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Certified Nurse-Midwives in Illinois and Indiana:

An Analysis of Need

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Paper presented at the 124th annual meeting of the

American Public Health Association, New York, NY

November 19, 1996

Abstract

This study examines the need for obstetric care in underserved areas of Illinois and Indiana. The study investigates obstetric care need based on epidemiological variables and migration patterns for obstetric care, as well as by health care provider to population ratios. A review of the literature provides the basis for the assessment of need using criteria specified in the Healthy People 2000 standard, and other standards. Data from the U. S. Census Bureau and the American Medical Association are used to determine health care provider to population ratios. Need is also determined by vital statistics for Indiana and Illinois, in particular births by county, infant mortality rates, and rates for first trimester prenatal care. The study compares need by county to the U. S. Department of Health and Human Services health professional shortage area (HPSA) designations to determine if traditional methods for determining need are effective. The study examines trends in the distribution of obstetricians/gynecologists in the two states. Findings suggest that access to obstetric care is limited for some patients due to maldistribution of obstetric care providers and distance to obstetric care. The utilization of health care professionals, such as certified nurse-midwives, in medically underserved areas is discussed as a means for meeting health care needs. Certified nurse-midwives are seen as a possible solution to the problems of access to obstetric care. The study concludes with recommendations for meeting the needs for obstetric care in the future.

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A considerable amount of research has been conducted on the problem of primary health care shortages in rural America. Illinois and Indiana are no exception in rural shortages. However, primary health care shortages also occur in some major metropolitan areas as well. To counteract these shortages, state and federal programs have been implemented. These programs, such as financial incentive and loan programs for medical students, national and state health corps programs, and recruitment, training and placement programs for health care professionals, have helped but not eliminated the problem of primary health care shortages for portions of our population.

This study demonstrates the need for obstetric care providers in certain areas of Illinois and Indiana. The study also demonstrates some major issues with attempting to eliminate obstetric care shortages in these two states, and provides a framework and method for researching the feasibility of implementing a recruitment, training and placement program for health care professionals, in particular certified nurse-midwives.

Primary Health Care Need

The need for primary health care in rural and inner-city areas has been widely demonstrated. While the supply of physicians and other health care providers is increasing, demand is still great in underserved and rural areas (Dunham, Better, & Monson, 1995; Dunham, Kindig, & Libby, 1995; Kindig & Kaufman, 1995; Weiner, 1994; Williams, Whitcomb, & Harris, 1994). Simply increasing the supply of physicians does not seem a viable solution to this problem, considering physicians' patterns of

location after graduation (Dunham, Kindig, & Libby, 1995; Williams, Whitcomb, & Harris, 1994). In addition, the problem appears not so much a shortage of generalist physicians, but an oversupply of specialist physicians (Weiner, 1994).

The literature illustrates the need for formalized training in rural, underserved areas for physicians and other health care providers (Berkowitz, 1993; Gupta & Konrad, 1992). According to Gupta and Konrad (1992), counties with HPSA designations, nationwide, lack health care training resources. When this result is coupled with the relationship between physicians' previous rural area experience and their future location of practice (Fowkes, Gamel, Wilson, & Garcia, 1994; Rabinowitz, 1993), the need for increased training in rural areas is strong.

Several studies suggest that certain types of health care providers are more likely than others to practice in rural, underserved areas (Fowkes, et al., 1994; Larson, Hart, & Hummel, 1994; Rabinowitz, 1993). That is, current health care providers and recent graduates are significantly more likely to practice in a rural area if they are from or have had previous experience in rural areas (Fowkes, et al., 1994; Rabinowitz, 1993). Further, research indicates that rural health care providers perform a wider range of tasks than urban providers (Larson, Hart, & Hummel, 1994).

Healthy People 2000, the nation's touchstone for designing, implementing, and evaluating health promotion initiatives in the final years of this century, is organized around three broad goals: (a) to increase the span of healthy life for Americans, (b) to reduce health disparities among Americans, and (c) to achieve access to preventive services for all Americans (Mason & McGinnis, 1990). Achieving these goals is no easy task. Political, economic, and social forces outside the domain of health and medicine

may impede our efforts. It is evident from recent legislative battles, for example, that tobacco is as much an economic and political issue as it is a health concern. Likewise, whether a physician chooses to practice in a rural or urban setting may have as much to do with earning potential and technical support as the desire to improve the health status of an underserved population. Some indicators would suggest that things may be getting worse rather than better: The number of federally designated health professional shortage areas (HPSAs) has actually increased 40% since 1990 (Schroeder, & Beachler, 1995).

Meeting the objectives of Healthy People 2000 seems particularly difficult for rural populations. First, can "equal opportunity for good health" be possible when the nearest hospital may be an hour or more away? Second, rural populations are often economically, politically, or educationally disadvantaged and consequently are exposed to health threats that more affluent, educated, urban populations may avoid; this fact tends to perpetuate disparities in health status. Finally, if access to primary care is difficult and expensive, there is certainly little motivation or incentive to seek preventive medical services, including prevention services as beneficial and well documented as prenatal care. If genuine progress is to be made in improving the health status of rural populations, then solutions must address the realities of rural practice.

Fewer and fewer physicians are interested in primary care, opting instead for specialization (Mullan, 1991). Weiner (1994) notes that we face not so much a primary care shortage, but a "specialty care provider surplus." Specialization, in turn, demands a larger population base to generate sufficient patient load. This makes rural practice economically unfeasible. Even when the supply of physicians is increased, there may

be little effect on rural practice. For example, the state of Ohio doubled the number of graduates from its medical schools from 1972 through 1987, yet the number of family physicians practicing in nonmetropolitan areas of the state actually declined through 1990 (Williams, Whitcomb, & Harris, 1994). Efforts are being made to identify variables that predict satisfaction with primary care rural practice (Rourke, 1993), and these variables may in turn be used to selectively admit students into medical school with the goal of increasing service in rural areas (Rabinowitz, 1993; Tippetts, & Westpheling, 1993). Finally, incentives of various kinds can be used to draw physicians into rural practice (Li, Williams, & Scrammon, 1995; Mullan, 1991; Koska, 1989).

An alternative to this physician-dependent model of rural health improvement is the recruitment, utilization, and promotion of mid-level medical practitioners, including physician assistants, nurse practitioners, and certified nurse-midwives. Some of the same challenges regarding recruitment and retention of physicians are present when considering mid-level practitioners (Fowkes, Gamel, Wilson, & Garcia, 1994), and there are important issues regarding limits and liability (Bottom, 1987; Jacox, 1987; Jenkins, 1994; Schnirring, 1993; Springer, 1987), but most studies to date support the use of mid-level practitioners on a variety of grounds.

Utilization of certified nurse-midwives (CNM) in rural, underserved areas is an issue of particular interest. Given the aforementioned glut of medical specialists, there may be increased pressure to limit the practice of CNM's. In the Minneapolis-St. Paul area, for example, entry level physicians are willing to take below average salaries in exchange for the benefits inherent to practicing in a major metropolitan area (P. Sarvela, personal communication, October 25, 1996). In turn, CNM's in the area may

be forced out of practice or required to relocate to more economically supportive areas.

There are many advantages to the utilization of CNM's in general, but there are especially strong arguments for their utilization in rural areas. In a recent study, an expert panel was used to select and rank the health indicators that would be most useful in a rural county needs assessment. Of the thirty-one measures considered, infant mortality received the highest ranking, and low birth weight was number six (Leitner, Gast, Sarvela, Ring, & Newell, 1996). The principle benefits to utilization of CNM's include increased access to services and reduced costs of services.

Cost and access issues can be discerned: cost is reduced and access is improved. No one has claimed that the utilization of CNM's actually increases costs, so the question becomes how much money is saved? One admittedly outstanding entrepreneurial obstetrician runs a clinic in Virginia with one CNM and twenty-six other staff (including three aerobics instructors and a massage therapist). Most of the clinic's obstetric work is actually handled by the CNM and nurse practitioner on staff. The clinic's fees are below the national average, yet it brings in annual revenues comparable to that of a four obstetrician clinic (Kassberg, 1994). Utilization of CNM's in a California HMO resulted in an overall payroll reduction of thirteen percent (Bell & Mills, 1989). Cost per office visit among the clinics in the study was not significantly different since clients not being seen by a CNM are routinely handled by nurse practitioners who are compensated at comparable levels. In areas of the country where office visits are still handled by physicians, the savings could be expected to be even greater. The greatest savings came in the costs of delivery: CNM's provided savings of between \$34 and \$223 per delivery over the other sites in the study. Finally, it must be

noted that by providing relatively low-cost access to prenatal care through CNM's, the very high costs of premature and low birth weight deliveries can be greatly reduced.

This study is part of a larger effort to recruit, train, and place CNM's into rural areas of Illinois and Indiana. A population and epidemiologically-based needs assessment will be conducted utilizing data from a variety of sources. The overall goal is to identify those counties in the bi-state area that would most benefit from the additional obstetric services of a CNM. To assess need for obstetric care in Illinois and Indiana the following research questions are posed:

- RQ1 Do counties in Illinois and Indiana meet the minimum criterion, as specified by the American Medical Association, for the ratio of obstetricians/ gynecologists to the population?
- RQ2 Do counties in Illinois and Indiana meet the Healthy People 2000 standard for epidemiological criteria related to obstetric care?
- RQ3 Do women have adequate access to obstetric care within their home counties in Illinois and Indiana?
- RQ4 Is county HPSA designation an effective means of determining obstetric care need for Illinois and Indiana?

Method

To answer the research questions, data were collected on populations of potential obstetric care patients/clients and obstetricians/gynecologists. Supplemental data were gathered on general/family physicians and certified nurse-midwives. As well, particular epidemiological data related to obstetric care were collected including birth by county of occurrence, birth by county of residence, infant mortality, and first trimester

prenatal care. Federal health professional shortage area (HPSA) designations by county were also collected. The primary method of data collection was through published sources. Population figures are taken from the U.S. Census; estimated population is taken from the Revised Estimates of the Resident Population of States and Counties: 4/1/90 to 7/1/94. The number of obstetricians/gynecologists and general/family practitioners are taken from the American Medical Association List of Physicians (1992, 1993). The number of certified nurse-midwives is taken from the American College of Nurse-Midwives mailing list.

The number of live births by county of occurrence (BCO), the number of live births by county of residence (BCR), and the number of infant deaths are taken from the U.S. Department of Health and Human Services Vital Statistics. The number of women who received prenatal care in the first trimester in Illinois is taken from the data provided by the Illinois Project for Local Assessment of Needs (IPLAN). The number of women who received prenatal care in the first trimester in Indiana is taken from the data provided by the Indiana State Department of Health. HPSA designation information is derived from the annual report of the U.S. Department of Health and Human Services in the Federal Register.

Adequate obstetric care was assessed using the American Medical Association's standard ratio of one full-time equivalent obstetrician/gynecologist per eleven thousand total population. The AMA's standard ratio for primary care is one physician per four thousand population. This standard includes obstetrician/gynecologists and general/family practitioners, as well as internists and pediatricians. For purposes of this study, general/family practitioners were assumed to be able to potentially provide

obstetric services to women, particularly in rural communities that do not have specialists. However, assessing which family physicians do provide full obstetric services, including deliveries, was outside the scope of this study.

Adequate obstetric care was also assessed by determining the number of counties below the Healthy People 2000 standard for infant mortality and first trimester prenatal care. The standard for infant mortality is a rate less than seven deaths per thousand live births. The standard for first trimester prenatal care is enrollment at or above ninety percent. Counties in Illinois and Indiana below these standards are considered in need.

The final measure, migration, was assessed by determining which counties experienced a significant movement of women to other counties for delivery services. This migration figure was calculated by dividing the births by county of occurrence figure by the births by county of residence figure for each county. Those counties with a larger number of births by county of residence versus births by county of occurrence were considered as demonstrating migration. A standard derived from the bottom quartile using the aggregate figures for obstetric care migration in each state (< 0.0112), over the years for which data were collected (1990 - 1993), was utilized to determine need.

Overall need for each county was determined by whether the county failed to meet the standard criteria for the following variables: (a) total number of obstetricians/gynecologists to the population, (b) by county infant mortality rates, (c) by county first trimester prenatal care rates, and (d) by county comparison of birth rates by county of occurrence to birth rates by county of residence. For this comparison, if the

criteria for need was met by any three of the four above measures, the county was considered to demonstrate need. Counties demonstrating need by these measures were compared to the list of HPSA designated counties to see if a relationship exists. For purposes of this comparison, only counties with full HPSA designation were considered. Counties with partial designation, such as service area, facility or special population were not considered due to the inability to measure need using the population and epidemiological indicators at the sub-county level. These comparisons will be used to demonstrate limitations to current and traditional data gathering techniques.

Results

For Illinois, the number of obstetricians/gynecologists to total population fell below the standard for seventy-six percent of the counties in 1992 and eighty-three percent of the counties in 1993. This represents a decrease in the ratio of providers to population between 1992 and 1993. The infant mortality rates may be related to the decrease in the ratio of obstetricians/ gynecologists to population by county. For infant mortality rates by county, in 1992 fifty-two percent of the counties fell below the Healthy People 2000 standard, whereas fifty-four percent of the counties fell below the standard in 1993. In 1992, migration for delivery occurred in thirty-two percent of the counties, whereas the figure for 1993 was thirty-seven percent.

The figures for first trimester prenatal care do not follow these trends (see Figure 1). The percentage of Illinois counties that fell below the standard for first trimester prenatal care in 1992 was ninety-eight percent. On the positive side, 1993 saw a slight decrease to ninety-one percent in the number of counties that fell below the standard

for first trimester prenatal care. Enrollment in first trimester prenatal care appears unrelated to the other need criteria.

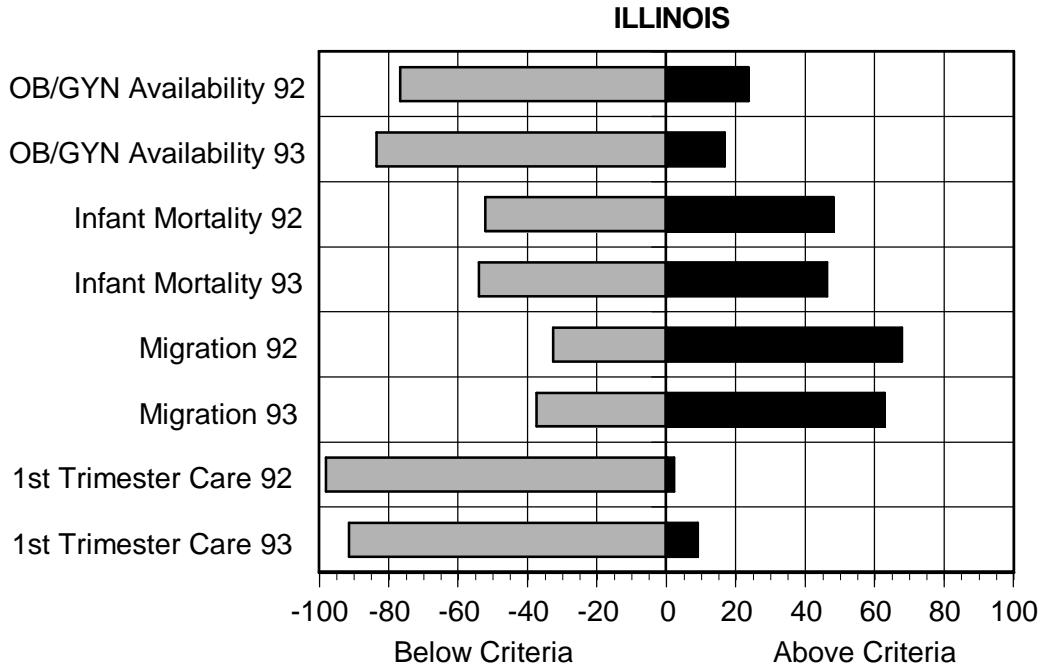


Figure 1. Percentage of counties in Illinois (1992 & 1993) which fall below or above standard criteria for each of the four need variables.

The figures for Indiana are similar (see Figure 2). For Indiana, the number of obstetricians/gynecologists to total population were eighty-four percent in 1992 and eighty-five percent in 1993, which represents a slight decrease. However, for infant mortality rates by county, in 1992 twenty-seven percent of the counties fell below the Healthy People 2000 standard, whereas fifty-four percent of the counties fell below the standard in 1993. That represents a significant increase in the number of counties that fell below the standard between 1992 and 1993.

The Indiana figures for first trimester prenatal care were stable between 1992 and 1993. The number of counties that fell below the standard for first trimester

prenatal care was ninety-eight percent for both years. Yet in 1992, migration for delivery occurred in fifteen percent of the counties in 1992 and twelve percent of the counties in 1993. For Indiana, migration for delivery services decreased between 1992 and 1993.

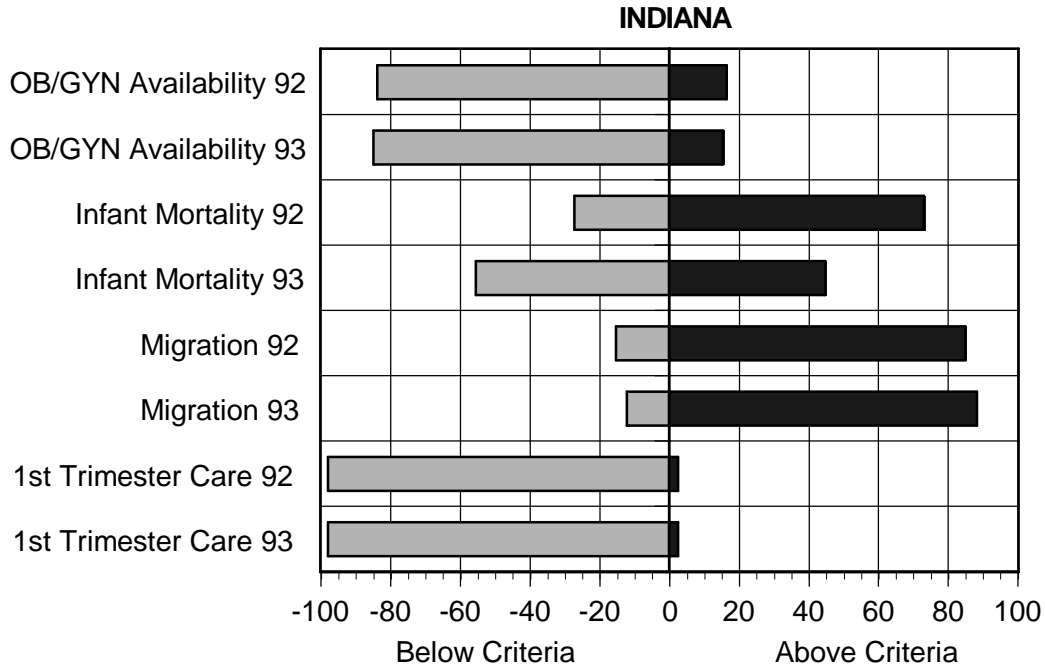


Figure 2. Percentage of counties in Indiana (1992 & 1993) which fall below or above standard criteria for each of the four need variables.

As Table 1 demonstrates, the percentage of counties which failed to meet three or four of the obstetric care need criteria has increased for both states between 1992 and 1993. Indiana has a greater percentage of counties which failed to meet three criteria, when compared to Illinois, in 1993. However, Illinois has a greater percentage of counties which failed to meet any of the four need criteria for both years. The percentage of counties below the criteria for obstetric care need is distributed fairly

normally for both states in both 1992 and 1993. The distribution, however, is slightly negatively skewed, with greater skewness for 1993 for both states.

Table 1

Need level for Illinois and Indiana counties in 1992 and 1993

		Need level				
		0	1	2	3	4
Illinois 1992	n	0	6	46	34	16
	%	0%	5.9%	45.1%	33.3%	15.7%
Illinois 1993	n	1	5	39	40	17
	%	1.0%	4.9%	38.2%	39.2%	16.7%
Indiana 1992	n	0	7	56	29	0
	%	0%	7.6%	60.9%	31.5%	0%
Indiana 1993	n	0	8	35	44	5
	%	0%	8.7%	38.0%	47.8%	5.4%

Note. Need level was established by determining whether each county met established criteria for each of the four variables in the study. A need level score of four indicates failure to meet any of the need criteria, whereas a score of zero means all need criteria were met.

When comparing the percentage of counties below standards in Illinois and Indiana, both states have similar figures for the proportion of obstetricians/ gynecologists to the population and infant mortality rates in 1993, although both figures differed dramatically in 1992 (see Table 2). With the exception of the slight increase for Illinois counties in 1993, Illinois and Indiana demonstrated similar results in meeting the first trimester prenatal care criterion for 1992 and 1993. Illinois and Indiana also

demonstrated similar characteristics for HPSA designation (1992 and 1993) and obstetric care need (1993). The fact that Illinois has a lower proportion of counties below the AMA standard for the ratio of obstetricians/gynecologists to total population than Indiana in 1992 seems to contradict the assessment of need, which is significantly lower for Indiana in 1992. Illinois and Indiana differ significantly for the migration criterion in both 1992 and 1993. With the exception of the slight decreases in first trimester prenatal care and number of counties with full HPSA designation in Illinois, and migration in Indiana, both states have lost ground from 1992 to 1993, and in the case of infant mortality in Indiana the situation has worsened dramatically.

Table 2

Percentage of counties below need criteria by state and year.

	OB/GYN Criteria?	Mortality Criteria?	Migration Criteria?	Prenatal Criteria?	Need Rate	HPSA Designation
Illinois Total	79.9%	53.0%	34.9%	94.6%	52.5%	21.1%
'92	76.5%	52.0%	32.4%	98.0%	49.0%	22.5%
'93	83.3%	53.9%	37.3%	91.2%	55.9%	19.6%
Indiana Total	84.3%	41.3%	13.6%	97.8%	42.4%	20.1%
'92	83.7%	27.2%	15.2%	97.8%	31.5%	18.5%
'93	84.8%	55.4%	12.0%	97.8%	53.3%	21.7%

When comparing the counties which received HPSA designation to the counties which demonstrated health care need in Illinois for both 1992 and 1993 some interesting patterns emerge. A Pearson point-biserial correlation between HPSA designation and obstetric care need for 1992 was $r_{pbi} = .412$ ($p < .01$, $n=102$), but for 1993 was not significant. A comparison of means revealed a significant relationship between HPSA designation and need for 1992 only ($t(1, 100) = -4.706$, $p < .001$). In

1992, the number of counties which demonstrated need but were not designated as HPSAs was 31 of 102 (30.4%), whereas the number for 1993 was 44 of 102 (43.1%). The percentage of counties which demonstrated need and did not have HPSA designation in 1992 but not in 1993 was 11.8%. The percentage listed in 1993, but not in 1992, was 24.5%. The number of counties which demonstrated need and had HPSA designation was 19 of 102 (18.6%) in 1992, and 13 of 102 (12.7%) in 1993. However, in 1992 7.8% of the counties which demonstrated need and had HPSA designation were not listed in 1993, and two percent of counties listed as such in 1993 were not listed in 1992. Finally, the number of counties which had HPSA designation but did not demonstrate need was 4 of 102 (3.9%) in 1992, and 7 of 102 (6.9%) in 1993. In 1992, one percent of the HPSA designated counties which did not demonstrate need were not listed in 1993, whereas 3.9% of the counties which were listed as such in 1993 were not listed in 1992. Figure 3 below shows the distribution of counties in Illinois in 1992 and 1993 which were listed as: (a) demonstrating need in three or four of the criteria but not having full county HPSA designation, (b) demonstrating need and having full county HPSA designation, and (c) having full county HPSA designation but not demonstrating need on at least three of the criteria.

When comparing the counties which received HPSA designation to the counties which demonstrated health care need for both 1992 and 1993 in Indiana, further interesting patterns emerged. A Pearson point-biserial correlation test failed to find any relationship between HPSA designation and health care need measures in Indiana. A comparison of means also failed to find any relationship between need and HPSA designation for both years. In 1992, the number of counties which demonstrated need

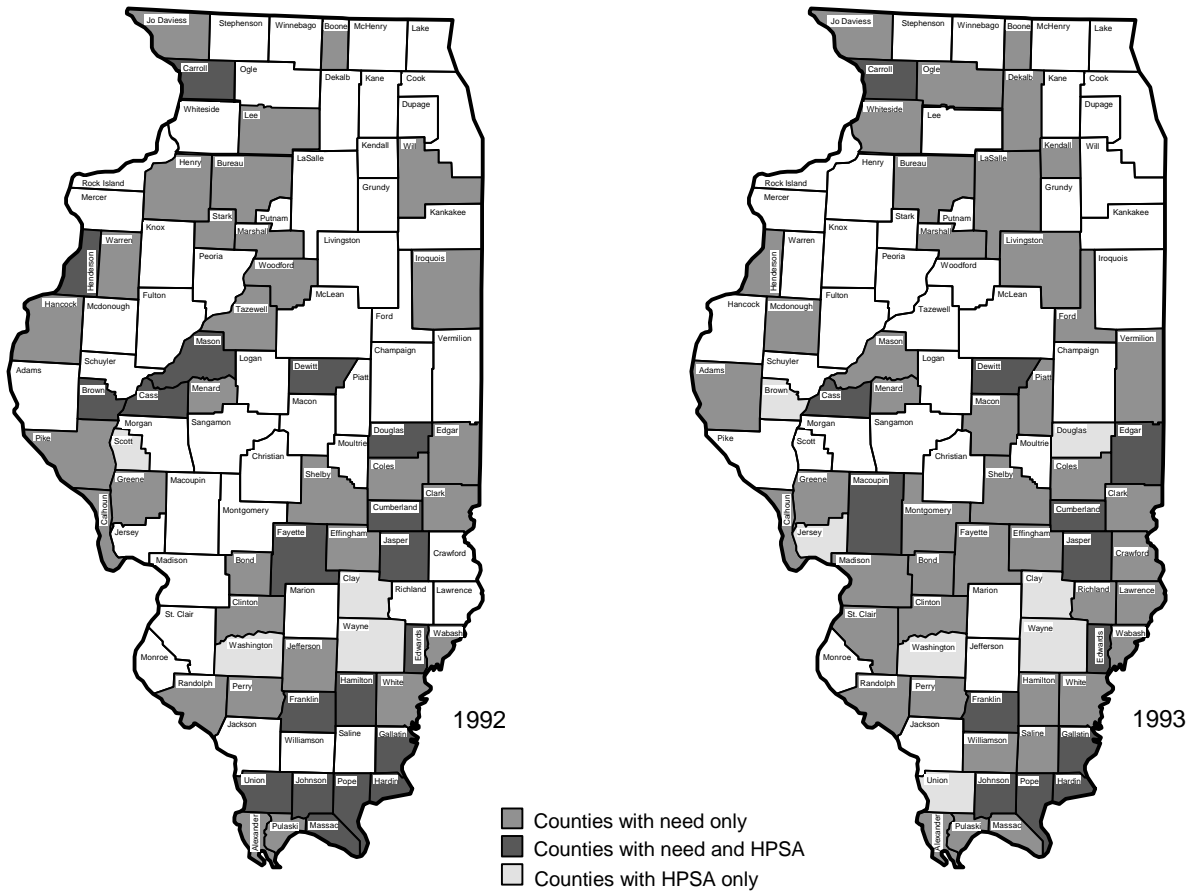


Figure 3. Comparison of obstetric care need by HPSA designation in Illinois counties in 1992 and 1993.

but were not designated as HPSAs was 23 of 92 (25.8%), whereas the number for 1993 was 38 of 92 (41.3%). The percentage of counties which demonstrated need but were not HPSA designated was 6.5% in 1992, but was 28.3% in 1993. The number of counties which demonstrated need and had HPSA designation was 6 of 92 (6.5%) in 1992 and 11 of 92 (12.0%) in 1993. In 1992, none of the counties which demonstrated need and had HPSA designation were listed in 1993. Only 5.4% of the counties listed in 1993 as demonstrating need and having HPSA designation were listed in 1992. Finally, the number of counties which had HPSA designation but did not demonstrate need was 11 of 92 (12.0%) in 1992 and 9 of 92 (9.8%) in 1993. In 1992, 5.4% of the

counties which were listed as HPSA designated but did not demonstrate need were not listed in 1993, whereas 4.3% percent of the counties which were listed as such in 1993 were not listed in 1992. Figure 4 below shows the distribution of counties in Indiana in 1992 and 1993 for obstetric care need and HPSA designation status.

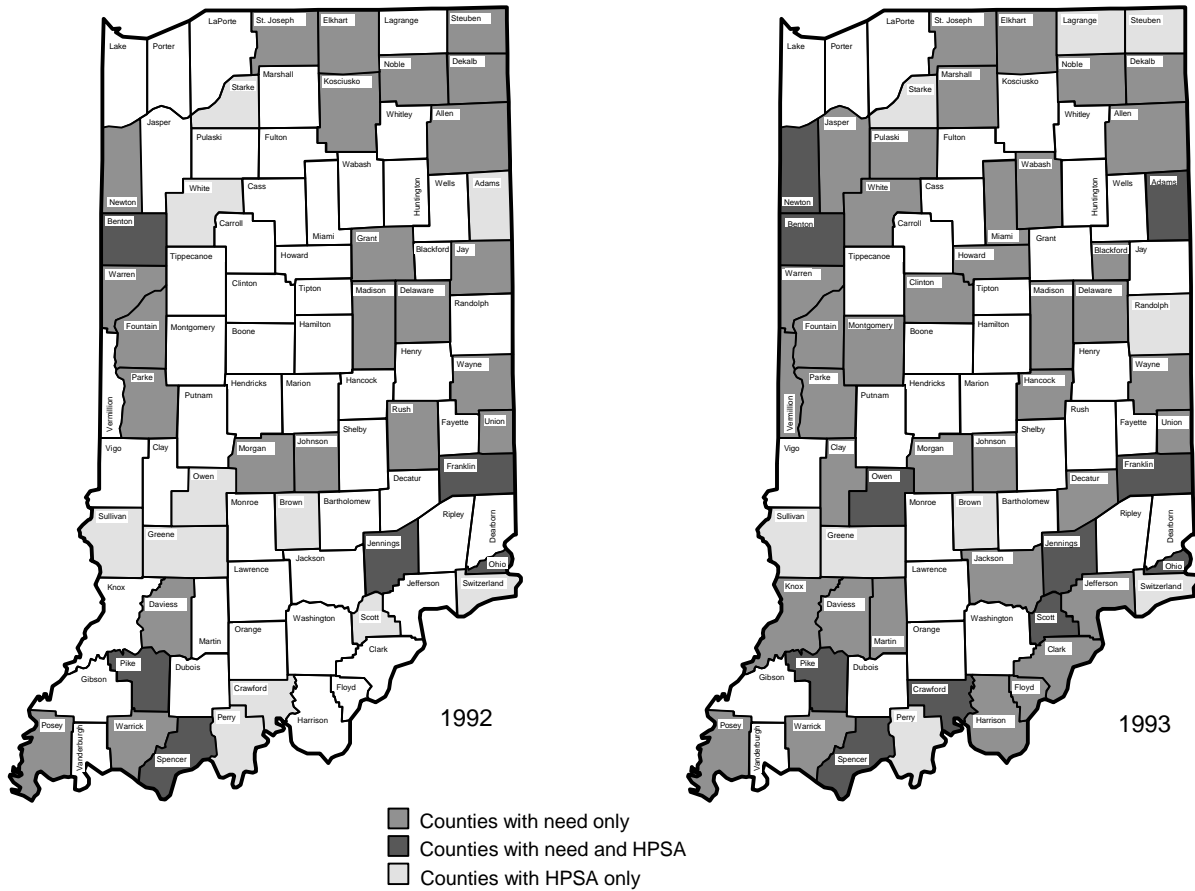


Figure 4. Comparison of obstetric care need by HPSA designation in Indiana counties in 1992 and 1993.

In general, the picture for need and HPSA designation changes dramatically from 1992 to 1993. Some counties which were considered in need in 1992 were not considered in need for 1993, and vice versa. Also, some counties which had HPSA designation in 1992 did not have HPSA designation in 1993, while other counties

gained HPSA designation from 1992 to 1993. While many counties were found to be in need, not all counties in need were listed as HPSA designated. As well, for both states and for both years, some counties were listed as HPSA designated that did not demonstrate need according to the criteria. In general, HPSA designation did not appear to have a one to one relationship to need. Only moderate overlap occurred between HPSA designation and measured need for either state in both 1992 and 1993. However, the decrease in correlation between HPSA designation and obstetric care need from 1992 to 1993 in Illinois suggests decreased effectiveness of the HPSA designation.

Overall, these findings suggest that the methods used to designate a county as a Health Professional Shortage Area are ineffective in determining need. Other measures, such as those employed in this study may be stronger predictors of need. Furthermore, changes from year to year in county needs for health care may make tracking needs difficult.

Discussion and Conclusions

The population-based needs assessment for Illinois and Indiana demonstrate a significant need for obstetric care in both states. Many counties in both states are underserved: they do not meet the minimum criteria as specified by the American Medical Association for provider to population ratios nor do they meet Healthy People 2000 standards. For example, women in many counties in Illinois and Indiana travel outside their county of residence to give birth. This may be due to a number of factors including the closing of rural hospitals or the limiting of obstetric services to larger regional hospitals. Although it may not be economically feasible to have hospitals in

every county, reduced costs remote clinic obstetric care services may provide a workable alternative.

We did not include general and family practitioners in the number of obstetric care providers based on the assumption that family doctors may not be offering obstetric care in rural areas due to cost of liability insurance or other reasons. Furthermore, determining which family doctors offer obstetric care services would be difficult if not impossible to accomplish. The lack of inclusion of family doctors in this study may overestimate obstetric care need. However, the migration of women for delivery services suggests a maldistribution of obstetric care providers. Furthermore, the number of counties that have not met the Healthy People 2000 standard for infant mortality and first trimester prenatal care in both states demonstrates a need for greater access to obstetric care.

Despite these findings, more robust methods for determining regional need must be developed. The traditional method of assessing need has been the calculation of health care provider to population ratios as well as examining epidemiological data. However, there are some serious limitations to that method as we experienced in this study. The primary limitation is that the most recent data obtainable for the necessary variables are several years old. The latest vital statistics data available are from 1993. The latest population estimates are from 1994. The census is taken only every ten years and the accuracy of estimates has to be continuously revised. These census estimates only include global numbers, so an estimate of a particular segment of the population, such as females between the ages of 15 and 45, has to be derived from an algorithm.

Data on the number of physicians may not be accurate. For example, the Illinois State Office of Professional Regulation does not keep records by medical specialty and by county. This may be true in other states as well. The AMA provides data by specialty by county for every state; however, this information was only published for the years of 1992 and 1993. Furthermore, these data may not be all inclusive.

Accurate data on the number of CNM's was also difficult to obtain. For example, the number of members of the national organization did not equal the number of local chapter members, nor were either list inclusive of all CNMs in the two states. Obtaining data from previous years may be impossible because it may not exist or may not be readily accessible. Also, member status (full vs. student) was not differentiated in the local chapter ACNM list. It was not clear whether the addresses listed for CNM's were home or practice sites. It is likely that a proportion of members practice in a county different from the address listed. This discrepancy will negatively affect the reliability of reported statistics.

Epidemiological data such as birth and mortality rates frequently differed between what was reported by the state(s) and what was reported in the U.S. Department of Health and Human Services and Center for Disease Control's Vital Statistics. In one case, there was a difference of more than fifty percent between the rates reported by the state and by the federal government.

Finally, the release of information on HPSA designation in the Federal Register is not consistent from year to year. Release dates from 1990 through 1993 fell consistently later each year. The importance of accurate data cannot be underscored. In order to assess the health care needs of citizens, researchers and policy makers

must have ready access to accurate data. Without such data resources may be placed where they are not needed and not placed where they are. This possibility is strongly suggested by the lack of correlation between by county obstetric care need and HPSA designation. Regardless of these limitations, the findings suggest tremendous need for obstetric care throughout Illinois and Indiana.

As suggested above, increased access to obstetric care may be realized through utilization of certified nurse-midwives and other health care professionals such as family nurse practitioners and physician assistants (Goldman, 1993). Modest gains in the ratio of obstetric care providers to the population may occur with an increase in the number of certified nurse-midwives. However, to increase access to primary and obstetric care may require a concerted effort. Many obstacles remain which must be overcome to increase the number of primary and obstetric health care providers. According to Jacox (1987), these obstacles may include: (a) location of practice issues, (b) physician versus CNM responsibilities, (c) the clarification of the physician / CNM relationship, (d) legal and professional climate issues, (e) liability insurance costs, and (f) payment reimbursement of physicians and CNM's (such as Medicaid, Medicare, insurance reimbursement and salary). In future studies, researchers should examine these issues and obstacles as they pertain to obstetric care need.

This study demonstrates the need to increase obstetric care access in rural and underserved areas in both Illinois and Indiana. It is hoped that through this study, programs may be instituted which can meet those needs. Future studies may include an assessment of the potential client demand for certified nurse-midwives, the provider group or organization demand for new providers, and the professional relationship and

climate between physicians and certified nurse-midwives in Illinois and Indiana. These studies may prompt educational institutions, provider groups, health care organizations, and local, state and federal agencies to collaborate in developing programs for the recruitment, training and placement of certified nurse-midwives and other health care providers in rural and underserved areas.

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Author Notes

This study is sponsored by the Illinois/Indiana NP, CNM, and PA Training Consortium through a grant by the Robert Wood Johnson Foundation. The authors wish to acknowledge the assistance and support of the Co-Project Directors: Mary deMeneses, RN, EdD, of Southern Illinois University at Edwardsville, and Fred Isberner, PhD, of Southern Illinois University at Carbondale. We would also like to acknowledge the support of the Project Co-Principal Investigators: Margaret Beaman, RN, PhD, of Southern Illinois University at Edwardsville, Paul Sarvela, PhD, of Southern Illinois University at Carbondale, and Melinda Swenson, RNC, PhD, of Indiana University at Indianapolis.

The authors wish to acknowledge the assistance and support of Robynn Nawrot of the Center for Rural Health and Social Service Development at Southern Illinois University at Carbondale.