physicians by making them feel less isolated? How will telehealth influence access in remote underserved areas to specialist physicians and how good will the care be that is provided? There are far more questions outside the technological sphere than there are answers. All this said, it seems inevitable that the dramatic diffusion of telehealth services across the rural and urban US landscape will accelerate, almost a technological imperative.

Will telehealth mitigate the effects of the geographic maldistribution of physicians or exacerbate that maldistribution for underserved populations? There are a host of other potential telehealth effects on rural providers, including its influence on scope of services, quality, income, and more.

### **OTHER HEALTH PROFESSIONALS**

There are many other types of rural health professionals who are clearly critical to the medical care of underserved rural populations. These include physician assistants (PAs), nurse practitioners (NPs), dentists, certified nurse anaesthetists (CNAs), certified nurse midwives (CNMs), chiropractors, pharmacists, mental health professionals, naturopaths, physical therapists, public health professionals, and many others. At the national level, there has been substantial growth in both the numbers of non physician health care providers and in their scopes of practice (Cooper, Laud, Dietrich, 1998). We know relatively little about the rural care provided by these professionals in underserved communities. For example, our knowledge is lamentably inadequate related to local public health workforce and mental health services (Richardson, Casey, Rosenblatt, 1999; Hartley, Bird, Dempsey, 1999; Woolf, Dewar, Tudiver, 2001).

Of particular interest for rural care are nurse practitioners and physician assistants. Because of data definitional problems and differences in state laws, the number of active practicing NPs is difficult to estimate. The number of NPs is growing at an extraordinary rate, as reported by Cooper, Laud, and Dietrich (1998). They estimate that the number of trained NPs will nearly double by 2015. Licensing authority per independent practice and prescriptive authority vary widely from state to state (Sekscenski et al., 1994). It is estimated that approximately 20 percent of NPs practice in non metro areas, and many of the training characteristics described for successful rural physician production are also characteristic of NP programs (Baer, Smith, 1999). This translates into about 13,000 rural NPs. While it is understood that the majority of NPs provide primary care, the actual percentage of NPs practicing as generalists is not known.

Many of the early PA programs were designed to create physician extenders, non physicians who could assist beleaguered rural doctors in providing care to isolated populations. Approximately 19 percent of PAs practice within non metro areas, and they number about 6,000 (Baer, Smith, 1999). Of the full-time rural PAs, 72 percent identified with generalist clinical care (Larson et al., 1999). The most recent graduating PA cohorts are less likely to be practicing in rural areas than those PAs who graduated earlier (Larson et al., 1999). Only 10 percent of PAs who graduated during the past four to seven years were practicing in a rural areas as generalists, compared with 37 percent of those who graduated twelve or more years ago. There is also evidence that generalist PAs are attracted to states with favorable PA practice laws. In terms of ambulatory visits, full-time rural generalist PAs are nearly as productive as FPs (Larson, Hart, 2001).

It is not practical to examine the supply of non physician rural medical care providers more fully in this paper. Many of the same factors that influence physicians also shape their location decisions and service to those located in underserved areas. In addition, there are many other issues, such as scope of practice turf conflicts with other provider types, that are relevant and consequential. In Washington State, generalist NPs and PAs provide about 30 percent of the generalist care provided in rural areas, with PAs being somewhat more likely to practice in HPSA areas, but NPs being more likely to be the only women generalist providers in these areas (Larson et al., forthcoming).

The mix and increases in non physician providers suggest the potential for dynamic change in rural underserved areas. It remains to be seen if these changes will help to ameliorate rural generalist care underservice. Further, we understand little about the consequences of these dynamic changes. Recent antidotal evidence strongly suggests, for example, that there is a growing shortage of pharmacists and registered nurses that was not anticipated.

## **WORKFORCE RESEARCH, DATA AND METHODS**

It became more and more apparent in the 1980s that the lack of relevant and objective rural health workforce research hampered those advocating federal rural health policies aimed at underserved areas. Policy debates were often reduced to arguments about quantified cost savings to the federal budget through program change versus anecdotal stories about the consequences of such actions. Although rural health workforce research had significantly lagged behind the rest of health services research, rural researchers of the 1970s and the first half of the 1980s provided the first documentation of poor rural access and other problems. The late 1980s saw the emergence of rural issues at the national level as well as the emergence of special rural interest groups (Hart, Taylor, 2001). During the subsequent decade, more and more high quality and policy relevant rural research was produced, including health provider research, that has had some influence on policy (Ricketts, 1999a). Research funding by the federal Bureau of Health Professions and the federal Office of Rural Health Policy has acted as a catalyst to these developments. During this time of significant health care delivery change with its emphasis on cost containment, decisions made within this context have the potential to profoundly influence the viability of the rural health care delivery system along with local economic development. At a personal level, these changes have the potential to intrusively degrade or augment personal access to

quality care while increasing the personal costs of care (Hart, Taylor, 2001). Policy makers and administrators need to adopt a realistic view of the rural health care delivery system to facilitate more appropriate federal policies.

Rural workforce data and research methods seldom inspire great passion for rural health advocates. Nevertheless, researchers are highly dependent on available data and the maxim that data are power is nowhere more true than for rural health policy debates. Rural data from federal surveillance systems and surveys have been extremely limited (Ricketts, 1999a) and funds for rural surveys have been scarce. While there has been some progress in making more rural data available, the scarcity of rural data still represents the greatest obstacle to the production of relevant, effective, and policy relevant research results.

Workforce analysis, including the methods of designating provider shortage areas, are important to research, policy, and the targeting of resources to the rural communities most in need of providers. For many critical rural health workforce research areas, better methods and tools are needed to make meaningful progress. For example, improved methods are needed to describe and compare provider quality of care for small numbers of providers and for providers under resource shortage circumstances. Likewise, intra state small area health provider workforce modelling and analysis methods are rudimentary and need to be further refined. The earlier discussion of HPSA designation methodologies is an example.

Another case in point relates to the availability of useful rural taxonomies. A decade ago, Patton (1989) indicated that the need for new and more precise measures of rural status was indispensable to research and policy advancement. Reliance of almost all federal policies on the federal Office of Management and Budget's (OMB) Metro/Non Metro county-based definition, which grossly oversimplifies the wide gradients of the rural and urban continuum into a dichotomy, causes overbounding and underbounding of metro areas. In addition, it does not allow programs to be targeted to the rural populations most in need of help. The use of different rural definitions such as the Census Bureau's Urban Areas and Urban Places and OMB's Metro Areas only partially identify the same rural populations and can lead to different policy conclusions (Ricketts, Johnson-Webb, Taylor, 1998).

The Department of Agriculture's Economic Research Service has added a more useful county classification of the rural and urban status: the county Urban Influence Codes. More recently, the Goldsmith adjustment for large area metro counties (Goldsmith, Puskin, Stiles, 1997) was employed in federal legislation to help rectify some of the inequities caused by use of counties as a legislative and regulatory unit. Subsequently, a multi-level Census Tract-based rural/urban taxonomy that is based on employment commuting patterns and city/town population was developed (Morrill, Cromartie, Hart, 1999). A ZIP code area approximation was also developed. These Rural-Urban Commuting Areas (RUCAs) allow more precise targeting of resources and interventions to rural populations and permit more meaningful rural research analyses. Although concern over such definitional issues may seem academic, the consequences of the use of different definitions materially influence

research and policy analysis results, perceptions, governmental policies, and the transfers of large sums of federal and state resources (see Hewitt, 1989).

### **UNDERSERVED INNER CITY AREAS**

Many of the issues discussed above regarding underserved rural areas and the supply of physicians are also relevant for underserved inner city areas. Lack of insurance coverage, persistent poverty, physician specialization trends, and the like also play out in inner cities, with much the same result. In inner cities, long distances to providers may play less of a role in impeding access to needed care than do access issues related to poverty, class, language, prejudice, and race. Generalist and specialist services may be located relatively close by, but many residents of inner city neighbourhoods have poor access to them. The barriers to care are much more a function of the structure of the social and health care system than they are the result of where physicians locate (COGME, 1998a). Federal programs such as CHCs are essential in providing needed services, and in many inner city neighbourhoods it is unlikely that traditional office-based physician practices can be induced to meet local medical needs. Though geographic availability and access for inner city underserved areas do share many processes and issues, there are many meaningful differences that are beyond the scope of this paper to address. A broad summary of the issues appears in the Tenth COGME Report entitled *Physician Distribution and Health Care Challenges in Rural and Inner-City Areas* (COGME, 1998a) and proscriptively in *Strategies for Increasing Physician Supply in Medically Underserved Communities in California* (Grumbach et al., 1999).

### **CONCLUSION**

It is not possible to predict all of the US rural health workforce policy issues that will be addressed at the federal, state, and local levels during the first decades of the 21<sup>st</sup> century. However, most of the detailed federal policy questions posited a decade ago by Patton (1989) and by Hersh and Van Hook (1989) are still relevant today. However, there are some new twists and turns on them, and some new questions occasioned by changes in the system such as managed care, the BBA97, and the BBRA99 (Hart, Taylor, 2001). In the short term, some of the most critical questions surrounding physician and rural underserved areas involve the consequences of the multifaceted BBA97 for rural and inner city underserved populations. If the rural practice environment becomes even more hostile and unstable, it will be that much more difficult to recruit and retain generalist physicians in underserved areas.

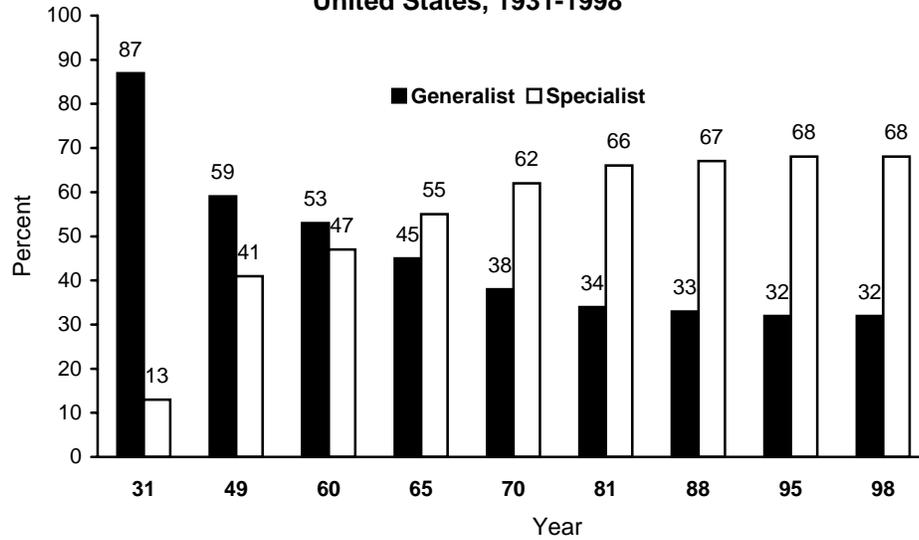
Federal and state health policies have a dramatic influence on the supply of local rural health care providers and their delivery of care. For instance, without Medicare funding for the elderly in poor communities there would be but a shadow of the health care delivery system that now exists. For structural reasons, “one size fits all” Congressional policies and regulatory rules are often detrimental to rural health care delivery systems, although some programs like the NHSC are designed and contribute to ameliorating rural underservice (Hart, Taylor, 2001). Over the last few decades, there was a significant emergence of rural and inner city special interest groups. They are now acting on the federal stage to influence

policies to be more effective, equitable, and humane for underserved populations. How successful these efforts will prove to be regarding physicians supply remains to be seen.

The most crucial question is whether our nation will continue to deal with providing an adequate supply of physicians and other health care professionals for underserved rural and inner city populations on an inadequate, erratic, and often inefficient piecemeal basis, or whether a more radical, coherent, benevolent, and expansive system will be adopted? A wide array of policy options is available that range from doing nothing, to pragmatically repairing and better funding the present system, to entirely revamping programs and increasing insurance coverage. However, US political realities limit the probable options to a much narrower range.

The well meaning use of patchwork remedies in attempts to ensure an adequate supply of providers in underserved areas is proving complicated, inefficient and problematic. No national policy to increase this supply can be completely successful unless it addresses root issues such as physician specialization, insurance coverage, prejudice, poverty, unstable rural health care delivery infrastructure, and poor and uncertain reimbursement. At a secondary level, new energy and funding needs to be invested in medical school and residency training of more generalists, training more generalists in rural locations, determining how to attract and keep female generalists in rural areas, and training more rural and minority students to be generalists - if there is any expectation that current rural generalist underserved areas are to be helped. Medical schools and residency programs need to be funded explicitly to produce rural generalist physicians. Funding levels need to be high enough to bring about the desired behaviours, and funded programs must be required to furnish proof of meeting program goals in order to continue receiving funding. While emphasis on family medicine makes sense, there also needs to be increased funding of general paediatrics, general internal medicine, obstetrics/gynaecology, and general surgery along these lines (COGME, 1998a). In the meantime, it is important to fine tune and better fund ameliorative federal programs that should continue to provide care for those who live in underserved areas and who have few personal resources (such as the Medicare, Medicaid, NHSC, CHCs, and Medicare Bonus Payments). These programs need better tools to target their resource allocation and to more accurately measure program outcomes. Regardless of federal, state, and local policies and programs, local residents and providers are not released from their responsibility to use available resources to provide as optimally cost effective and high quality of care as possible (Amundson, 1993). And finally, there also can be no hope of long-term success in eliminating areas of rural underservice unless we create a stable and financially sound rural health care delivery system that provides for physicians to have rewarding professional and personal lives.

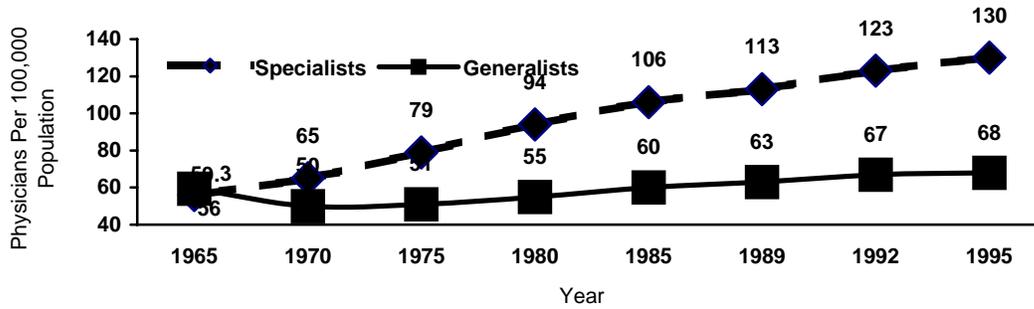
**Figure 1: Percentage of generalist and specialist physicians, United States, 1931-1998**



The AMA reclassified MDs in 1968 causing a 3.5% change in primary and non-primary care.

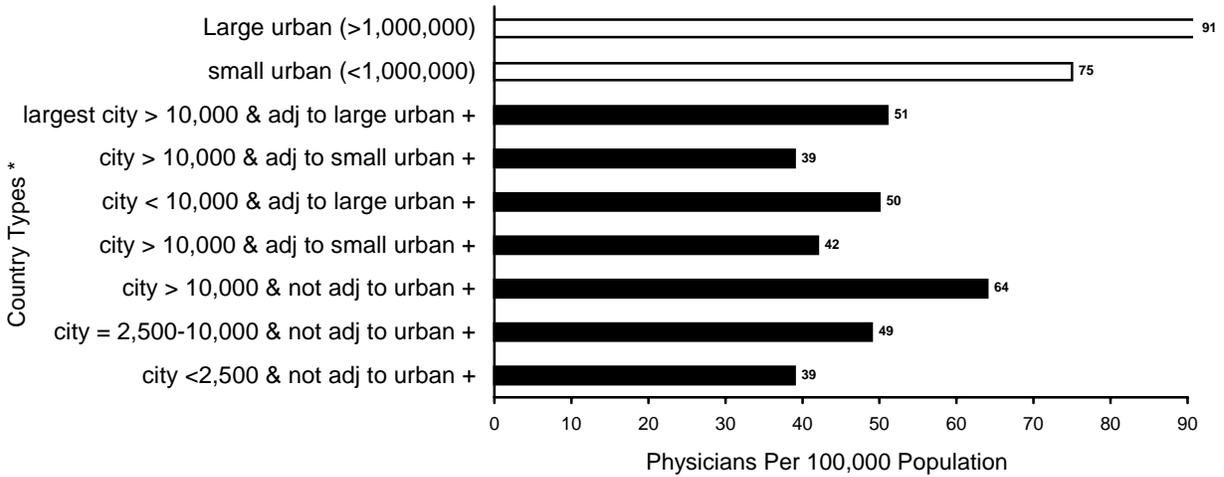
Source: COGME 1998a and BHP 2000

**Figure 2: Patient care generalist and specialist physician supply ratios per 100,000 population, United States, 1965-1995**



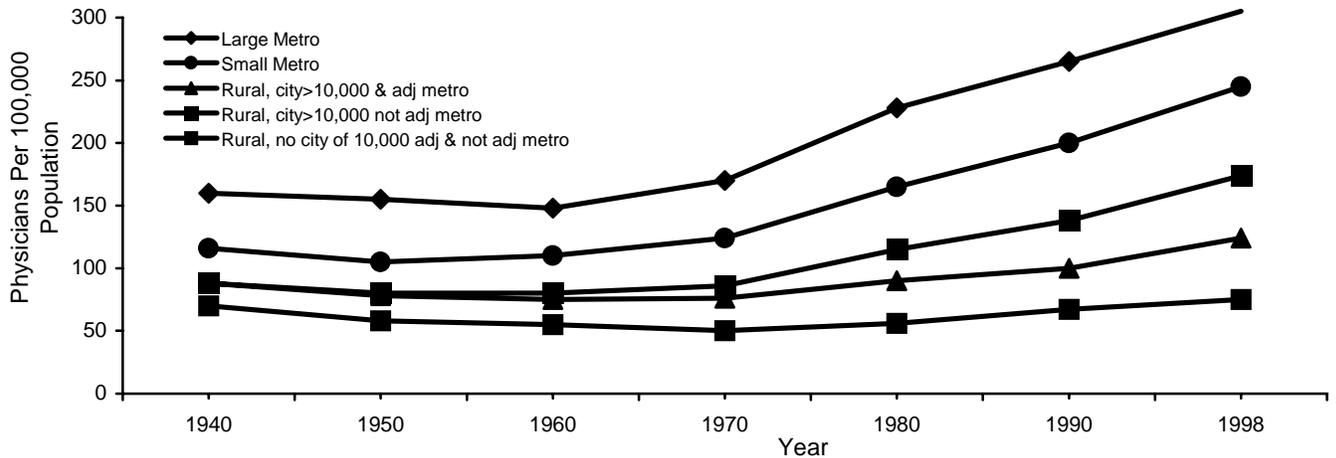
Source: COGME 1998a

**Figure 3 Patient care generalist physicians per 100,000 populaton by location, United States, 1998**



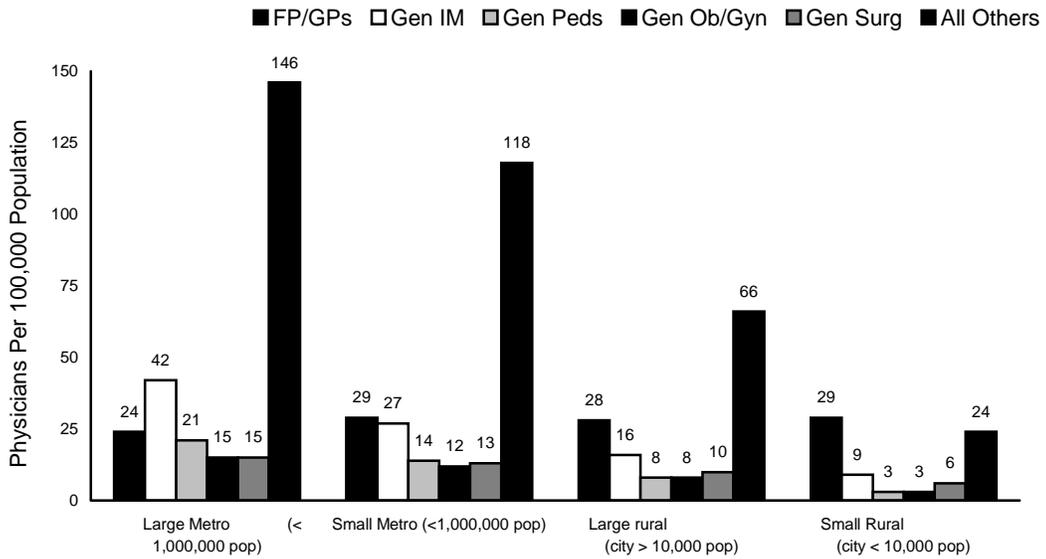
\*Urban influence codes (Department of Agriculture); + Rural  
 Source: BHPPr 2000

**Figure 4: Active MD physicians per 100,000 population by year and location\*, United States, 1940-1998**



\* Groups of urban influence (Department of Agriculture)  
 Source: COGME 1998a and BHPPr 2000

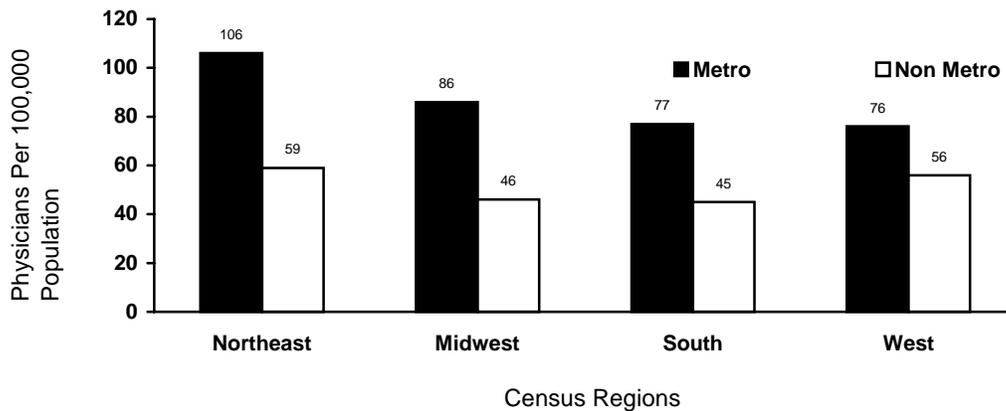
**Figure 5: Patient care MD physicians per 100,000 population by location\* and specialty, United States, 1996**



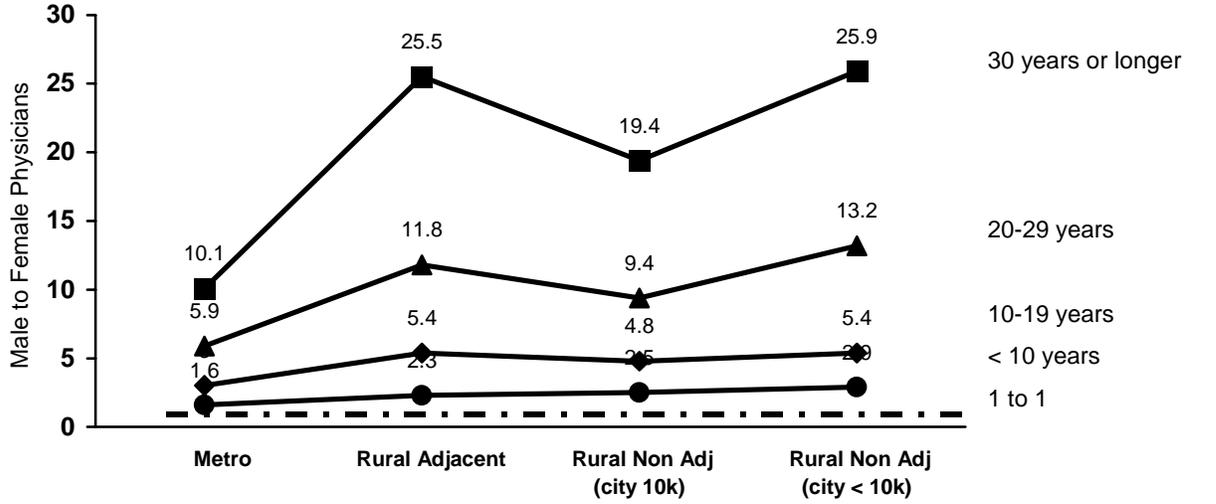
\* Groups of urban influence (Department of Agriculture)

Source: COGME 1998a

**Figure 6: Generalist physicians by Census region and metro status, United States, 1997**



**Figure 7: Male to female FP/GP physicians by graduation cohort and location\*, United States, 1997**



\* Groups of urban influence codes (Department of Agriculture)

Source: Doescher, Ellsbury and Hart 2000

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