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U.S. Rural Healthcare Shortage: A Review of Strategies in the U.S., Canada, and Colombia.

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U.S. Rural Healthcare Shortage: A Review of Strategies in the U.S., Canada, and Colombia.

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I. Introduction

Globally and in the United States, there are large disparities in the supply of healthcare professionals between rural and nonrural areas. This imbalance in the health workforce is a major concern in high income as well as low and middle income countries. It is a complex issue that encompasses a wide range of possible situations.[1] Imbalance in the healthcare workforce is a major challenge for health policymakers, since human resources, the different kinds of clinical and non-clinical staff who make healthcare interventions happen, are among the most important of the health system's inputs.[2]

Nearly all countries have a maldistribution of the healthcare workforce, which is worsened by migration from middle and low income countries to developed countries with potential better professional and personal conditions, affecting global equity with the loss of nurses and doctors from health systems in many poor countries. The urban concentration of workers is a problem everywhere. Improving within country equity requires attracting and retaining healthcare workers in rural and underserved communities.

Today's global health picture is one of great diversity, with life chances and health inequities sharply polarized. Poverty and inequality are both causes and symptoms of the crisis in health. Average life expectancy in many societies is less than half that of more privileged areas. And the gaps are widening. The wealthy continue to enjoy longevity up to and beyond 80 years, but life expectancy at birth is less than 40 in more than a dozen countries, nearly all in sub-Saharan Africa[3].

We face a global crisis of the healthcare workforce. There are not enough health workers, they do not have the right skills and support networks, they are overstretched and overstressed, and often they are not in the right place. For many health workers, their work is not just a job or a career, it is a vocation. It is the continuing dedication of millions of health professionals, working to prevent diseases, deliver health, and provide a minimum package of services to hundreds of millions of people, despite inadequate numbers, poor working conditions, and neglect by policymakers[4].

In 2004, the Joint Learning Initiative (JLI), a consortium of more than 100 health leaders, emphasized workers as the ultimate resource in health because they manage and synchronize all other health resources, including financing, technology, information, and infrastructure. It is the health worker who glues these inputs together into a functioning health system (figure 1)[3].

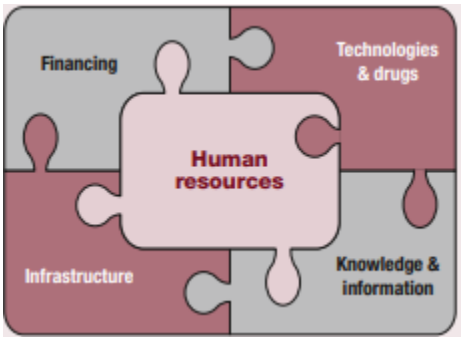

Figure 1. The glue of health system[3]

But the workforce as human resources cannot be considered as simply another input. Healthcare is a service that is overwhelmingly worker dependent. As a unique resource, health workers are active agents of health change. They require time and investment to build their capabilities. And as people they have mixed motivations, which include dedication to service, the desire to contribute to society, or wanting to advance their own interests[3].

JLI asked whether hiring more health workers makes it possible to provide better services. Of interest and importance are the precise levels at which health worker density makes a difference, and in which ways. These are some of the questions the JLI research set out to answer. Is there a linear relationship between health worker numbers and health outcomes, or a minimum threshold for making a difference? Are areas, such as maternal health or infant mortality, especially sensitive to health worker density? How do countries compare; can they be fit into general patterns, and are there over and under performers? Can a country be saturated with health professionals; reaching a point at which its people do not demand more health workers? And how many health workers are there, who are they, and where are they?[43].

The Joint Learning Initiative proposed that “mobilization and strengthening of human resources for health, is central to combating health crises in some of the world's poorest countries and for building sustainable health systems in all countries. Nearly all countries are challenged by worker

shortage, skill mix imbalance, maldistribution, negative work environment, and weak knowledge base. Indeed, the only route to reaching the health Millennium Development Goals (MDGs) is through the worker; there are no shortcuts. Workers alone are not panaceas. Building a high-performance workforce demands hard, consistent, and sustained effort. For workers to be effective they must have supplies, and for them to use these inputs efficiently they must be motivated, skilled, and supported"[42].

Regarding areas sensitive to health worker density, evidence shows that human workforce drives health-system performance. Throughout history, periods of acceleration in health have been sparked by popular mobilization of workers in society. Higher worker density and better work quality, professional education, gender equality, and higher income, improve population health and human survival (figure 2)[37].

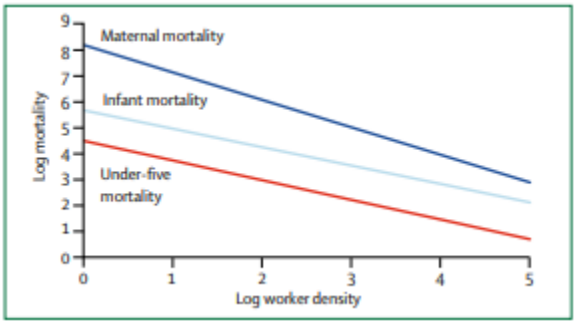

Figure 2. Association between worker density and mortality rates[37].

In September 2000, the United Nations signed the Millennium Development Goals (MDGs) and committed 189 world leaders to combat poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women. By 2015, MDGs helped to lift more than one billion people out of extreme poverty, to make inroads against hunger, to enable more girls to attend school than ever before and to protect our planet[49].

Specific densities of health workers were associated with two key MDG-related health indicators: measles immunization and skilled attendants at birth (Figure 3). Regression analysis based on worker density and health outputs around the world suggest that a density of about 1.5 workers per 1,000 population is associated with 80 percent coverage with measles immunization, and 2.5 workers per 1,000 with 80 percent coverage of births with skilled attendants. These relationships

suggest that a density of 2.5 workers per 1,000 may be considered a threshold of worker density necessary to attain adequate coverage of some essential health interventions and core MDG-related health services[2,3].

"It can be assumed that more demanding health functions associated with more complex health services—such as antiretroviral therapy— will require higher worker density. This ratio, of course, is only suggestive because the regression does not control for the range of other inputs to health advances—such as socioeconomic progress or new vaccines and drugs. More important, the data omit informal, traditional, and community workers. Nor does the analysis consider productivity or quality"[43].

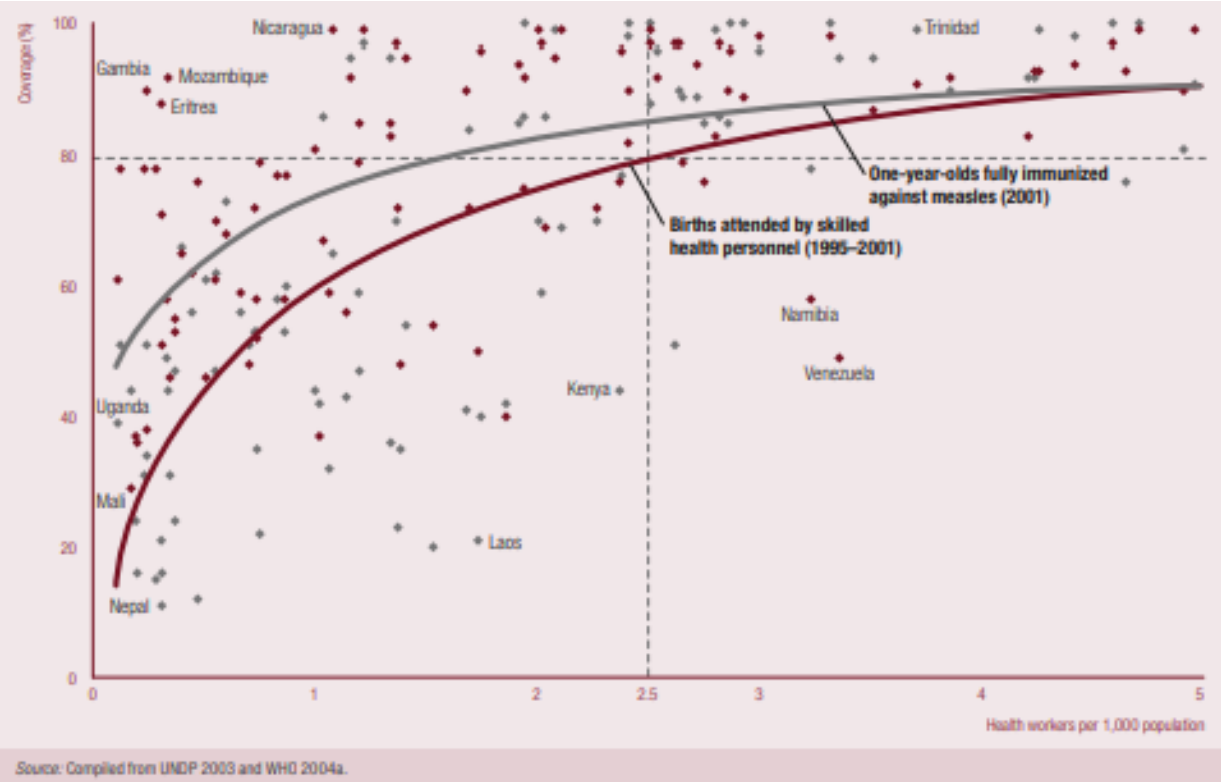

Figure 3. Health Service Coverage and worker density[2,3].

However, many countries do not follow the regression precisely. Some perform worse than their worker density ratios would suggest, which suggests that factors affecting health workforce imbalances are numerous and complex but focusing on crucial elements should permit insight into the issue of health workforce imbalances[3].

Healthcare workforce shortages also impact healthcare access in rural communities. One measure of healthcare access is having a regular source of care, which is dependent on having an adequate healthcare workforce. Determining healthcare access by simply measuring provider availability is not an adequate measure to fully understand healthcare access. Measures of nonuse, such as counting rural residents who could not find an appropriate provider, can help provide a broader picture of whether a sufficient healthcare workforce is available to rural residents.

Health professions workforce shortages are exacerbated in rural areas, where communities struggle to attract and keep well-trained providers. By 2010, while approximately 16 percent of the U.S. population lives in rural America, only about 11 percent of physicians practice in rural locations. Approximately 65 percent of primary care health professional shortage areas (HPSAs) are rural[41].

The shortage of healthcare professionals in rural areas of the U.S. can limit access to healthcare by limiting the supply of available services. As of December 2019, 62.93% of Primary Care Health Professional Shortage Areas (HPSAs) were in rural U.S. areas[45].

The Health Resources and Services Administration (HRSA) scores Primary Care HPSAs 0-25, with higher scores indicating a greater need for primary care providers. Population-to-Provider Ratio, percent of population below 100% Federal Poverty Level, infant health index or low birth weight and travel time to nearest source of care outside the HPSA designation area are having in mind for calculation.

In April 2021 map highlights nonmetropolitan areas with primary care workforce shortages, with areas in darker green indicating higher nonmetro HPSA scores (Figure 4)[45].

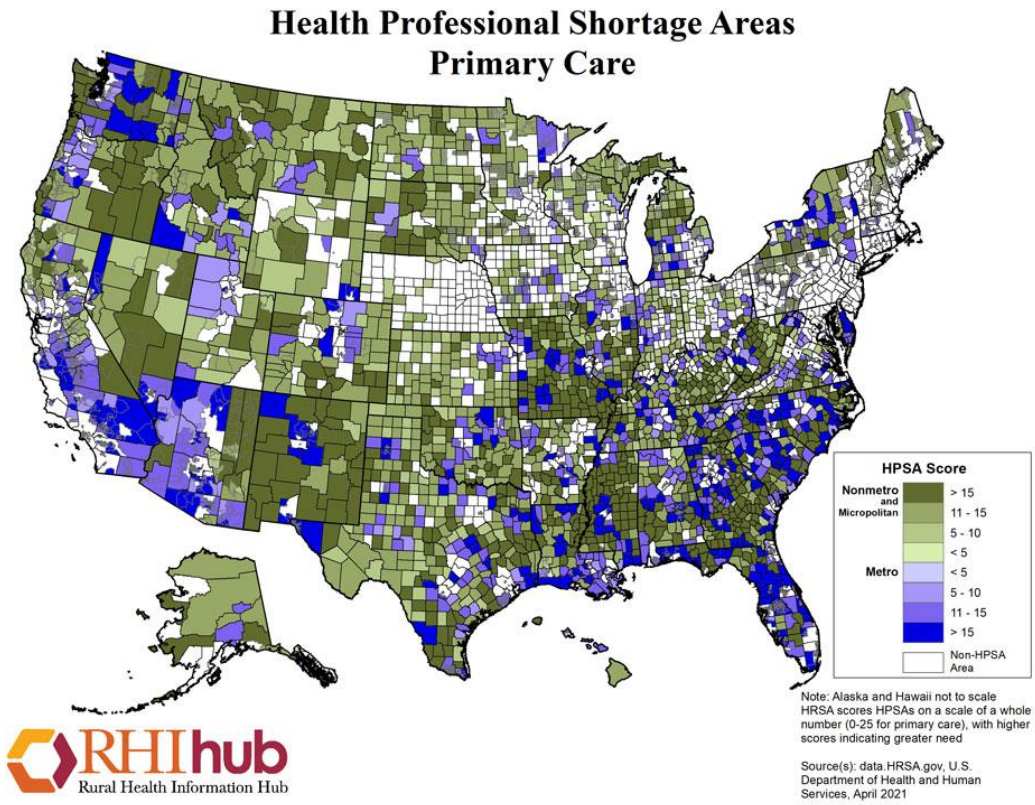

Figure 4.

The types of healthcare services that are frequently difficult to access in rural areas include home health, hospice and palliative care, mental health, substance use, and obstetric services. As well as primary care physicians, pediatrician, internal medicine, gynecology, and obstetrics.

Like many other countries, the U.S. suffers from severe workforce shortages or maldistribution of health personnel, especially in rural underserved areas. One of the most damaging effects of severely weakened and under-resourced health systems is their difficulty producing, recruiting, and retaining health professionals, particularly in remote areas. Low wages, poor working conditions, lack of supervision, lack of equipment and infrastructure[4].

This paper intends to provide a critical review and assessment of the rural health care workforce shortage in the US. In addition, it will evaluate policy and programmatic approaches in the US and other countries to analyze which policies and approaches offer the most promising solutions.

II. US Rural Health Care Workforce Shortages

According to the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine, healthcare quality is "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge"[38].

Health Professional Shortage Areas (HPSAs) indicate areas with a shortage of healthcare professionals who provide primary care, dental, and mental health services. HPSAs are designated by the U.S. Health Resources and Services Administration (HRSA) based on the population defined by **Geographic area** (figure 4); by **Population**, for a subset of the population in a defined geographic area, and by **Facility**, such as public or nonprofit private clinics, state mental health hospitals, and federal or state prisons. In addition, there are safety net clinics that automatically receive shortage designation status. These include federally qualified health centers (FQHCs), Indian health service and tribal clinics, rural health clinics (RHCs) after a complete verification[46].

The primary factor used to determine whether a location is designated as a HPSA is the number of full-time equivalent healthcare professionals relative to the population, with consideration given to high-need indicators such as percentage of the population living at or below 100% of the federal poverty level[45].

Other designations determined by the number of primary care physicians by population include Medically Underserved Areas (MUAs) and Medically Underserved Populations (MUPs), which are federal designations that indicate a lack of primary care services for an area or a population. MUAs and MUPs are based on four factors: ratio of population to primary care providers, infant mortality rate, percentage of population below the federal poverty level, and percentage of population over age 65 (figure 5)[44,45].

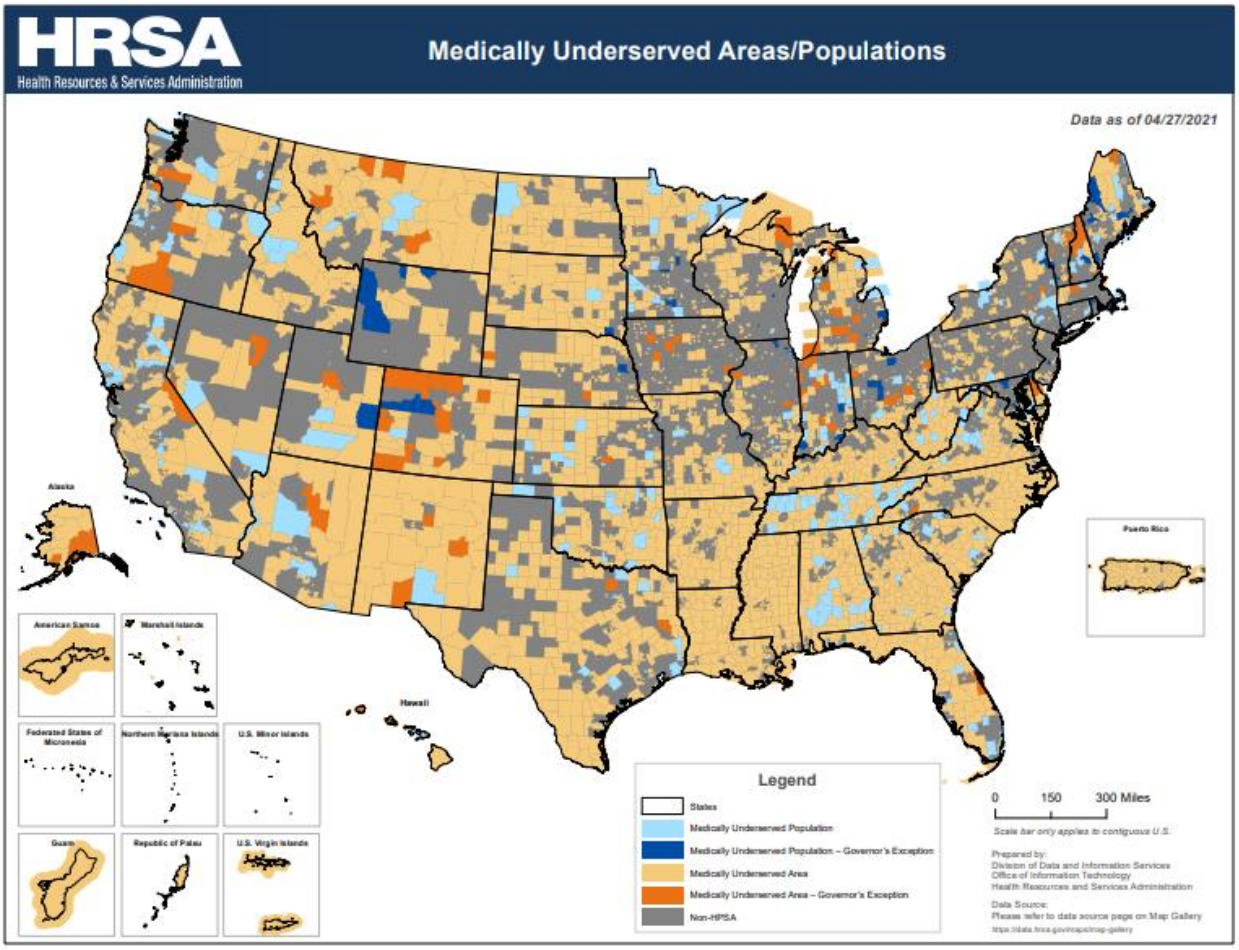

Figure 5.

According to the National Rural Health Association, healthcare labor shortages are an ongoing problem and conditions were not expected to improve significantly in the near future[5]. Whether shortages exist in rural communities and how severe they are can be difficult to determine since estimates of supply and demand for specific professions are not always available. Maldistribution of healthcare professionals is probably a bigger problem affecting rural communities. The Association of American Medical Colleges' report, The Complexities of Physician Supply and Demand: Projections from 2018 to 2033,[6] notes that as of 2018 an additional 14,100 to 17,600 physicians were needed in nonmetropolitan areas to give underserved populations the same access to care as populations facing fewer barriers. A shortage of primary care physicians of between 21,400 and 55,200 was projected for 2033[6]. Areas with higher proportions of low-

income and minority residents, such as rural areas, tend to suffer most from lower supply of physicians and other health professionals.

Four factors were identified by the National Rural Health Association (NRHA)[5], affect the current healthcare workforce shortage in rural areas:

Education[5,8,9]

- The current healthcare education system tends to be urban-centric.
- Access to healthcare training and education programs may be limited in rural areas, particularly beyond the community college level.
- Providers trained in urban areas may not be prepared for the challenges of working in rural communities or the kinds of health concerns rural patients may present.
- Urban areas frequently draw potential healthcare professionals away from rural areas. Students in rural communities may have to travel or relocate to an urban area for health professions coursework, unless they can find degree programs offered online, or for clinical training. Some do not return to rural communities after completion of their studies.
- There are fewer clinician role models in rural communities.
- Rural secondary school students may have fewer opportunities to receive the required math and science courses needed to pursue health careers.

Rural Demographics and Health Status[5,8]

- Rural populations usually have higher rates of chronic illness, which creates more demand.
- Rural areas tend to have higher proportions of elderly residents, who typically require more care.

Rural Practice Characteristics[5,8]

- The current healthcare system is designed around face-to-face contact. When rural communities lack certain types of providers, particularly specialists, patients must travel longer distances or forego care.

- Barriers such as reimbursement policies and lack of broadband availability have hindered telehealth adoption in some rural areas. Many regulations related to telehealth have been relaxed or suspended as a result of the COVID-19 pandemic and the need for social distancing. It remains to be seen whether these changes will remain in effect after the public health emergency ends.
- Rural communities may offer fewer opportunities for career advancement.
- Understaffing causes increased workloads, longer shifts, and less flexibility in scheduling, sometimes leading to burnout.
- Urban facilities and practices may offer higher salaries, more benefits, and better working conditions.
- Health professions that require longer and more expensive training can be less affordable for rural students.
- Small, rural communities may offer fewer job opportunities for spouses, which can make recruiting providers difficult.

Table 1 shows ratios of health professionals per 10,000 population in rural areas as compared with urban areas for select professions. Only licensed practical nurses and licensed vocational nurses' rates are higher in rural than in urban areas.

Occupation	Health professionals per 10K, Rural	Health professionals per 10K, Urban
Dentists	2.9	4.3
Registered Nurses	65.3	93.6
Licensed Practical Nurses/Licensed Vocational Nurses	25.1	20.6
Physician Assistants	8.1	10.2
Physicians (MDs)	10.9	30.8
Physicians (DOs)	1.8	2.4
Primary Care Physicians	5.3	7.9
Total Physicians	12.7	33.3
Nurse Practitioners	6.5	8.1
Total Advanced Practice Registered Nurses	6.5	8.1
Nurse Anesthetists	1.2	1.6

Source: HRSA Area Health Resources Files, 2017 and 2018.

Table1. Rate of Health Professionals, 2008 -2010.

Rural residents in many parts of the United States have faced chronic and sometimes severe shortages of primary care providers for decades and maintaining an adequate supply of primary care providers has been one of the key challenges in rural health care.[7,8] Rural hospitals and clinics face difficulties recruiting and retaining providers, an aging workforce, and a financially challenging environment. Compared to urban populations, rural populations experience higher rates of poverty, higher rates of chronic conditions, and are more likely to have no health insurance[7,9]. All these factors contribute to the provider shortages extant in many rural areas of the United States.

In addition, rural populations often depend on primary care providers in ways that urban residents do not. Given the lack of medical specialists in rural areas, rural primary care providers deliver a wider range of direct patient care services than their urban counterparts[11,12]. Primary care providers are also essential in connecting rural patients to specialty care services in urban centers when necessary. Good rural access to primary care also requires a geographical distribution of providers that assures reasonable travel times for patients. Geographic

maldistribution of providers, as measured by provider-to-population ratios, leaves rural areas in some regions and some types of rural areas relatively well supplied with providers, while other rural areas face severe shortages. Poorer and more isolated rural areas often face chronic shortages of providers[4,5].

Since the 1990s, family physicians, general internists, general pediatricians have been recognized as the three physician groups providing the core of physician-based primary care. In addition, nurse practitioners (NPs) and physician assistants (PAs) have become an important part of the rural primary care workforce as primary care physician shortages have persisted. Between 2010 and 2016, the overall physician workforce in the United States grew at an annual rate of 1.1% while the annual rates of increase in the number of PAs and NPs during the same period were 2.5% and 9.4%, respectively[13]. The fact that the number of NPs and PAs being trained continues to increase rapidly than the physician workforce provides the opportunity for NPs and PAs have an increasing role in providing primary care in rural areas (Figure 5).

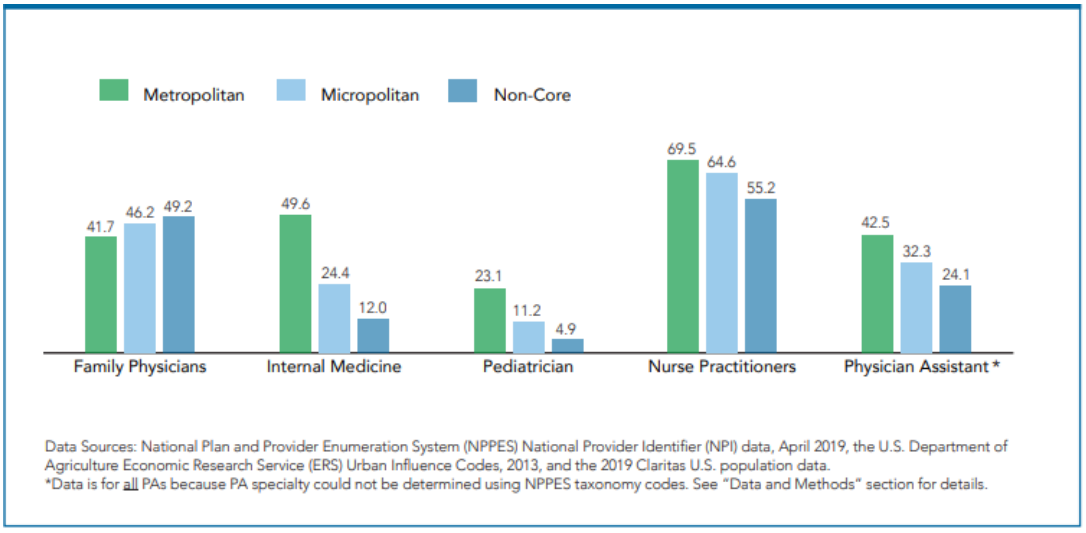

Figure 5. Primary Care Providers per 100,000 population in U.S counties by category

III. Policy and Practice Approaches in the US

IIIa. Federal Approaches

At the federal level, approaches have primarily focused on providing funding and policies that address existing barriers. Funding supporting healthcare education and recruitment from rural areas through grants, loans, fellowships, scholarships, state loan repayment/forgiveness or scholarship programs, faculty loan repayment programs, tax benefits, and other incentives aimed at increasing the number of healthcare graduates prepared for rural practice by supporting the development and growth of healthcare education programs with rurally oriented curricula.

Policy options are aimed at removing barriers to practice, such as allowing telehealth services across state lines, allowing national policies for new or alternative provider types to practice in rural areas or expanding existing scopes of practice.

The National Health Service Corps (NHSC), administered by the Health Resources and Services Administration (HRSA), is a federal program that helps to bring healthcare providers to those who need it most. Since 1972, the NHSC has worked to connect primary care providers to healthcare facilities located in Health Professional Shortage Areas. The NHSC offers primary care providers financial support in the form of loan repayment assistance and scholarships. More than 50,000 primary care medical, dental, mental, and behavioral health professionals have served in the National Health Service Corps since its inception. According to the NHSC Report to Congress for the Year 2019, in 2019, there were 13,053 active participants in the NHSC, providing care to 13.7 million patients in urban, rural, and frontier communities in all 50 states, the District of Columbia, and the U.S. territories. Approximately 36% of NHSC providers are practicing at rural facilities[48].

According to a 2016 National Health Service Corps participant survey,[14] 88% of participating clinicians remained at their practice obligation site for up to one year after their obligation, and 43% intend to remain for 5 or more years. A 2014 report,[15] found that 49% of NHSC

primary care clinicians were in the same HPSA and 82% were in any HPSA location one year after the service obligation was completed. Six years after the completion of the service obligation, 35% were still practicing at the same HPSA, while 72% were practicing at any HPSA site.

The HRSA State Loan Repayment program (SLRP) provides funding to many states to operate loan repayment programs for eligible health professionals. For the federal fiscal year 2019, only 9 states did not have active grants through the program: Alabama, Arkansas, Connecticut, Florida, Mississippi, New Hampshire, Oklahoma, South Carolina, and South Dakota. However, some of these states do offer loan repayment programs supported entirely through state funds, rather than federal funds.

In exchange for loan repayment, recipients must serve at least two years of service (and no more than four years) at an NHSC-approved site in a Health Professional Shortage Area (HPSA)[45].

Area Health Education Centers (AHEC) Program

The AHEC (Area Health Education Centers) program was developed by Congress in 1971 to recruit, train and retain a health professions workforce committed to underserved populations. The AHEC program helps bring the resources of academic medicine to address local community health needs. The strength of the AHEC Network (more than 300 AHEC program offices and centers that serve over 85% of United States counties) is its ability to creatively adapt national initiatives to help address local and regional healthcare issues. The purpose of the AHEC program is to meet the needs of the communities they serve through robust community-academic partnerships, with a focus on exposure, education, and training of the current and future health care workforce, such as the development of an AHEC Scholars program.

Through these longstanding partnerships, the AHECs employ traditional and innovative approaches to develop and train a diverse health care workforce prepared to deliver culturally appropriate, high-quality, team-based care, with an emphasis on primary care for rural and underserved communities[39].

Health Careers Opportunity Program (HCOP)

The Health Resources and Services Administration created the HCOP in 2018 to increase the number of people from economically disadvantaged backgrounds who enter the health professions field. The purpose of this grant program is to assist individuals from disadvantaged backgrounds to enter a health profession through the development of academies that will support and guide them through the educational pipeline. Academies are expected to focus on: 1) promoting the recruitment of qualified individuals from economically or educationally disadvantaged backgrounds into health professions, including allied health programs; 2) improving retention, matriculation and graduation rates by implementing tailored enrichment programs designed to address the academic and social needs of economically or educationally disadvantaged students; and 3) providing opportunities for community-based health professions training in primary care settings, emphasizing experiences in rural and underserved communities[40].

Telehealth

HRSA's Office for the Advancement of Telehealth (OAT) defines telehealth as the use of electronic information and telecommunications technologies to support long distance clinical healthcare, patient and professional health related education, public health, and health administration. Telehealth can include remote nonclinical services, such as training, administrative meetings, and continuing medical education, in addition to clinical services. There are a number of challenges to telehealth adoption, implementation, and success. This includes reimbursement issues (due to current Medicare reimbursement model for telehealth) with providers, services, and site restrictions. Individual state Medicaid programs vary in their guidelines regarding reimbursement for telehealth services. Another challenge for telehealth is licensure[46]. The 2013 NRHA policy brief[16], Streamlining Telemedicine Licensure to Improve Rural America, describes how the current physician licensure system places burdens on physicians wanting to expand their practice to rural areas. Physicians who wish to practice across state lines must be licensed by the professional licensing board in each

state where they are delivering care to patients. The Interstate Medical Licensure Compact (IMLC)[17] is an agreement between 29 states, the District of Columbia, and the territory of Guam, and 43 osteopathic and medical boards within those states and territories that offers an expedited process for qualified physicians to be licensed to practice in multiple states. The U.S. Department of Veterans Affairs (VA) is an exception; VA physicians have license portability that allows them to practice across state lines to wherever the patient is receiving care.

Accessible and affordable broadband is also required to support telehealth programs, health information technology (HIT), and health information exchanges (HIEs), all of which can increase access and quality of healthcare. Many rural communities do not currently have access to internet connection speeds which support the effective and efficient transmission of data to provide telehealth services. Additional barriers to the adoption of telehealth in rural areas include issues related to malpractice, HIPAA, privacy, security, online prescribing, and liability insurance[16,18].

In 2010, American Hospital Association (AHA) reported 35% of hospitals had full or partial implementation that grew to 76% of hospitals reporting telehealth usage in 2017. In 2016 Mehrotra et al.[18] found telemedicine visits among rural Medicare beneficiaries increased from 7015 in 2004 to 107 955 in 2013 (annual visit growth rate, 28.0% [95% CI, 27.5%-28.5%]). Mental health conditions were responsible for 78.9% of visits. Rural beneficiaries who received a 2013 telemedicine visit were more likely to be younger than 65 years, have entered Medicare due to disability, have more comorbidities, and live in a poorer community compared with those who did not receive a telemedicine visit[41].

J-1 Visa Waiver Program

The J-1 Visa is an educational visa obtained by foreign medical graduates who enter the United States to further their medical training. Federal Law requires that foreign physicians pursuing medical education or training in the United States obtain a J-1 Visa immigration waiver upon completion of training in order to remain in the United States. The physician must be located in a Health Professional Shortage Area [44,50].

Many program staff wished to recruit more physicians to primary care or rural placements, favoring facilities in Health professional Shortage Areas over other eligible practice sites. In practice, however, most states do not fill all slots available annually, and staff were often willing to sponsor any qualified applicant without regard to specialty or practice location rather than leave a slot unfilled[44].

Broader spectrum in Healthcare professional License

Redesigning practice and processes to allow professionals to work at the top of their license and skill set can also lessen the effects of shortages. Facilities can provide workers with opportunities to learn new skills and encourage them to pursue career advancement through apprenticeships and other educational opportunities[46].

Nurse practitioners, physician assistants might be a valuable trained workforce currently available, and with valuable knowledge but tied due to absence in policy which allow them to manage clinical situations.

Community Scholarship Program

This program, administered by the National Health Service Corps, is designed to improve access to primary care by providing federal matching dollars for scholarships to community organizations in Health Professional Shortage Areas for primary care providers. In return for scholarship awards, scholars commit to providing primary care health services to underserved communities. The program provides support to students who seek financial assistance to complete primary care health professions education[48].

The NHSC SP pays for tuition and various other reasonable education-related costs and also provides a monthly stipend to assist with living expenses in exchange for a minimum of two (2) years of fulltime service[48].

IIIb. State Approaches

Successful recruitment and retention practices can minimize the number and duration of staff vacancies, which can, in turn, save money, improve quality of care, and ensure that services are provided in the community which is the ultimate goal from state government.

The Conrad State 30 Program allows each state's health department to request J-1 visa waivers for up to 30 foreign physicians per year. In addition to the J-1 visa waiver, non-immigrant H-1B visas can also sometimes be used to fill employment gaps[5,8].

The program generally targets physicians who fulfilled a U.S. residency training program in family medicine, general obstetrics, general pediatrics, general internal medicine, and general psychiatry. In 2003 the Conrad program was reauthorized and increased the number of state sponsored waivers to 30, thus the name Conrad 30. Later, Congress enabled states to accept specialist physicians for waiver consideration if the state chose to do so[50].

After review, by 2012 only seven states had filled the 30 positions with foreign physicians (Florida, Illinois, Kentucky, Maryland, Michigan, Texas and West Virginia), and 17 states did not have even one application received.

Rural Network Development Grant: This program is designed for organizations that wish to establish vertically integrated systems of care in rural communities. The grant supports organizational development activities and services that may result from these activities[22,41].

Rural Health Outreach Grants: These grants are available to support the direct delivery of health care and related services, to expand existing services, or to enhance health service delivery through education, promotion, and prevention programs. The emphasis is on the actual delivery of specific services rather than the development of organizational capabilities[9,45].

Federal/State Loan Repayment Program: Several rural providers utilize incentives such as federal and state loan repayment programs. These incentive programs require providers to receive certain benefits in exchange for years of obligated service. Providers must agree to provide primary care services in a HPSA for a minimum of two years[50].

The State Offices of Rural Health Services (SORHS) placed a total of eighty-two (82) National Health Service Corps (NHSC) healthcare professionals.

State Medical Education Scholarship Program: Most often referred to as **"The Country Doctor Program,"** this scholarship program began in 1952. The purpose of the program is to recruit physicians for rural, underserved towns and to provide financial assistance to medical students.

A more local method has been leaded by existing schools of medicine. A **rural track (RT)** is a program designed to identify, admit, nurture, and educate students who have a declared interest in rural practice, with no other goal than increase the number of graduates who enter and remain in rural practice. Although a medical schools initiated programs to train more rural physicians prior to the 1990s, many more programs were initiated after a 1990 Association of American Medical Colleges (AAMC) task force report[19] on medical education for rural practice. Since 2000, new rural programs have appeared with more on the way, possibly in response to the recognized current need, as well as in anticipation of the increased demand for healthcare from the aging population and increased number of people with health insurance as a result of the 2010 Affordable Care Act.

IV. Compulsory service in rural areas to reduce healthcare workforce.

Different approaches to the rural physician shortage have been tried in other countries. One approach is compulsory rural medical service as a part of the medical licensure process. Compulsory service programs have existed around the world since the early 20th century. Different names have been given to such programs, including “obligatory”, “mandatory”, “requisite” and “coercive” programs. There is evidence of programs in the Soviet Union in 1920,[22,23] Mexico in 1936[22], and Norway in 1954. In the 1970s, there was an acceleration of new programs worldwide. No one reason is evident for this rapid growth, though this decade witnessed an overall increase in attention paid to inequities in healthcare provision (as evidenced by the 1978 adoption of the Declaration of Alma-Ata), as well as increased worldwide interest in socialist ideologies. Over the years, different countries created and

implemented compulsory service programs, with one of the most recent ones started in Ghana in 2009 (Figure 6)[20].

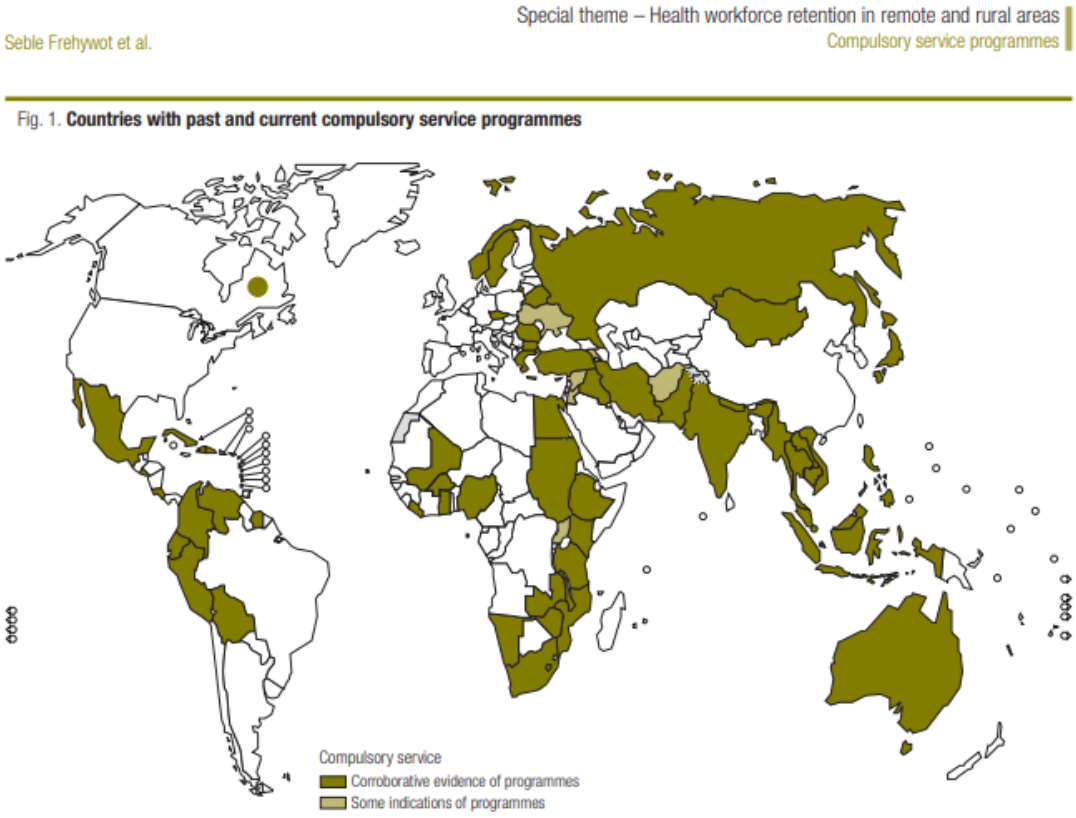

Figure 6.

In Latin America, Mexico in 1936 was the pioneer in "Servicio Social obligatorio", or compulsory rural service as part of the process for medical licensure, initiated by medical students due to the need for medical service in rural and underserved area. Costa Rica (1948), Colombia (1949), Nicaragua (1968), Argentina, (1970s), and others, were moving gradually towards this strategy with different approaches in terms of area designation, number of physicians, remuneration, and time[24]. In 2010, Seble Frehywot et al[20]. described a classification system for compulsory service programs after a country by country inventory of all member states of the World Health Organization (WHO) identified with compulsory service programs. Compulsory service programs can be divided by condition of service, compulsory service with incentives, and compulsory

service without incentives.

Condition of service

These programs require health professionals to work for the government. There is little or no opportunity for private or nongovernmental practice. Government employment contracts give the employer (federal and state ministries of health) the authority to assign health employees to any part of the country, based on need for a specified number of years. In Australia, for example, all international medical graduates must spend ten years working in a "district of workforce shortage" as assigned by the Rural Workforce Agencies. Cuba's doctors serve the government both within Cuba and internationally[20].

Compulsory service with incentives

Compulsory service with incentives does not rely on a governmental mandate but, rather, is associated with incentives to serve in designated areas for specified time periods. Governmental regulations govern the implementation and enforcement of these programs. Four categories were identified[20,24].

Educational

Healthcare workers might face requirements for three different types of education incentive. In the first type, students are required to complete a rural placement during the course of their training to complete their education. If the compulsory service requirement is not met, the diploma/degree will not be given. Colombia is an example. In the second type, the graduate is required to serve in an underserved region of the country as a prerequisite for entering a postgraduate/specialization program[23]. This is seen in Mongolia and Viet Nam. In the third type, there is a return of service program where rural placement is required after graduation, often for one year for each year that educational financial support was provided. These systems are found in Australia, Lesotho, and Japan[24,32].

Employment

Two employment models exist; the first, as a requirement for obtaining a license to practice and the second, as a prerequisite for career advancement. For example, Ecuador, Myanmar and South Africa[25] allow medical personnel to practice privately only after they complete a period of compulsory service. Peru has employment incentives which are associated with career advancement.

Living provisions-linked

Some countries provide incentives associated with family benefits, such as housing in Kenya and Mozambique, lower car loan rates and children's scholarships in Zambia[26,27], to encourage the graduates to stay in a remote area after the compulsory service period ends.

Bundled

A few countries like Ecuador and Thailand have programs that combine incentives for education, employment and living provisions. Ecuador's rural system requires one year of service before doctors, nurses and dentists gain their license to practice[21]. Rurales are paid variable salaries based upon remoteness of assignments and they receive housing in posted locations. In Thailand, public medical school graduates must perform compulsory service for three years. They may supplement their public salaries by concurrently practicing privately, or they can receive US$ 250 per month if they agree only to work in the public system[28]. Additional incentives for rural practice include higher pay for more rural placements, greater access to postgraduate training, logistic and housing support, career enhancement and improved health infrastructure.

Compulsory service without incentives

These programs require the graduate to work in an underserved setting with no attached incentive, usually for one year. Some examples are found in India, Iraq, Malaysia, Mexico[21], and Venezuela[28,29].

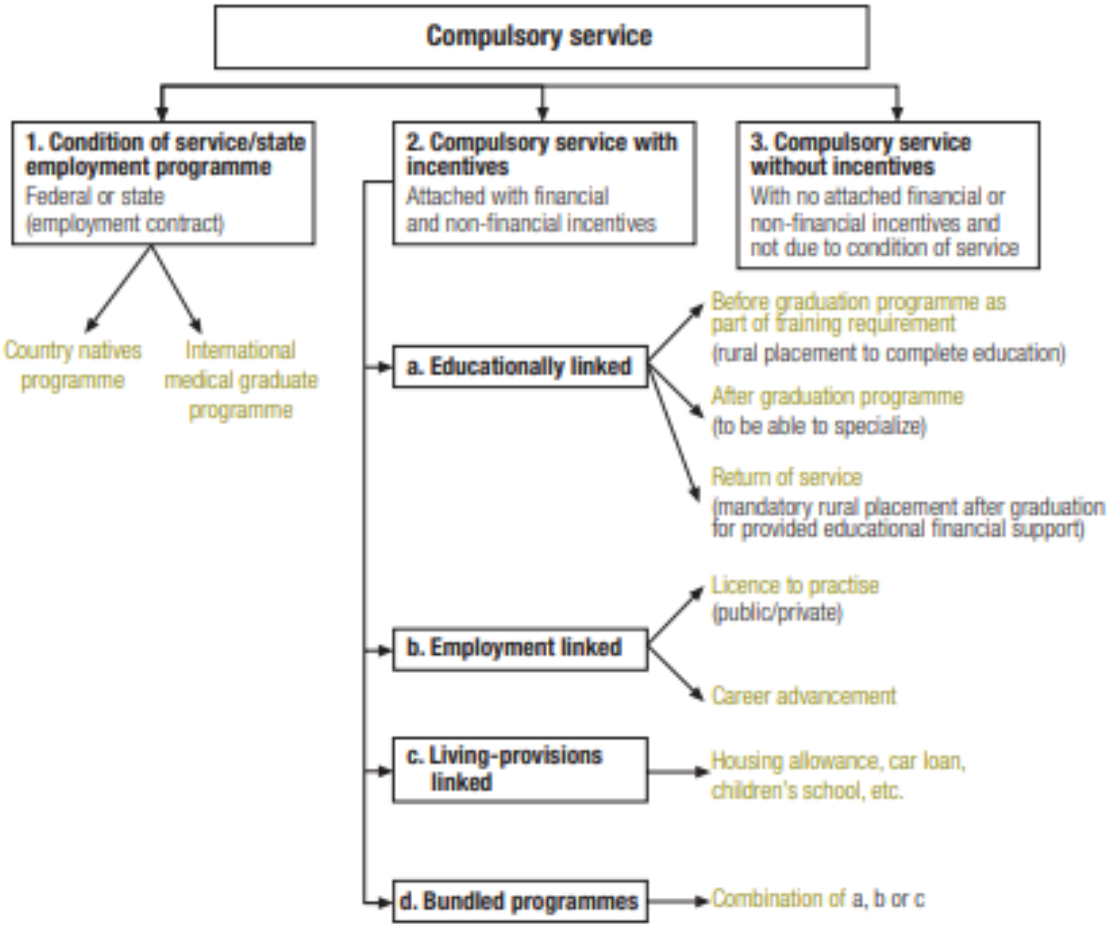

Figure. 7 Classification of compulsory service programs[20]

IVa. Colombian compulsory rural service

Beginning in 1955 with the National Seminar on Rural Education, the Colombian system of medical education entered a period of dramatic change. Much of this change arose out of the work of ASCOFAME, the Association of Colombian Medical Schools[23,47].

Colombia requires that every medical graduate serve at least six months (maximum one year) in an "internship" in a rural area. The graduate is called upon to direct a healthcare team and community health workers but lacks training in team management. At the same time, he must deliver primary care but has had relatively little training for this role,

because the elements of comprehensive primary care including treatment of psychosocial and emotional problems, disease prevention, and management of patients with chronic illness are underemphasized in his hospital-based university education. In 1963 the Association developed a descriptive definition of the "ideal" Colombian physician, specifying that such a physician should possess the skills needed to meet rural needs. The plan then envisaged by the Association was to develop these skills during the student's performance of his obligatory rural internship[23].

In December 1974, The Pan American Health Organization sponsored an international conference to coordinate experiences with 11 Latin American countries who attended the meeting. Curiously, rising interest in the subject was also reflected in the United States Congress in 1974, which included a bill proposing that each U.S. medical graduate spend at least two years performing national service in an underserved area (S. 3585, U.S. Senate), that was never enacted[47]. The rationale for such programs was clear: rural areas were underserved, and it was felt that medical graduates owed society a debt for their education, which was partially subsidized in many cases. Therefore, it was felt that medical graduates should serve those areas most in need for some specified period[47,23].

Several Colombian medical schools have developed training programs over the years to prepare students for the period of rural service, and all country schools include some community work in their present curricula. Colombia's compulsory rural service falls into Seble Frehywot et al.'s classification of compulsory service with employment incentive in order to be able to acquire a license to practice[20].

IVb. Canadian compulsory rural service

In an attempt to maintain adequate access to health care for residents of rural regions, Canada's provinces and territories have generated an array of strategies and incentive programs to entice physicians to rural and remote areas and to encourage them to stay there[51].

Regulatory/administrative approaches include policies used to influence the location decisions of physicians through laws and regulations. Restricting the issuance of "billing

numbers" in urban areas, so that physicians cannot be reimbursed by the provincial health care insurance plan, and implementing controls on the licensing of foreign medical graduates, are both examples of regulatory/administrative approaches[51].

Educational initiatives include a wide range of policies, from enriching high school science classes in rural areas to increased emphasis on rural medicine in Canadian medical schools. Since it has been established that medical graduates who have grown up in rural areas are more likely to come back to practice in these areas, exposing rural high school students to the health care professions or admitting more medical students from rural areas could have positive effects on these regions[46].

Financial approaches, which consist of different methods of payment and incentives to health care providers, are the most commonly used policy strategies. These include guaranteed minimum income contracts, northern/isolation allowances, loan forgiveness, assistance with practice expenses, and differential fees (for instance, discounted fees for practitioners locating in "oversupplied" areas – also known as "urban disincentives"). Some examples of recruitment programs include British Columbia's $10,000 signing bonus to new rural doctors and Ontario's Free Tuition Program, which provides funding to final-year medical students, residents and newly graduated physicians in exchange for a full-time return-of-service commitment in an underserviced area in the province[31].

Finally, the **"laissez-faire"** approach involves relying on market forces: as urban centers become "oversupplied" with physicians, new physicians will slowly begin to set up in rural areas.

Foreign Medical Graduates in Canada

Rural Canada has relied heavily on the graduates of foreign medical schools to provide primary and advanced procedural care to its citizens. Partly because of conditional licenses or other restrictions, many of them end up practicing in rural and remote communities. Approximately one-half of Canada's rural general practitioner surgeons and one third of general practitioner anesthetists have been trained elsewhere[45].

V. Discussion

Although there has been little evaluation of policy interventions, physician shortages in rural areas may be reduced by policies that focus on the healthcare workforce in combination with measures to sustain the economic and social viability of rural communities[30].

The factors driving rural workforce shortages are multi-faceted and complex; strategies are usually not comprehensive and often limited to addressing a single or limited number of factors. They suggest that because of the complex interaction of factors impacting on attraction and retention, there is a strong argument to be made for more comprehensive and coordinated policies and interventions which include attention to living environments, working conditions and environments and development opportunities as well as new policies to accommodate a larger supply of health professionals. Planning and decision-making to improve retention requires multi-sectoral collaboration within and beyond government[4]. If the staffing of rural and remote areas is to be improved, strategies employed by government structures must address the factors which impact on attraction and retention in each context with all parts working together.

The empirical evidence suggests that strategies are not comprehensive and often limited to a single or limited number of factors. The evidence suggests that "no single intervention is likely to provide a sustainable solution to all workforce challenges facing an organization.[31]" This provides a strong rationale for revisiting the ways in which strategies are developed, who is involved and how these strategies are coordinated.

Arguably the biggest challenge is the problem of access to healthcare providers. Increasing physician shortages in rural regions means that many residents must travel for care, sometimes considerable distances. Communities that lack specialists must rely on their general practitioners and other health care providers to perform a wider variety of tasks; they have a greater need for telehealth technology and are often obliged to send their residents to urban areas for treatment and care[31].

Rural health experts have suggested that the federal government play a stronger leadership role in the areas of research, technology, education, and the coordination of state/territorial initiatives. While each state/territorial government has its own policies intended to improve access to health care in rural areas, many experts agree that a coordinated, national effort would be more effective at reducing the gap in health status and health care access that exists between urban and rural areas[31].

Regarding compulsory healthcare workforce service, no rigorous study has systematically compared rural and remote workforce disparities in countries with compulsory service to those in countries that do not have such programs. Compulsory service programs are a mechanism for staffing and reinforcing the health workforce especially in areas where access to primary and essential healthcare services and systems is weak. Compulsory service may not be able to provide a permanent answer to capacity development, nor guarantee the development of a permanent workforce for underserved communities but, if well planned with incentives, can contribute to a nation's plan for health workforce capacity development, distribution, and retention in rural and underserved areas[20].

The extent to which health workers can be attracted to and retained in remote areas depends on two interrelated aspects: the factors which contribute to health workers' decisions to accept and the stay in a remote post; and the strategies employed by governments to respond to such factors[4].

All factors impact on the individual who decides about moving to, leaving, or staying in a job in many ways. Any decision by an individual will be the result of a complex interplay between these factors (figure 8).

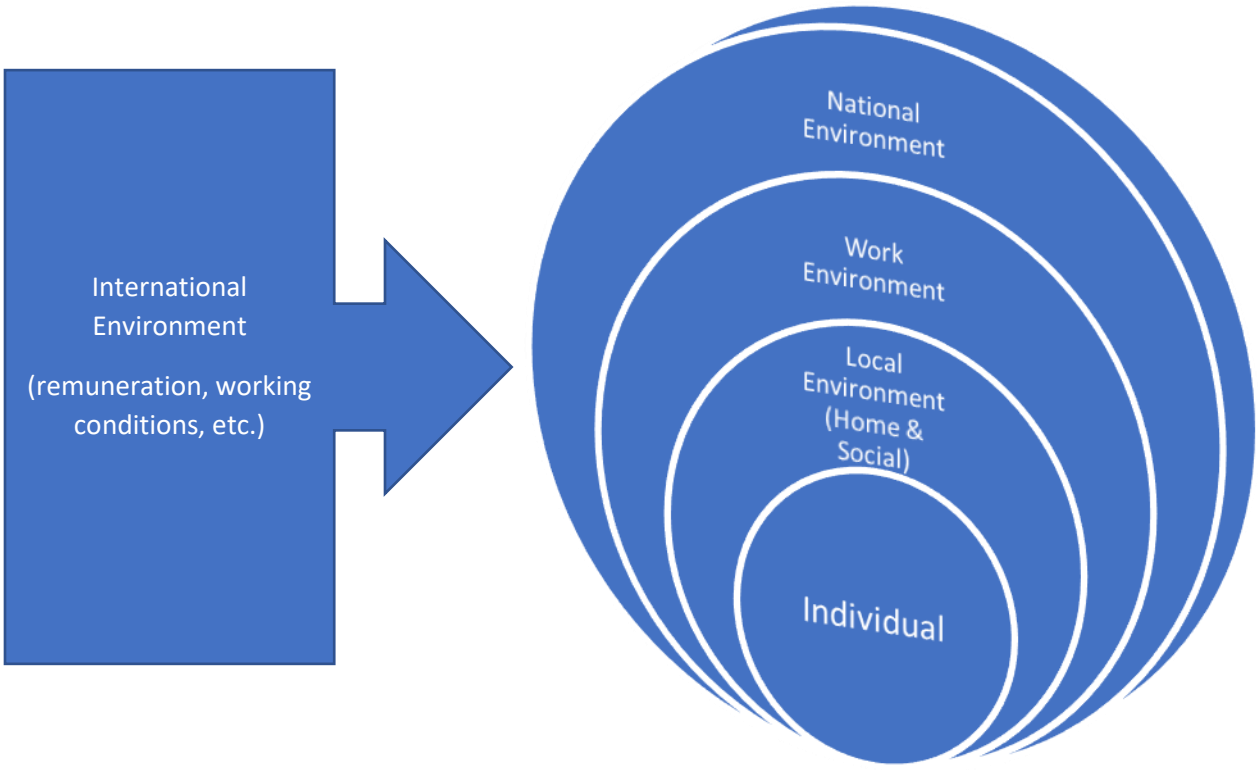

Figure 8. Environments impacting attraction and retention of healthcare workforces.

Rural healthcare workforce supply must be understood as a delicate balance between multiple factors in which healthcare professionals are the main characters and their financial, professional, family, and personal wellbeing is at stake.

Economic, sociodemographic, cultural, and geographical factors contribute to shaping and transforming society and hence have a direct or indirect impact on health workforce issues. Moreover, both the demand and supply are likely to be affected by sociodemographic elements such as the age distribution of the population. On the demand side, the ageing of the population is giving rise to an increase in the demand for health services and health personnel, especially nurses for home care.

As we have seen throughout this paper, it is evident the U.S efforts with several approaches attempted to address rural and underserved areas healthcare provider shortages. Federal, state, local and educational organizations (universities) have worked to understand, identify, and manage health needs for populations in underserved areas. However, all states in the U.S are still struggling with a larger need of professionals and a future that does not look better[6].

Compulsory service was mentioned by U.S. Senate in 1974 after an international conference sponsored by Pan American Health Organization with participants from 11 Latin American countries attended the meeting. Rising interest in the subject was also reflected in health manpower legislation which included a requirement that each U.S. medical graduate spend at least two years performing national service in an underserved area with no impact current legislation or medical license procedure.

In Puerto Rico before compulsory service, 16 of 78 municipalities had no physician. After implementation, all 78 had at least one doctor[32]. Incentive-linked compulsory service in Indonesia increased new doctors' willingness to work in remote areas[4]. Turkey's program was effective at mitigating staffing discordance[33]. In South Africa, better staffing levels in rural hospitals, shorter patient wait times and more frequent visits to outlying clinics by health workers are reported[34]. In Thailand it helped to narrow the disparities in urban/rural health worker density[35].

In South Africa, Reid et al. found that after the first 15 years of compulsory rural service was implemented to have been a successively positive program. It has primarily met its original objectives of redistribution of health professionals and professional development; however, greater attention needs to be given to orientation, management support, clinical supervision, and focusing professional development opportunities on the crucial minority prepared to stay on longer than their obligatory year[36].

Compulsory service still needs to be complemented by other interventions to capitalize on its potential[36]. If well planned with incentives, it can contribute to health workforce capacity development, distribution, and retention in rural and underserved areas.

Redistribution of healthcare professionals or increasing the number of recently graduated physicians to rural areas might not be the answer to the shortage; however, can be part of the group of solutions and part of the scaffolding.

Even though there is a limited amount of research concerning the impact of compulsory rural service around the world; it is an alternative strategy that might bring positive results to a system with multiple other programs aiming to improve access to healthcare well trained professionals in rural underserved areas in the U.S.

VI. Conclusions

Even though there have been multiple efforts in the U.S to achieve a more articulated flow of healthcare workforce in rural areas, no single intervention is likely to provide a sustainable solution to all rural workforce challenges.

Stronger Policies focused on the healthcare workforce wellbeing, prosperity, and professional growth, in combination with measures to sustain the economic and social viability of rural communities must be created to generate a more attractive job environment.

Compulsory service may not be able to provide a permanent answer but, if well planned with incentives, can contribute for health workforce capacity development, distribution, and retention in rural and underserved areas. All together with training, recruiting and retaining healthcare professionals.

Greater attention needs to be given to orientation, management support, clinical supervision, and focusing professional development opportunities on the crucial minority prepared to stay on longer than their service time.

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