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The Contribution of Nurse Practitioners and Physician Assistants to Generalist Care in Underserved Areas of Washington State

by

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WWAMI RURAL HEALTH RESEARCH CENTER

WWAMI CENTER FOR HEALTH WORKFORCE STUDIES

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About the Rural Health Research Center

The WWAMI Rural Health Research Center (RHRC) is one of six centers supported by the Federal Office of Rural Health Policy (FORHP), a component of the Health Resources and Services Administration (HRSA) of the Public Health Service. The major focus of the WWAMI RHRC is to perform policy-oriented research on issues related to rural health care. Specific interests of the Center include the training and supply of rural health care providers and the content and outcomes of the care they provide; the availability and quality of care for rural women and children, including obstetric and perinatal care; and access to high-quality care for vulnerable and minority rural populations. The WWAMI Rural Health Research Center is based in the Department of Family Medicine at the University of Washington School of Medicine, and has close working relationships with the WWAMI Center for Health Workforce Studies, Programs for Healthy Communities (PHC), Area Health Education Centers, and the other health science schools at the University, as well as with other major universities in the five WWAMI states: Washington, Wyoming, Alaska, Montana, and Idaho.

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The WWAMI Center for Health Workforce Studies at the University of Washington Department of Family Medicine is one of four regional centers funded by the National Center for Health Workforce Information and Analysis (NCHWIA) of the federal Bureau of Health Professions (BHPr), Health Resources and Services Administration (HRSA). Major goals are to conduct high-quality health workforce research in collaboration with the BHPr and state agencies in Washington, Wyoming, Alaska, Montana, and Idaho (WWAMI); to provide methodological expertise to local, state, regional, and national policy makers; to build an accessible knowledge base on workforce methodology, issues, and findings; and to widely disseminate project results in easily understood and practical form to facilitate appropriate state and federal workforce policies. The Center brings together researchers from medicine, nursing, dentistry, public health, the allied health professions, pharmacy, and social work to perform applied research on the distribution, supply, and requirements of health care providers, with emphasis on state workforce issues in underserved rural and urban areas of the WWAMI region.

The WWAMI Rural Health and Health Workforce Research Center Working Paper Series is a means of distributing prepublication articles and other working papers to colleagues in the field. Your comments on these papers are welcome and should be addressed directly to the authors. Questions about the WWAMI RHRC or the WWAMI Workforce Center should be addressed to:

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This study was performed by the WWAMI Center for Health Workforce Studies and the WWAMI Rural Health Research Center. The two studies whose results are combined in this paper were funded by the Health Resources and Services Administration's (HRSA) federal Office of Rural Health Policy (FORHP) and the National Center for Health Workforce Information and Analysis (NCHWIA) of the Bureau of Health Professions. The authors would like to thank the Eastern Washington Area Health Education Center, the Western Washington Area Health Education Center, the Washington State Department of Health and Vince Schueler of the Washington State Office of Community and Rural Health for their assistance with data collection.

Abstract

Background: Nurse practitioners (NPs) and physician assistants (PAs) are an important part of the primary health care system in the United States. However, quantified estimates of the total contribution to primary care made by these non-physician clinicians (NPCs) are rare. In this study, we use productivity data from the NPC and physician populations in Washington State to assess the contribution to generalist care made by NPCs. The role of NPCs in rural and underserved areas of the state, and the role of women NPCs in the female provider population are given special attention.

Methods: Data collected at the time of Washington State health provider license renewal on demography, medical specialty, place of practice and outpatient visits performed were used to estimate the productivity of generalist physicians and generalist NPCs. Head counts of physicians, NPs and PAs were adjusted for missing specialty and productivity data and then converted into family physician Full-Time Equivalents (FTEs) to facilitate comparisons and estimation of total contribution to care made by each provider type. The geographic units of analysis were the 124 Washington State Health Service Areas (HSAs).

Results: When actual productivity data were examined and converted into family physician FTEs, the "discounting" was severe. A total of 4189 generalist physicians produced only 2760 family physician FTEs (1 FTE=105 outpatient visits per week). NP and PA discounts were also severe. Overall, generalist NPCs make up 23.4 percent of the generalist provider population and perform about 21.0 percent of the generalist outpatient visits in Washington State. NPC contribution is higher in rural areas of the state, about 24.7 percent of all generalist visits, and a bit lower in urban parts of the state, about 20.1 percent of generalist visits. In rural areas, female physicians provided only 49.3 percent of the visits provided by female providers; female NPCs provided the remaining 50.3 percent. In urban areas, female physicians provided about 63.5 percent of the generalist care provided by women and female NPCs provided 46.5 percent. NPCs made similar contributions to total care in rural Health Professional Shortage Areas (HPSAs) compared to rural non-shortage areas, though PAs appear to contribute somewhat more care in HSAs with severe shortages of providers.

Conclusions: NPs and PAs are providing over 20 percent of the generalist outpatient visits in Washington State. This result suggests that accurate and meaningful estimates of available generalist care must take into account the contribution of NPs and PAs. Results also reveal that simple head counts of licensed providers are likely to result in substantial overestimates of available care. Actual productivity data or empirically derived discount factors must be used for accurate estimation of provider shortages. Using discount factors and/or actual productivity data to designate shortage areas (e.g., in HPSA designation) will, in turn, help programs designed to reduce shortages, such as the National Health Service Corps, target resources more effectively.

Introduction

Over the past thirty years, nurse practitioners (NPs) and physician assistants (PAs) have become an established presence in the primary health care workforce. The emergence of these professions was spurred, in part, by the expectation that their shorter, less costly training would make them affordable providers of primary care for underserved communities. In addition, it was anticipated that expansion of the skills of existing local providers, such as Registered Nurses (RNs) and Emergency Medical Technicians (EMTs), to NP and PA levels would prove a more realistic solution to provider shortages than attracting physicians to underserved areas.

Despite the growing visibility of NPs and PAs, most estimates of provider shortage have focused on physicians, with few efforts devoted to assessing the total contribution to care made by these non-physician clinicians (NPCs). In this study, we describe the contribution to generalist care made by NPs and PAs in Washington State, with special attention paid to the role of NPCs in underserved rural areas.

Specifically, this study of Washington State addresses the following questions:

- What is the total contribution to generalist care made by NPCs?
- What is the role of NPCs in providing generalist care in rural Health Professional Shortage Areas (HPSAs)?
- What proportion of the total generalist care provided by women is provided by women NPCs?

An important issue in health workforce analysis is how to count the contribution to patient care of each provider and each provider type. Simple head counts of providers are unlikely to produce realistic estimates of the actual supply of health care available to a population (Larson, Hart & Ballweg, in press; Ricketts, Hart & Pirani, 2000). Differences in training, location, specialty, in-patient care activities, experience, scope of practice and full-time/part-time status create large differences in the number of visits that a given clinician is likely to perform during a week. Data from the American Medical Association (Randolph, Seidman & Pasko, 1997), for example, indicate that an average family physician provides 105 ambulatory patient visits each week, a general pediatrician 95, and a general internist about 65. If estimates of available care are to include NPCs, basing estimates of available care on head counts becomes yet more doubtful because so little is known about the productivity of NPCs and their total contribution to care (Scheffler, Waitzman & Hillman, 1996). In this study, we address this issue by using state licensing data and self-reports of outpatient visit productivity to count contribution to care by providers in family physician full-time equivalents (FTEs). By measuring productivity in this way, we can correct for individual differences in productivity and directly compare productivity across professions.

Because the analysis is based on individual-level productivity data, we are able to base our analysis on FTEs rather than head counts of providers. While many states and other jurisdictions do not have the data necessary to carry out such an analysis, this work presents some empirically derived "discount factors" for different provider types in different settings. If we can determine, for example, that full-time PAs perform 70 percent of the number of visits performed by full-time family physicians, we can, in the absence of actual visit data, use the .7 discount factor to estimate the contribution to care made by a PA in meeting the visit requirements of a population. These discount factors can be used to estimate available care based on provider type, specialty and location when productivity data are not available.

Methods

Data Source

Washington State health professional licensure information was the main data source used in this study. In addition to basic demographic information collected on the required license renewal form, the state administered a survey with the license renewal that was used to collect information on practice type, medical specialty, practice location and weekly number of outpatient and inpatient visits performed.

Geographic Units of Analysis

The 124 ZIP code-based generalist Health Service Areas (HSAs) that were developed by the Washington State Department of Health are the basic geographic unit of analysis used in this study. Fifty-two of the HSAs are considered to be rural and are based on the normative service areas of the state's rural hospitals and clinics. The remaining 72 HSAs are considered urban. The use of these ZIP code-based units avoids the problems of over-bounding and under-bounding so often associated with the use of county-based definitions such as the metro/non-metro definition or Urban Influence Codes (Ricketts, Johnson-Webb & Taylor, 1998). There are 52 rural HSAs and 72 urban HSAs. NPC contribution to care was measured at the HSA level and at the rural/urban level (all rural HSAs compared to all urban HSAs). To assess the contribution to care of various providers in rural HPSAs, we determined the percentage of the population in each rural HSA that resided in a designated geographic HPSA in 1998. Figure 1 shows the 124 HSAs and their HPSA status. In four (7.7%) of the 52 rural HSAs, 100 percent of the population lived within a designated HPSA. Twenty-six (50.0%) of the rural HSAs had no one living in a designated HPSA. The HPSA population in the remaining 26 rural HSAs ranged from 2 to 91 percent.

Study Population and Survey Response

The study population consisted of physicians (MDs and DOs), nurse practitioners and physician assistants who renewed their professional licenses between April of 1998 and May of 1999. Annual license renewal is required by Washington State for MD/DOs and PAs, biannual renewal is required for NPs. Counts of active providers and their full-time/part-time status in certain rural areas of Washington State were verified with the assistance of the Western Washington Area Health Education Center and the Eastern Washington Area Health Education Center (AHECs). After eliminating duplicates, retirees, residents, and providers practicing outside of the state, license data identified 12,296 physicians, 2,277 NPs and 1,033 PAs licensed and actively practicing medicine in Washington State. Response rates to the optional survey instrument varied across profession. Ninety percent of physicians, 81.9 percent of PAs and 61.8 percent of NPs completed the survey. Most providers with survey data were actively practicing medicine (94.7% of MD/DOs, 98.1% of NPs, and 95.4% of PAs).

Data on physicians who did not respond to the state licensure survey were obtained by linking AMA Masterfile data to the licensing data, reducing the effective rate of missing specialty data for physicians to only 1.7 percent. Though the AMA data provided specialty information, it did not include data on patient visits.

Estimating the Proportion of Generalists among Unknown Providers

Because of this study's goal of estimating the contribution of each provider type to generalist care, it was not possible to simply exclude cases with missing data. Instead, we examined the proportion of rural and urban providers of the three provider types who were generalists and then applied those proportions as weights to estimate the generalist contribution of each unknown provider. Generalists were defined as providers principally involved in general/family practice, general internal medicine, and general pediatrics. The total rural and urban estimated generalist head counts for a single provider type is calculated (Equation 1):

$$\sum_{r=1}^{2} t + g(s)$$

Where: t = count of known generalists
g = proportion of generalists among known providers
s = count of unknown providers
r = rural/urban location

For illustrative purposes, consider a hypothetical population of 100 PAs, in which 90 completed the optional survey, 70 from urban areas and 20 from rural areas. Rural/urban status is derived from licensing data and is available for all 100 providers. Examination of the data shows that 42 of the known urban PAs (60%) are generalists (practicing in family practice, general pediatrics or general internal medicine), and 16 of the rural PAs (80%) are generalists. Each unknown urban PA is counted as .6 of a generalist PA and each unknown rural PA as .8 of a generalist PA. Of the 10 PAs who did not provide specialty information, 2 are from rural areas and 8 from urban areas. The total (estimated) head count of generalist PAs for the population is calculated (following the formula above):

Counted Urban Generalist PAs + Counted Rural Generalist PAs + .6(Unknown Urban PAs) + .8(Unknown Rural PAs)

Or:

$$42 + 16 + .6(8) + .8(2) = 64$$

In the example, unadjusted head counts would have suggested that 58 PAs in the population were generalists, while imputation increases that estimate to 64. Imputation of missing specialty data in this manner is a conservative measure which guards against undercounting the number of providers of any given type in a population. Of course, the accuracy and appropriateness of using this method are affected by the number and proportion of the population for whom specialty is known. The AHECs helped us verify the presence, specialty and practice characteristics of providers in Washington State communities with fewer than twenty providers. This helped to improve the accuracy of our estimates in low population areas where the consequences of miscounting providers would result in serious over- or under-estimates of the total available care.

Determining the Total Supply of Generalist Visits

The use of head counts of providers to assess the supply of visits available to a population is inherently inaccurate. Head counts, even after careful adjustment in the manner described above, fail to take into account differential levels of productivity within professions, and across professions and individuals (Larson, Ballweg & Hart, in press). A more realistic approach to ascertaining supply and comparing productivity and contribution to care is employed here. Rather than estimating available care from head counts, ambulatory visit data were used to determine the total supply of generalist care in a given area. To assess the contribution to care made by each provider type, the number and proportion of outpatient visits being provided by NPs, PAs and physicians were counted and compared to the total number of visits being provided by all three types of providers in a given HSA or HPSA. These counts were then converted into family physician FTEs, a more intuitive and convenient unit. To convert, visit counts were divided by the number of visits performed by an average full-time family physician (105 visits per week).

Counts of number of outpatient visits performed each week from providers who completed the survey were used to estimate the number of generalist visits performed by providers who did not provide specialty and/or productivity information (Equation 2).

$$B = \underbrace{\left(\sum_{r=1,t=1}^{2,5} V_t \right)}_{\text{(for known providers)}} + \underbrace{\left(\sum_{r=1,t=1}^{2,5} M_t * a_t * p_t \right)}_{\text{(for providers without survey data)}}$$

Where: B = total visits
V = reported visits
t = provider type (FP, GIM, Ped, PA, NP)
M = median visits from known providers
r = rural or urban
a = proportion of providers actively practicing
p = proportion of provider type in primary care
(this will be 1 for known FPs, GIMs and Peds who did not have productivity data)

The discount factors and median outpatient visits (M and p) applied to all unknown providers are reported below. All were derived from the provider population with complete survey data.

Measuring Contribution to Care

The proportion of outpatient visits provided by each provider type can be used to address the study questions. However, it is useful to re-express outpatient visits as physician FTEs. The FTE measure facilitates comparisons across professions and allows corrections for individual differences in productivity. It is also far more convenient and intuitive than a count of total visits provided in a given period. The AMA, using nationally representative survey data, estimates that an average full-time family physician performs 105 outpatient visits per week (Randolph, Seidman & Pasko, 1997). So, available primary care FTEs in a given area are calculated (Equation 3):

$$F = \sum_{t=1}^{5} B_t / 105$$

Where: F = total family physician FTEs available
B = total visits (from equation 2)
t = provider type (FP, GIM, Ped, PA, NP)

For example, if a family physician in a given HSA provides 110 visits each week and an NP and a PA provide 60 and 40 visits (respectively) then the provider supply in the HSA is estimated at 210 visits or two family physician FTEs. By examining the individual components of F, the contribution to ambulatory primary care of each provider type can be assessed. The physician, in this example, is providing 1.048 FTEs (or 52.4 % of the total visits) in the HSA. The NP is providing .571 FTEs (or 28.5 % of the visits) and the PA is providing .381 FTEs (or 19.1 % of visits). A more detailed discussion of this approach to health provider supply estimation can be found in Hart & Palazzo (forthcoming) and in Hart, Palazzo, Baldwin et al., (forthcoming).

Results

Distribution of Providers

In 1998-99 the state licensed 12,296 active physicians and osteopaths, 2,277 active NPs and 1,033 active PAs- a total of 15,606 providers. As shown in Table 1, there are substantial demographic and practice differences across the professional groups. Only 21.5 percent of MD/DOs licensed at the time were women, compared to

87.1 percent of the NPs and 36.8 percent of the PAs. PAs were the most likely to practice in rural settings (21.8 %) and physicians the least likely (14.1 %). PAs were also more likely than NPs or physicians to be practicing in the generalist specialties of family medicine, general practice, general pediatrics and general internal medicine.

When analysis is restricted to active providers ***known*** to be generalists (Table 2), the total number of providers drops substantially to 5,051. All three groups of generalist providers were slightly more likely to be women than in the overall population of providers. Not surprisingly, the generalist providers were also more likely to practice in rural settings and to practice in geographic HPSAs. The majority of the generalist MD/DOs were predominantly family physicians or general practitioners (56.3%). General internists and general pediatricians made up 28.2 percent and 15.3 percent of the generalist physician population respectively. It should be borne in mind that the provider counts shown in Table 2 are ***undercounts*** of the number of generalist providers; the table data are restricted to known generalists. To accurately estimate the contribution to care of NPCs, the provider counts had to be adjusted for the likely number of generalists in the population of providers who did not provide survey information on specialty and/or productivity.

Estimating the Total Generalist Population

Using the procedure described above (Equation 1), unadjusted headcount data were evaluated and a revised, estimated head count for each provider type was calculated. The "discount factors" used for each provider type in each location are found in Table 3. In rural areas, for example, 37.8 percent of the NPs are known to be generalists, 31.1 percent in urban areas. These proportions were applied as weights to the 38.2 percent of NPs that did not respond to the survey (see Table 1). The same procedure was used to estimate the proportion of generalist MDs and PAs among those who did not respond to the survey based on the proportion of generalists in rural and urban areas for each of the professions. Adjusted estimates of the numbers of generalist providers of each type in rural and urban parts of the state are presented in Table 4. The estimate of the total number of physicians increased slightly (from 4,124 to 4,189), reflecting a low rate of missing survey/AMA data. In contrast, the estimate of the total number of generalist NPs increased substantially from 442 to 699, reflecting their very high rate of missing survey information. The final estimate of the total number of generalist PAs increased from 485 to 581.

Estimating the Supply of Generalist Ambulatory Visits and FTEs

Following the procedure outlined in Equation 2 above, we estimated the total supply of ambulatory visits available from each provider type in rural and urban areas of the state. Total visits were then converted into family physician FTEs using Equation (3). In Figure 2, the fairly dramatic effects of converting from unadjusted head counts, to estimated head counts, to physician FTEs can be observed. The licensing/survey data identified 4,124 generalist physicians. We estimated that of the licensed, active physicians for whom we did not have productivity or specialty information, an additional 65 physicians were generalists, for an estimated total of 4,189 active generalist physicians. Outpatient visit productivity data indicated that those physicians were providing the visits that could be supplied by 2,781 family physician FTEs. An estimated 699 NPs provided 330 family physician FTEs and 581 PAs provided 411 family physician FTEs. In short, there are an estimated 5,469 generalist providers in Washington (see Table 4) who provide approximately 3,522 family physician FTEs of outpatient visits. Generalist physicians make up 76.6 percent of the generalist providers in Washington State and provide 78.9 percent of the generalist FTEs; NPs provide 9.4 percent and PAs provide the remaining 11.7 percent.

There are some differences in the contribution to care made by NPCs in rural versus urban areas of Washington, which can be seen in Figure 3. Overall, NPCs provide 24.7 percent of the total generalist outpatient visits in rural areas compared to 20.1 percent in urban areas ($p = .014$). In both rural and urban settings, NPs provide about 10 percent of the outpatient visits; the rural/urban difference in NPC contribution is primarily attributable to the proportion of total visits provided by rural PAs. The range of NPC contribution to generalist care in rural HSAs is quite wide. Some rural HSAs have no NPCs and some, at the time of the survey, had 100 percent of their generalist care being provided by NPCs, as shown in Figure 4. In the majority of rural HSAs, NPCs provide between 20 and 30 percent of the generalist outpatient visits.

Contribution of NPCs to Care in Rural HPSAs

Rural NPCs contribute more to generalist care than their urban counterparts. To determine whether NPCs were making a relatively larger contribution to care in underserved rural areas, we restricted the analysis to rural providers alone and examined differences in NPC FTEs across the HPSA/non-HPSA dimension. As shown in Table 5, NPCs perform between 25.3 and 32.6 percent of the outpatient visits in HSAs that are at least partially designated as geographic HPSAs. In non-HPSA rural HSAs, they contribute about 22.6 percent of the total visits. Though these findings suggest that NPCs make a larger contribution to care in HPSA-designated HSAs, the observed contribution differences were not statistically significant. The proportions of care contributed separately by NPs and PAs were also compared separately to physician contribution. PAs in HSAs where at least 34 percent of the population lives in a designated HPSA made a larger contribution to care than in HSAs with no HPSA population (21.6% compared to 12.5%, $p = .03$). No other statistically significant differences across the HPSA/non-HPSA dimension were found (not tabled).

Female Generalists in Rural HSAs

Stark rural/urban differences in the relative contribution of NPCs compared to physicians were found when we examined the role of NPCs in the ambulatory visits performed by female providers (Table 6). Women generalist physicians provided 49.3 percent of the visits performed by women, compared to 63.5 percent among urban female generalist providers ($p < .01$). Not surprisingly, NPs (a group that is 87% female (89% in rural areas) provided 31.9 percent of female provider visits in rural areas and 24.3 percent in urban ones ($p < .01$ compared to MD/DOs). Female PAs also made a larger contribution to generalist care provided by women in rural areas compared to urban ones, 18.8 percent compared to 12.2 percent ($p < .01$ compared to MD/DOs). Overall, NPs and PAs provided over half (50.7%) of the generalist care provided by women in rural areas.

Discussion

Summary

The analysis presented above indicates that non-physician clinicians provide about 21.0 percent of the generalist ambulatory visits performed in Washington State. The contribution of NPCs is slightly higher in rural parts of the state, about 24.7 percent compared to 20.1 percent in urban areas. These estimates are improvements over those based on unadjusted head counts because they are based on actual productivity data (when available, and imputed estimates when not available) and actual differences in specialty distribution. Converting estimated head counts into FTEs also revealed the difficulties with estimating available care from head counts. There were productivity differences both within and across professions that, when applied to head counts and converted to FTEs, result in steep productivity discounts.

The contribution of NPCs to generalist care in rural geographic HPSAs appeared to be slightly higher than in non-HPSAs but the observed difference were not found to be statistically significant. We had hypothesized that NPCs would make up a larger part of the care system in HPSAs than in non-HPSAs because NPCs generally cost less and are believed to be easier to recruit and retain than physicians. The data presented here do not generally support that hypothesis. PAs do appear to make a larger contribution in HSAs with large HPSA populations, compared to non-HPSA HSAs.

Though women make up an increasing part of the generalist physician workforce and are the providers of choice of many female patients (Fennema, Meyer & Owen, 1990), rural medicine has been relatively unattractive to women physicians (Doescher, Ellsbury & Hart, 2000). We hypothesized, therefore, that in rural settings, NPCs would provide a larger share of the care provided by women. This hypothesis was sustained. In rural settings female physicians provided less than half (49.3 %) of the FTEs provided by women. In contrast, women physicians provided 63.5 percent of the generalist care provided by women in urban settings. In both rural and urban settings, NPs provided the majority of female NPC FTEs. Nurse Practitioners provided 31.9 percent of female FTEs in rural settings, 24.3 percent in urban settings.

Limitations

Several data limitations should be borne in mind when evaluating the contribution to care estimates discussed above. First, the data come from one state, Washington. The extent to which the productivity and discount estimates used to assess contribution to care of different provider types are generalizable to other states is not known. The methods for estimating contribution to care that are outlined above can be used to generate estimates from other states using licensing data. Other state-level studies would definitely enhance our understanding of the contribution of NPCs to generalist care.

Because we wanted to assess the total contribution to generalist care made by physicians, NPs and PAs, we could not simply exclude cases missing productivity data. It was necessary to develop the imputation method described above for estimating productivity (and sometimes specialty and active/non-active status) based on the known population of providers. Any productivity estimate is bound to involve some inaccuracy. The degree of error will vary with the proportion of cases being estimated compared to the proportion that is known and the degree to which the respondents were representative of the non-respondents. This is most problematic for the NP estimates since NPs responded to the survey instrument at a much lower rate than physicians or PAs. For example, if survey non-respondent NPs were less likely to be actively practicing, their contribution to primary care would be less than estimated (or vice-versa).

In interpreting the results of the study the reader is cautioned that observed discounts across professions may reflect either differences in hourly productivity or differences in number of hours worked (or, mostly likely, both) (Larson, Ballweg & Hart (in press)). Since our purpose here was to assess the overall contribution of NPCs to generalist ambulatory care, we did not adjust our contribution estimates for hours worked. Our estimates are based on reports of total ambulatory visits performed weekly. If, for example, NPs as a group are more likely to be part-time workers than PAs, the NP total contribution to care would be lower than the PA contribution, even if the number of visits performed per hour were exactly the same (Hart & Palazzo, forthcoming). (The licensing data show that NPs are, in fact, more likely to work less than 32 hours per week than PAs [30% for NPs and 13% for PAs]).

Finally, any time physicians are compared to other clinicians, the question of substitutability is raised. Great caution must be exercised in employing these findings in discussions of provider shortage mitigation. NPCs may be providing 25 percent of care in a location and the overall provider population ratio may seem reasonable – but this does not mean, necessarily, that there is no physician shortage in that place. The health of a local population, patient preferences, facilities, and a host of other factors make up the background that determines the constellation of services and providers that will effectively address the health care needs of a given population. Access to primary care ambulatory visits is important, but hospitals, emergency care systems and public health systems all play vital roles in addressing those needs as well.

Conclusions

The results of this study point to the need for empirically based estimates of provider counts and provider productivity. For example, proposed changes to HPSA designation rules include a change that would count PAs and NPs as .5 of a primary care physician FTE (Federal Register, 1998). Under the proposed rules, all primary care physicians are counted as 1 FTE. No discounts are taken for specialty, part-time status, or any actual known productivity data. The results of this study indicate strongly that simple provider head counts are likely to result in severe over-estimates of available care. Recall, for example, that we estimated that a total of 4,145 generalist physicians produce only 2760 family physician FTEs. NP and PA counts were also discounted severely when turned into FTEs.

While head count to FTE discounts are important, it is also important to consider productivity differences across and within provider groups. Work based on a national sample of PAs (Larson, Ballweg & Hart, in press), as well as some earlier work (Cyr, 1985; Scheffler, Waitzman & Hillman 1996), for example, suggests that generalist PAs are likely to perform about 75 percent as many outpatient visits as generalist physicians, not the 50 percent suggested in the proposed HPSA designation. NPs appear more likely to work part-time than other providers. However, their hourly visit productivity appears to be only slightly lower than for PAs. In a case where one is trying to estimate the available care in a given area, it is obviously important to know the part-time/full-time distribution of providers both within and across professions. Taken together, the analyses presented above highlight the inherent and severe weaknesses associated with using provider head count to population ratios as measures of available care. More accurate estimates of provider productivity and contribution to care can significantly enhance our ability to assess provider shortage, identify solutions and plan for the education of future health care providers. Such estimates can be made using the methods outlined above with data that are relatively simple and inexpensive to collect.

This study describes the overall configuration of generalist care in Washington State in 1998-99 and shows that NPCs provide over 20 percent of the generalist ambulatory visits performed in urban areas and 24 percent in rural areas. Additionally, rural areas of Washington State are particularly dependent on NPCs for women primary care providers. Clearly, NPC contributions must be taken into account whenever one is trying to assess the availability of generalist care. At the same time, care must be taken with the methods used to count providers and estimate productivity. When working from provider head count data, the use of discount procedures, such as those described above, are essential for accurate estimates of provider shortages and available care.

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Table 1: Active Providers in Washington State, 1998-99

	MD/DOs	NPs	PAs	Total
Count	12,296 (78.8%)	2,277 (14.6%)	1,033 (6.6%)	15,606 (100.0%)
Mean age	48.3	47.5	44.6	46.6
% female	21.5	87.1	36.8	32.1
% practicing in rural HSAs	14.1	17.9	21.8	15.0
% practicing in geographic HPSAs	0.3	1.1	1.5	0.5
% with survey/AMA data	98.3	61.8	81.9	91.9
% generalists*	34.1	31.4	57.3	35.2

* Known from licensing survey or AMA data only (no imputation).

Table 2: Active Generalist Providers in Washington State, 1998-99

	Generalist MD/DOs	Generalist NPs	Generalist PAs	Total
Count	4,124 (81.6%)	442 (8.8%)	485 (9.6%)	5,051 (100.0%)
Mean age	46.7	47.1	45.4	46.6
% female	28.9	92.7	38.8	35.5
% practicing in rural HSAs	19.4	19.7	27.8	20.2
% practicing in geographic HPSAs	0.8	3.1	2.0	1.1
Physician Specialty:				
% FP/GP	56.3	—	—	46.0
% general internal medicine	28.2	—	—	23.0
% general pediatrics	15.3	—	—	12.6

Table 3: Factors Used in Estimating the Productivity of Providers Who Were Missing Productivity Data

	Median Visits (M in Equation 2)		% in Generalist Specialties (p in Equation 2)		% Active (a in Equation 2)
	Rural	**Urban**	**Rural**	**Urban**	
Family physicians	80	72	32.1*	17.1*	94.7
General internists	55	60	9.7*	9.7*	94.7
General pediatricians	83	75	5.3*	5.3*	94.7
Nurse practitioners	58	45	37.8	31.1	98.1
Physician assistants	70	75	71.2	54.7	95.4

* For MDs with no known specialty data only. MDs with known generalist specialty but no productivity information are assumed to be 100 percent generalists.

Table 4: Active Identified and Imputed Generalist Providers by Rural/Urban Location in Washington State, 1998-99

	Generalist MD/DOs Count (%)		Generalist NPs Count (%)		Generalist PAs Count (%)		Total Count (%)	
Rural	811.2	(73.9)	133.9	(12.2)	152.7	(13.9)	1097.8	(100.0)
Urban	3377.8	(77.3)	565.5	(12.9)	428.1	(9.8)	4371.4	(100.0)
Total	4189.0	(76.6)	699.4	(12.8)	580.8	(10.6)	5469.2	(100.0)

Table 5: Generalist Provider Supply (in FTEs) in Rural Geographic HPSAs, Washington State, 1989-99

	Generalist MD/DOs Count (%)		Generalist NPs Count (%)		Generalist PAs Count (%)		Total Count (%)	
Rural HSAs with no HPSA population (25 HSAs)	320.3	(77.4)	41.6	(10.1)	51.8	(12.5)	413.7	(100.0)
Rural HSAs 1-33% of population in HPSAs (12 HSAs)	170.5	(74.6)	23.8	(10.4)	34.1	(14.9)	228.4	(100.0)
Rural HSAs 34-100% of population in HPSAs (15 HSAs)	64.4	(67.4)	10.5	(11.0)	20.6	(21.6)	95.5	(100.0)
Total	555.2	(75.3)	75.9	(10.3)	106.5	(14.4)	737.6	(100.0)

Table 6: Percentage of Female Generalist Providers by Provider Type (in FTEs) by Rural/Urban Location, Washington State, 1998-99

	MD/DOs Count (%)		NPs Count (%)		PAs Count (%)		Total Count (%)	
Rural	98.6	(49.3)	63.8	(31.9)	37.8	(18.8)	200.2	(100.0)
Urban	599.3	(63.5)	228.8	(24.3)	115.1	(12.2)	943.2	(100.0)
Total	697.9	(61.0)	292.6	(25.6)	152.9	(13.4)	1143.4	(100.0)

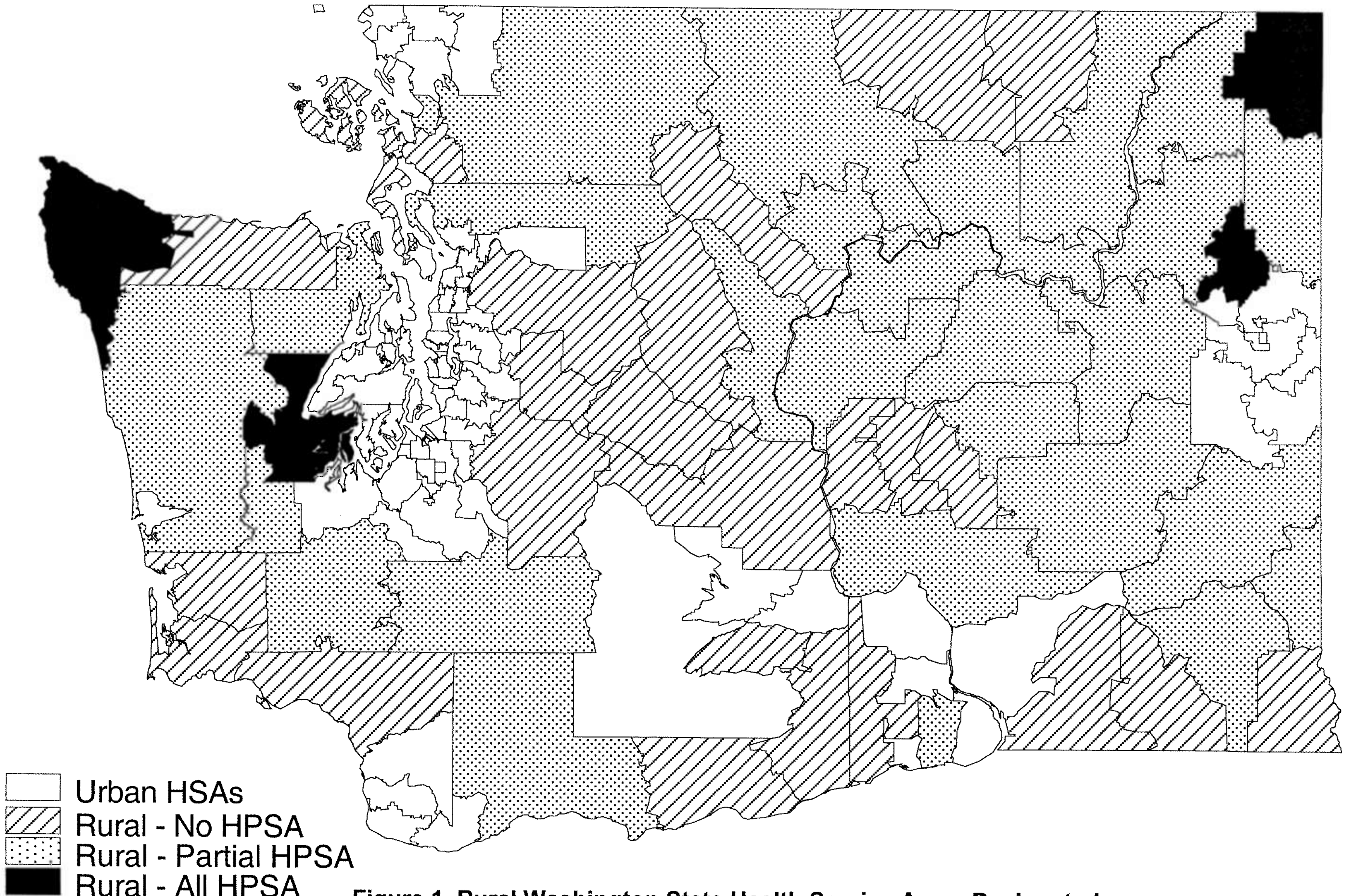


Figure 1. Rural Washington State Health Service Areas Designated as Geographic Health Professional Shortage Areas

Map prepared by
WWAMI Rural Health Research Center
University of Washington
Director L. Gary Hart, PhD
Cartographer: Joseph Miller

Figure 2. Generalist head counts and FTEs, by provider type, Washington State, 1998-99.

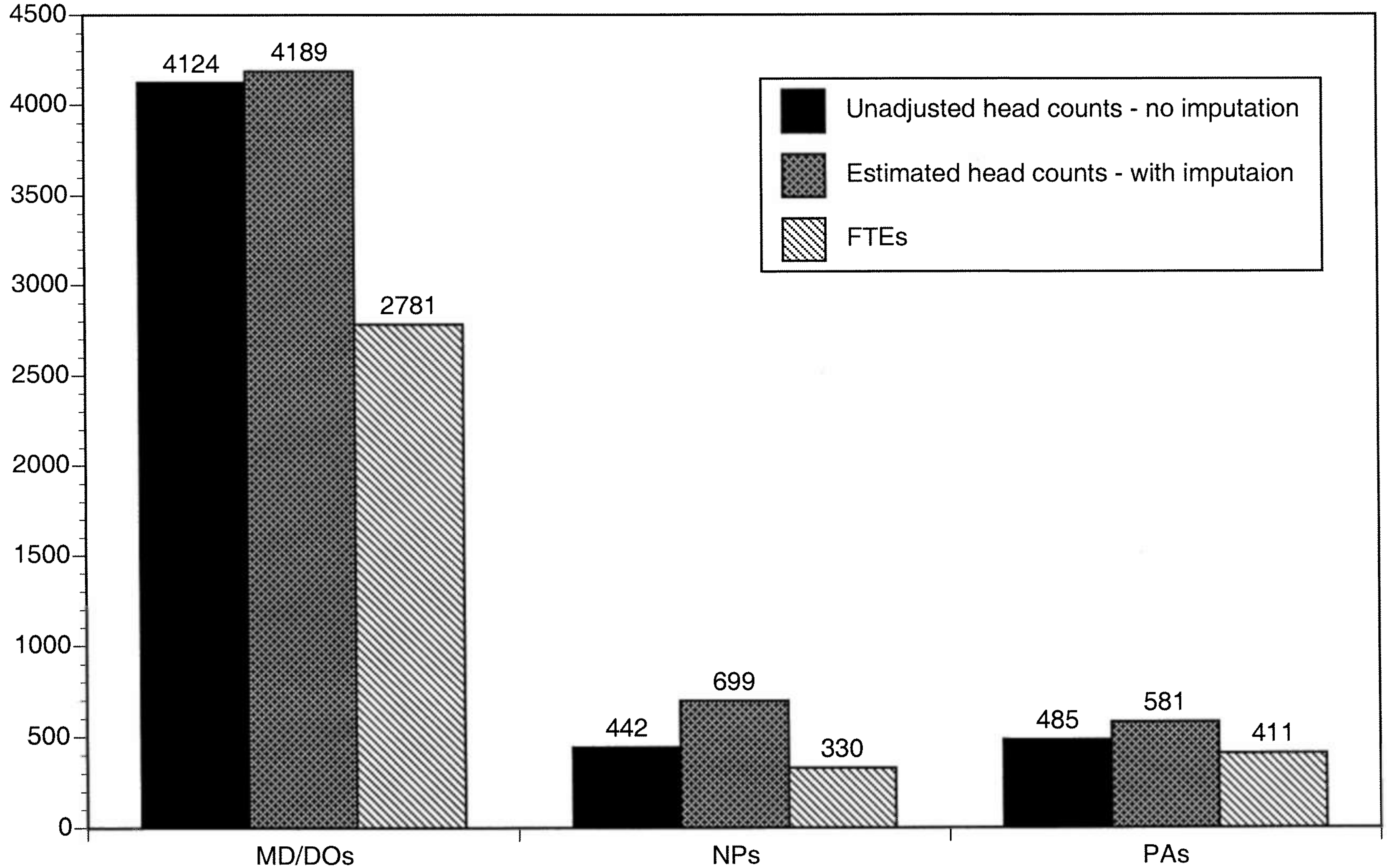
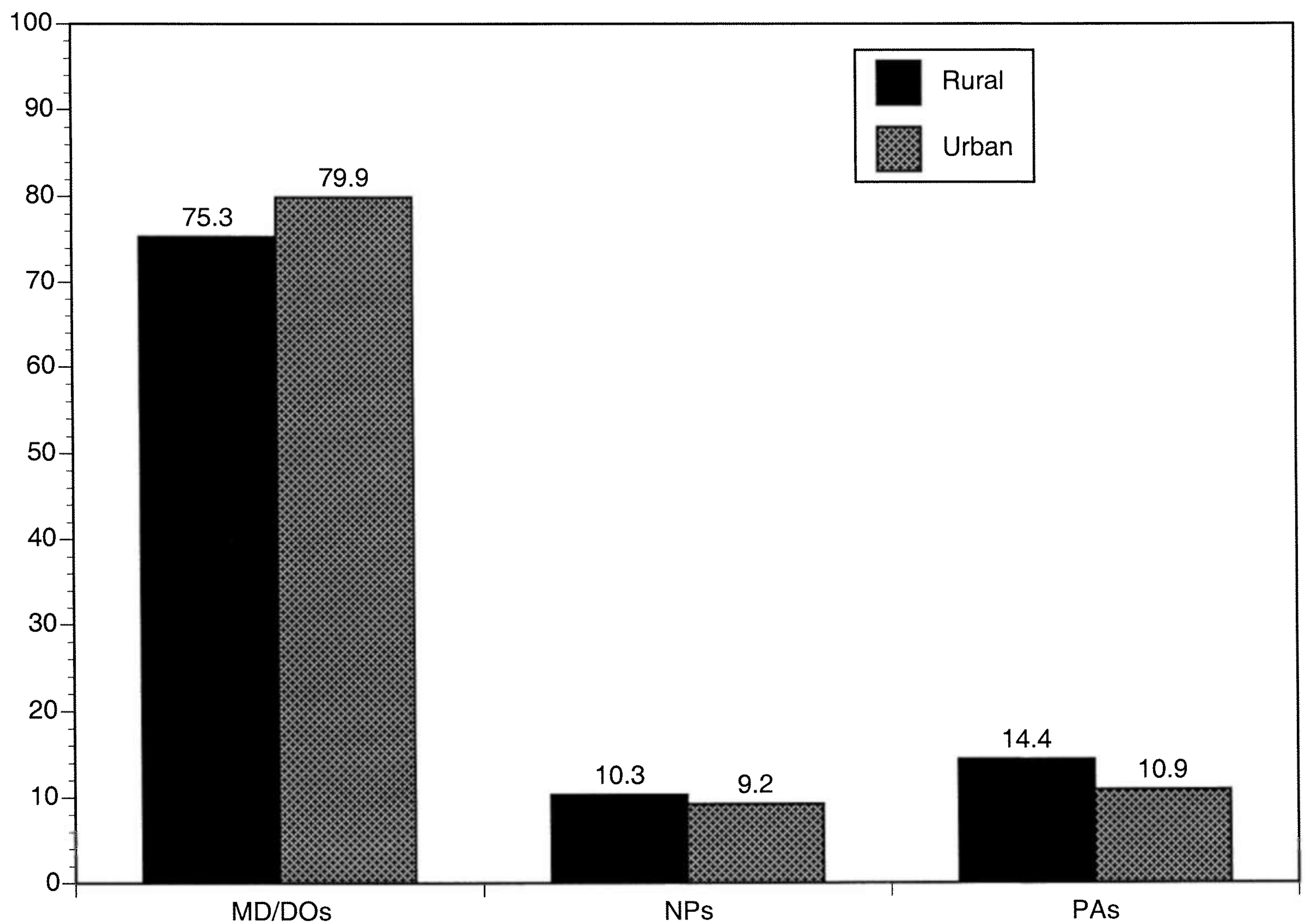


Figure 3. Generalist provider mix in rural and urban Washington State, 1998-99, in FTEs.



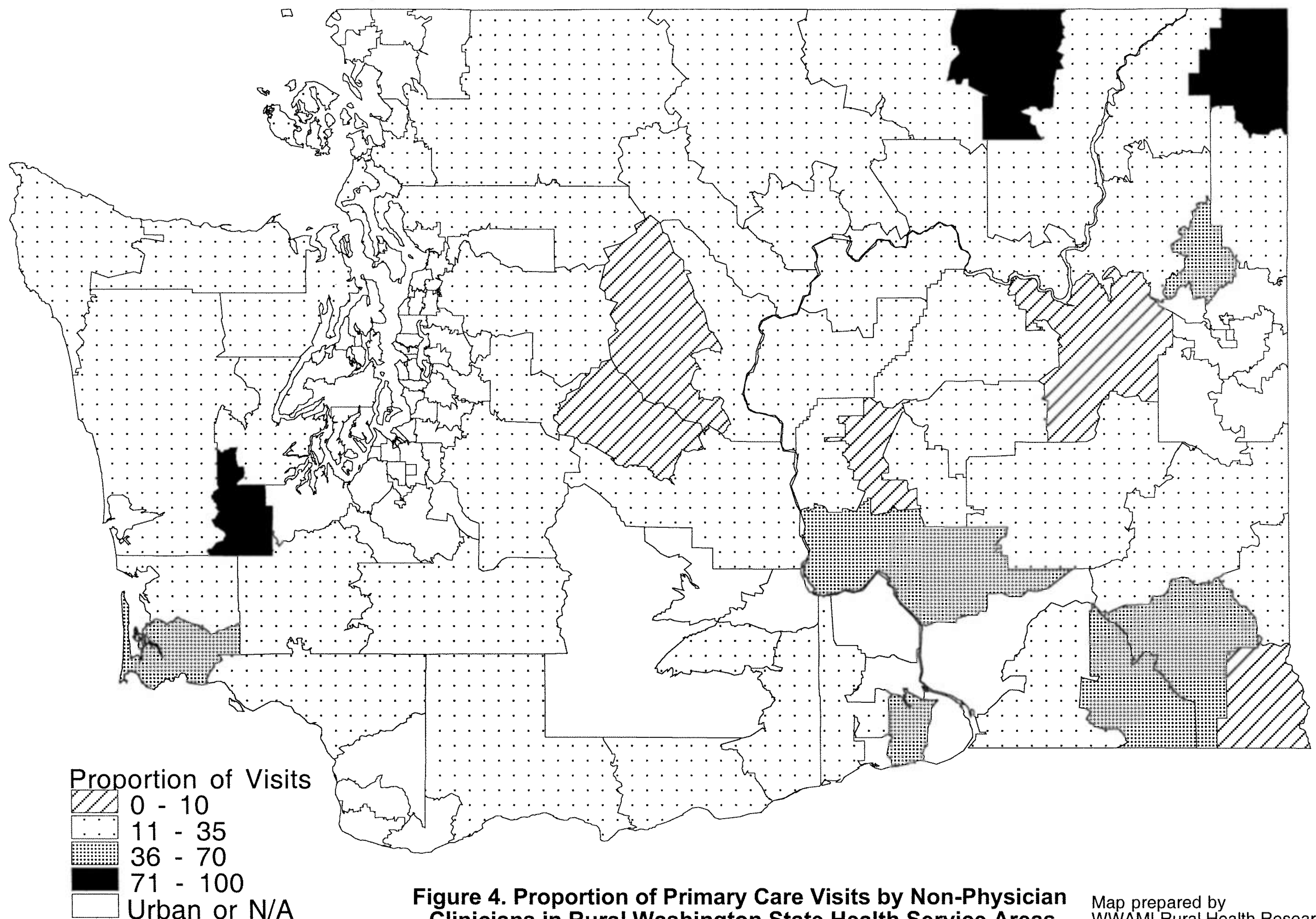


Figure 4. Proportion of Primary Care Visits by Non-Physician Clinicians in Rural Washington State Health Service Areas

Map prepared by
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