The impact of physician assistants on health care access in rural America

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The Impact of Physician Assistants on Health Care Access in Rural America

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Dedication

Thanks to all my family and friends for their never ending support and encouragement throughout all the years of my education.
Acknowledgements

I would like to thank Jolene Miller and my grandfather Dr. Ken Pohly for all of their help and guidance throughout my scholarly project. Their suggestions have assisted me in the writing of this paper.
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Abstract .........................................................................................................................................45
Introduction

Health care is an important focus in America today due to many factors including medical workforce shortages, lack of access to medical care, rising health care costs, increasing age of the population, growth in the prevalence of chronic diseases, and increases in the number of uninsured Americans (Everett, Schumacher, Wright, & Smith, 2009). These factors and many more are intertwined, causing a complex problem facing America as a whole, but in particularly rural America.

In general residents of rural areas face increased health care challenges compared to those who reside in urban areas. Rural residents are more likely to have lower incomes, be dependent on public assistance programs, and be uninsured. In addition, they have longer traveling distances to hospitals for emergencies and annual doctor visits or screenings, less access to specialty practice, and, on average, tend to be less healthy (MacDowell, Glasser, Fitts, Nielsen, & Hunsaker, 2010; Ziller, Coburn, & Loux, 2003). Any of these characteristics can have a negative impact on health outcomes; having more than one of these characteristics can compound the impact. The lack of rural health professionals is one factor which increases the magnitude of the problem; by one estimate the number of health care providers in rural counties across the United States is 65% lower than recommended levels (Probst, Moore, Glover, & Samuels, 2004). This combination has synergistic effects on the health and access to health services of rural Americans. To reduce health care disparities in rural communities, a number of strategies have been employed, such as reforming health care policy, recruiting international medical graduates, increasing the number of domestic medical graduates, delegating some medical work to other health professionals, and developing effective retention and recruitment methods (O’Connor & Hooker, 2007).
One such strategy to mitigate the health issues faced in rural America occurred 40 years ago: the implementation, education, and deployment of physician assistants to serve in rural areas as non-physician health care providers in response to physician shortages. Physician assistants, along with nurse practitioners, were to help with health care demands by working with physicians to better manage and care for patients. As the profession has developed, physician assistants have found service in all areas of medicine, from primary care to a multitude of specialties in urban, suburban, and rural areas. When looking at the trends of U.S. health workforce, studies have shown that physician assistants continue to move to areas of need such as rural and non-metropolitan areas and are more likely to care for the underserved (Grumbach, Hart, Mertz, Coffman, & Palazzo, 2003). Has this trend of physician assistants locating in rural areas had a major influence on rural health care? Is the number of these health care professionals continuing to increase in these locations, and are they providing optimal cost-effective quality health care? This is one strategy that has been implemented to help alleviate the strain and shortage of health care in rural America, but what has been the impact?
Methodology

An extensive literature review was conducted spanning the years 1970 to 2011. Literature was selected from databases including PubMed, CINAHL, Science Citation Index, and resources such as government websites and the Journal of American Academy of Physician Assistants. Criterion for inclusion was English literature on rural physician assistants and health care access. A preference was given to studies conducted within the United States. Key search terms included “rural health,” “rural health care disparities,” “health workforce,” “physician extenders,” “physician assistants,” “nurse practitioners,” “mid-level providers,” “primary health care,” “medically underserved areas,” “retention and recruitment in rural health,” “physician assistant productivity,” “non-physician impacts in rural health,” “inequalities of health care,” “rural health care access.” A manual search of the reference lists of retrieved articles was also conducted to ensure a complete and comprehensive search. Articles were thoroughly reviewed and analyzed regarding physician assistant productivity and impact on availability, accessibility, and affordability in rural areas. Articles used in this review spanned 1992 to 2011 and included surveys, interviews, and secondary analyses of databases. Articles ranged from a state or geographical area to a national scope.
Rural Health Disparities

Access to Health Care

Before exploring the health care disparities and challenges that rural residents face, one must understand what rural is. There are many definitions and variations in definitions, making it difficult to clearly define rural areas. The two main systems that define “ruralness/rurality” in the United States are the Bureau of Census and the Office Management and Budget (OMB) (Wakerman, 2004). The Census Bureau attempts to define rural on the basis of population density, whereas OMB defines rural by a county basis depending on population (Ricketts, 1998). These definitions share a common theme in the fact that they both try to define rural by population size or density, relationship from cities in regard to distance, or a combination of these (Simpson & Simpson, 1994).

The U.S. Census Bureau develops its definition of rural by defining urban areas first. It defines urban as all territory, population, or housing units located within an urbanized area (UA) or urbanized cluster (UC). A UA includes a core of densely settled territory of at least 50,000 people with a population density of 1,000 people per square mile within a total land area of less than two square miles. The surrounding areas may have an overall density of at least 500 people per square mile which encompasses 50,000 people. A UC is classified the same as above, but contains at least 2,500 to no more than 50,000 people. Areas that are not an UA or UC are considered rural (U. S. Census Bureau, 2002).

Office of Management and Budget has its own definition of urban and rural which is based upon counties. Urban areas are designated into metropolitan (metro) or micropolitan (micro) statistical areas. “A metro area contains a core urban area of 50,000 or more population, and a micro area contains an urban core of at least 10,000 (but less than 50,000) population.
Each metro or micro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration with the urban core” (U. S. Census Bureau, 2010). Rural or non-metro or micro areas would not contain a core urban area which designates them into their metro or micro classification respectively. Although these definitions are not uniform in delineating the difference between rural and urban areas, they do provide a better understanding of the term rural.

According to the U. S. Census Bureau approximately 21% of the U.S. population lives in areas classified as rural. While the proportion of the population in rural America has continued to decline throughout the 20th century, the actual number of individuals that reside in rural America is at an all-time high (Simpson & Simpson, 1994). As of 2000, the population in rural America was reaching 60 million people. Within this population, individuals face economical, cultural, and demographic challenges that affect their health, including appropriate access to health care. Disparities exist in rural America and certain health characteristics differentiate rural and urban populations.

Health disparities among rural and urban areas encompass a complicated interrelated mix of factors such as: poverty, environmental threats, access to health care, individual and behavioral factors, and educational inequalities. These geographical, demographical, and cultural factors all can affect an individual’s ability to achieve optimal health (U. S. Centers for Disease Control and Prevention, 2011; Gamm, Hutchinson, Dabney, & Dorsey, 2003). Rural populations face many of the above factors as well as many others that contribute to health disparities. Rural populations have higher rates of chronic diseases, including heart disease and cancers (Monroe, Ricketts, & Savitz, 1992; Ricketts, 1999), and on average, the rural population
is older, less likely to be insured or be covered by public insurance, poorer, and more sick than its urban counterparts (Size, 2002; Ziller et al., 2003). The combination of social, educational, and geographical factors all impede health outcomes in rural America.

Although all these factors play an important role, this paper will focus on the disparities related to access of health care; because one of the roles of physician assistants is to increase access to health care. “Health care access is the ability to obtain preventative, routine, and acute health care in a timely fashion” (Bible, Lee, & Friedlaender, 2009). Access to health care can be broken down and dissected into three main categories: availability, accessibility, and affordability (Comer & Mueller, 1995).

**Availability**

Availability refers to access to a health care provider or health care facility. As of 2000, nearly 25% of the country’s population (Simpson & Simpson, 1994) lived in rural areas. When compared to the proportion of practicing physicians in rural areas, at 13%, the unbalanced patient provider ratio is evident (Hooker & Berlin, 2002). Cooper (2004) reported that in 2010 the United States was still facing a shortage of 200,000 physicians. Comparing the physician workforce in rural versus urban areas, rural areas have higher proportion of primary care physicians (PCPs) and lower proportion of specialty practice physicians. PCPs made up 49% of the physician workforce in rural areas compared with 30% in urban areas. Specialty practice had the opposite trend with only 23% of the physician workforce in rural areas compared with 37% in urban areas. Determining patient-provider ratios illustrates a lower supply of physicians in rural areas with 5.3 PCPs and 5.4 specialists per 10,000 population in rural areas compared with 7.8 and 13.4 respectively in urban areas (Reschovsky & Staiti, 2005). Low numbers of specialty
practitioners in rural areas can contribute to suboptimal care for these patients due to the fact the
PCPs are more commonly providing care outside of their specialty (Reschovsky & Staiti). In
addition to physician shortages in rural areas, economic problems have driven residents to urban
areas, which in turn have led to hospital closures in rural areas (Comer & Mueller, 1995). These
closures make it even more difficult to sustain a health care workforce that provide for the rural
community.

Accessibility

Accessibility is another barrier to rural residents seeking health care. Unlike urban
residents, rural populations may face many geographical obstacles when in need of health care.
Longer distances between home and health care provider, and lack of public transportation can
have a major impact on the health of rural residents (Comer & Mueller, 1995). Longer distances
can mean greater traveling expenses and delay in preventive care, diagnosis, and treatment,
negatively affecting health outcomes. It has been suggested that the higher rates of chronic
diseases such as heart disease, diabetes, and cancer in rural populations might be indicative of
problems with accessibility (Smith, Humphreys, & Wilson, 2008).

Affordability

The cost of health care is a major component that influences individual’s decisions on
health care from providers, to procedures, medications, treatments, and ultimately access.
Affordability affects access regardless of setting. What sets rural residents apart is the higher
level of poverty and higher rates for people with inadequate insurance coverage. For example,
poverty rates of nonmetropolitan areas in 2009 were nearly 17% compared to about 14% in
metropolitan areas. A higher incidence of poverty has been apparent since the recording of poverty rates were implemented in the 1960’s. Figure 1 displays this relationship. When looking at poverty demographics in rural areas, all age groups in nonmetropolitan areas have higher rates of poverty than in metropolitan areas (U. S. Department of Agriculture, 2010).

Rural population covered by private insurance is 64% compared with 70% of the urban population. Twenty-three percent of rural residents are Medicare beneficiaries and of those, 45% are without drug coverage. Compared with urban residents, 20% are Medicare beneficiaries and of those, 31% are without drug coverage (Size, 2002). Rural residents who are employed are less likely to receive health insurance coverage from their employer and less likely to buy individual health insurance coverage than urban residents (Simpson & Simpson, 1994). Rural residents are less likely to be insured by private insurances, and those that are Medicare beneficiaries are less likely to have drug coverage than their urban counter parts. Without insurance, health care can be unaffordable. With high cost health care, access is limited which in turn decreases health outcomes in terms of prevention, management, and treatment.

Availability of physicians, accessibility to health care facilities, and affordability of health care services play an important role in accessing health care for rural residents. Individually these factors can cause many difficulties, but when combining these disparities together, as is seen in rural America, there is an obvious barrier facing these individuals’ health. Implementation of physician assistants was an approach made to close the gap of disparities among rural communities, has their presence proved to be effective?
Scope of Practice and Clinical Productivity

Physician assistants are licensed health care professionals that are divided into primary care and specialty practice. Their scope of practice and level of autonomy varies and is determined by state medical statues as well as the supervising physician (Everett, et al., 2009). In 2007, the number of employed physician assistants was approximately 79,000 (American Academy of Physician Assistants [AAPA], 2011; U. S. Bureau of Labor and Statistics [BLS], 2009).

This new type of medical provider was born during the major physician shortage that faced America in the late 1960’s. These non-physician providers are dependent practitioners that practice medicine under the supervision of a physician. The initial development of these providers was to aid in primary care deficiencies in health care in rural and underserved urban areas by improving access and reducing health care costs (Everett et al., 2009; Hooker & Berlin, 2002).

The first physician assistant program started at Duke University in the late 1960’s and as of 2008 there were 142 accredited PA programs in the United States (BLS, 2009). Since the early 1970’s the number of graduates per year was approximately 300, which has increased significantly to over 4,000 per year in 2000 (Larson & Hart, 2007). Although the PA profession started primarily as a male-dominated profession due to recruiting of military corpsmen, there has been a shift towards a female predominance more recently. During the initial years of PA training, graduates were almost entirely men. As of 2000, 62% of graduates were female (Larson & Hart). More recent literature reports in that in 2007 nearly 67% of employed physician assistants were female (He, Cyran, & Salling, 2009). According to the AAPA census report of 2009, 36% of physician assistants surveyed worked in a primary care setting, 15% of
which worked in rural areas (AAPA, 2009). This census is limited by response rate, roughly 27% of physician assistants in total, but it does give an estimate of specialty and location of practice.

Physician assistants perform physical exams, order and interpret tests, advocate preventative medicine, diagnose, and prescribe medications (AAPA, 2011). The profession has grown tremendously since its creation and so has the physician assistant’s scope of practice, responsibilities, and practice specialties. Through the 1980’s and 1990’s the scope of practice expanded following standardization of certifications and federal and state regulation of the profession. When prescriptive authority was granted to physician assistants (in most states), it increased responsibilities as well as expanded the scope of practice. During this time specialty practices such as surgery, emergency medicine and other medical subspecialty outside of primary care emerged. This allowed physician assistants to provide a medical care in a variety of practice settings (Larson & Hart, 2007).

The increasing specialization of physician assistants is in contrast to the founding role of providing primary care. Although distribution of physician assistants among rural and urban areas has been fairly equal, the original intent of the clinician was to be trained to provide medical care in rural areas (Larson & Hart, 2007). When comparing physician assistant and physician distribution among rural areas, 23% of PA’s work in rural areas compared with only 13% of physicians (Hooker & Berlin, 2002). Specialization is partly due to the development of managed care over the years (Hooker & Berlin). The opportunity for specialization has also led to a decline in the proportion of physician assistants practicing in primary care. Overall the number of primary care physician assistants is higher than those in specialty practice, the percentage of physician assistants in primary care continues to decrease. In 1974 estimates of
physician assistants practicing in primary care was just below 70%, by 2000 it had declined to 48%, and by 2009 it was 36% (AAPA, 2009; Larson & Hart, 2007). These statistics demonstrate a trend that physician assistants are moving away from primary care practice and towards specialization, which might be leading to a decrease of these practitioners in rural areas.

Overall, physician assistants are increasing in numbers and affecting all areas of medicine. Whether primary care or medical subspecialties, the profession has made an impact on health care delivery across urban and rural settings. The early goals in establishing a non-physician clinician workforce was aimed at providing primary care specifically in rural and underserved communities. This paper explores whether these providers have fulfilled these objectives in primary care among the rural health care and medically underserved communities, or if the evolution and progress of the profession has taken it down other paths.
Impact of Physician Assistants

Physician Assistant Productivity

The determination of physician assistant productivity is important in evaluating how PAs have had an impact on health care access whether in a rural or urban setting. Since the main role of the physician assistant profession was originally to mitigate the health care shortages of the time, knowing how physician assistant productivity compares to physician productivity can give a better understanding of how or if health care needs are being met by these clinicians. Measuring and analyzing productivity rates is important in determining how physician assistants have impacted health care access in rural America.

The growth of the non-physician clinicians (NPC) professions, which includes primarily physician assistants, nurse practitioners, and certified nurse midwives, has grown dramatically in the last two decades. With the increasingly growing numbers of NPCs, it is more important than ever to measure the contribution to health care access. More and more physician assistants are practicing every year but what significance does that have on health care? Physician productivity has been studied closely by the American Medical Association (AMA), but few studies have reported productivity of NPCs. These studies were conducted in the 1970’s and are limited due to productivity in only certain settings (Larson, Hart, & Ballweg, 2001). With such a large increase in these professionals in the last twenty years it is important to recognize their contributions in health care delivery.

Determination of productivity is primarily based upon outpatient visits, inpatient visits, as well as hours worked per week. The AMA has been using these variables to determine physician productivity in the past. When identifying productivity, rural/urban setting, practice setting, and specialty are also used in determining a more comprehensive range of productivity in the NPC workforce. These variables allow statistics to be gathered and compared to physician’s
productivity. The limiting factor when determining productivity lies in the fact that many states and professional organizations do not collect complete information about NPC providers practice (Larson et al., 2001). Not collecting complete data about NPC providers can have an impact on analysis and results of productivity. Maintaining these variables will give a more complete and accurate illustration of NPC’s productivity.

Health professional shortage areas (HPSA) are areas designated as having a shortage of primary medical, dental, or mental health providers. The purpose of a HPSA is to identify areas of greater need for health care services and aid in directing health care professional and resources to those areas. They may be urban or rural areas, population groups, or public or non-profit private medical facilities. These medical facilities include community health centers, public health centers, outpatient medical facilities, or community mental health centers, hospitals, state mental hospitals, facilities for long-term care, rehabilitation facilities, migrant health centers or Indian Health Service facilities, facilities for delivery of health services to inmates in a U.S. penal or correctional institutions, state correctional institutions, Public Health Service medical facilities, or any other federal medical facilities (Health Resource and Service Administration [HRSA], 2010a).

As of September 30, 2009, there were 6,204 Primary Care HPSAs with 65 million people living in them. It would take 16,643 practitioners to meet their need for primary care providers (a population to practitioner ratio of 2,000:1) (HRSA, 2010b). Designation of an HPSA can be influenced by physician assistant’s productivity, allowing areas to qualify for federal programs, such as the National Health Service Core, which thereby aide in shortages of health care providers. Federal designation of HPSAs and medically underserved areas/populations (MUA/MUP) was changed in September of 1998; adopting that primary care PAs would be
included in the generalist supply calculations of an area, where they were not included prior to 1998.

The new regulations would total the number of PAs in an area and weight them against a physician full-time equivalent (FTE) factor of 0.5. These new regulations did not take into account specialty practice, practice location, active/non active, rural/urban, and or part-time/full-time status when determining a proper weighting scale (Larson et al., 2001). These factors can have major implications on determining PA productivity.

Larson et al. (2001) completed a study during 1993 and 1994 to determine PA productivity compared to physician productivity based on factors that were omitted in the federal regulations when determining a physician full-time equivalent. Rural/urban setting, practice setting, and medical specialty were all used in the study to establish more accurate productivity estimates. A survey questionnaire was used to collect data on productivity of PAs in regards to outpatient visits per week, inpatient visits per week, and hours worked each (excluding on-call hours). The results obtained from this survey would allow for the comparison of data from the American Medical Association on physician visits and hours worked in the form of full-time equivalent estimates of PA productivity relative to physician productivity (Larson et al.).

Results revealed that many variables such as practice specialty, setting, and location play a role in PA productivity. On average PAs, perform an average of 61 outpatient visits per week, 18 inpatient visits per week, and worked approximately 42 hours per week for all respondents that were clinically active. Variability in productivity among specialty practice and location was evident. The number of outpatient visits was higher in non-metro locations compared to metropolitan locations, about 74 compared with 58 visits a week respectively. Although generalist PAs, whether urban or rural setting performed on average 61 outpatient visits per
week, the higher productivity seen in non-metro PAs is attributed to the larger number of
generalist PAs in non-metro settings (Larson et al., 2001).

When estimating PA productivity in physician full-time equivalents, the 61 outpatient
visits performed by PAs as stated above represents about 83% productivity when compared to
the 74 outpatient visits produced by physicians per week. When comparing inpatient visits, the
18 inpatient visits per week by PAs corresponds to about 90% productivity when compared to 20
inpatient visits per week produced by physicians. These results propose that a full-time,
clinically active PA would have a full-time equivalent estimate in terms of outpatient visits about
83% of one physician FTE (Larson et al., 2001), much higher productivity factor than the FTE
factor of 50% used by the HPSA.

Another way in which Larson approximates PA productivity is by estimating generalist
full-time equivalents in a population of PAs. By using this method of estimation and knowing
the rural/urban distribution of PAs, Larson (2001) calculates that a population of 1000 PAs
would yield 359 generalist family practice physician full-time equivalents (FTE). Breaking this
down even further into rural/urban distribution illustrates that 122 of the 359 family practice FTE
are isolated to rural practicing physician assistants. These results demonstrate the importance of
NPCs in a rural setting and how they can affect health care access by increasing the number of
family practice FTEs, leading to lower provider patient ratios.

While this study demonstrates the significance of PA productivity in comparison to
physicians, we must not forget there are many variables such as different specialties, locations,
and settings that affect these results. By comparing physician and PA productivity it can help in
determining and addressing shortages as well as health care access problems in rural America.
By recognizing productivity of physician assistants compared to physicians this can benefit both health care delivery and the recipients.

When assessing productivity, one must not forget that non-physician clinicians such as physician assistants are not substitutes for physicians. While these providers seek to increase access and provide care, they work with a physician as a team to accomplish these goals. Although quantifying the contribution PAs have made is difficult due to many variables, distinguishing productivity of physician assistants allows for the analysis and assessment of meeting the health care goals set out by the development of the career in the first place.

As this study reports important results there are limitations to the study. One limitation is that the study’s productivity data is dated. While physician productivity has remained stable since the study (Larson et al., 2001), there has been no further data to suggest the NPCs productivity has remained the same. The possibility still remains that their productivity has remained stable, or even possibly increased, no data has convincingly reported these findings. Secondly, the FTEs presented in the study may or may not represent precisely the number of FTEs produced by physician assistants in 2011, but rather an estimate which is more reflective of how many physician assistants could be utilized in narrowing of provider shortages.

Finally, when measuring productivity on visits and hours worked basis, the quality of care is not measured. This could also be a limitation in the AMA study when measuring the productivity of physicians. We cannot assume that the increasing patient visits and the greater number of hours worked equates to a more effective health care outcome for the patient. In this sense quantity is not necessarily equal to quality. Finally, this study estimates national results, which does not take into consideration state-by-state variation in productivity. Further research
that determines productivity on a state-by-state basis would be valuable when determining NPCs productivity overall.

In summary, increases in productivity by non-physician clinicians equates to more health care providers especially in areas of greatest need, such as rural communities throughout America. Increasing access in these underserved areas is linked to increasing quality of life and decreasing health care costs overall (Staton, Bhosle, Camacho, Feldman, & Balkrishnan, 2007).

**Physician Assistants in Rural Areas**

As noted above, many rural communities lack adequate numbers of primary care providers. These populations tend to have lower incomes, more likely to be uninsured, and overall less healthy (Ziller et al., 2003). Rural areas have a more difficult time recruiting and retaining physicians compared to urban areas. These challenges provide a barrier to care and negatively impact health. A study by Grumbach et al. (2003) examined the distribution of primary care providers practicing in underserved areas. This study compared different primary care disciplines such as physicians, physician assistants, nurse practitioners, and certified nurse-midwives and their geographic distribution in California and Washington State. Results revealed that physician assistants had the greatest proportion of their members, in terms of raw numbers, practicing in rural communities in both states.

Twenty-two percent of physician assistants were located in rural communities in California, where 28% of physician assistants were located in rural areas in Washington State. The proportion of physician assistants working in rural areas far exceeded or roughly equaled the distribution of the population in these states where 13% of the population lived in rural communities in California and 24% in Washington (Grumbach et al., 2003). A comparison of physician assistants and other medical disciplines practicing in rural areas in California and
Washington can be observed in table 1. This table demonstrates that physician assistants have a higher proportion of their workforce among rural communities compared with other medical disciplines in both states.

Overall, Grumbach’s results showed that a higher proportion of primary care non-physician clinicians practiced in underserved areas compared with physicians. This suggests that a greater percentage of physician assistants in California and Washington are seeking to practice in rural areas compared to other medical disciplines. These numbers were consistent with percentages of physician assistants working in rural/non-metro areas across the nation around the same time, which was approximately 19%. Of those 19% of physician assistants working in rural areas, 69% were working in general practice (Hart, Salsberg, Phillips, & Lishner, 2002). Table 2 breaks down the distribution of physician assistants by specialty type in non-metro versus metro locations. While working in these areas physician assistants provide care for a higher proportion of low-income and uninsured patients. It is important to note that even though there is a higher proportion of non-physician clinicians working in rural communities, the total number of primary care physicians in these areas are higher because of the greater number of physicians (Grumbach et al., 2003).

**Increased Affordability of Health Care due to Physician Assistants**

With the health professional shortages that faced the United States in the 1960’s and 70’s funding by the federal government was geared towards developing and expanding programs for physician assistants, nurse practitioners, family physicians, and nurse mid-wives (Grumbach et al., 2003; Staton et al., 2007). As more physician assistants began practicing problems arose with payment issues and reimbursements. By 1977, the Rural Health Clinic Services Act was
passed, which enabled rural clinics staffed by non-physician clinicians to be eligible for Medicare and Medicaid payments. This reform in policy was enabled to allow physician assistants to expand their practice in rural communities and to aid in underserved populations (Staton et al., 2007).

Affordability is a major factor that influences access of care as mentioned above. Utilizing physician assistants in underserved primary care communities is associated with lower medical expenses, which in turn, increases delivery of health care. This could increase preventative care, improve management and treatment of diseases with earlier diagnoses, and potentially improve the quality of individual’s health. A study by Hoffman (1994) reported the cost-effectiveness of non-physician providers was due to less expensive education in addition to their clinical model and fees. Another study of twenty-six primary care clinics demonstrated that clinics with a higher number of practicing physician assistants had a lower labor costs than did those with fewer non-physicians clinicians (Roblin, Howard, & Becker, 2004). So by improving costs, physician assistants increase health care efficiency in underserved populations such as rural communities (Staton et al., 2007).

The hypothesis that underserved populations, defined as low-income and rural populations, are more likely to be seen by physician assistants as opposed to physicians in an out-patient setting was tested by Staton et al. (2007). Results revealed that physician assistants had more patient visits in rural areas compared to physician assistants working in urban areas. Patients in these rural communities were 102% more likely to see a physician assistant than were patients in urban areas. The outcome of this study suggests that physician assistants are providing access to care in rural communities. As well as improving access, they allow the health care unit to function more cost-effectively. Providing more health care to the underserved
population supports the hypothesis of this study and confirms that these practitioners are filling the gap of inequalities among rural America (Staton et al.).

Effective use of midlevel providers can help to lower health care delivery costs in turn affecting affordability and access. Studies have shown that the use of these providers in primary care can decrease health care delivery costs (Grzybicki, Sullivan, Oppy, Bethke, & Raab, 2002). In this study economic benefit was determined by calculating a compensation-to-production ratio between physician practices that employ physician assistants compared to those that do not. Results reported that although a physician assistant generates a lower total revenue annually, a practice that utilizes a physician assistant is much more financially productive. For example, a practice that employs a physician assistant can increase financial productivity annually from approximately $53,000 to $64,000 depending on the reimbursement percentages that range from 100% to 60% respectively. As the number of office visits and number of physician assistants in a particular practice increased so did the financial productivity.

It is important to mention that this study was conducted at only one family/general medicine practice in Pennsylvania and caution should be taken to generalize the results to all practices that utilize physician assistants. It is also important to point out that the physician assistant in this study saw primarily more patients that presented with acute conditions than compared with the patients that presented to the physician. In any case, the economic outcomes of the study illustrate that there are financial benefits of a practice with a physician assistant compared to a physician only practice (Grzybicki et al., 2002).

In the simplest equation, one would expect that higher financial productivity and lower labor costs seen with the employment and use of non-physician clinicians would provide a lower cost system for patients. This could potentially increase affordability and access to underserved
populations, allowing for better preventative care, treatment of diseases, and health outcomes. Many studies have reported findings that are consistent with use of non-physician clinicians in a primary care setting and a reduction in service delivery costs (Grzybicki et al., 2002; Roblin et al., 2004). Roblin et al. reported that “practices with more extensive use of midlevel providers realized lower labor costs per visit than those that did not.” Adult medicine practices that use physician assistants and nurse practitioners had a 6.1% lower labor cost per visit that the national annual average. When comparing to pediatric medicine practices and the use of PA/NPs there was a 4.1% lower labor cost than the national average (Roblin et al.).

Another important factor to be addressed is the practice patterns of physician assistants. Where are PAs more likely to work, urban or rural settings? With the shortages of primary care providers in rural areas, the government has funded organizations such as the National Health Service Corps (NHSC), which provides incentives for providers to locate and practice in rural communities. Many factors contribute to one’s decision to practice in underserved areas, but two major influences such as previous training in underserved areas and growing up in rural areas has shown to be a higher probability of returning to those areas to practice (Martin, 2000).

Martin (2000) found that in Pennsylvania, there were a greater number of physician assistants willing to practice in rural areas. The research team was interested in looking at differences among respondents who practice in rural areas compared with those that practice in urban and metropolitan areas. A survey was sent out to all the licensed physician assistants (1,385) of the state. After a period of eight weeks, they received a response rate of 72%, and after all criteria was met a total of 681 respondents were used in the study. The use of ZIP codes of the practice facilities used by the surveyed physician assistants was used to determine rural
and urban setting type. Approximately 28% of respondents practice in rural areas compared with 72% practicing in urban areas.

The physician assistants who practiced in rural communities had a higher percentage of PAs working in facilities that serve low-income patients, the uninsured, and the underserved compared to their urban counterparts: 28% compared to 11% respectively (Martin, 2000). This study showed an overall greater willingness of physician assistants in rural practice to work in rural underserved areas compared to physician assistants working in an urban setting and working in an underserved area. Rural physician assistants in this study were also more likely to practice in a primary care setting, see more patients a week, and have a higher percentage of patients for whom they were the principal provider, compared to urban physician assistants. Another major difference among rural and urban physician assistants in this study is the type of primary care practice site. Physician assistants practicing rurally were more likely to be at a physician’s office or clinic, where as urban physician assistants were more likely to practice primary care in a hospital setting. This difference could be due to the greater involvement of physician assistants in primary care practice in the rural setting (Hart et al., 2002; Larson et al., 2001; Martin, 2000).

This study is limited to the physician assistant population of Pennsylvania, and it may not accurately represent a conclusion about rural and urban practice differences nationwide. Although limitations exist in this study, it does offer overwhelming evidence of the impact of physician assistants in rural underserved areas. Physician assistant offer solutions for increasing access especially primary care, by their willingness to practice in rural underserved areas. As physician assistants see more patients weekly, they become the primary provider for these region’s patient population which tend to be lower income, uninsured, and underserved (Martin,
The overwhelming evidence concluded from this study suggests that the willingness to serve in these communities is evident among Pennsylvania physician assistants.

**Physician Assistant Impact among Rural Hospitals**

For thirty years, non-physician clinicians have provided their skills in primary care among rural hospitals as physician shortages have loomed. These providers perform between sixty and eighty percent of the primary care that physicians provide which is equivalent in quality of care compared to that of physicians (Bergeron, Neuman, & Kinsey, 1999). The benefits of non-physician clinicians in rural hospitals was demonstrated in a study by Bergeron and colleagues. This study used quantitative and qualitative data to describe hospitals’ experience with nurse practitioners and physician assistants.

A total of 285 hospitals were surveyed that were awarded Rural Health Care Transition (RHCT) grants in 1993 or 1994 by the Health Care Financing Administration (HCFA). The RHCT grant program was developed to assist small, not-for-profit, rural hospitals to improve their finances and management. These hospitals were surveyed in 1995 and 1996 about their use of non-physician clinicians. Of the 285 hospitals, 36 were selected for on-site visits to obtain more detailed information about the hospitals’ experience with these clinicians. Hospitals for on-site visits were selected by five categories determined by the use of non-physician clinicians: no use, low use, high use, increased use, and decreased use. At the time of the visits, thirty-one of the hospitals used non-physician clinicians and five did not. Site visitors conducted interviews with hospital administrators, hospital staff, physicians, nurse practitioners, and physician assistants. Since the study used a small sample of hospitals, all of which were small not-for-profit rural hospitals awarded RHCT grants, results should be carefully analyzed when
generalizing rural hospitals nationwide. This study aimed at determining to what extent these clinicians provide primary care, and how much have they benefited small rural hospitals.

Many concerns and oppositions arose such as public acceptance, scope of practice, and physician opposition. The benefits of these practitioners outweighed the concerns by increasing access to primary care, lower salary expenses, and a reduced need for physicians (Bergeron et al., 1999). Benefits that physician assistants can potentially bring to small rural hospitals include reducing physician patient load, relieving emergency room coverage, relieving financial burden of struggling rural hospitals, and increasing cost based reimbursement from Medicare and Medicaid. The conclusion of the study did report many of these benefits including much more. Reduced recruitment costs, increased revenues, reduced operating costs, increased patient volume, reduced staffing needs, and improved physician recruitment and retention were all reported among rural hospitals where non-physician providers were employed (Bergeron et al., 1999).

Physician assistant presence in rural hospitals allows for reduction in physician-patient load by physician assistants handling the treatment and management of uncomplicated ambulatory cases. This allows physicians to concentrate on more seriously ill patients. The results of the study showed that 40% of the hospitals surveyed reported a decrease in physician workload (Bergeron et al., 1999). Physician retention rates could potentially increase by distributing emergency room coverage to non-physician providers. Non-physician providers cost less to recruit and have lower salaries than physicians, which can be attractive to financial struggling rural hospitals that are unable to recruit physicians (Bergeron et al.).

Also, under the federal Rural Health Clinic (RHC) program, certain clinics in underserved areas that are staffed by non-physician providers are eligible for cost-based
reimbursement from Medicare and Medicaid. These non-physician providers increased revenues in 60% of the hospitals surveyed by qualifying them as RHCs, allowing them eligibility for Medicare and Medicaid reimbursements.

Of all the hospitals sampled, 40% that employed non-physician clinicians reported a decrease in the average operating cost and 20% of the hospitals reported a decrease in the average cost of the emergency room and other departments. By increasing the number of providers at a facility, physician assistants increased the number of people seeking care in 64% of the hospitals sampled, due to increased number of providers in an existing service and by extending care to new services. An increase of 88% was seen when physician assistants expanded existing services in the hospitals and an increase of 64% was seen when physician assistants played a role in extending new services to the hospitals. In addition, in hospitals that reported an increase in volume, 39% reported that patients preferred non-physician providers over physicians, contributed to the increase in volume (Bergeron et al., 1999).

Overall, approximately 80% of the hospitals sampled reported that these non-physician providers benefited the hospital in at least one of the fore-mentioned areas; reduced operation costs, increased revenues and increased patient volume. Along with these benefits, staff reports from these hospitals claimed that “the combination of physician and non-physician providers delivers more efficient primary care than physicians alone” (Bergeron et al., 1999). Also, 60% of the hospitals sample reported increased revenue with the use of nurse practitioners and physician assistants because these clinicians qualified clinics as RHCs, making them eligible for cost-based reimbursements. Future use of these physician assistants is expected to increase because 60% of these hospitals sampled reported plans to increase recruitment of non-physician providers, suggesting the benefits of using these providers offset the costs (Bergeron et al.).
In a similar study, Krein (1997) looked at the employment and use of non-physician providers in rural hospitals spread across an eight-state region in the Northwestern United States. As health care costs climb, the use of non-physician practitioners increases and is an avenue thought to lower costs and improve efficiency of health care delivery (Prescott, 1994).

The study found that out of the 407 hospitals sampled more than 80% of the rural hospitals used non-physician providers and more than 50% (216 hospitals) used physician assistants (Krein, 1997). When comparing the employment of physician assistants to nurse practitioners in these rural hospitals; physician assistants worked in smaller, lower volume facilities that had a smaller medical staff including lower numbers of specialty and primary care physicians, as well as a smaller service population. Practice scope between physician assistant and nurse practitioners in these rural hospitals was similar but physician assistants had more admitting and discharge privileges and more were able to order lab tests and X-rays. “Physician assistants appear to provide a more expanded scope of services in rural hospitals” when compared to nurse practitioners (Krein).

This article further states that both physician assistants and nurse practitioners play a vital role in the delivery of health care and outpatient services in rural hospitals. Similar themes exist in why these hospitals employ non-physicians clinicians; extend medical care, inability or difficulty in recruiting physicians, cost-effective and more economical for rural areas, and Rural Health Clinic certification requirements. This study shows that rural hospitals are a major employer of non-physician providers and that the Rural Health Clinic program is a major factor associated with the employment of these providers (Krein, 1997).

*Providing for the Uninsured and Underinsured in Rural America*
As affordability is directly related to health care access, the ability of non-physician clinicians to narrow this gap is important in providing access to rural America. While health care cost continues to rise, the number of uninsured citizens increases. This inverse relationship is affecting the health of the nation (Bible et al., 2009). The financial barrier is evident in rural populations due to the large number of individuals that fall below the federal poverty index in rural America compared to urban areas (Bible et al.). With higher rates of poverty and higher rates of unemployment, this leads to a higher number of uninsured individuals. Inadequate health care access directly correlates with more negative health outcomes for these individuals.

One study reported that one in five uninsured Americans reported their health as fair to poor, where only one out of nine Americans with insurance had the same rating (Bible et al., 2009). Prenatal care, preventive screenings such as blood pressure monitoring, mammograms, pap smears, and colonoscopies are initiated, in many cases in a primary care setting, all of which are influenced by insurance coverage. All of these procedures, screenings, or counseling comes with a price. Many who are uninsured go without proper preventative screenings and thus are diagnosed with conditions or diseases at an advanced stage (Hadley, 2003). Other studies showed that uninsured individuals are more likely to die when in the hospital (Hadley), and uninsured individuals are at a 25% greater risk of premature death. Increased mortality rates can be attributed to lack of preventive medicine (Franks, Clancy, & Gold, 1993). These statistics are a great concern, and thereby increasing the recruitment and employment of cost-effective providers while maintaining adequate reimbursement for services is essential in improving access in rural communities.

Anderson and Hampton (1999) conducted a study that examined the reimbursement in the utilization of physician assistants and nurse practitioner and the difference among rural and
urban outpatient hospital settings. These non-physician clinicians have been shown to be cost-effective in many studies which have been based upon productivity, salaries, and medical education expenses. This study hypothesized that health maintenance organizations (HMOs) would utilize these providers due to the evidence that supports their cost-effectiveness.

Results of the study reported physician assistants and nurse practitioners were present at 37% of rural patient visits compared with only 5% of urban visits. It also demonstrated that HMOs and prepaid plans were not linked to utilization of non-physician clinicians in rural or urban settings. In fact individuals with HMOs or prepaid plans increased the likelihood of utilizing a staff physician (Anderson & Hampton, 1999).

Greater utilization of physician assistants and nurse practitioners was seen when Medicaid and other government payers were used as the payment source. Other government sources include any federal, state, and local health care programs such as workers compensation and medical programs of the uniformed services. Other government sources do not include Medicare or Medicaid (Anderson & Hampton, 1999). These results suggest that government subsidies are supporting cost-effective utilization of non-physician providers. The importance of this study shows that while HMOs are not utilizing non-physician clinicians as much as physicians; Medicare, Medicaid, and other government sources are.

In rural communities with higher rates of unemployment and poverty, these sources of coverage are utilized much more. This in return can increase health care access to these underserved populations because these payment sources are utilizing non-physician clinicians. As these reimbursement sources favor non-physician clinicians, they also provide incentives for practicing in rural communities. If reimbursement of non-physician clinicians continues to
increase, greater utilization of these providers in the future can provide more health care to rural communities and individuals who need it the most.
Why Physician Assistants Choose to Work in Rural Areas

Another important aspect of improving health care access in rural communities is the ability of retaining health care workers in these isolated areas. With retention comes access by means of availability. It is important to understand what makes physician assistants willing to seek employment in rural communities as well as what is keeping these providers interested in staying. In addition to retention of non-physician providers, acceptance by these communities is also vital in the role of increasing access in rural underserved areas.

An important factor to be addressed is the practice patterns of physician assistants. Are PAs more likely to work in urban or rural settings? With the shortages of primary care providers in rural areas, the government has funded organizations such as the National Health Service Corps (NHSC), which provides incentives for providers to locate and practice in rural communities. The NHSC provides primary health care to areas around the United States where health care providers are in short supply. Clinicians are awarded scholarships and loan repayments for service in health professional shortage areas (HPSA). Many factors contribute to one’s decision to practice in underserved areas, such as loan repayments as mentioned above, but one study has shown that previous training in underserved areas and growing up in rural areas has a major influence on clinicians’ decision to return to those areas to practice (Martin, 2000).

Martin (2000) found that in Pennsylvania, there were a greater number of physician assistants willing to practice in rural areas. The research team was interested in looking at differences among respondents who practice in rural areas compared with those that practice in urban and metropolitan areas. A survey was sent out to all the licensed physician assistants (1,385) of the state. After a period of eight weeks, they received a response rate of 72%, and after all criteria was met a total of 681 respondents were used in the study. The use of ZIP codes
of the practice facilities used by the surveyed physician assistants was used to determine rural and urban setting type. Approximately 28% of respondents practice in rural areas compared with 72% practicing in urban areas.

Out of the physician assistants that practiced in rural communities, there were a higher percentage of PAs that worked in facilities that served low-income patients, the uninsured, and the underserved compared to their urban counterparts: 28% compared to 11% respectively (Martin, 2000). This study provides evidence of an overall greater willingness of physician assistants in rural practice to work in rural underserved areas compared to physician assistants working in an urban setting and working in an underserved area. Rural physician assistants in this study were also more likely to practice in a primary care setting, see more patients a week, and have a higher percentage of patients for whom they were the principal provider, compared to urban physician assistants. Another major difference among rural and urban physician assistants in this study is the type of primary care practice site. Physician assistants practicing rurally were more likely to be at a physician’s office or clinic, where as urban physician assistants were more likely to practice primary care in a hospital setting. This difference could be due to the greater involvement of physician assistants in primary care practice in the rural setting (Hart et al., 2002; Larson et al., 2001; Martin).

This study is limited to the physician assistant population of Pennsylvania, and it may not accurately represent the broader population of practicing PAs nationwide. Although limitations exist in this study, it does offer evidence of the impact of physician assistants in rural underserved areas. Physician assistants offer solutions for increasing access to healthcare, especially primary care, by their willingness to practice in rural underserved areas. As physician assistants see more patients, they become the primary provider for the region’s patient population.
which tends to be lower income, uninsured, and underserved (Martin, 2000). The evidence concluded from this study suggests that the willingness to serve in these communities is evident among Pennsylvania physician assistants.

The dynamics of small rural towns is significantly different compared to larger metropolitan areas. A smaller community finds satisfaction when medical professionals participate in the community functions and events, which reflects interest and investment into the community as a whole. Being involved in the community, and developing relationships, in not only a medical setting but also demonstrating social and civic duty has been shown to build a stronger relationship between provider and patient in these areas (Henry & Hooker, 2007).

One study by Henry and Hooker (2007) sought out to determine elements that increase the likelihood of physician assistants to continue to practice in rural communities as well as the community’s acceptance of these providers. The study was conducted in eight small towns in Texas. Rural distribution of physician assistant in Texas makes up nearly a quarter of the overall physician population state wide. Twenty percent of the population of Texas lives in nonurban areas spread across 82% of the state land area. Of the 254 counties, 126 are designated as Health Professional shortages areas (HPSA); 176 counties are Medically Underserved areas (MUA) or Medically Underserved populations (MUP). The presence of non-physician clinicians is vital in the delivery of health care in Texas. Formulating methods to increase retention and community satisfaction of physician assistant can have a major benefit not only in Texas but nationwide.

The communities included in this study were no different and reflected the same patient demographics overall. Medicaid and Medicare beneficiaries were the majority of patients seen at clinics staffed by physician assistants in this study. The elderly were the majority of patients that visited these clinics followed by children, although all age groups sought out medical treatment
at these facilities. Commonly treated primary care conditions were presented as well as minor traumas and chronic conditions such as diabetes and hypertension (Henry & Hooker, 2007).

Retention of physician assistants in rural communities was shown to be multi-factorial. The major factor of physician assistant retention in these communities was seen to be confidence in oneself as a practitioner. The providers were comfortable with limited physician supervision and having more autonomy than what a colleague might experience in an urban area. More autonomy among these rural physician assistants does not mean providing care to patients outside of their scope of practice. Results of the study also revealed that physician assistants who desired living in a rural community may also be a strong predictor of retention in a rural setting, when compared to recruiting students or practicing physician assistants that were from rural areas originally. Another factor that determined better retention was the importance of community involvement.

Baldwin et al. (1998) described the difference in patient satisfaction and community acceptance as being both willingness to seek care from a PA or NP, in addition to being satisfied with the care received from that non-physician provider. Participation of physician assistants in the community outside of the medical arena built a stronger relationship between provider and residents and developed more trust and confidence on both sides. Physician assistants who resided in the town in which they practiced displayed more commitment to the community in a social and civic standpoint, as opposed to just a professional relationship alone (Henry & Hooker, 2007). In addition to community involvement, attitudes toward physician assistants who remained in the area for longer periods of time increased the community satisfaction of these health care providers. Those that remained in the community for longer periods of time conveyed interest in the community, as well as built confidence among patients. Residents who
participated in this study expressed a positive outlook about the physician assistants that worked at the local clinics. Residents sought health care locally for variety of reasons, including convenience and cost savings of not having to travel to another town for a physician.

Further training in areas of primary care and emergency medicine might benefit physician assistants that plan to practice in these remote areas due to the exposure of such a wide spectrum of health issues in these locations. Training in community involvement and rural culture could also improve provider and patient satisfaction. As reported in this study increased satisfaction can in turn build a greater patient population and therefore increase access to health care in these underserved areas. The complexity of rural medicine and maintenance of health care delivery is important from a medical view point as well as the patient’s view point. The presence of non-physician clinicians is vital in the delivery of health care nationwide. By formulating methods thereby improving job satisfaction, increased retention, and community satisfaction in rural communities, can be a vital step in closing the gap of rural health care disparities.
Conclusion

As the number of physician assistants across the country continues to grow, it is important that their contribution is measured to assure that the original goal of their generation is being met, but more importantly how and if they are positively affecting health care delivery and access. Currently a greater proportion of the physician assistant workforce are working in rural areas when compared to the proportion of physicians (Grumbach et al., 2003); 23% versus 13% respectively (Hooker & Berlin, 2002). Physician assistant’s willingness to work in rural underserved areas allow them to expand accessibility to low income, underinsured, and medically underserved individuals where they are more than twice as likely to serve these patients in rural communities than in urban areas (Martin, 2000).

Determining physician assistant productivity correlates with increasing availability of health care delivery. Studies have reported that physician assistant’s productivity (in terms of outpatient visits, inpatient visits and hours worked per week) in rural areas is higher than in urban areas. These numbers are attributed to a higher proportion of generalist PAs working in non-metropolitan areas (Larson et al., 2001). When estimating physician assistants’ productivity with physician full-time equivalents, physician assistants’ productivity equals roughly 83 % of a physicians’ when comparing outpatient visits. When comparing inpatient visits, physician assistants’ productivity increases to around 90% (Larson et al.). Why are these numbers important? It is not to determine how much a physician assistant can perform compared to a physician in a competitive sense, but rather to show how physician assistants can improve health care access. If PAs produce a family practice physician full-time equivalent around 83%, this increases the ability of a physician-physician assistant team to provide health care to more
individuals and lower patient provider ratios, therefore increasing the availability of health care access to underserved rural communities.

The passing of the Rural Health Clinic Services Act in 1977 led the frontier in physician assistants practicing among rural communities. Enabling non-physician clinicians to be eligible for Medicare and Medicaid payments expanded their practice limits. This is very important when underserved patients are over 100% more likely to be seen by a physician assistant in these settings compared to their urban counterparts (Staton et al., 2007). As physician assistants continue to make impacts in patient loads in rural settings they have also been shown to be cost-effective in rural clinics (Hoffman, 1994; Roblin et al., 2004) which allows for more efficient health care delivery.

In addition to benefiting rural clinics, physician assistants have had major impacts in rural hospitals around the country. Some of which include: reduced recruitment costs, increased revenues, reduced operating costs, increased patient volume, reduced staffing needs, and improved physician recruitment and retention were all reported among rural hospitals where non-physician providers were employed (Bergeron et al., 1999). Impacts of these providers have come a long way in their contribution to rural health care. An important factor in maintaining their positive effects is by increasing recruitment and retention strategies. As specialization increases primary care PAs decrease, leaving fewer amounts to practice in rural areas. In 1974 there were just below 70% of PAs practicing in primary care; by 2000, that had decreased to 48%, and down to 36% in 2009 (AAPA, 2009; Larson & Hart, 2007). At that rate, implementation of effective recruitment and retention strategies must be developed in order to maintain physician assistant’s footprint in Rural America. One such strategy currently being used by the government is the National Health Service Corps (NHSC) which provides incentives,
such as loan reimbursements, for medical professionals who want to practice in medically underserved areas.

Although there have been many studies reporting the impacts physician assistants have made on health care access in rural America, there are still areas of research that would provide a more complete understanding of the capabilities that these clinicians might be providing to an underserved patient population. For example, the productivity studies of PAs as reported in this paper are outdated. These studies were conducted in the 1990s, and while it may be assumed that PA productivity has increased as the profession has matured, there is no evidence to support that proposition. Future research should examine changes in PA productivity, both in general as well as focused on the impact of the increasing specialization of PAs.

Another area of research that would provide beneficial data would be the health outcomes of patients treated by physician assistants. This would be a major undertaking, but would present important objective data that would answer more questions about delivery of health care as well as access produced by physician assistants. Comparing these results with other health care providers as well as practice locations (rural versus urban) can generate new strategies of focus for meeting the demands of not only underserved rural areas, but health care everywhere. A combined effort from both clinicians and researchers will help develop and mold new and diverse approaches to have a positive impact on health education and services in rural America as well as improve the health of the country.
References


http://bhpr.hrsa.gov/shortage/hpsas/designationcriteria/designationcriteria.html


Figure 1.

Table 1. Percentages of Clinicians in Different Medical Disciplines Practicing in Rural Areas in California and Washington.

<table>
<thead>
<tr>
<th>Practice type</th>
<th>California</th>
<th>Washington</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>13%</td>
<td>24%</td>
</tr>
<tr>
<td>Family physician</td>
<td>13%</td>
<td>24%</td>
</tr>
<tr>
<td>Nurse practitioners</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Certified nurse-midwives</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>Physician assistant</td>
<td>22%</td>
<td></td>
</tr>
</tbody>
</table>


Table 2. Physician Assistant Practice Location by Specialty Type.

<table>
<thead>
<tr>
<th>Practice type</th>
<th>Non Metropolitan</th>
<th>Metropolitan</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Practice</td>
<td>69.0%</td>
<td>37.8%</td>
</tr>
<tr>
<td>General Pediatrics</td>
<td>3.3%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>7.3%</td>
<td>9.0%</td>
</tr>
<tr>
<td>General Obstetrics/gynecology</td>
<td>2.1%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>1.7%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Subspecialty of Internal Medicine</td>
<td>0.8%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Subspecialty of Pediatrics</td>
<td>0.7%</td>
<td>2.0%</td>
</tr>
<tr>
<td>General Surgery</td>
<td>3.4%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Specialty Surgery</td>
<td>8.7%</td>
<td>17.1%</td>
</tr>
<tr>
<td>Other</td>
<td>3.0%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Abstract

Objective: To determine the impact of physician assistants in rural medicine and how their presence has affected delivery of health care in terms of accessibility, availability, and affordability.  Method: A search of literature was conducted from 1970 – 2011.  Sources included: PubMed, CINAHL, Science Citation Index, government websites.  Criterion for inclusion was English literature on rural physician assistants and health care access.  Discussion: Generally the literature suggests that physician assistants are providing cost effective quality health care among clinics and hospitals in rural underserved communities.  However much of the literature is dated which could have an impact on interpreting the effects of PAs across rural America.  Conclusion: Currently a greater proportion of the physician assistant workforce is working in rural areas when compared to the proportion of physicians.  Physician assistant’s willingness to work in rural underserved areas allowing them to expand accessibility to low income, underinsured, and medically underserved individuals.