Final Report #125

The Future of Family Medicine and Implications for Rural Primary Care Physician Supply

August 2010

by

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This study was supported through the WWAMI Rural Health Research Center with funding from the federal Office of Rural Health Policy, Health Resources and Services Administration, Public Health Service (Grant #6U1CRH03712-02).

WWAMI RURAL HEALTH RESEARCH CENTER

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RHRC
Rural Health Research & Policy Centers
Funded by the Federal Office of Rural Health Policy
www.ruralhealthresearch.org

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EXECUTIVE SUMMARY

The precipitous decline in student interest in the field of family medicine over the past decade is exacerbating the crisis posed by the persistent shortage of providers in rural areas of the United States. Family physicians are the foundation of the rural health care system, with generalists accounting for almost half of rural physicians. Their presence is even more critical in the smallest and most isolated communities where they constitute the majority of all physicians. This policy discussion examines the rural physician shortage, the effect of recent trends in specialty choice on provider supply, and major trends that are changing the dynamics that shape the delivery of health care. It concludes with a discussion of how private efforts and federal and state policy options can be refined to ensure adequate and high-quality health care in rural America.

This report is based on estimates of the future supply of family physicians, taking into account recent patterns in specialty choice. We performed analyses of medical school graduates from 1988 through 1997, determining the discipline they entered, the location of their residency programs, and where they decided to practice, on an urban-rural continuum. We selected these cohorts to allow us to follow the career trajectories of the most recent graduates (from 1997) through residency training (3-5 years) and establishment of their practices.

Major findings are:

- Rural locations are heavily reliant on family physicians for their health care, accounting for about half of all rural physicians in large rural areas and about two thirds in smaller and more isolated areas. Specialty supply diminishes as areas become smaller and more remote. Without family physicians, the shortages in rural areas would be much higher.
- There has been a sharp decline in the proportion of U.S. medical graduates choosing the discipline of family medicine over the last decade, with most family medicine residency positions filled by students who graduated from medical schools outside of the United States. The decline in the number and proportion of U.S. medical graduates entering family medicine is occurring at the same time that the population continues to age and expand. Moreover, newly graduated family physicians tend to seek out urban employment.
- Despite the increasing numbers of medical school graduates, the proportion of students choosing family medicine careers will likely remain far below the numbers required to replace rural and urban family physicians leaving the field because of death or retirement.
- Barriers to expanding the rural physician supply include the dysfunctional pipeline, with few rural youth pursuing medical careers; the changing composition of the workforce (more women entering the field of medicine, and a reliance on international medical graduates, both less likely to settle in rural settings; the increased use of non-physician providers, although they provide only a subset of services for which family physicians are trained); the prevalence of poverty and lack of medical insurance, resulting in less demand for health care and lower reimbursement for provider services; and disincentives for

primary care practice involving compensation, lifestyle demands, and social standing.

What private efforts and federal and state policy options could alter this arid landscape by increasing and sustaining the number of family physicians in rural practice?

- Increase the number of medical students raised in rural communities and provide skills and support at an early stage that will effectively prepare them for future medical careers.
- Make changes to medical school curriculum and admission policies including admitting more students from rural backgrounds, providing financial support, offering enrichment programs to help disadvantaged students gain entry into medical school, and prioritizing the preparation and production of future rural providers.
- Provide financial support for residency training programs that prepare rural physicians through exposure to rural practice and training tracks, and that impart the requisite repertoire of skills needed in rural practice settings.
- Provide incentives for rural practice by making it both more attractive and financially viable, and thus more professionally rewarding and competitive (such as Medicaid reimbursement, practice development subsidies, tax credits for rural/underserved practice, locum tenens support, malpractice immunity for free care, payment bonuses, subsidies for electronic health records, and Medicaid reimbursement of telemedicine).

Over the last 40 years, a vast array of new programs has been deployed to address the shortage of family physicians entering rural practices. As a result of rigorous research and evaluation of these programs, it is possible to identify a spectrum of interventions within both the private and public sectors that could reverse these trends. These interventions need to occur at all of the life cycle stages of physicians: K-12 and college preparation, medical school admissions and curricula, residency training, and the way in which rural practitioners are supported while in practice. Only then will the integrity of the rural health care system remain intact to ensure high-quality and equitable health care in rural America.

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INTRODUCTION: FAMILY MEDICINE AND RURAL HEALTH

This report considers how the precipitous decline in medical student interest in family medicine over the past decade could adversely affect the rural physician workforce in the near future. Family physicians are the foundation of the rural health care system. Although for the nation as a whole, only about one third of all physicians are generalists, almost half of rural physicians fall in this category (Fordyce et al., 2007). Family physicians constitute the majority of rural generalist physicians throughout rural America, and their presence is particularly critical in the smallest and most isolated communities (Fordyce et al., 2007).

Over three decades ago, family medicine emerged as a separate specialty, with a well-developed three-year residency program and consistent and rigorous accreditation criteria, which has led to better preparation of future rural physicians compared to the old model of general practice that simply required a one-year internship after medical school. While rural areas have long experienced issues of provider supply and maldistribution, recent trends in physician specialty choice have increased the vulnerability of rural communities to physician shortages. The sharp decline in interest in family medicine as a clinical discipline among graduating medical students in the United States over the past 10 years will continue to have a disproportionate impact on rural America. Recent work by the WWAMI RHRC has updated our understanding of the physician supply and distribution in rural areas (Fordyce et al., 2007; Chen et al., 2008) and given us a much more precise estimate of the most likely future supply of generalist physicians within the rural communities in the United States.

This policy discussion will examine specifically the likelihood of persistent and significant shortages of physicians in rural areas as interest in the field of family medicine declines, and the relative importance of family physicians in addressing those shortages. It will also examine some of the major trends that have impacted the choices medical students make about specialty and practice location, with particularly serious implications for rural areas. This report concludes with a discussion of some of the policy options that can be addressed by public and private entities with an interest and responsibility for ensuring adequate and high-quality health care for the rural U.S. population.

METHODS

This report is based on a review of recent estimates of the future supply of family physicians in the United States that take into account the past decade's decline in the number and proportion of medical graduates entering into the discipline (Colwill et al., 2008; Phillips et al., 2009).

We performed a national cross-sectional analysis of the 2005 American Medical Association (AMA) and American Osteopathic Association (AOA) Masterfile physician data to examine a 10-year cohort of clinically-active allopathic and osteopathic physicians who graduated from medical school 1988 through 1997 and had completed residency training. We selected these cohorts to enable us to follow the career trajectories of the most recent graduates (from 1997) through residency training (3-5 years) and establishment of their practices. We determined the medical school of graduation and the most recent residency program for each physician and identified the location of that residency program as rural or urban, based on its ZIP code-derived Rural-Urban Commuting Area (RUCA) code. Urban, large rural, small rural, and isolated small rural categories were created based on RUCA codes (Morrill et al., 1999). Self-designated primary specialty was used to classify physicians as being generalists or non-generalists. Generalist

physicians were further classified as family medicine (family physicians and general practitioners), general internal medicine, or general pediatrics; non-generalists were classified as medical, surgical, pediatric, and other. We classified persistent poverty areas according to their degree of rurality using 2004 Economic Research Service (ERS) policy type county typology codes (U.S. Department of Agriculture, Economic Research Service, 2004). Estimated 2004 population data were obtained from the 2004 Claritas ZIP-level demographic database and served as the denominator for calculating physician per 100,000 population ratios (Claritas, 2004).

We complemented this work by having general discussions with an opportunity sample of national leaders in rural health and medical education. These discussions, which followed a semi-structured but informal process, allowed us to refine the policy options that our literature review suggested would be most helpful in strengthening the rural health workforce. Although we do not report in any formal way the results of this discussion, this process has enriched our understanding of the most critical rural health workforce issues.

FINDINGS/RESULTS

CURRENT RURAL PHYSICIAN SUPPLY: FAMILY PHYSICIANS ARE THE FOUNDATION OF RURAL HEALTH CARE SYSTEMS

One of the few aspects of American medicine that has remained constant is the relative shortage of physicians in rural areas (Kindig & Movassaghi, 1989; Kuehn, 2008; Colwill et al., 2008; Phillips et al., 2009). While 19.2% of the U.S. population lives in rural America, only 11.4% of physicians practice in rural locations. As seen in Figure 1, rural communities in general have many fewer physicians per capita than their urban counterparts, with family physicians playing a prominent role in the more rural areas. The differences between metropolitan areas and the smallest rural communities are stark: urban areas have 210 physicians per 100,000 people (or 1 physician for every 476 inhabitants) while isolated small rural areas have 52 physicians per 100,000 people (or 1 physician for every 1,912 people).

Although generalists represent only 35.9% of all physicians in the United States, they account for almost half of all physicians in large rural areas. Family physicians constitute about two thirds of physicians in small rural and isolated small rural areas. By contrast, the specialist supply per capita declines steadily as geographic areas become smaller and more isolated (Fordyce et al., 2007). Table 1 demonstrates the paucity of specialists of all kinds in all but large rural locales and in metropolitan areas.

In every rural category, family medicine had by far the highest supply of physicians per capita of any medical discipline, including any of the other generalist disciplines. In fact, the only physician discipline that has more physicians per capita in rural areas than in urban areas is family medicine. These data show that without a steady influx of family physicians, physician shortages in rural areas would be much larger.

Rural America remains an important demographic component of the larger nation. About 62 million people live outside metropolitan statistical areas (MSAs), and more than 35 million people reside in rural counties that have no town larger than 20,000 people (Robert Graham Center, 2005). Small

Figure 1: Patient Care Physician-to-Population Ratios by Rural-Urban Status, 2005

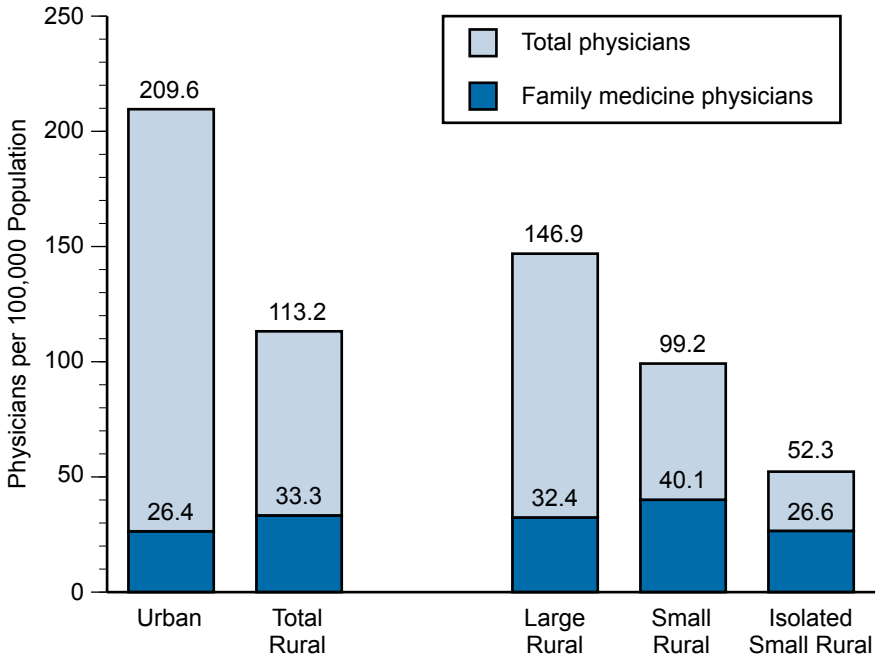


Table 1: Percentage of Physicians Graduating from 1988 to 1999 Practicing in Rural Areas, by Physician Type

Specialty	Large Rural Percent	Small Rural Percent	Isolated Small Rural Percent	Total Rural Percent	Total Urban Percent
Family medicine	11.3	7.6	3.7	22.6	77.3
Internal medicine	7.0	2.8	1.4	11.3	88.7
General pediatrics	6.4	2.0	0.7	9.1	90.9
General surgery	11.0	4.3	1.1	16.4	83.6
Orthopedics	10.3	2.6	0.6	13.5	86.5
Obstetrics-gynecology	8.2	2.1	0.4	10.7	89.3
Emergency medicine	6.9	1.9	0.8	9.6	90.3
Psychiatry	6.5	1.6	0.5	8.7	91.3
Medical specialties	6.0	1.5	0.6	8.1	91.9
Surgical specialties	3.4	0.3	0.2	3.9	96.1
Total	7.5	2.8	1.2	11.4	88.6

communities have too few people to support the specialists who comprise the majority of physicians, and thus are dependent for much of their health care on the availability of generalists. Among generalists, family physicians have the added advantage of being able to provide care for all segments of the population, which explains the fact that their relative supply increases in the smaller and more remote rural communities. These factors have led experts to conclude that family medicine must remain the mainstay of the solution for small rural areas (Geyman et al., 2000; Colwill & Cultice, 2003; Rosenblatt et al., 2006a).

Below we present some of the reasons for the decline in rural generalists that have been reported in the literature, followed by a typology of comprehensive strategies to reverse the trends that are threatening the viability of the rural health care system.

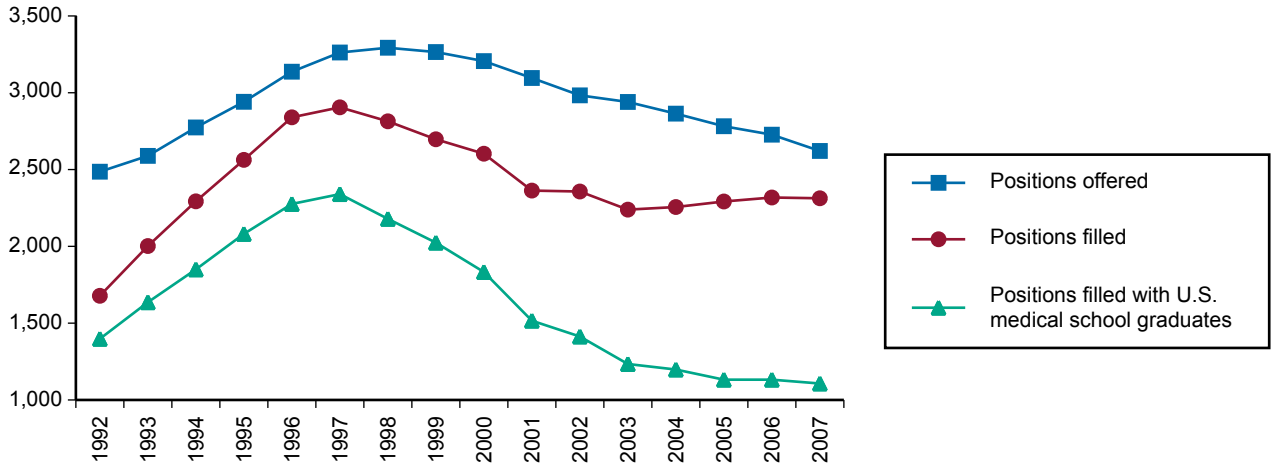
FUTURE RURAL PHYSICIAN SUPPLY: DECLINING INTEREST IN FAMILY MEDICINE AND THE LIKELY IMPACT ON THE RURAL HEALTH WORKFORCE

There has been a dramatic decline in the proportion of U.S. medical graduates choosing the discipline of family medicine over the last decade (Jeffe et al., 2007; Colwill et al., 2008; Phillips et al., 2009). This sharp decline is also reflected in the family medicine residency match rate during that time period (McGaha et al., 2008; Pugno et al., 2008). While the number of medical school graduates matching into U.S. family practice residencies in 2008 increased compared to the previous year for the first time in a decade, the percentage of U.S. seniors choosing primary care fields remains very low (Pugno et al., 2008).

As seen in Figure 2, the number and proportion of U.S. medical graduates entering this generalist discipline peaked in 1997, and declined steadily for the next 10 years. The decline in the number and proportion of U.S. medical graduates entering family medicine is occurring at the same time that the United States population continues to age and expand (Colwill et al., 2008), and with a potential for an influx of patients if universal access is achieved (Phillips et al., 2009), with both trends likely to dramatically increase the demand for primary care services. The U.S. population is expected to rise by 18% during the next two decades, with the population over 65 increasing at over three times this rate (U.S. Census Bureau, 2007, cited in Colwill et al., 2008). Colwill and colleagues (2008) predict that between 2005 and 2025, the workload of primary care physicians serving adults will increase by 29% but their supply will only rise by 7% during that time period. Partially as a result, there has been a perceived shortage of physicians generally, which led to the American Association of Medical Colleges recommending an increase in medical school size of 30% (AAMC, 2007, cited in Colwill et al., 2008).

To the extent that there are baseline shortages of physicians throughout the country, regions of the country and institutions dependent on family physicians will be more vulnerable if this segment of the workforce does not grow or continues to decline. In fact, if the proportion of students choosing family medicine careers continues its descent, there will be insufficient numbers to replace those rural and urban family physicians that are leaving the field because of death or retirement. As Colwill and colleagues (2008) point out in an analysis of the future generalist workforce, changes in the age structure of

Figure 2: Family Medicine Residency Match Decline, 1992-2007



the population and the declining proportion of U.S. medical graduates entering generalist specialties will have a pervasive impact on generalist physician supply. The authors conclude, "…the adjusted supply figures point to a 20% shortage of adult care generalists by 2025.…These translate into shortages of 35,000-44,000 adult care generalists.…"

ADDITIONAL FACTORS LEADING TO GREATER IMPACTS ON RURAL AREAS

The impact of this secular change away from generalist careers will be greatest in rural areas, which are particularly reliant on primary care providers. While there has also been a decline in the number of medical students entering general practice, internal medicine, and general pediatrics (U.S. General Accounting Office, 2008), the changing career choices of American medical graduates have been most pronounced in the discipline of family medicine, which is the predominant specialty in rural locations. Because of the decreasing numbers of general internists and general pediatricians being trained and because they are less inclined than family physicians to practice in rural areas, they cannot compensate for the loss in the numbers of U.S. graduates being trained in family medicine.

The following discussion focuses on some of the major barriers to expanding the supply of family physicians that are having substantial impact on the health care workforce in rural areas.

The Dysfunctional Pipeline: Relatively Few Rural Youth Are Successful in Pursuing Medical Careers

Physician education does not begin on the first day of medical school. Because medical school is competitive, arduous, and expensive, only a group of highly motivated and very well prepared youth can gain admittance to U.S. medical schools. For the most part, these future physicians come from urban areas, places with excellent schools and abundant role models. Most rural educational systems lag far behind, and many rural students receive inadequate preparation in keystone subjects such as math and science that would facilitate the pursuit of a medical career (Kassebaum & Szenas, 1993; Rabinowitz, 1988; Bowman et al., 2003). Barriers to medical training for students of rural origin enumerated by Rourke and colleagues (2005) include lower educational and socioeconomic status, fewer role models, less encouragement for attaining advanced degrees, less technology, and the need to travel to obtain their medical education. However, despite concerns about the lack of educational preparation of students of rural origins, several studies have shown that there are not significant academic performance disparities between students from rural versus urban areas (Rabinowitz et al., 2008).

The nation's medical schools reinforce this problem by selecting most of their students based on grades and test scores, and charging increasingly high tuition fees, factors that tend to eliminate many students from rural background (Hyer et al., 2007). Twenty years of experience has demonstrated unequivocally that the students most likely to enter rural practice are those who come from rural backgrounds (Rabinowitz et al., 2008). But the dearth of rural students entering medical schools almost guarantees that the supply of rural physicians will be deficient. A handful of medical schools have demonstrated that, in concert with admissions policies targeting students raised in rural communities, they can increase the yield of rural

physicians substantially by creating rural-emphasis medical education programs (Rabinowitz et al., 2008; Halaas et al., 2008).

The Changing Composition of the Medical Workforce

Increases in the Proportion of Women in the Physician Workforce

The composition of the medical workforce has changed dramatically over the last 20 years. The gender imbalance of medicine, in which most physicians were male, has been transformed by the entry of women in large numbers into the profession. Although this has increased the number of talented people in the medical field, the impact on rural health care shortages has been problematic. Women are less likely than men to choose rural practice for a variety of reasons, with further research needed to identify and address gender-related factors associated with rural placement, such as longer hours, inflexible work arrangements, and spousal career concerns (Doescher et al., 2000; Ellsbury et al., 2000). Only one third of rural physicians are women, and while women persist in preferring urban practices compared to their male counterparts, the rural-urban gender gap may be narrowing (Chen et al., 2008). However, as students seek medical disciplines that allow them more control over their work hours, the proportion in every specialty entering rural practices declines regardless of gender. And because women physicians work fewer hours than men generally, this has the effect of reducing total workforce availability within all areas of the country (Colwill et al., 2008). Phillips and colleagues (2009) conclude that women will continue to be reluctant to enter rural practices until strategies are put forward to make this a more attractive and viable choice.

Reliance on International Medical Graduates

One of the consequences of the decline in the choice of primary care discipline by American medical graduates has been the importation of large numbers of international medical graduates (Hagopian et al., 2007). Currently, nearly one quarter of all U.S. primary care physicians went to medical schools in other countries (Hart et al., 2007). International medical graduate (IMG) physicians often enter the United States through programs that grant them visas in return for service in underserved locations, a large number of which are in rural areas. But as the immigrant physicians establish themselves in the United States, and gain the freedom to change both location and specialty, they tend to move away from the rural areas that initially recruited them (Hart et al., 2007). In fact, a longitudinal comparison of a sample of U.S.-trained medical graduates (USMGs) and IMGs based on AMA data from 1978 through 2004 demonstrated that almost 90% of both USMGs and IMGs were practicing in urban settings of the United States (Akl et al., 2007).

There has been a dramatic increase in the number of residency matches filled by IMGs (Pugno et al., 2006). In the match conducted in 2005, IMGs filled 36.5% of PGY-1 positions in family medicine residencies (Morris et al., 2006). Most IMGs have been trained in countries that have themselves desperate provider shortages and enormous disease burden (Starfield & Fryer, 2007). And although visa programs for IMGs have been specifically established to provide care in shortage areas, IMG physicians are more likely to become generalists and practice in designated Health Professional Shortage Areas (HPSAs), but are actually slightly less likely to settle and work in rural areas and persistent poverty counties than U.S.-trained medical graduates (Hart et al., 2007).

Many training programs have had to adapt to the increase in IMG physicians, and some programs may rely on developing pipelines that begin overseas. IMG physicians may have cultural differences as well as language barriers that complicate the process of residency training substantially (Gastel, 2006; Wilner, 2007). The Society of Teachers of Family Medicine now sponsors a "pre-residency academy" to address some of these cultural differences in IMG trainees (Benson et al., 2008). Many rural communities currently rely on IMG physicians, but this reliance perpetuates the existing system in which the United States addresses its health care delivery needs by diminishing the ability of poor countries to provide a basic service to their own residents. The international "brain drain" issues with IMG physicians are perhaps the most compelling argument against dependence on IMG physicians to extend the rural physician workforce (see Mullan, 2005).

Increased Use of Non-Physician Providers

A third factor affecting the composition of the workforce is the expansion of non-physician providers, primarily physician assistants (PAs) and nurse practitioners (NPs). These health professionals have made a major contribution to the rural health workforce, and in community health centers in particular they almost equal the number of family physicians (Rosenblatt et al., 2006b). Moreover, a descriptive study of practice locations of 310 NP graduates showed that 38% had rural practice addresses and of these, 62% were in rural areas designated as shortage areas (Edwards et al., 2006). But NP numbers have fallen fairly precipitously in recent years as well, and may fall further as masters-level NP programs are replaced by more expensive and lengthier doctoral programs for future NPs (Fang et al., 2006, cited in Colwill et al., 2008). And although PA numbers have remained stable, the proportion entering the generalist disciplines has declined considerably over recent years (Larson & Hart, 2007). In their analysis of National Ambulatory Medical Care Survey data, Colwill and colleagues (2008) concluded that 42% of office visits

to PAs and NPs are in offices of specialists rather than generalists.

Furthermore, PAs and NPs provide only a subset of the services for which family physicians are trained. Studies have consistently shown that the spectrum of primary care services provided by NPs is as effective as that provided by physicians (Cooper, 2007). Although the care they provide within their scope of training has been shown to be equivalent to that provided by physicians (Cooper & Stoflet, 2004), they are not typically trained in the full range of ambulatory and inpatient medicine procedures performed by physicians.

Poverty and Lack of Medical Insurance in Rural Areas

Poverty in the United States has been exported to rural areas. The U.S. has 386 persistent poverty counties, of which 340 are non-metro counties (U.S. Department of Agriculture, Economic Research Service, 2005). Rural counties that are not adjacent to metro counties have the highest poverty rates, with 16.8% of the population considered to be poor. This same source reveals that the non-metro poverty rate has exceeded the metro rate every year since the 1960s, with poverty rates averaging 2.6 percentage points higher in rural than metro areas. Although the percentage of rural residents in poverty actually decreased from 17.1% to 13.4% from 1993 to 2000, the recession in 2001 caused rural growth to slow and poverty to expand once again (U.S. Department of Agriculture, Economic Research Service, 2006).

Partially as a result, the proportion of people with health insurance is lower in rural areas than in urban areas, a problem made worse because many smaller rural employers do not provide health insurance to their employees. Workers living in the most rural areas are 10.4 percentage points less likely to have health insurance than their urban counterparts (Larson & Hill, 2005). As a result of lack of insurance and underinsurance, rural populations are less able to create demand for private health care, and rural providers are less well reimbursed for the services they supply.

As a reflection of these patterns, a disproportionate number of federally-qualified community health centers (FQHCs) are located in rural areas (Ricketts, 1999; Regan et al., 2003). However, despite the expansion of the FQHC program over recent years, there has not been a commensurate investment in primary care or family medicine education, as evidenced by the failure to substantially bolster Title VII program funding. In fact, primary care training in FQHCs and other rural ambulatory settings is often thwarted because the current graduate medical education (GME) funding mechanism centers on urban teaching hospitals. Thus, the increasing shortage of family physicians has led to high vacancy rates in FQHCs generally, which is much more severe in rural counties (Rosenblatt et al., 2006b).

Disincentives for Primary Care Practice

Medical students make their specialty choices on the basis of their informed appraisal of the competing opportunities. Many studies have examined factors related to specialty choice. For example, a review of four observational studies examining variables associated with family medicine specialty choice concluded that consistent factors were older age of students, Hispanic ethnicity, rural background, lower income expectations, a preference for family medicine at matriculation, attending a public school, participating in a program targeted at producing family physicians, undergoing required training in this discipline in the third or fourth year, and an intent to practice in a rural area (Campos-Outcalt et al., 2007).

Major factors that influence medical student choices can be summarized under the categories of potential income, future lifestyle, and social standing (Phillips et al., 2009). In all three of these areas, family medicine and primary care have become considerably less attractive in comparison with specialties. Generalists earn less than half as much as specialists, and disparities are increasing (Bodenheimer et al., 2007, as cited in Colwill). According to a recent report, over a 35-40 year career, this payment disparity produces a $3.5 million gap in return on investment between family medicine physicians and the midpoint of income for subspecialist physicians (Phillips et al., 2009). Other disincentives to becoming generalists include earning half the income made by procedurally-oriented specialists, socializing influences towards specialization at tertiary care centers, limited leisure time, and educational debts that divert students from primary care (Colwill et al., 2008). Our society places a high value on physicians who have mastered complex technical skills, and hospitals and medical schools are dominated by these role models. And increasingly, graduating students are entering specialties that allow copious free time (including part-time practice), little call, and fewer lifestyle demands. Rural practice does not easily fit into any of these categories.

POLICY OPTIONS: WHAT CAN BE DONE TO INCREASE THE NUMBER OF FAMILY PHYSICIANS ENTERING RURAL PRACTICE?

Over the last 40 years, a great deal has been learned about how to increase the rural health care workforce. Unfortunately, that knowledge has not been applied consistently. Powerful forces that are part of the culture of both our country and the medical discipline have created an environment where sustaining the kind of primary care practice that is the foundation of rural medicine has become increasingly difficult.

In order to systematically explore the policy options that are available to improve the supply of rural family physicians, it is helpful to consider the life cycle of the typical physician. There is utility in splitting this continuum into the following consecutive phases: the years before medical school, especially grades 7 through 12 and college; the medical school years; residency training; and the practice years themselves. Although many approaches could be taken to influence each of these stages, three major types of institutions have the resources and the organizational ability to create programs that can have a substantial impact: (1) private efforts, including foundations and local entities; (2) state government efforts; and (3) federal government efforts. In the discussion that follows, we will discuss each of the life cycle stages and suggest specific interventions that these three components of American society could use to improve the supply of rural physicians, especially rural family physicians.

The goal of this discussion is to focus on the most promising policy interventions, reflecting the research and evaluation that has been done over the past several decades. The topic is so large that no discussion could adequately review all of the studies, and this discussion is meant as much to illustrate a way in which individual communities, states, or federal entities could systematically approach the issue as it is meant to provide definitive solutions to what are complex and persistent problems.

Stage One: Increasing the Number of Medical Students from Rural Communities

The most powerful predictor of future rural practice is rural upbringing. For physicians the odds that someone who was born in a rural county will practice in a rural county are over two times as great as the odds of someone who was not born in a rural county ($P < .05$) (Phillips et al., 2009; Laven & Wilkinson, 2003). Students born in the most rural counties are four times more likely than their urban counterparts to practice in a rural community (Hyer et al., 2007). Arguably, the best way to create a sustainable pipeline of future rural physicians is to select students with rural upbringing.

We will discuss how medical schools can play their part in encouraging students with rural aspirations to realize their goals later in this policy discussion. But even before this step, rural communities and rural schools must ensure that students have adequate educational preparation to gain admission to medical schools and perform well in these very demanding educational settings. Unfortunately, rural educational systems are often inadequate to the task, particularly in the areas of math and science, not because of poor student performance, per se, but because rural schools often offer less curricula choices (Haller et al., 1993).

The following are ways in which private, state, and federal entities can change this equation:

Private Efforts (Including Foundations and Local Entities)

Rural educational systems are usually under the control of locally elected school boards. Unfortunately, rural school boards—like most voluntary organizations in rural communities—often have difficulty in attracting skilled and devoted school board members. Foundations have also made an impact by improving the functioning of local rural school boards, both through broad training and by providing consultation to boards tackling specific issues (Johnson & Strange, 2007). The Bill and Melinda Gates Foundation (2010) provides another example of private foundation support aimed at the local level. It has adopted a number of rural communities throughout the nation. In addition to improving the curricula and teaching workforce of selected communities, the foundation has guaranteed college tuition to students who successfully complete high school. All these efforts can definitely complement the entity that is most relevant to the quality of school systems—state government—which will be discussed next.

State Efforts

Public education is generally the responsibility of individual states. In fact, in many states the funding of schools is enshrined in their constitutions, and in many cases is considered of higher importance than all other state functions. A large proportion of taxes collected at the state level goes toward K-12 education, and it is through state policy that the funding formulas are established that determine the educational quality of rural schools.

Perhaps the most important policy that states can adapt is to ensure that the funding for public education is driven by needs of the children rather than relative affluence of the communities themselves. Unfortunately, there is a tendency for richer communities to have better school systems, simply because parents in these communities are both able and willing to provide more money for their schools, often through local levies and by direct donations of time and money.

Rural communities—particularly poor rural communities—would be better served by educational policies that channeled more resources to the needier schools. Some states have designed funding formulas that accomplish this end, and in so doing can attract better teachers to rural areas and sustain the types of curricula that can produce future health care professionals. In addition, states can create training programs that better prepare teachers for rural locations, and maintain and improve their skills once they have begun to work in these areas. It is particularly difficult to ensure that science and math education is available at a high level of quality in rural areas, but this is absolutely essential if graduates of

these schools are going to be well prepared for medical school education.

States can also establish policies that ensure curricular effectiveness. Although the whole issue of competency testing is very controversial both within educational circles and among the public at large, efforts to ensure educational quality must be embraced in some form at the state level.

Federal Efforts

The federal government affects preschool through college-level education in a myriad of ways. For example, the recently passed $787 billion federal stimulus plan includes an additional $5 billion for Head Start, a program to help low-income families. The federal government has the capacity to improve rural educational effectiveness through grants, regulations, and innovation. Current federal efforts by the Obama administration are focusing on expansion in early childhood education, tougher testing standards, teacher training and recruitment, support of charter schools, and financial aid for college education (see CNN, 2009).

Perhaps the most effective policy would be to systematically explore ways to improve educational quality in disadvantaged and remote rural communities, especially in those subjects that are the building blocks of future health care careers.

Stage 2: Medical School Efforts: Admission and Curriculum

Private Efforts: Admit More Medical Students with Rural Backgrounds

A series of studies over many decades have indicated that rural physicians are up to five times more likely than their urban counterparts to come from a rural background. Evidence of targeted admissions policies fits into the "affinity model" of rural educational theory (Crandall et al., 1990). Medical schools can have a major impact on the number of rural physicians by admitting students who grew up in rural areas: medical schools can be effective not only as passive conduits to residency programs, but also as settings which reinforce the aspirations of students who will later become rural doctors (Rabinowitz & Paynter, 2000).

A 1997 U.S. national sample of physicians demonstrated that medical school experiences per se, independent of background variables, had little effect on physicians' decisions to practice in underserved areas. The investigators concluded that admission policy is the key to increasing the number of graduates likely to practice in underserved areas (Xu et al., 1997). This conclusion was powerfully supported by data from seven medical school programs successfully targeting selection of students with rural backgrounds (Rabinowitz et al., 2008).

Although the most significant personal characteristic influencing a physician's decision to practice medicine in a rural location is rural background, most medical school admissions committees do not explicitly incorporate this knowledge into their selection process. Not all medical schools have the production of rural physicians as part of their mission, but many do. It is very clear that for medical schools—particularly state-funded medical schools that are trying to address shortages of rural physicians—selective admission of students from rural backgrounds is vital. This goal can be enhanced by the following strategies:

- Providing scholarships and tuition relief to rural students.
- Including rural physicians on the admissions committee.
- Ensuring that rural students are not disadvantaged by the admissions process.
- Potentially applying a rural adjustment factor to grade point averages and Medical College Admissions Test scores.
- Setting quotas for rural enrollment.

Most medical schools in the United States are now expanding their enrollment, and several new allopathic and osteopathic schools are being added to this pool. For those schools with a rural workforce mission, this provides an excellent opportunity to introduce or strengthen rural tracks that admit students with rural backgrounds and support them throughout medical school.

Although admitting rural students is the most important single step that medical schools can take, it is also critical that the medical school curricula help students maintain their goal of becoming rural physicians. To that end, research demonstrates that specific curricular activities help students to maintain their rural interests rather than be affected by the dominant urban and specialty orientation of most medical schools (Rabinowitz et al., 2008). These curricular components include:

- Rotations that focus on rural primary care, rural preceptorships, and specialized medical school curricula for applicants with rural background or rural intentions.
- Requirements that all third-year medical students complete a clerkship in family medicine. Some states that have already done this include Texas, California, Iowa, Illinois, Utah, and Washington.
- Linkages between community provider practice sites and health professional training programs. Current education of students and residents occurs almost exclusively in large urban teaching hospitals, which

rarely provides them with opportunities to learn about the vast majority of primary care delivered in rural settings. Some or all Medicaid GME payments should be directly linked to state policy goals intended to support primary care and rural, underserved areas (Henderson, 2000). Medicare GME should be redirected from the inpatient environment to the types of ambulatory settings found in rural locations.

- Support for health professions education (preceptorships) in underserved areas.

State Efforts

Although states provide only a portion of the funds that medical schools use to run their educational programs, they have enormous potential influence on the missions of the schools they sponsor. To the extent that the education of future rural physicians is important to state government, states have the opportunity to shape both admissions and curricular policy.

Moreover, studies have shown that a larger proportion of primary care physicians and rural physicians are produced by state-supported medical schools (Senf et al., 2003), with a correlation between the proportion of state financial support per student in a school and the percentage of graduates entering family medicine residencies (Campos-Outcalt & Senf, 1999).

There is an obvious potential tension between the objectives of state governments that fund medical schools and the faculty who administer them. By the same token, even in rural states that have established medical schools largely because they want to ensure an adequate supply of physicians for the local population, training future rural physicians is only one of many roles that medical schools are asked to assume. However, in states with significant shortages of rural health personnel, it is reasonable to expect that state-funded medical schools will carry out a workforce function.

States can help achieve these aims not only by using their influence to persuade university administrations to appoint faculty and administrators who embrace these goals, but also by providing specific funding for rural practitioner training. Ensuring that rural state residents can be admitted to and successfully complete medical education may require special enrichment or preparation programs as have been established by many states seeking to help disadvantaged students gain entry to medical school (for a full listing of these programs see: http://services.aamc.org/postbac/). In addition, funding rural clinical rotations may require directed funding by states.

States can also fund some of the ancillary programs that are useful in rural training. Area Health Education Centers are generally funded in part by state governments and have the capacity to aid medical education programs of all types in rural areas. State offices of rural health also can be extremely innovative in using state funding to support rural medical education. There are a myriad of examples of these programs, which range from sponsoring rural immersion experiences for students at all levels of training, to innovative uses of telemedicine, to expanding educational opportunities in rural communities.

Federal Efforts

The major tool that the federal government has used to stimulate the training of rural and primary care physicians in medical schools has been funds under Title VII of the Public Health Service Act. Most of the medical school funding has gone to departments of family medicine, internal medicine, and pediatrics in both allopathic and osteopathic schools to stimulate curricular innovation designed to produce physicians who would practice in rural and underserved areas. Evaluation of the efficacy of these programs is methodologically difficult, as Title VII provides relatively small funding streams that must function within large institutions with many competing goals. However, the preponderance of evidence suggests that Title VII has achieved its goal of affecting physician careers positively in regard to primary care, rural placement, and minority opportunities (Rittenhouse et al., 2008; Rich & Mullan, 2008; Green et al., 2008; Rosenblatt et al., 1993; Fryer et al., 2002; Lipkin et al., 2008; Maupin et al., 2008).

The amount of funding for Title VII has decreased—in constant dollars—since the inception of the program in the mid-1960s. For example, the final budget for FY 2006 included a 51.5% cut to Title VII; the $40 million increase in FY 2007 joint funding resolution did not fully recover the funding lost as a result of the 2006 cut. To the extent that producing rural physicians is seen as a national priority, existing studies suggest that bolstering the Title VII program would increase the output of future rural physicians.

The Society of Teachers of Family Medicine's Working Group on Rural Health recommended in 1998 that Title VII funding be tied to predoctoral education programs that demonstrated output of rural physicians and accord priority to program applications with rural goals. Continued funding should then be dependent on successful output of rural physicians. The working group also recommended that incentives be created for medical schools to develop rural missions for medical schools and residents (Society of Teachers of Family Medicine Group on Rural Health, 1998). In the field of research and policy development, the STFM recommended the tracking of graduates of rural medical education programs, both individually and collectively, in terms of selection and retention in rural practice (Geyman et al., 2000).

The federal government also has a long history of stimulating innovation in medical science generally. Educational dollars from federal sources are dwarfed by the investment in research. Agencies such as the Office of Rural Health Policy have made important investments in rural health research—some of which has been directed at increasing our understanding of how medical education affects workforce issues—but the amounts involved are small in comparison to the funding of basic and clinical science through agencies such as the National Institutes of Health (NIH).

The federal government could strengthen medical schools and academic disciplines that train rural physicians by directing that a greater proportion of the funds provided by institutions such as the NIH and the Centers for Disease Control and Prevention (CDC) go to those institutions. The money need not be directed strictly at education to achieve this aim. Supporting community clinical research and translational research would achieve the same end, while further multiplying the impact of NIH discoveries by making them more relevant and more available to underserved and rural communities.

Stage 3: Residency Training

Residency training—especially in family medicine—is one of the most effective way of augmenting the supply of rural physicians. Research has demonstrated that one of the most powerful influences on physician location is where the physician completed residency (Rosenblatt et al., 2006a). Although few family medicine residencies are based in rural communities, graduates of these programs are much more likely to practice in rural settings than their peers who trained in urban-based programs (Rosenblatt et al., 2002; Hart et al., 2005; Halaas et al., 2008; Chen et al., 2008). In addition, even among family medicine residencies there are enormous differences in the extent to which they prepare students for future rural practice, both in the scope of clinical skills and in their attitudes to and exposure to rural practice.

Private Efforts (Including Foundations and Local Entities)

One of the major impediments to the training of rural family physicians is the paucity of training that actually occurs in rural areas. In a survey of 435 family medicine residencies in 2000, Hart et al. (2005) found that only 33 (7.6%) were located in rural areas, and while one third of urban programs included rural training in their mission, only 2.3% of these schools offered training in rural locations. Residency training is almost always anchored in a hospital, and most rural hospitals in and of themselves have neither the volume nor the clinical diversity to support a family medicine residency program. This problem has been exacerbated by the profound decrease in the number of U.S. medical graduates entering family medicine residencies over the last 11 years.

However, excellent models exist for rural training. Hospitals in large rural areas often serve as regional referral centers and do have the capacity to train rural residents in a three-year program. In addition, rural training tracks attached to urban residency programs are one of the most effective means for locating residency training in rural areas. Of the graduates in these programs between 1988 and 1997, 76% were found to be practicing in rural locations, with 61% of these practicing in Health Professional Shortage Areas. Importantly, 72% of these respondents indicated their intention to stay in their current locations indefinitely (Rosenthal, 2000). While a later study found the average retention of generalist physicians in rural underserved communities to be the same or slightly shorter than for those in rural non-HPSAs (Pathman et al., 2004), the authors attribute local shortages of rural providers to the need for more effective recruitment strategies.

Local communities can take advantage of these programs by helping to support rural hospitals that wish to train rural family physicians. Additional financial support, plus political support from county commissioners, mayors, and hospital board members can encourage rural hospitals to investigate these links. In addition, the enormous potential of partnerships with rural community health centers as residency training sites could be exploited. Considerable preparatory work has been done in this arena over the last three years and could be accelerated by increased local, private, and foundation support.

State Support

States have historically provided direct funding for residency programs, particularly in the field of family medicine. In FY 2005-2006, grants and contracts accounted for 37% of revenues for public medical schools, followed by faculty practice plans (35%) and tuitions, fees, and state appropriations (17%) (Association of American Medical Colleges, 2007). However, few states have funding models that target medical education, and those states use them for different functions (Office of Program Policy Analysis & Government Accountability, 2006). According to Henderson (2000), 10 states require Medicaid GME payments be linked directly to state policy goals that address the health care workforce, and three of these states use these payments to encourage training of physicians in settings such as ambulatory sites and rural locations. Discussions with state governments about expanding rural training through some of the mechanisms discussed above could bolster the strength of rural-oriented GME substantially. Some state-level activities that could be supported to bolster the rural family medicine workforce include:

- Provide financial support for residency training in careers that are most needed. It costs approximately $75,000 per new medical student versus $39,000 per

new resident. Therefore, preferential funding could be given to specialties, such as family medicine rural residencies, which are most needed in one's own state.

- Require that all primary care residencies offer residents a rural rotation. This currently has been done by Texas, California, and Utah.
- Develop "One-Two" Rural Training Tracks. These tracks require residents to complete their first year of training in an urban center, with years two and three in a rural community.
- Implement "Support-for-Service" Programs, which have the goal of enticing new physicians to practice in medically underserved areas. These state-sponsored programs include scholarships, service-option loans, loan repayment, direct financial incentives, and resident support programs.

Federal Support

The majority of financial support Graduate Medical Education (GME) funding comes through Medicare's direct and indirect medical education subsidies. Payments by Medicare and Medicaid for GME largely do not address rural training per se. With the recent acknowledgement by the Medicare Payment Advisory Commission (2008) that an increase in the proportion of primary care physicians is essential to the future of the Medicare program, it may be time to readdress this issue. Even modest changes in the funding formulas for Medicare's educational subsidies would have a powerful impact in shaping the future of graduate medical education programs.

Stage 4: Practice Settings

Medical students choose careers based upon which specialty and practice location they perceive as best meeting their personal and professional aspirations. The decline of primary care nationally is occurring because these disciplines are seen as less rewarding than the competing alternatives. In the current health care system—where there are few constraints on students' choice of career—specialty care has been seen as more attractive than primary care because it commands higher salaries and more prestige, while also allowing greater professional autonomy and more satisfying life styles (Phillips et al., 2009). When these factors are coupled with medical schools that tend to admit well-qualified urban applicants, and train students in tertiary medical centers staffed primarily by specialists, there is no mystery as to why primary care is shrinking.

To the extent that the nation wishes to change these dynamics, primary care and rural practice must be seen as a viable financial and lifestyle option for talented young health professionals who have a wide range of choices.

Private Efforts

Private entities and foundations can assist in making rural practice more attractive by helping to support the medical education of rural youth, and by ensuring that their local communities allow physicians to practice high quality medicine in a professionally rewarding way. To the extent that the prevailing fee-for-service system undervalues primary care relative to other disciplines, salaries can be augmented to make them more competitive. Local loan-repayment options have been shown to be effective. And hospitals and other local entities can create job slots that ensure that physicians have reasonable workloads, ample time for vacation and continuing education, and a sustainable amount of after-hours on-call duties.

State Efforts

State governments are responsible for:

- Financing and governing health professions education,
- Licensing and regulating health professions practice and private health insurance,
- Purchasing services and paying providers under the Medicaid program, and
- Designing a variety of subsidy and regulatory programs providing incentives for health professionals to choose certain specialties and practice locations.

It is important for states and the federal government to effectively share information on state workforce data, current issues, and policy initiatives. States would benefit from investing resources in the collection of a comprehensive workforce database. Most states have tended to concentrate their efforts on only a few workforce policies in a fragmented process, rather than encouraging broader change and reform. States have the opportunity to pursue a coherent and comprehensive set of policies aimed at promoting a quality health workforce for their states.

Federal Efforts

Numerous federal, state, and local loan repayment initiatives are intended to recruit new primary care physicians and other health care providers to underserved areas. The most well-known program, the National Health Services Corps (NHSC), is a critical program for addressing the maldistribution of health care providers. However, the Corps' current group of clinicians placed in medically underserved communities meets only a fraction of the long-term needs of underserved rural communities (Pathman et al., 1992). Issues exist with enforcing service obligations and, most importantly, retaining providers beyond their payback period. It may also be difficult for states to obtain federal shortage designations for communities to qualify for NHSC physicians.

A number of other powerful federal programs can be used to improve the quality of rural practice, and change the decisions that medical students make about discipline, and graduating residents make about location. The programs include:

- Medicaid reimbursement.
- Practice development subsidies (start-up grants).
- Tax credits for rural/underserved area practice.
- Providing substitute physicians (*locum tenens* support).
- Malpractice immunity for providing voluntary or free care.
- Payment bonuses/other incentives by Medicaid or other insurance carriers.
- Subsidies for the installation of effective electronic health records.
- Medicaid reimbursement of telemedicine.

CONCLUSIONS

The health of rural communities depends upon having a well-trained and committed health care workforce. The foundation of this rural workforce is family physicians. The precipitous decline in the number of U.S. medical graduates choosing family medicine residencies, and the decline in the number of graduates from these residencies despite the importation of large numbers of international medical graduates, has led to increasing shortages of rural physicians and threatened the integrity of the rural health care system. Future projections of population growth suggest that the shortages will worsen unless the private and public sectors work together to change the dynamics that affect the choice of medical career and practice location.

Over the last 40 years, a vast array of new programs has been deployed to try to address these issues. As a result of rigorous research and evaluation of these programs, it is possible to identify a spectrum of interventions within both the private and public sectors that could reverse these trends. These interventions need to occur at all of the life cycle stages of physicians: K-12 and college preparation, medical school admissions and curricula, residency training, and the hopefully long and satisfying period in which physicians practice in the rural communities of our nation.

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