Evaluation of Alternative Health Professional Shortage Area (HPSA) Definitions in Washington State

Technical Report

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The Bureau of Primary Health Care (BPHC) commissioned a study in 2001 to look at the process and procedures used to designate places as Health Professional Shortage Areas (HPSAs) throughout the country. Since federal programs and dollars are often only available to places that are designated as a HPSA, the process has political ramifications. Which specific factors are included in the designation algorithm as well as the type of health care providers included in the algorithm, and the method in which those health care providers are counted, have the potential to drastically change an individual places' access to these resources.

The purpose of this technical brief is to describe the differences in designation status of the 124 Health Service Areas (HSAs) in Washington State that result when the current designation system is used and provider counts versus provider full-time equivalencies (FTEs) are used. An algorithm proposed by the Rural Health Research Center in the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill is also evaluated here using the same two provider counting methods. Finally, the proposed designation algorithm is compared to the current designation method to assess the impact of changing the designation criteria. This final comparison is performed using both provider counts and provider FTEs. This text is written considering the HPSA designation rules as they existed in 2001 (current method).

Because it possessed detailed health care provider data for each of 124 HSAs covering the state of Washington, the Rural Health Research Center (RHRC) at the University of Washington was in a unique position to evaluate different HPSA designation algorithms. Washington State health professional licensure information was the main data source used to quantify an HSA's health care providers. HSAs were developed by the RHRC for health services research within Washington State. The HSAs are normatively defined such that all ZIP code areas that are closest by paved road to a current short-term general hospital or a town that has had such a hospital close during the past two decades. Urban is defined as cities of 50,000 or more population and those ZIP code areas closest to them. In addition to basic demographic information gathered on the required licensure renewal form, the state administered a survey with the license renewal that was used to collect information on practice type, medical specialty, practice location(s), weekly hours, and the number of weekly inpatient and outpatient visits performed.

Methods of quantifying the supply of providers that were considered included:

(1) A simple count of primary care physicians,

(2) A count of primary care physicians and mid-level providers (including nurse practitioners (NPs), physician assistants (PAs), and certified nurse midwives (CNMs),

(3) A full-time equivalency (FTE) measure of primary care physicians and the mid-level providers previously mentioned based on weekly work hours, and

(4) An FTE measure of primary care physicians that also included only the FTEs of the mid-level providers that provided primary care.

A maximum provider FTE level of 1.3 was implemented. Providers with direct patient care hours that resulted in a FTE of greater than this cutoff value had their FTE truncated to 1.3. Using FTEs allowed us to examine the differences in HPSA designations when a provider's actual time worked was considered as opposed to a simple count of all providers.

The two designation algorithms considered in this analysis are described below. The variables included in each of the models considered and their original source is in Table 1.

Table 1: Data Elements Required in HPSA Designation Algorithms

	Current Algorithm	Proposed Algorithm	Source
Population to primary care ratio	X	X	
Birth rate	X	X	Claritas
Infant mortality rate	X	X	Claritas
Percent below poverty line	X		Claritas
Percent below 200% poverty line		X	Claritas
Percent unemployed		X	ARF*
Percent Hispanic		X	Claritas
Percent nonwhite		X	Claritas
Percent over age 65		X	Claritas
Standardized mortality rate		X	ARF
Population per square mile		X	Claritas

Current HPSA Designation Algorithm

The current HPSA designation algorithm requires the use of four variables. These variables are:

(1) Population to primary care MD ratio.
(2) Birth rate per 1000 women aged 15-44 years.
(3) Infant mortality rate per 1000 live births.
(4) Percent of population with incomes below the poverty line.

* Health Resources and Services Administration (HRSA) Bureau of Health Professions Area Resource File, http://bhpr.hrsa.gov/healthworkforce/data/arf.htm.

Using the current designation algorithm, the population to primary care provider for each area is the first variable considered. Areas with a ratio greater than or equal to 3500 are automatically designated as HPSAs. Areas that have a ratio greater than or equal to 3000 are eligible for designation if the value of any of the other three variables meets or exceeds an established "unusually high need" cutoff level. Unusually high need is defined as greater than 100 births per 1000 women aged 15-44, 20 or more infant deaths per 1000 live births or 20 percent or more of the population or households below the poverty line. For example if the percentage of the population living below 100 percent of the Federal Poverty Level is greater than 20 percent (the current cutoff point) in a given area and the population to primary care provider ratio is over 3000, the area will be designated as a HPSA. An area needs only to exceed any one of the high needs cutoff values in order to qualify if their primary care ratio is in the 3000-3500 range. Areas that meet the high needs cutoff level in all areas but do not have a population to provider ratio that exceeds 3000 are not designated under this designation system.

Cecil G. Sheps Center Proposed Model

The algorithm that resulted from a Notice of Proposed Rulemaking (NPRM) was rejected in its original form and was replaced with the proposed model (NPRM2) for HPSA designation tested in this technical brief. The NPRM2 algorithm requires the use of nine variables. These variables are:

(1) Percentage of the population living at below 200 percent of the Federal Poverty Level.
(2) Percentage of population unemployed.
(3) Percentage of the population that is Hispanic.
(4) Percentage of population that in nonwhite.
(5) Percentage of the population that is over age 65.
(6) Infant mortality rate.
(7) Standardized mortality rate.
(8) Low birthweight rate.
(9) Population per square mile.

Table 1 lists these variables and their original source. In most cases the data used in this analysis were aggregated from ZIP code level data to Health Service Area (HSA) level data. The unemployment rate and the standardized mortality rate were calculated from county-level data. The percentage of an HSA's population living in each county was calculated. This resulting percentage was then used as a weight to calculate HSA level information from county data.

The NPRM2 algorithm used to determine HPSA designation status assigns each of the contributing variables a score. The score increases as the level of the variable increases. For example, an HSA with an unemployment rate of 5 percent would be assigned a score of 50 while an HSA with an unemployment rate of 8 percent would be assigned a score of 82. After all

component scores are assigned, a total score is calculated by summing the nine individual scores. This total score, combined with the population to primary care provider ratio determines whether an area would be designated as a HPSA using the NPRM2 method. This method allows places with a high population to primary care provider ratios (3000:1) to be designated regardless of other variables scores. It also allows areas with high component scores but a population to primary care provider ratio less than 3000:1 to be designated. For specific details of the NPRM2 algorithm, contact the Cecil G. Sheps Center (www.shepscenter.unc.edu).

The population to primary care provider ratio is an important number as it is the major factor that determines HPSA status in the current designation system. Additionally it is an important piece of the NPRM2 designation algorithm. Using Washington's 124 Health Service Areas as our unit of analysis, the differences in designation status using the two different algorithms (i.e., Current Method, NPRM2) and the two different provider counting methods (i.e., Head Counts and FTEs) was investigated. Fifty-eight (47%) of the HSAs were never designated using any of the algorithms and each provider counting method. Thirty-one (25%) HSAs were designated regardless of the algorithm or provider counting method. These results account for 72 percent of HSAs in Washington State. For the remaining 35 (28%) of HSAs, the designation status varied depending on the designation and provider counting method.

Consider first the difference caused by the provider counting method using the current designation algorithm. Using provider head counts and the current designation algorithm, 26.6 percent of HSAs were designated as HPSAs (see Table 2). Using provider FTEs and the current designation algorithm, 44 of 124 or 35.5 percent of HSAs were designated as HPSAs. Of the 124 HSAs, designation status using the two methods agreed in 113 (91%) cases. Eighty (65%) HSAs were never designated and 33 (27%) were designated using either provider counting method. The remaining 11 (9%) HSAs all changed from a nondesignated area to a designated HPSA when FTEs were used to count providers rather than head counts.

Table 2: Current Designation Method

		Head Count Counting Method		
		Designated HPSA	Not-Designated HPSA	Total
FTE Counting	Designated HPSA	33	11	44
	Not-designated HPSA	0	80	80
	Total	33	91	124

Looking at the NPRM2 designation algorithm, the story is similar. When provider head counts are used and mid-level providers are included, 38 (31%) of Washington's HSAs are designated

as HPSAs and 86 (69%) HSAs are not (see Table 3). If FTE data for the same providers are used, 65 (52%) of Washington's HSAs achieve designation status while 59 (48%) are not designated HPSAs. For 97 (78%) HSAs, designation status is unchanged using the different provider counting methods. Fifty-nine (48%) HSAs are not designated and 38 (31%) are designated. Twenty-seven (22%) additional HSAs are designated as HPSAs when provider FTEs are used rather than provider counts.

Table 3: Proposed NPRM2 Designation Algorithm

		Head Count Counting Method		
		Designated HPSA	Not-Designated HPSA	Total
FTE Counting	Designated HPSA	38	27	65
	Not-designated HPSA	0	59	59
	Total	38	86	124

Another provider counting strategy that was considered included only those mid-level providers that provided primary care (see Table 4). Results comparing the use of counts of all mid-level providers compared to only primary care mid-level providers are shown below. As expected, when only primary care mid-level providers are counted, the percentage of HSAs designated as a HPSA increases 12 percent, from 31 percent (38) designated to 43 percent (53) designated.

Table 4: Proposed NPRM2 Designation Algorithm

		Head Count All Mid-Levels Providers Included		
		Designated HPSA	Not-Designated HPSA	Total
Head Count Only Primary Care Mid-Level Providers Included	Designated HPSA	38	15	53
	Not-designated HPSA	0	71	71
	Total	38	86	124

Next, we considered the differences in designation status that resulted when the different methods were applied using the same provider counting method (see Table 5). Using provider head counts in the current designation method, 33 (26.6%) of HSAs received designation status. Using provider head counts in the NPRM2 algorithm, 53 (42.7%) of HSAs were designated. Using provider head counts, the designation status between the current method and NPRM2 agreed in 104 (84%) of HSAs. The remaining 20 (16%) HSAs all went from a nondesignated

status to a HPSA designated area when the NPRM2 algorithm was applied in place of the current designation method.

Table 5: Head Count Provider Counting Method

		Current NPRM Designation Algorithm		
		Designated HPSA	Not-Designated HPSA	Total
NPRM2 Proposed Algorithm	Designated HPSA	33	20	53
	Not-designated HPSA	0	71	71
	Total	33	91	124

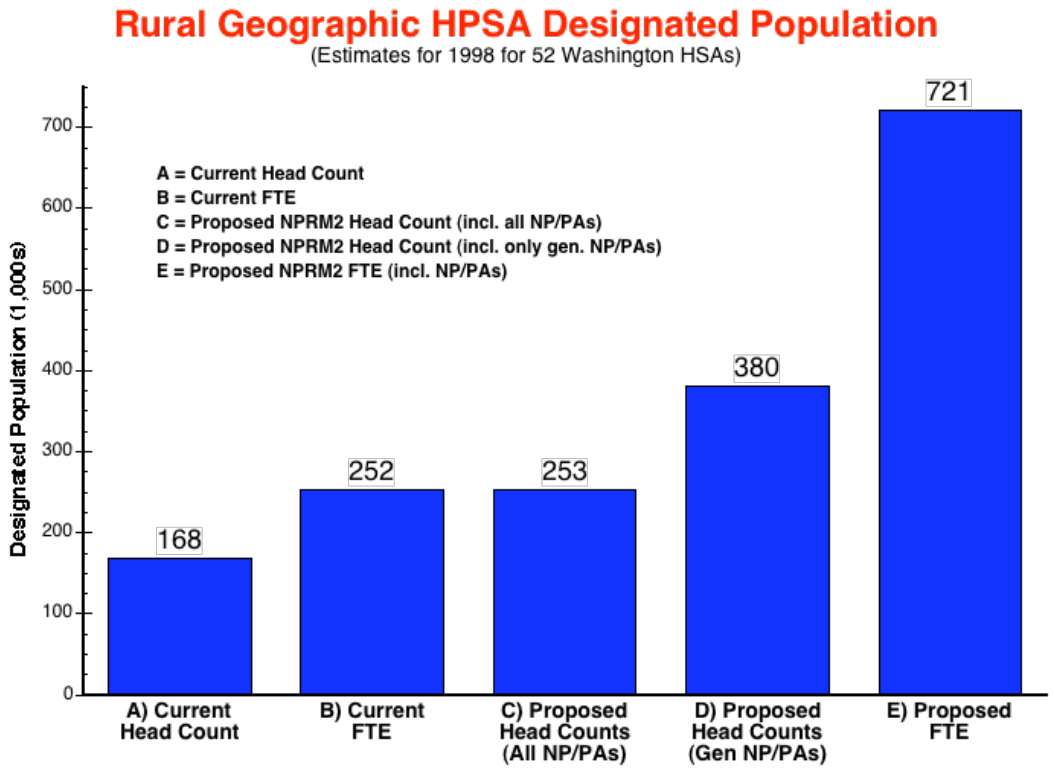
When providers FTEs were used, designation status was the same for the current designation method and the NPRM2 designation algorithm in 103 (83%) of HSAs (see Table 6). Forty-four (35%) HSAs received a HPSA designation and 59 (48%) HSAs did not. All of the 21 (17%) remaining HSAs changed to HPSA designated places from nondesignated places when the NPRM2 algorithm was used instead of the current designation algorithm.

Table 6: FTE Provider Counting Method

		Current NPRM Designation Algorithm		
		Designated HPSA	Not-Designated HPSA	Total
NPRM2 Proposed Algorithm	Designated HPSA	44	21	65
	Not-designated HPSA	0	59	59
	Total	44	80	124

Another way to consider the different combinations of algorithms and provider head counts/FTEs is to examine the differences in the populations being designated and not designated. As can be seen from Figure 1, depending on the designation methods employed there are large differences in the Washington State rural population designated—from 168000 to 721000 (more than four times more population designated). Clearly the proposed NPRM2 head counts including only generalist NP/PAs (designated as “D”) and the proposed NPRM2 FTE including generalist NP/PAs methods yielded much more population as designated as the other methods.

Figure 1



For the five designation methods being tested here, Figure 2 shows the patterns of designation of the population. For all five methods, some 141000 of the population were designated by all five methods while 632000 were never designated by any of the methods. As can be seen, methods E (proposed NPRM2 algorithm including NP/PAs accounted for the highest incremental increase. The rest of the figure bars to the right show other combinations of the methods and the designated populations they share. Figure 3 shows information similar to Figure 2 but for urban Washington. The urban designations are not nearly as sensitive to the differences in the algorithms.

Figure 2

Rural Geographic HPSA Designated Population

(Estimates for 1998 for 52 Washington HSAs)

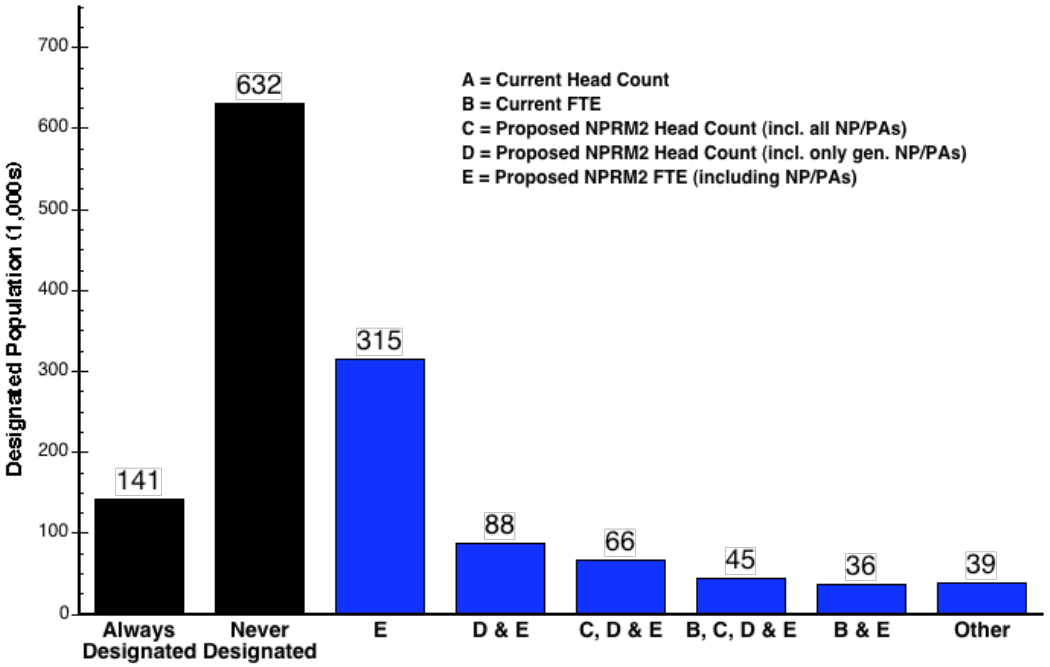
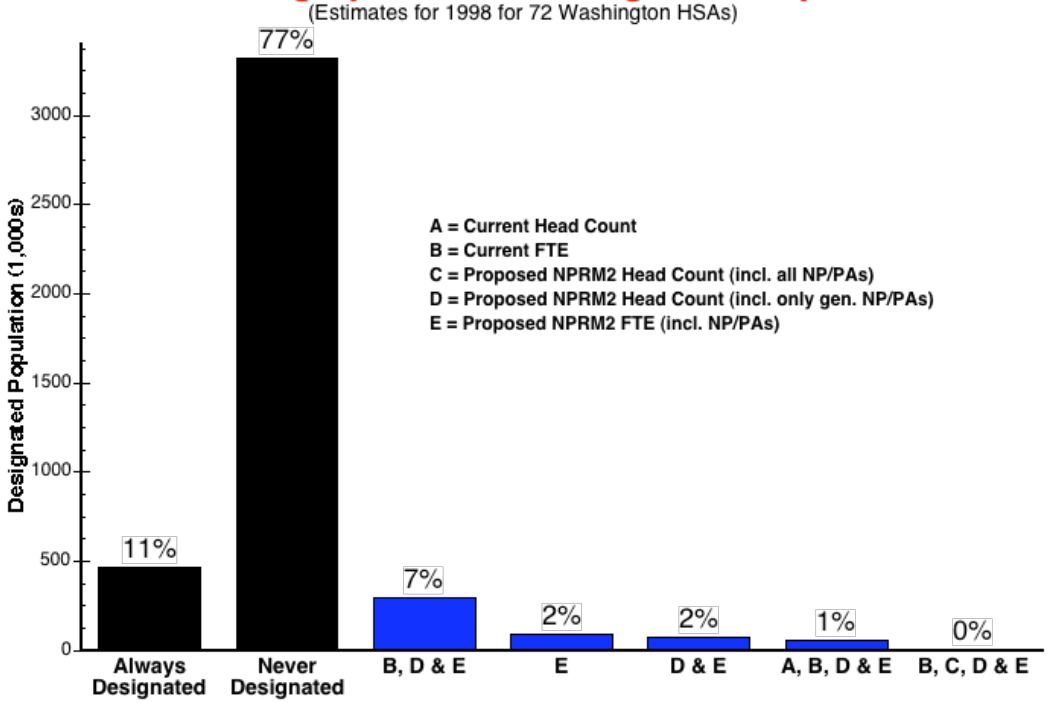


Figure 3

Urban Geographic HPSA Designated Population

(Estimates for 1998 for 72 Washington HSAs)



Conclusions

Using the proposed NPRM2 algorithm increases the number of HSAs eligible for designation and the associated population as a HPSA regardless of the method in which health care providers are counted. The NPRM2 algorithm allows for access to care, to be influenced not only by the number of available health care providers but also by a variety of other factors. The NPRM2 algorithm allows for the social challenges an area may face, to contribute to the assessment of need in improving access to medical care.

Accounting for actual provider FTEs rather than merely the number of primary care physicians, NPs, and PAs also increases the number of HPSA eligible places. When possible, using provider FTEs seems to be desirable, as it provides a more refined measure of physician/NP/PA supply for a given area. However, in most cases these data are not readily available. These results demonstrate that a significant number of places could achieve designation status that they currently do not, if more refined data were available. Not surprisingly, in every comparison the number of HSAs designated as a HPSA and the associated populations increased when provider FTEs were used rather than simple head counts. Clearly in rural areas the NPRM2 algorithm using generalist physicians, NPs, and PAs results in a much larger percentage of the population being designated—and if dependable data are available, this method is more sensitive to real provider supply.