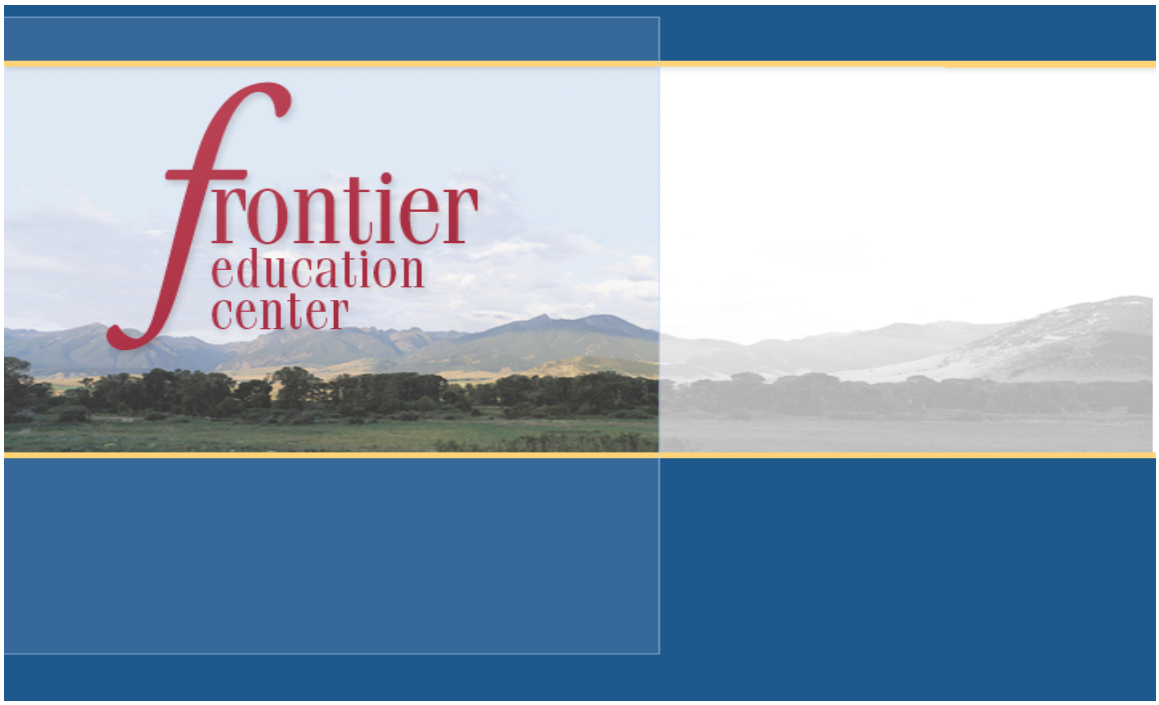
ADDRESSING THE NURSING SHORTAGE: IMPACTS AND INNOVATIONS IN FRONTIER AMERICA

December 2004



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Addressing the Nursing Shortage:
Impacts and Innovations in Frontier America

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Acknowledgements

The Frontier Education Center would like to thank the many individuals who provided invaluable assistance in the preparation of this report.

Lydia Yu at the East Texas Area Health Education Center and Stephanie Tabone of the Texas Nurses Association provided detailed information on the Texas Nurse Friendly Program as well as guidance on nurse recognition programs in general. Trish Goudiet at the Montana State University College of Nursing provided information on the Rainbow Project.

Ann Howard and Katie Gaul at the Cecil B. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, provided a database that was used in the county-level nurse shortage analysis.

At the U.S. Department of Health and Human Services, Andy Jordan, Director of the Shortage Designation Branch, provided guidance on the Nurse Shortage Counties designation. Marshall Fritz at the National Center for Health Workforce Analysis provided assistance with the NSSRN County Public Use dataset.

Steve Hirsch and Emily Costich at the Office of Rural Health Policy provided valuable feedback on an earlier draft, which substantively improved the quality of this report.

Finally, at the Frontier Education Center, this report was prepared by Jill E. Sherman. The author thanks Tess Casados, who performed some of the initial research and a number of interviews, and Karen Sweeney for her meticulous proofreading and of the manuscript and assistance with a number of editorial tasks.

ADDRESSING THE NURSING SHORTAGE: IMPACTS AND INNOVATIONS IN FRONTIER AMERICA

I. INTRODUCTION

The national nursing shortage is well chronicled in studies and articles ranging from such diverse sources as the Bureau of Health Professions to monthly magazines such as Reader's Digest. The Frontier Education Center seeks to assess how small communities are addressing nursing shortages and are continuing to provide nursing and home health care.

Frontier communities are the most sparsely populated and isolated areas of the United States [1]. They experience many of the same problems as more densely populated areas, but experience even more obstacles due to isolation, distance from facilities and services, and lack of community resources.

This paper will discuss how the nursing shortage affects rural and frontier communities, highlighting the challenges that are specific to rural and frontier communities, and strategies developed at different levels – regional, state, and local – to increase the supply of nurses who practice in these communities. Strategies to address the nursing shortage are highlighted in boxes; the intent is not to present a comprehensive list or suggest "best practice" but to recognize creativity and the broad range of opportunities that may exist for these communities to ensure access to essential nursing care.

II. BACKGROUND

A National And International Shortage

The American Nurses Association (ANA) reports that that the nursing shortage will have an impact on health care delivery throughout the nation. Although the country has experienced shortages in the past, it is believed that this burgeoning nursing shortage is unlike any other, due to increasing health care demands of an aging American population and changes in the nursing profession. Moreover, the shortage extends beyond the U.S.; many experts call it an international shortage, in which competition between countries for available nurses may be

[1] Note: All references to "frontier" use the Consensus Definition of the Frontier Education Center unless otherwise indicated http://www.frontierus.org/index.htm?p=2&pid=6003&spid=6018. This definition has not been adopted by any federal programs but has been adopted as policy by the Western Governors' Association http://www.frontierus.org/documents/WGA%20Policy%20Resolution%2004.htm and the National Rural Health Association. The Consensus Definition weighs three elements – population density, distance in miles and travel time in minutes – which together, generally describe the geographic isolation of frontier communities from market and/or service centers. The Frontier Education Center understands that various programs will establish their own programmatic definitions and eligibility criteria.

expected to raise numerous debates of equity and fairness as wealthier countries draw educated health providers from poorer countries who can ill-afford to lose them.

While some areas currently suffer from the shortage, it is expected to continue to worsen throughout the next two decades. In 2000, there were 30 states that were estimated to have shortages of registered nurses; by 2020, 44 states and the District of Columbia are projected to have shortages (U.S. Department of Health and Human Services 2002a).

The Bureau of Labor Statistics has estimated that there will be more than one million openings for registered nurses between 2002 and 2012, with registered nurses ranking first in occupations with the largest growth (Hecker 2004). And, a recent analysis by the Bureau of Health Professions estimates that the supply of nurses will fall 29 percent below requirements by the year 2020, unless dramatic interventions and significant investments are developed and implemented (U.S. Department of Health and Human Services 2002a).

Factors Contributing To The Nursing Shortage

The causes of the nursing shortage have been the subject of numerous studies and analyses. While some pose the shortage as primarily a "supply" issue, the Bureau of Health Professions analysis, *Projected Supply, Demand, and Shortages of Registered Nurses: 2000-2020* (U.S. Department of Health and Human Services 2002a), also highlights the forces behind increase in demand for registered nurses. These include two major demographic factors: the overall growth of the U.S. population that has outpaced the growth of registered nurses; and the aging of the population, resulting in an increased need for health care.

Supply (Drivers and Trends)	**Demand (Drivers and Trends)**
Declining numbers of nursing graduates	*Population growth and aging*
Aging of the RN workforce	*Trends in health care financing*
Declines in relative earnings	

Similarly, the American Association of Colleges of Nursing identifies the following key factors:

- A shortage of nursing school faculty is restricting nursing program enrollments;
- With fewer new nurses entering the profession, the average age of the RN is climbing;
- The total population of registered nurses is growing at the slowest rate in 20 years;
- Changing demographics signal a need for more nurses to care for an aging population; and,
- Job burnout and dissatisfaction are driving nurses to leave the profession (American Association of Colleges of Nursing 2004).

A shortage of nursing faculty appears to be a key bottleneck in the supply of nurses, as many nursing schools have experienced an increase in the number of applicants that they are unable to accept. The aging of nursing faculty reflects a number of dissatisfactions with academic nursing, including a gulf between academic research and applied practice, the "publish or perish" demands of academia, and the fact that practicing BSNs can easily earn as much or more than nursing faculty who must undergo many more years of schooling.

The Nurse Reinvestment Act

With the strong support of major health care organizations, the House and Senate passed a bill in July 2002 designed to increase recruitment and retention of nurses by making nursing a more rewarding and inviting profession. The act was written to encourage men and women to enter the nursing profession, to offer continuing education and more chances of advancement, and to increase the number of nursing school faculty. In August 2002, President Bush signed the Nurse Reinvestment Act into law (PL 107-205), and in February 2003, both chambers of Congress passed the FY 2003 Omnibus Appropriations bill, enacting and funding the Nurse Reinvestment Act programs.

The Nurse Reinvestment Act will:
- Create nurse retention and patient safety improvement grants;
- Offer scholarships for nursing students through the National Nurse Service Corps;
- Provide for a public service announcement campaign to promote nursing as a profession;
- Offer grants to nursing schools for faculty loan programs;
- Create career ladder programs;
- Establish comprehensive geriatric training grants for nurses (PL 107-205).

III. IMPACT OF THE NURSING SHORTAGE IN THE FRONTIER

Available data and literature suggest that the impact of the nursing shortage on rural and frontier communities varies greatly from community to community. While some rural/frontier communities face lengthy vacancy and recruitment time frames, others have no difficulty filling vacancies. In many frontier and rural communities, nursing jobs pay relatively well by community standards, so there may be high demand for few jobs. However, in other areas, recruiting for openings in rural areas is estimated to take about 60 percent longer to fill than in urban areas (Long 2000). Nurse employers may receive many applications but often find applicants do not meet desired qualifications; they often have to accept lower qualifications to fill positions.

The nursing shortage has exacerbated an already difficult task of recruiting rural nurses by driving up wages for nurses. Rural employers cannot compete with urban employers in terms of wages/bonuses offered to recruit BSNs and MSNs. Non-hospital care settings fare the worst, as private practices, schools, nursing homes and home care providers typically pay less than hospitals (Jacob 2001; National Association for Home Care 2003).

Using data from the 2000 National Sample Survey of Registered Nurses (NSSRN) [2] (U.S. Department of Health and Human Services, no date), respondents were aggregated by county type (where county type refers to place of employment) to compare frontier and non-

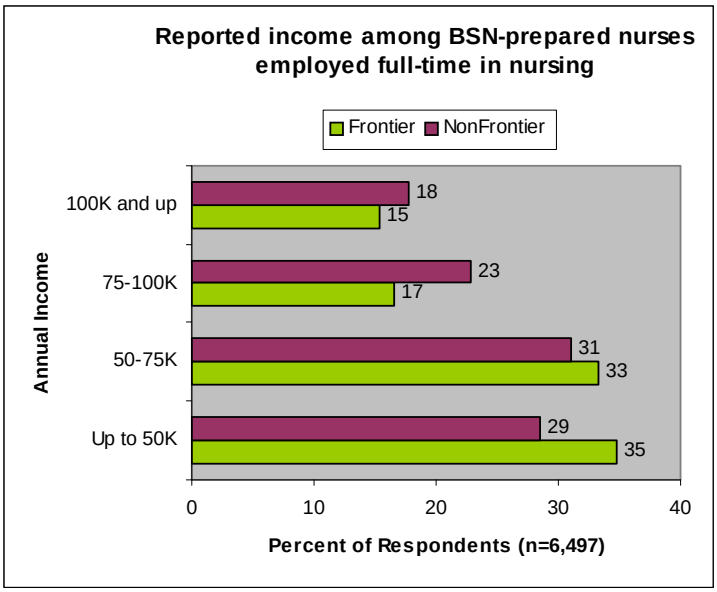
[2] County Public Use Data Files were obtained from HRSA/BHPr and analyzed in Stata 8.0 using SVR, a Stata module developed for complex survey data using replication methods (Winter, no date; Winter 2004). Per the survey documentation, a jackknife procedure (in the SVR module, the jk2 method) was used to produce weighted estimates (U.S. Department of Health and Human Services, 2002b). The income data are categorized; linear analysis of income is not possible.

frontier nurses on a number of indicators: percent of respondents who live and work in the same county; race/ethnicity; type of degree program for RN certification (basic nursing education); highest degree received; employment status; and income earned (see tables 1 and 2 in Appendix A).

Table 1 shows a comparison of county of residence and county of employment, revealing that frontier respondents were more likely to live and work in the same county (85%) than non-frontier respondents (75%), likely a reflection of the smaller county area of non-frontier counties and a greater likelihood of crossing county boundaries while traveling to routine activity destinations.

Differences in education between frontier and non-frontier nurses were also evident, both in their basic nursing education and the highest degree earned. Fully half of frontier nurses had qualified as RNs through associate degree (ADN) programs, in comparison with 40% of the non-frontier nurses; in contrast, non-frontier nurses were more likely to have attended diploma or BSN programs. Differences remained when looking at highest degree received; 44% of frontier nurses' highest degree was the ADN, in contrast with 34% of the non-frontier nurses. And, while the percentage of nurses who had earned a bachelors degree was slightly lower among frontier nurses (30% frontier, 33% non-frontier), the percentage who had earned masters degrees was also lower among frontier (7% frontier compared with 10% non-frontier).

Salary data are shown in Appendix A, Table 2 for all respondents employed in nursing at the time of the survey, for respondents employed full-time in nursing, and for respondents whose highest degree was a BSN employed in full-time nursing. For all three variables, respondents employed in frontier counties had a higher proportion than non-frontier respondents in income categories below $75,000 per year, and a lower proportion in income categories over $75,000 per year.



Data Source: National Sample Survey of Registered Nurses, 2000

Although the impact of the shortage may not be evenly felt across rural and frontier communities, many experts perceive the shortage to disproportionately affect frontier and rural communities (Trossman 2001). As reported in the Boulder, Colorado Daily Camera, it's very difficult for rural areas to compete against large urban hospitals with the resources to entice the dwindling supply of registered nurses (Long 2000). At Prairie Vista Nursing Home in Holyoke, Colorado, a town of about 1,900 people about 130 miles northeast of Denver, administrators reportedly had to work double shifts to cover shifts after a nurse retired.

Quantifying The Nurse Shortage: Hospital-Based Nurse Shortage Counties

To what extent is the nursing shortage felt in frontier communities? It is difficult to quantitatively assess the impact of the nursing shortage in frontier areas because little frontier-specific data on the nursing shortage is available. However, where county-level data is available, it is possible to make comparisons of frontier counties to non-frontier counties using the 2000 Census data and applying the Consensus Definition (Frontier Education Center 2000a; 2000b).

The Bureau of Health Professions has classified Nurse Shortage Counties based on a ratio of the number of hospital-based nurse FTEs over the adjusted daily census and aggregated to the county level (Bureau of Health Professions, no date). Ratios were calculated using data from the 1999 American Hospital Association Annual Survey (Jordan 2004). The 1999 American Hospital Association Annual Survey does not record any hospital for 633 of the 3,141 counties (Cecil B. Sheps Center for Health Services Research 2004); no ratios could be calculated for these counties and thus were not classified as shortage counties. Of the 3,141 counties and administrative equivalents defined at the 2000 Census, a total of 880 (28%) were classified as nurse shortage counties; among the 2,058 counties with hospitals, 35% were classified as nurse shortage counties.

Percent of Frontier and Non-Frontier Counties Designated as Nurse Shortage Counties, among Counties with Hospitals

County Type	Total Number of Counties with hospitals	No Nurse Shortage (n)	%	Nurse Shortage (n)	%
Frontier	557 of 811	(270)	48.47	(287)	51.53
Non-Frontier	1,951 of 2,330	(1,358)	69.61	(593)	30.39
Total	2,508 of 3,141	(1,628)	64.91	(880)	35.09

Total based on the number of counties and county administrative equivalents in the 50 States and District of Columbia, 2000.

Using this list, frontier counties were classified as nurse shortage or non-shortage frontier counties (see Appendix B). Of 811 frontier counties, 557 had hospitals and 287 were classified as nurse shortage counties (52%), in contrast with 593 of 1,951 non-frontier counties (30%). Maps showing the frontier counties and their nurse shortage designations illustrate not only the widespread nature of the problem, but also how shortage counties and counties without any hospital are frequently clustered (Appendix C).

The appropriateness of hospital-based nurse shortage indicators for frontier counties may be questioned. First, proportionately more frontier counties did not have a hospital in 1999, and thus were not assessed as nurse shortage counties[3]. Among frontier counties, 31% lacked hospitals, nearly double the percentage of non-frontier counties without hospitals (16%).

Counties without Hospitals, by County Type

County Type	Has Hospital		No Hospital	
Frontier	(557)	69%	(254)	31%
Non-Frontier	(1,951)	84%	(379)	16%
Total	(2,508)	80%	(633)	20%

Data Source: American Hospital Association 1999 Annual Survey

Among counties that do have hospitals, a very low average daily census is the norm[3]. This means that one or two nurses may appear "adequate," when in reality access to nursing care is limited. One characteristic of this 'small numbers problem' is that even in communities where nurse staffing is adequate, a single nurse may be the difference between adequate and underserved; a rural or frontier community is "always one nurse away" from a shortage (Trossman 2001).

Moreover, a single hospital may serve the entire county. As frontier counties tend to be much larger than non-frontier counties, the geographic area served by the hospital is much larger. The burden of distance to care and the inability of small frontier and rural communities to take advantage of efficiencies of scale suggest that a higher per capita level of staffing is required in frontier communities to provide the same level of access to care as in more populous communities. Finally, skilled nursing care in non-hospital settings – such as home health, public health, primary care, school health – is more frequent for frontier and rural populations than hospital-based care.

Thus, *relative to non-frontier counties*, this nurse shortage indicator may underestimate the shortage for frontier counties. For example, in New Mexico (a largely frontier state), San Miguel County is the only county designated as a nurse shortage county, a result that runs counter to local expert perceptions. Indeed, eight counties in New Mexico did not have any hospital in 1999, and at the state level using nurses-per-capita as

PROVIDING NURSING SERVICES TO RURAL SCHOOLS

eNurse Consortium
Southeast Kansas Education Service Center, Girard, KS
http://www.greenbush.org

Known as "Greenbush," The Southeast Kansas Education Service Center is an Interlocal School District that provides services to member school districts that, individually, the schools could not afford to provide (eSchool News 2003).

Greenbush contracts with American Educational Telecommunications (AET) to provide the eNurse service. Twenty-one rural schools with no nurse or a shared nurse had cameras installed to access the eNurse Consortium. Services include emergency telenursing consultations via computer connection to staff and students.

To enable non-clinical staff to provide better health supervision to students, the eNurse Consortium also provides schools with access to a health education network for school staff, with different topics broadcast each month (e.g. asthma, adolescent development) and a schedule that allows staff members to watch when convenient for them (Greenbush no date).

[3] These issues are recognized by the Bureau of Health Professions. A new methodology for designating Nurse Shortage Counties is being developed (Jordan 2004).

an indicator, New Mexico (#42) ranks in the bottom ten states (California, Utah, Texas, Arizona, Oklahoma, Idaho, New Mexico, Georgia, and Arkansas) (Jacob 2001).

Non-Hospital Nursing Shortages

School nurse shortage. The National Association of Elementary School Principals (NAESP) advocates for a full-time nurse in every school; on that basis, the NAESP estimates a need for 91,000 school nurses, while only 57,954 RNs were employed as school nurses (Magnuson 2002). In addition to the declining supply of nurses and increasing competition, state budgets for education have been declining to a crisis point in many states. School nurse positions are cut as a result. Rural and frontier communities, with lower tax bases to begin with, are the most vulnerable.

Even where school nurse positions are budgeted, the shortage makes it difficult for school districts to recruit nurses. In New Mexico, the Espanola school district had seven nurses to share among 15 schools (Green 2004). The superintendent attributed the lack of nurses for some schools to the nurse shortage; positions were budgeted and advertised, but no one applied. According to the National Association of School Nurses, "the No Child Left Behind Act allows local uses of funds for programs to hire and support school nurses under "Title V, Innovative Program," although many other programs and services compete for these funds" (National Association of School Nurses 2004).

Home health and the nurse shortage. The past decade has witnessed the ongoing restructuring of the health care industry, and a number of important policy shifts have responded and added to these changes. Home health care has seen a simultaneous increase in demand and decline in reimbursement, resulting in a highly unstable industry. The closure of a large number of home health agencies has been the subject of scrutiny and controversy. At the aggregate (national) level, these closures represent consolidation and do not appear to have reduced access to home health services; closures of home health agencies located within rural counties are compensated by urban agencies providing services to rural residents (MedPac 2001; Franco 2004).

The National Association for Home Care and Hospice maintains that rural home health agencies experience lower margins and are therefore more vulnerable to closures than urban agencies; these lower margins would also discourage urban providers from providing services in rural areas. Travel time, low patient census, and lack of community support structures raise the costs of providing home care in rural areas (National Association for Home Care and Hospice 2003). The 2001 MedPac report, for example, confirms that home health agencies are less willing to accept certain higher cost patients, including some rural patients. And, because analysis at the aggregate level masks variation at regional, state, and local levels, the problem may be more acute in one region than another.

Where there is no nurse. Whether a result of a nursing shortage or changing demographics and care models, many experts agree that care traditionally provided by nurses will increasingly be provided by unskilled providers, including family members, friends, and other organized service delivery programs. In recognition of this fact, a 2001 Milbank Memorial Fund report on the decline in access to nursing care recommended that "government and private payers explore

SUPPORTING FAMILY AND FRIENDS AS PERSONAL CARE PROVIDERS

Medicare Personal Care Option Program
State of New Mexico

Much of the care provided by home health providers is personal care that does not require skilled nursing. To free up available nurses to provide skilled nursing care, New Mexico developed a program that allowed family and friends to be paid for providing personal care to eligible patients. New Mexico was the first state to design its Personal Care Option (PCO) to allow family members and relatives to be paid for providing personal care, paving the way for other states to examine the option of family members providing care (see LeBlanc, Tonner et al. 2001 and Niesz and Martino 2003 for a review of state programs).

The goal of the PCO program is to improve the quality of life for the elderly and individuals with a qualifying disability and prevent them from having to enter a nursing facility, enabling them to retain the highest possible degree of independence (Personal Care Option Committee 2003). The lack of trained home care providers would ordinarily be a constraint on both the number and the location of potential beneficiaries. Under the waiver program, relatives are provided training and then paid as home care providers. The program not only enables rural and frontier beneficiaries to remain in their homes, it also enables them to remain in their own communities instead of being forced to relocate.

Permitting the use of relatives expands the geographic reach of the program into rural and frontier communities, multiplying the economic impact of Medicaid dollars in the state. Program reviewers acknowledge multiple community benefits of the program, as it creates employment – with a living wage – in communities with high unemployment rates, and enables young adults to obtain work without leaving their communities.

Between 2000 and 2003, the home health sector of New Mexico's economy grew by 219 percent (Domrzalski 2003), and this growth is attributed primarily to the Personal Care Option. However, the projected costs of the program for 2003 ($10 million) were dwarfed by actual costs of $150 million, prompting a review and revision of the program. Program revisions, primarily improved controls and oversight, are projected to reduce the 2005 budget by $45-53 million.

ways to support unpaid caregivers (for example, by providing tax incentives or subsidizing their own health coverage)"(Fagin 2001).

It is important to recognize two realities when addressing the nursing shortage in frontier and rural communities. First, solutions designed for urban areas will not work for rural areas; they must specifically address the nursing context in frontier and rural areas. Second, short term solutions that emphasize improving competitiveness will simply draw nurses away from somewhere else and exacerbate the shortage elsewhere – possibly rural and frontier areas. For example, in Montana, alumni surveys indicate that more nursing school graduates leave the state than remain employed in Montana (Goudiet 2004). "Grow your own" strategies that emphasize the unique context of providing care in frontier and rural communities are those with the best chance of reducing the frontier nurse shortage over the long term.

IV. NURSING IN FRONTIER AND RURAL COMMUNITIES

Literature suggests there are a number of factors that affect the nursing shortage in rural and frontier communities, including differences in education, practice setting, and practice within setting type. They also differ in terms of the populations they serve.

Education And The Rural/Frontier Nurse

Ongoing debates within the nursing profession address the extent to which rural nursing practice is different from mainstream (e.g. urban) practice (Trossman 2001; Brown-Schott, Britten et al. 2003; Crooks 2004). The questions - Is rural/frontier nursing a specialty? Do nurses require different preparation for a successful career in rural settings? If so, as many rural experts argue, one reason that rural areas may suffer disproportionately from the nursing shortage is that nursing schools lack rural/frontier curricula and clinical practice opportunities.

Recruiting nurses to work in rural areas is difficult to begin with; and, when urban-trained nurses enter rural practice, they often find they are ill-prepared for the demands of the job, contributing to job dissatisfaction and turnover. Once there, they typically find it difficult to access continuing education opportunities that fit their needs. "When educators bring their knowledge to us, they often do not realize that we practice differently than urban centers do" (rural nurse, quoted in Molinari 2001).

The rural nurse as "generalist-specialist." In the rural setting, nurses typically fill multiple roles. Organizational structures are typically more horizontal than vertical, suggesting the need for a broad range of skills and crosstraining in multiple jobs. "Rural nursing requires a high level of generalist skills and critical thinking" (Fahs, Findholt et al. 2003).

DEVELOPING RURAL NURSING FACULTY AND CURRICULA

The Helene Fuld Summer Institute for Rural Community Health Nursing, New York, SUNY-Binghamton

A summer institute for rural community health nursing provided a forum for practitioners and faculty to explore the dimensions of a specific rural-based nursing practice; the resulting publication provides material for nursing faculty who wish to teach a course on rural nursing.

The Institute produced a publication, Teaching/Learning Activities for Rural Community-Based Nursing Practice" (Collins 2003) which reflects the experience of the Institute Fellows and offers valuable materials that nursing programs can use to develop a rural nursing course or curriculum.

Access to education. The geography of higher education is mirrored by the geography of nursing practice. Registered nurses in rural practice are more likely than their urban counterparts to have graduated from ADN programs, largely because four-year and graduate degree programs are not available in rural areas (Szigeti 2000). And, while nurse employers express a preference for hiring BSNs, rural employers report greater difficulty in recruiting BSNs.

Rural nurses find it more difficult to obtain advanced degrees: in some areas, "anyone seeking another degree must move to the urban centers for their education" (Molinari 2001). Once trained in an urban setting, BSN graduates typically do not return to practice in rural areas. One study found that nurses who obtain BSN degrees receive less for their "investment" if they practice in rural areas than in urban areas (Pan and Straub 1997), so rural nurses have less of a financial incentive to obtain four-year degrees.

While rural nurses strive to turn around perceptions of lower quality of care in rural areas, the lower degree credentials of rural nurses and their difficulties in obtaining continuing education are suggestive of greater difficulty in raising standards of quality in rural nursing. Recent studies in hospital-based nursing link level of nurse education to quality of care (Aiken, Clarke et al. 2003). The American Association of Colleges of Nursing "believes that education has a significant impact on the knowledge and competencies of the nurse clinician" and advocates for a differentiated nursing practice model based on level of education (American Association of Colleges of Nursing 2003; see also American Association of Colleges of Nursing, American Organization of Nurse Executives and National Association for Associate Degree Nursing 1995). According to the AACN, "BSN nurses are prized for their skills in critical thinking, leadership, case management, and health promotion, and for their ability to practice across a variety of inpatient and outpatient settings," precisely the skills that proponents of a rural nursing specialty emphasize.

STATE FUNDED NURSING SCHOLARSHIPS

Michigan Nursing Scholarships
http://www.michigan.gov/mistudentaid/0,1607,7-128-1724-54524--,00.html

MI Student Aid Scholarships
In 2002, the Michigan state legislature approved a bill that would provide state scholarships for nursing students (Michigan Nurses Association 2003a). Administered by the State of Michigan Department of Student Aid, scholarship awards range from $2,000-4,000 per year for up to four years, depending on the number of credit hours for which a student is enrolled (Michigan Nurses Association 2003b). The terms of the scholarship stipulate that students agree to obtain licensure and direct care employment in the State of Michigan within one year of graduation, and work in Michigan for the same number of years that the student received scholarship support (Johnson 2002). In 2003, the scholarship program funds exceeded 4 million dollars.

Department of Labor and Economic Growth Scholarships
In another program started in 2000, the Michigan Department of Labor and Economic Growth began awarding scholarship monies to colleges with ADN and BSN programs. (Michigan Department of Labor and Economic Growth 2003). Recipient institutions award one-time scholarships of $1,000 to students who commit to practicing in medically underserved communities. Importantly, scholarship students will also perform their practicums in these communities. In the program's first year, $225,000 were disbursed to Michigan colleges and universities to train 45 people, who will work in medically underserved communities.

Importance Of Non-Hospital Based Nursing In Rural And Frontier Communities

Because most frontier and rural communities are distant from hospitals, residents may rely on non-hospital based care settings for a greater proportion of their care than their urban counterparts. For example, a school nurse may be the only skilled health care provider within a community. Thus, nurses serving in home health, public health, primary care, school health or

faith-based settings are important resources in communities that may otherwise have no locally-based provider.

At the same time, these nursing roles are traditionally the lowest paid within the profession. With competition for fewer nurses driving up salaries and the inability of employers to compete with urban, high-tech hospital-based employers, the impending nursing shortage could further reduce access to the most basic of health care services.

Providing home care in rural or frontier areas comes with its own set of challenges. Longer travel times per client for rural home care nurses means that fewer clients can be visited in a day. Distance also means that follow up care with other providers is more challenging, if available at all. Clients are also isolated from other types of community support networks that are considered important for successful home-based care. These difficulties can discourage home care providers from accepting cases and result in more institutionalized care. A condition that may be considered appropriate for home-based management in an urban setting may be deemed too risky for a rural setting, particularly if evening and weekend nurses are not available.

FILLING THE SOCIAL SUPPORT GAP: COMMUNITY-BASED ORGANIZATIONS

Medical Equipment Loan Bank
Open Hands, Santa Fe, NM
http://www.openhands.org

Open Hands is a non-profit organization that relies largely on volunteers based in Northern New Mexico communities to provide assistance services to elderly, disabled, and disadvantaged adults. Its community outreach services have evolved to encompass seven programs: case management, emergency financial assistance, healthcare advocacy, home safety assessment and modification, a volunteer program including home visitors program, a youth service corps, and a medical equipment loan bank (Open Hands 2004a).

Effective home-based care often requires expensive medical devices that are not always covered by insurance programs, or affordable to the uninsured. The medical equipment loan bank is modeled on the concept of a lending library. It receives donations of medically assistive devices such as wheel chairs, crutches, and canes, and lends these (temporarily or permanently) to those in need. The community-based availability of such equipment can help make home care a viable option, or improve the quality of life of community members who chose home care over institutional care. Coupled with other programs, notably the home safety assessment and modification program, Open Hands can help seniors retain their mobility within their own homes (Open Hands 2004b).

Ethnic And Cultural Diversity of Rural And Frontier Populations

Minorities face a number of barriers within the profession, including access to education and job advancement. A recent American Nurses Association survey of minority nurses concluded that cultural differences often resulted in questions of competence, and a majority of African American, Hispanic, and Asian American/Pacific Islander nurses believed that they had been denied a promotion on the basis of race rather than education or experience (Adams 2002). Until recently, the nursing profession has not made a major effort to recruit minorities into nursing education programs, and professional disparities make it difficult to convince potential nursing students that nursing would be a good career choice.

In the U.S., racial/ethnic minorities represent 30% of the U.S. population, but only 12% of the nurse workforce (U.S. Department of Health and Human Services 2003). Data from the 2000

NSSRN shows that among frontier nurses, the proportion of minority nurses is even smaller: only 9% of frontier RNs reported a race/ethnicity different from non-Hispanic White (see Appendix A, Table 1).

The ethnic composition of the rural nurse workforce does not correspond with the population it serves. Although non-Hispanic whites still comprise more than four-fifths of the non-metro population, the non-metro growth rate of minorities between 1990 and 2000 was 29%, much higher than the overall non-metro growth rate of 10% (U.S. Department of Agriculture 2002). The greatest minority growth in non-metro areas was among Hispanics; three out of four states had increases of at least 50% in their non-metro Hispanic population and nearly half had increases of over 100%. Moreover, minority populations are not evenly dispersed; high concentrations of African Americans live in non-metro areas in the South and Southeast; Hispanics in the Southwest; and Native Americans in the West and Great Plains regions (Beale 2004). Among frontier and rural nurses, there is clearly need for more Native American and other non-white groups.

INCREASING DIVERSITY IN THE FRONTIER NURSE WORKFORCE

The Rainbow Project, Department of Nursing
Montana State University-Northern
www.nmclites.edu/academics/nursing/rainbow2.htm

Montana has 17 counties, 14 of which are frontier, and three different Indian reservations. Current estimates indicate that more nursing graduates leave the state than stay. The Rainbow Project will encourage more graduating students to stay in their communities, especially on the reservations. Although the intent is to recruit any and all students to nursing, a special focus is on recruiting more Native Americans into the nursing profession (Goudiet 2004).

Funded through a 3-year grant from the Basic Nurse Education and Practice program of the U.S Department of Health and Human Services, the project "addresses the need for nursing graduates to possess rural and cultural competencies to work in health care facilities across Montana and on the Indian Reservations." Enrollment has increased overall by 20 students at Montana State University's three sites (Montana State University-Northern, no date).

Grant funds are not for scholarships or direct student support, but rather are used to support recruitment and retention (R&R) efforts. A Native American R&R specialist was hired to visit middle and high schools to interest students in a nursing career at an early age. In 2003, the Rainbow Project sponsored a "Day in the Life of a Nurse" summer camp for the same purpose – exposing teens to nurses and a nursing career, at the same time conducting courses in CPR and First Aid.

The R&R specialist's interaction continues after the student enters nursing school, helping students with any issues, including attending meetings with the students and their teachers, tutors, and advisors to be fully informed about how each student is performing. This personal attention helps prevent students from "falling through the cracks." The grant makes it possible to encourage second year students to continue on to the BSN program.

Other Practice Differences

Further issues faced by rural nurses are the result of the interaction between the rural setting, population characteristics, and health service delivery. The ANA Rural Nursing module identifies five factors that affect rural nursing practice: threats to anonymity and confidentiality; traditional gender roles; geographic isolation; professional isolation; and scarce resources (Bushy 2004).

Threats to anonymity and confidentiality affect both patient and professional; where nurses and patients are also friends and neighbors, familiarity has advantages (more holistic comprehensive care) but also disadvantages (lack of

privacy for both patient and nurse; tendency to make assumptions based on familiarity). Traditionally-defined gender roles are also more common in rural areas, affecting expectations of provider-patient interaction; it also affects expectations regarding compensation for "women's work," where women traditionally fill unpaid roles as well as assuming responsibility for community-based volunteer work.

Geographic isolation affects more than access to care; the self-sufficiency and independence required of rural lifestyles can affect care and treatment decisions. Individuals whose physical status would render them home-bound in an urban context often see no choice but to find a way to remain mobile in the rural context; "non-compliant" behaviors result when practitioners lack an understanding of the necessity of rural patients to remain active. Isolation also restricts the professional interaction and support that a nurse may benefit from in urban areas. Although some nurses may enjoy the autonomy and creativity required by this isolation, others struggle with the lack of professional interaction and the stress of bearing so much responsibility.

Nursing practice in rural communities is also defined by an "ever-present scarcity of human and financial resources" (Bushy 2004). While scarce resources are a feature of any publicly funded service or institution, the resource base and scale of economy in rural areas exaggerates the lack of resources in rural communities. For nurses, this may mean that positions are funded only at a part-time level while they are expected to serve an entire county. The lack of resources also affects the availability of support staff, supplies and equipment, and services offered.

IMPROVING WORKING CONDITIONS FOR NURSES, part one

Magnet Nursing Services Recognition Program
http://www.nursingworld.org/ancc/magnet.html

This national hospital accreditation program, developed by the American Nurses Credentialing Center (ANCC) in 1994, recognizes hospitals that provide high quality nursing care and support professional nursing practice, as an innovative approach for addressing the nation-wide nursing shortage.

The stated objectives of the program are to:
- *Recognize nursing services that utilize the Scope and Standards for Nurse Administrators to build programs of nursing excellence;*
- *Promote quality in an environment that supports professional nursing practice;*
- *Provide a vehicle for the dissemination of successful nursing practices and strategies among health care organizations utilizing the services of registered professional nurses; and,*
- *Promote positive patient outcomes (American Nurses Credentialing Center 2003a).*

The Magnet Nursing Services Recognition Program recognizes those hospitals that have fostered an environment that attracts and retains competent nurses through its respect for the values and science of nursing. In 2004, more than 100 health care organizations had achieved magnet certification. According to the ANCC, certification can benefit a healthcare organization by recognizing nurses' worth; increasing recruitment and retention of nurses; creating competitive advantage; attracting high quality physicians and specialists; reinforcing positive collaborative relationships among staff members; creating a "magnet" culture of quality; improving patient outcomes; and, increasing the use of health care among patients and health plans (American Nurses Credentialing Center 2003b).

IMPROVING WORKING CONDITIONS FOR NURSES, part two

Nurse-Friendly Program for Small/Rural Hospitals
Texas Nurses Association and the East Texas Area Health Education Center
http://www.etxahec.org/Papers/nursefriendly.htm

To date, all of the Magnet-certified hospitals are larger, urban-based hospitals (the sole exception is a 99-bed hospital in Bennington, VT). Application and survey fees are expensive and the process intensive, potentially discouraging some small rural hospitals from attempting certification, particularly among hospitals that rely on federal programs to remain open (Minnesota Department of Health 2001). And, rural hospitals tend to have more flexible, informal systems than those required for Magnet certification.

Funded through a 5-year HRSA grant awarded in September 2003, the Texas Nurses Association (TNA) in collaboration with the East Texas AHEC will work with 30 hospitals to incorporate 12 "Nurse Friendly Criteria" into hospital policies and procedures (Texas Nurses Association 2004). Although the criteria are not specific to the small/rural hospital, testing the program in small/rural hospitals was ideal to ensure the program's applicability across all practice settings. The grant covers the costs of the AHEC providing consulting services to the hospitals to achieve and document the criteria, as well as the cost of TNA certification. Certification of the first "Nurse-Friendly" hospital is anticipated for this fall (Tabone 2004).

The focus of the Nurse-Friendly program is to foster a work-friendly environment through a recognition program similar to the way that Mothering Magazine identifies mother/family friendly employers. Although there are a number of similarities with the Magnet program, Nurse-Friendly places greater emphasis on a number of elements, including workplace safety, security, and systems to protect nurses from violence and abuse; support for management skills development among nurse managers; and support for nurse-initiated problem identification and solutions. Another difference is that the nurses themselves, rather than surveyors, must recommend certification for their employer.

The TNA sees Nurse Friendly certification as complementary to the Magnet program. On the one hand, not all hospitals will seek Magnet certification but can be certified as Nurse-Friendly. On the other hand, hospitals that achieve Nurse-Friendly status are well prepared to further seek Magnet certification.

V. STRATEGIES FOR INCREASING THE SUPPLY AND RETENTION OF RURAL/FRONTIER NURSES

A number of strategies highlighted in this report are being used to address the nurse shortage crisis in rural and frontier areas, including education, retention and job satisfaction, service delivery, and policy. Some target specific issues, while others emphasize a more comprehensive, whole systems approach.

Education

- Develop rural-specific nursing curricula
- Provide innovative educational systems that enable in-place education and rural practicums
- Fund basic and advanced nursing education
- Make service commitments in rural underserved areas
- Introduce high school students to health service careers
- Target recruitment of minority and underrepresented groups

Retention and job satisfaction
- Develop service recognition programs
- Set standards for nurse employers and implement employer certification programs

Service Delivery
- Deliver services through telemedicine
- Use non-skilled providers (friend & family) to deliver personal care
- Use non-profit/volunteer organizations to establish and coordinate care networks

Policies
- Enable family/friends to be paid for providing personal care services
- Educate unskilled providers
- Offer a reimbursement differential for care providers to reduce the rural penalty

Further Challenges

While agencies are attempting to solve the nursing shortage crisis at many levels, strategies focus on removing professional barriers to recruitment and retention of nurses in rural and frontier communities. However, barriers also exist at the personal and community levels (Mason 2004). For nurses with families, limited employment and educational opportunities for spouses and children will continue to discourage rural practice. For single nurses, limited social opportunities may be a barrier, and the difficulties faced by "outsiders" finding acceptance in rural communities is a further challenge.

Rural and frontier communities experiencing difficulty in recruiting and retaining professional health care staff may discover barriers of a non-professional nature. A successful placement in a rural community hinges on both the nurse and the community. The way in which a new nurse is received within the community factors highly in a decision to remain. A true community-based effort aimed at removing personal and community barriers may require innovations in community organizing. A local nurse shortage may represent an important opportunity for community members to organize and actively transform their own communities. A community-based model for recruiting and retaining physicians may also benefit communities with other health practitioner shortages, including nurses (Shannon 2004).

BECOMING A "MAGNET STATE"

Oregon Center for Nursing, Portland, Oregon
http://www.oregoncenterfornursing.org

The State of Oregon, with 11 frontier counties, is attempting to become a magnet state for nurses through the use of holistic partnerships. The initiative began with a 2001 study sponsored by the private Northwest Health Foundation, "Oregon's Nursing Shortage: A Public Health Crisis in the Making" (Tanner 2001). A conference held by the Oregon Nursing Leadership Council resulted in the adoption of five strategic goals to address Oregon's nursing shortage:

1. *Double the enrollment of Oregon nursing programs by 2004;*
2. *Develop, implement, and evaluate staffing models that make the best use of the available nursing workforce;*
3. *Redesign nursing education to meet more directly the changing health care needs of Oregonians;*
4. *Recruit and retain nurses into the profession; and*
5. *Create the Oregon Center for Nursing that will coordinate implementation and ongoing evaluation of this plan.*

The ONLC established the Oregon Center for Nursing (OCN) to oversee the implementation of its strategic plan. Partners include Oregon Health & Science University (OHSU); Eastern Oregon University; Oregon State Board of Nursing (OSBN); Oregon Office of Rural Health; Northwest Health Foundation; Oregon Student Assistance Commission (OSAC); and the Oregon State Legislature.

The Rural Frontier Delivery and BS/RN Program
Begun in 1992, the Rural Frontier Delivery and BS/RN Program of the Oregon Health & Science University School of Nursing in collaboration with Eastern Oregon University, is an online program to help RNs earn a bachelor's degree while remaining within their communities. Offered in 5 of 11 frontier counties since 1992, 95% of graduates remain within their communities after graduation (Oregon Health Sciences University 1999). Distance learning is combined with rural clinic-based education to increase the cultural competence of the rural workforce, provide in-place educational opportunities for those who would otherwise not have the chance to study nursing, and expand local nursing capacity (Mason 2004).

The Oregon State Legislature passed a bill in 2001 creating a loan repayment program for nurses who practice in "nursing-critical shortage areas," with practice in frontier counties receiving first priority. Priority specialties included public health, acute care, nursing education (including community colleges and universities), and long-term care.

The Northwest Health Foundation continues to fund a number of these programs aimed at alleviating the nursing shortage through its "Investing in a Healthy Future: Strategies for Addressing the Nursing Shortage" initiative.

VI. SUMMARY AND CONCLUSIONS

Frontier and rural communities are more likely to suffer from the national nursing shortage than their urban counterparts because (1) frontier and rural communities typically lack the economic resources to compete with urban-based employers, (2) nurses are typically not prepared for practice in non-urban settings, and (3) frontier and rural communities depend on non-hospital care settings to a greater extent than their urban counterparts; these practice settings are also disadvantaged relative to hospital-based practice. Urban-based strategies that emphasize competitive advantage may unwittingly exacerbate frontier and rural shortages.

One approach to increasing the supply of nurses in frontier and rural communities is a "grow your own" approach. Strategies include the development of rural-specific nurse education, in-place education, and funding for education targeted at underserved areas and groups. A second approach involves the use of technology to provide virtual services and increase the geographical reach of available nurses. A third approach is to is to identify a set of services traditionally provided by nurses that can be provided by available non-medical personnel (e.g. personal care providers, NGOs, community-based volunteers) – in essence, creating a class of non-medical providers that supplement nursing care, enable professional nurses to focus on more advanced nursing care, and provide the home care and community-based networks essential for good nursing outcomes in isolated communities.

Frontier and rural communities are innovators in the use of communications technology for both education of nurses and for provision of nursing services in communities that lack a provider. Distance education is a proliferating response to the demands of rural-based students to obtain in-place education, while telemedicine enables consultations with professional nursing staff in places that otherwise lack nursing services. The question of whether these relatively new modalities are seen as short-term responses to a crisis, or long-term, sustainable solutions that are as effective and acceptable as traditional, face-to-face modalities remains for future evaluation.

Finally, the health of a rural or frontier community is intertwined with its economic and social wellbeing. Nurse shortages in frontier and rural communities derive not only from the current national shortage of nurses but also a long-standing trend favoring rural-to-urban migration of the educated, skilled workforce. Although many rural communities are stable or even prospering, a great number are distressed, losing existing employment and education opportunities, and losing their people as a result. Approaches that ignore or fail to address the "health" of a community in a holistic sense cannot hope to resolve, over the long term, a nurse shortage crisis. Improving access to nursing care in frontier and rural communities means looking beyond a narrow focus on the nursing profession to a broader view of "workplace," that is, the community. Addressing the community context of a nurse shortage may require community-based development approaches as well as the crafting of healthy rural policies.

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APPENDIX A:

DATA FROM THE NATIONAL SAMPLE SURVEY OF REGISTERED NURSES (2000)

Table 1: Percent of respondents who live and work in the same county, type of RN degree received, highest degree received, and employment status.

	II. Total (n=35,452)	Metro (n=28,208)	Micro (n=4,364)	NonCore (n=2,880)		Non-Frontier (n=32,849)	Frontier (n=2,603)
Weighted percent of the total	100	85.3	9.8	4.9		97.2	2.8
Live and work in same county				p<.000			p<.000
No	24.9	25.4	20.7	24.0		25.1	15.3
Yes	75.2	74.6	79.3	76.0		74.9	84.7
Race/Ethnicity (n=34,486)				p<.000			p=.003
White	87.2	86.2	92.9	94.1		87.1	91.2
Other	12.8	13.8	7.1	6.0		12.9	8.8
Type of Education Program to become RN (n=34,801)				p<.000			p<.000
Diploma	29.8	30.2	27.8	27.6		30.0	24.7
Associate	40.3	38.3	50.6	54.5		40.0	49.9
Bachelor	29.5	31.1	21.6	17.7		29.6	25.0
Masters/ Doctorate	0.4	0.5	0.0	0.3		0.4	0.3
Highest Degree Received (n=34,801)				p<.000			p<.000
Diploma	22.7	22.8	22.7	22.0		22.8	19.2
Associate	34.3	32.3	44.2	48.2		34.0	44.0
Bachelor	32.8	34.1	26.0	24.0		32.9	30.3
Masters/ Doctorate	10.2	10.9	7.1	5.8		10.3	6.5
Employment Status (n=34,722)				p<.000			p<.769
Nursing - FT	58.3	57.9	60.3	61.4		58.3	57.8
Nursing - PT	23.2	23.7	20.2	18.8		23.2	22.8
Not Employed in Nursing	18.5	18.4	19.5	19.8		18.5	19.4

Table 2: Percent of respondents and income earned, by county type (county of employment)

	III. Total (N=35,452)	Metro (n=28,208)	Micro (n=4,364)	NonCore (n=2,880)		Non-Frontier (n=32,849)	Frontier (n=2,603)
Income 1: PT & FT Employment in Nursing (n=28,880)				p<.000			p<.000
Unknown/Refused	7.5	7.6	6.8	6.3		7.5	6.5
15,000 or less	0.5	0.5	0.3	0.6		0.4	1.0
15,001-25,000	1.5	1.4	2.2	2.2		1.4	3.1
25,001-35,000	5.5	5.0	8.5	7.5		5.4	8.6
35,001-50,000	18.6	17.7	23.0	25.6		18.4	23.5
50,001-75,000	28.7	28.0	31.4	32.7		28.5	30.1
75,001-100,000	21.0	21.6	18.2	15.6		21.2	14.7
100,001-150,000	12.8	13.8	7.3	7.3		12.9	10.3
> 150,000	4.2	4.5	2.5	2.1		4.2	2.2
Income 2: FT Employment in Nursing (n=20,737)				p<.000			p<.000
Unknown/Refused	6.4	6.5	5.3	5.7		6.4	5.2
15,000 or less	0.1	0.1	0.0	0.0		0.1	0.2
15,001-25,000	0.7	0.6	1.1	1.1		0.6	1.9
25,001-35,000	5.0	4.6	7.7	6.9		4.9	7.7
35,001-50,000	20.1	19.4	23.3	26.1		20.0	24.4
50,001-75,000	30.0	29.5	32.4	33.7		30.0	31.1
75,001-100,000	21.2	21.6	20.5	17.0		21.4	16.5
100,001-150,000	13.0	13.9	7.9	7.1		13.0	11.3
> 150,000	3.5	3.8	1.8	2.1		3.5	1.8
Income 3: BSN Employed Full-time in Nursing (n=6,485)				p<.000			p=.106
Up to 50,000	28.7	27.9	33.2	37.1		28.5	34.8
50,001-75,000	31.0	30.6	33.5	35.4		31.0	33.3
75,001-100,000	22.6	22.8	23.8	14.7		22.8	16.5
100,001 or more	17.7	18.6	9.6	12.8		17.8	15.4

Data Source: National Sample Survey of Registered Nurses, 2000, County Public Use Data Files; data analyzed in Stata 8.0 using SVR, a Stata module developed for complex survey data. Per the survey documentation, a jackknife procedure (in the SVR module, the jk2 method) was used to produce weighted estimates with replication-based standard errors. Replication based population=2,647,754.

p-values based on corrected Pearson chi square test of independence.

APPENDIX B
LIST OF HOSPITAL BASED NURSING SHORTAGE COUNTIES AND COUNTIES WITHOUT HOSPITALS (1999)

STATE	FRONTIER COUNTIES		NON-FRONTIER COUNTIES	
	Nurse Shortage	**No Hospital**	**Nurse Shortage**	**No Hospital**
AL	Greene		Bibb	Choctaw
			Bullock	Cleburne
			Chambers	Coosa
			Clay	Henry
			Coffee	Lamar
			Crenshaw	Lowndes
			Elmore	Macon
			Fayette	Perry
			Geneva	Sumter
			Jackson	
			Marion	
			Pickens	
			Talladega	
			Washington	
			Winston	
AK	Kodiak Island	Aleutians East		Denali
	Nome	Aleutians West		Yakutat
	Wrangell-Petersburg	Bristol Bay		
		Haines		
		Lake and Peninsula		
		Prince of Wales-Outer Ketchikan		
		Skagway-Hoonah-Angoon		
		Southeast Fairbanks		
		Wade Hampton		
		Yukon-Koyukuk		
AZ	Cochise	Greenlee	Pinal	
	Santa Cruz			
	Yavapai			
AR	Arkansas	Calhoun	Clay	Conway
	Pike	Cleveland	Crittenden	Grant
	Scott	Lafayette	Jackson	Howard
		Lee	Lawrence	Lincoln
		Madison	Little River	Lonoke
		Monroe	Mississippi	Marion
		Montgomery	Pope	Miller
		Nevada	Van Buren	Pointsett
		Newton		
		Perry		
		Prairie		
		Searcy		
		Woodruff		
CA	Mariposa	Apine	Amador	

	Modoc		Napa	
	Sierra		San Benito	
	Trinity			
	Tuolumne			
CO	Baca	Archuleta		Clear Creek
	Conejos	Bent		Douglas
	Grand	Costilla		Gilpin
	Huerfano	Crowley		Summit
	Kiowa	Custer		Teller
	Lake	Dolores		
	Lincoln	Elbert		
	Otero	Hinsdale		
	Phillips	Jackson		
	Rio Blanco	Mineral		
	Routt	Ouray		
	Sedgwick	Park		
		Rio Grande		
		Saguache		
		San Juan		
		San Miguel		
		Washington		
CT			Middlesex	
			Windham	
FL		Glades	Baker	Dixie
		Lafayette	Bradford	Gilchrist
		Liberty	Charlotte	Hardee
			DeSoto	Jefferson
			Gadsden	Sumter
			Lee	Wakulla
			Okeechobee	
			Pasco	
			Putnam	
			Suwannee	
			Taylor	
			Union	
			Washington	
GA	Clinch	Baker	Appling	Atkinson
	Hancock	Clay	Bacon	Banks
	Randolph	Echols	Baldwin	Brantley
	Wheeler	Glascock	Berrien	Bryan
		Marion	Brooks	Chattahoochee
		Quitman	Cook	Chattooga
		Talbot	Coweta	Columbia
		Taliafero	Decatur	Crawford
		Webster	Dougherty	Dawson
		Wilcox	Effingham	Fayette
			Elbert	Harris
			Emanuel	Heard
			Evans	Johnson
			Franklin	Jones
			Gilmer	Lamar
			Grady	Lee
			Greene	Lincoln
			Habersham	Long

			Hart	McIntosh
			Irwin	Madison
			Jackson	Montgomery
			Jasper	Oconee
			Jefferson	Oglethorpe
			Jenkins	Pierce
			Lanier	Pike
			Laurens	Schley
			Liberty	Taylor
			Meriwether	Terrell
			Miller	Treutlen
			Mitchell	Turner
			Monroe	Twiggs
			Murray	Walker
			Pickens	Warren
			Screven	White
			Seminole	Wilkinson
			Sumter	
			Thomas	
			Towns	
			Troup	
			Union	
			Walton	
			Washington	
HI			Kauai	Kalawao
ID	Adams	Boise	Bingham	Jefferson
	Bear Lake	Camas	Franklin	Lewis
	Benewah	Clark	Jerome	Payette
	Blaine	Custer	Minidoka	
	Boundary	Fremont		
	Butte	Lincoln		
	Caribou	Owyhee		
	Elmore			
	Oneida			
	Power			
IL	Hamilton	Calhoun	Bond	Alexander
	Schuyler	Pope	Christian	Brown
			Crawford	Carroll
			Edgar	Cass
			Fayette	Clark
			Ford	Cumberland
			Franklin	Douglas
			Greene	Edwards
			Iroquois	Gallatin
			Jo Daviess	Henderson
			Lawrence	Jasper
			Logan	Johnson
			Madison	Kendall
			Perry	Marshall
			Piatt	Menard
			Randolph	Monroe
			Shelby	Moultrie
			Vermilion	Pulaski
			Warren	Putnam
			Washington	Scott

			Wayne	Stark
			White	Woodford
IN			Cass	Benton
			Gibson	Brown
			Hendricks	Carroll
			Jefferson	Crawford
			Johnson	Fountain
			La Porte	Franklin
			Madison	Martin
			Miami	Newton
			Monroe	Ohio
			Putnam	Owen
			Ripley	Parke
			Rush	Pike
			Scott	Posey
			Steuben	Spencer
			Tipton	Switzerland
			Whitley	Union
IA			Adams	Butler
			Appanoose	Cedar
			Benton	Louisa
			Boone	Tama
			Buchanan	Taylor
			Calhoun	Warren
			Carroll	Winnebago
			Chickasaw	Worth
			Clarke	
			Clinton	
			Crawford	
			Dallas	
			Davis	
			Decatur	
			Des Moines	
			Fayette	
			Franklin	
			Fremont	
			Greene	
			Grundy	
			Guthrie	
			Hamilton	
			Henry	
			Humboldt	
			Ida	
			Iowa	
			Jefferson	
			Keokuk	
			Marion	
			Mills	
			Mitchell	
			Monona	
			Monroe	
			Montgomery	
			O'Brien	
			Plymouth	
			Pocahontas	
			Ringgold	

			Sac	
			Shelby	
			Sioux	
			Union	
			Van Buren	
			Washington	
			Wright	
KS	Barber	Chase	Anderson	Linn
	Chautauqua	Doniphan	Barton	Osage
	Clark	Elk	Butler	
	Decatur	Gray	Cherokee	
	Edwards	Wabunsee	Coffey	
	Ellsworth	Wallace	Dickinson	
	Gove	Woodson	Jackson	
	Graham		Jefferson	
	Greeley		Labette	
	Greenwood		Marion	
	Harper		Miami	
	Haskell		Norton	
	Hodgeman		Pottawatomie	
	Jewell		Pratt	
	Kearny		Rice	
	Kiowa		Shawnee	
	Lane			
	Lincoln			
	Logan			
	Marshall			
	Mitchell			
	Morris			
	Morton			
	Ness			
	Osborne			
	Ottawa			
	Pawnee			
	Phillips			
	Republic			
	Rooks			
	Rush			
	Russell			
	Scott			
	Sheridan			
	Sherman			
	Smith			
	Stanton			
	Stevens			
	Thomas			
	Trego			
	Washington			
	Wichita			
KY		Hickman	Bell	Allen
		Robertson	Bourbon	Anderson
			Boyle	Ballard
			Breathitt	Bath
			Breckinridge	Bracken
			Calloway	Bullitt
			Clay	Butler

			Clinton	Carlisle
			Crittenden	Carter
			Cumberland	Casey
			Estill	Edmonson
			Floyd	Elliott
			Garrard	Gallatin
			Graves	Hancock
			Green	Henry
			Harrison	Jackson
			Letcher	Jessamine
			Marshall	Knott
			Mercer	Larue
			Monroe	Lee
			Morgan	Lewis
			Muhlenberg	Lyon
			Nicholas	McCreary
			Owen	McLean
			Pike	Magoffin
			Simpson	Martin
			Trigg	Meade
			Union	Menifee
			Wayne	Metcalfe
				Owsley
				Pendleton
				Powell
				Spencer
				Todd
				Trimble
				Washington
				Webster
				Wolfe
				Woodford
LA	Cameron		Allen	Assumption
			De Soto	Bienville
			East Feliciana	Catahoula
			Evangeline	Grant
			Jackson	Livingston
			La Salle	Plaquemines
			Madison	Tensas
			Natchitoches	West Baton Rouge
			Red River	
			St. Helena	
			Union	
			West Carroll	
ME	Piscataquis		Kennebec	
MD			Talbot	Carolina
				Queen Anne's
MA			Barnstable	
			Bristol	
			Franklin	
			Hampden	
			Middlesex	
			Plymouth	

MI	Luce	Keweenaw	Arenac	Alcona
	Ontonagon		Baraga	Antrim
			Benzie	Lake
			Cheboygan	Menominee
			Chippewa	Missaukee
			Crawford	Montmorency
			Houghton	Oscoda
			Huron	Roscommon
			Iron	
			Jackson	
			Kalkaska	
			Lapeer	
			Leelanau	
			Mackinac	
			Macomb	
			Marquette	
			Mason	
			Montcalm	
			Newaygo	
			Osceola	
			Otsego	
			Van Buren	
MN	Aitkin	Red Lake	Becker	Benton
	Big Stone		Carlton	Clay
	Clearwater		Crow Wing	Dodge
	Cook		Dakota	Fillmore
	Itasca		Douglas	Mower
	Jackson		Goodhue	Sherburne
	Kittson		Houston	
	Lac qui Parle		Isanti	
	Lake		Le Sueur	
	Lake of the Woods		Lyon	
	Lincoln		McLeod	
	Mahnomen		Martin	
	Pine		Mille Lacs	
	Polk		Morrison	
	Roseau		Otter Tail	
	Stevens		Pennington	
	Swift		Pipestone	
	Traverse		Rice	
	Wilkin		Stearns	
	Yellow Medicine		Todd	
			Wabasha	
			Waseca	
			Winona	
			Wright	
MS	Greene	Amite	Attala	Itawamba
	Jefferson	Benton	Bolivar	Lamar
	Noxubee	Carroll	Chickasaw	Smith
	Perry	Issaquena	Choctaw	Stone
	Sharkey	Kemper	Claiborne	
		Tunica	Clarke	
			Coahoma	
			Copiah	
			Covington	
			DeSoto	

			Grenada	
			Holmes	
			Humphreys	
			Jasper	
			Jefferson Davis	
			Lawrence	
			Leake	
			Leflore	
			Madison	
			Montgomery	
			Neshoba	
			Panola	
			Pearl River	
			Pontotoc	
			Quitman	
			Rankin	
			Scott	
			Simpson	
			Sunflower	
			Tallahatchie	
			Tippah	
			Tishomingo	
			Warren	
			Webster	
			Winston	
			Yalobusha	
			Yazoo	
MO		Carter	Atchison	Benton
		Chariton	Audrain	Bollinger
		Holt	Bates	Buchanan
		Knox	Butler	Caldwell
		Mercer	Callaway	Christian
		Shannon	Carroll	Clark
		Worth	Clinton	Crawford
			Cooper	Dade
			Dent	Dallas
			Gasconade	Daviess
			Harrison	DeKalb
			Jefferson	Douglas
			Madison	Hickory
			Newton	Howard
			Pemiscot	Iron
			Perry	Lewis
			Ripley	McDonald
			Ste. Genevieve	Maries
			Sullivan	Miller
				Mississippi
				Moniteau
				Monroe
				Montgomery
				Morgan
				New Madrid
				Oregon
				Osage
				Ozark
				Ralls
				Schuyler

				Shelby
				Stone
				Warren
				Wayne
				Webster
				Wright
MT	Broadwater	Garfield	Gallatin	Powder River
	Carbon	Golden Valley	Pondera	
	Carter	Jefferson		
	Chouteau	Judith Basin		
	Custer	Petroleum		
	Daniels	Treasure		
	Dawson	Wibaux		
	Deer Lodge			
	Fallon			
	Fergus			
	Flathead			
	Glacier			
	Granite			
	Hill			
	Lake			
	Liberty			
	McCone			
	Meagher			
	Mineral			
	Musselshell			
	Powell			
	Prairie			
	Richland			
	Roosevelt			
	Rosebud			
	Sanders			
	Sheridan			
	Stillwater			
	Sweet Grass			
	Teton			
	Toole			
	Wheatland			
	Yellowstone			
NE	Brown	Arthur	Adams	Cass
	Chase	Banner	Colfax	Cedar
	Cheyenne	Blaine	Cuming	Dakota
	Custer	Clay	Dawson	Dixon
	Filmore	Deuel	Dodge	Stanton
	Furnass	Frontier	Gage	
	Garden	Garfield	Jefferson	
	Hamilton	Gosper	Kearney	
	Harlan	Grant	Pierce	
	Howard	Greeley	Richardson	
	Johnson	Hayes	Saline	
	Knox	Hitchcock	Saunders	
	Merrill	Hooker	Seward	
	Morrill	Keya Paha	Wayne	
	Nance	Logan	York	
	Nemaha	Loup		
	Perkins	McPherson		

	Rock	Sherman		
	Sheridan	Sioux		
	Thayer	Thomas		
	Valley	Wheeler		
	Webster			
NV	Humboldt	Esmeralda		Douglas
	Lander	Eureka		
	Lincoln	Storey		
	Lyon			
	Nye			
	Pershing			
	White Pine			
NH			Carroll	
NJ			Somerset	
			Sussex	
			Union	
NM	San Miguel	Catron		Sandoval
		Harding		Valencia
		Hidalgo		
		Mora		
		Roosevelt		
		Torrance		
NY	Essex	Hamilton	Broome	Greene
			Cattaraugus	Lewis
			Chautauqua	Seneca
			Chemung	Tioga
			Chenango	
			Clinton	
			Columbia	
			Cortland	
			Dutchess	
			Franklin	
			Fulton	
			Herkimer	
			Jefferson	
			Madison	
			Montgomery	
			Niagara	
			Oneida	
			Ontario	
			Orange	
			Orleans	
			Oswego	
			Otsego	
			Putnam	
			Rensselaer	
			Richmond	
			Rockland	
			St. Lawrence	
			Saratoga	
			Schoharie	
			Schuyler	
			Steuben	

			Sullivan	
			Tompkins	
			Washington	
			Wayne	
			Westchester	
			Wyoming	
			Yates	
NC		Hyde	Alamance	Camden
		Jones	Alleghany	Caswell
		Tyrrell	Anson	Clay
			Ashe	Currituck
			Burke	Dare
			Carteret	Gates
			Cherokee	Graham
			Chowan	Greene
			Cleveland	Madison
			Granville	Northampton
			Halifax	Pamlico
			Hoke	Perquimans
			Lenoir	Warren
			Macon	Yancey
			Montgomery	
			Nash	
			Pender	
			Person	
			Polk	
			Richmond	
			Rockingham	
			Rutherford	
			Stokes	
ND	Adams	Benson	Grand Forks	
	Barnes	Billings	Ward	
	Bottineau	Burke		
	Bowman	Dunn		
	Dickey	Eddy		
	Divide	Golden Valley		
	Emmons	Hettinger		
	Foster	Kidder		
	Grant	LaMoure		
	Griggs	Logan		
	McIntosh	McHenry		
	McKenzie	Morton		
	McLean	Oliver		
	Mountrail	Renville		
	Nelson	Richland		
	Pembina	Sargent		
	Pierce	Sheridan		
	Ransom	Slope		
	Stutsman	Steele		
	Towner			
	Traill			
	Walsh			
	Wells			
	Williams			
OH			Clermont	Carroll

			Clinton	Fayette
			Erie	Monroe
			Fulton	Morgan
			Geauga	Noble
			Harrison	Perry
			Hocking	Preble
			Jackson	Putnam
			Meigs	Vinton
			Morrow	Warren
			Sandusky	
			Tuscarawas	
			Union	
OK	Atoka	Alfalfa	Beckham	Adair
	Blaine	Cotton	Creek	
	Cimarron	Grant	Garfield	
	Coal		Logan	
	Harmon		McClain	
	Haskell		Murray	
	Hughes		Okmulgee	
	Jefferson		Wagoner	
	Kiowa		Washington	
	Love			
	Noble			
	Osage			
	Pushmataha			
	Tillman			
	Woods			
OR	Baker	Gilliam	Jefferson	Columbia
	Grant	Sherman	Josephine	
	Lake	Wheeler	Klamath	
	Morrow			
PA	Potter	Cameron	Beaver	Juniata
		Forest	Carbon	Perry
		Sullivan	Clinton	Pike
			Crawford	Snyder
			Delaware	
			Elk	
			Franklin	
			Fulton	
			Huntingdon	
			Lebanon	
			McKean	
			Mifflin	
			Northumberland	
			Schuylkill	
			Susquehanna	
			Tioga	
			Venango	
			Wayne	
RI			Newport	Bristol
			Washington	
SC			Allendale	Berkeley
			Bamberg	Calhoun

			Chester	Lee
			Clarendon	McCormick
			Colleton	Saluda
			Hampton	
			Jasper	
			Kershaw	
			Lancaster	
			Union	
SD	Bennett	Aurora	Brookings	Union
	Bon Homme	Buffalo	Brown	
	Charles Mix	Butte	Clay	
	Edmunds	Campbell	Davison	
	Faulk	Clark	Hughes	
	Grant	Corson	Yankton	
	Gregory	Fall River		
	Haakon	Hamlin		
	Hand	Hanson		
	Hutchinson	Harding		
	Jerauld	Hyde		
	Kingsbury	Jackson		
	Lake	Jones		
	Moody	Lyman		
	Perkins	McCook		
	Potter	Mellette		
	Tripp	Miner		
	Turner	Sanborn		
	Walworth	Stanley		
		Sully		
		Ziebach		
TN			Bedford	Chester
			Campbell	Crockett
			Cannon	Grainger
			Cheatham	Grundy
			Claiborne	Hancock
			Cocke	Jackson
			Coffee	Johnson
			Decatur	Lake
			Dickson	Lewis
			Fayette	Meigs
			Franklin	Moore
			Gibson	Morgan
			Greene	Pickett
			Hardeman	Sequatchee
			Hardin	Stewart
			Hawkins	Trousdale
			Haywood	Union
			Henry	Van Buren
			Hickman	
			Houston	
			Humphreys	
			Lawrence	
			McMinn	
			Macon	
			Rhea	
			Scott	
			Sevier	

			Unicoi	
			White	
TX	Bailey	Archer	Austin	Aransas
	Bosque	Armstrong	Bee	Bandera
	Clay	Blanco	Burleson	Hardin
	Crosby	Borden	Burnet	Kendall
	Dallam	Briscoe	Caldwell	Lampasas
	Fisher	Brooks	Cass	Lee
	Frio	Callahan	Falls	Marion
	Hansford	Carson	Fannin	Morris
	Hardeman	Coke	Fayette	Rains
	Houston	Cottle	Grimes	Rockwall
	Llano	Crockett	Hale	San Jacinto
	Lynn	Delta	Jasper	Upshur
	Montague	Dickens	Kleberg	Waller
	San Augustine	Donley	Panola	Willacy
	Swisher	Duval	Somervell	
	Trinity	Edwards		
	Upton	Foard		
	Wheeler	Garza		
	Wilbarger	Glasscock		
		Goliad		
		Hartley		
		Hudspeth		
		Irion		
		Jeff Davis		
		Jim Hogg		
		Kenedy		
		Kent		
		King		
		Kinney		
		La Salle		
		Leon		
		Lipscomb		
		Live Oak		
		Loving		
		McMullen		
		Mason		
		Menard		
		Mills		
		Motley		
		Newton		
		Oldham		
		Presidio		
		Real		
		Roberts		
		Robertson		
		San Saba		
		Shackelford		
		Sherman		
		Sterling		
		Terrell		
		Zapata		
		Zavala		
UT	Beaver	Daggett		
	Grand	Emery		

	Kane	Morgan		
	Millard	Piute		
	San Juan	Rich		
	Sanpete	Summitt		
	Tooele	Wayne		
VT		Essex	Addison	Grand Isle
			Lamoille	
			Orange	
			Washington	
			Windham	
VA		Bland	Alleghany	Accomack
		Craig	Amherst	Amelia
		Highland	Lee	Appomattox
		Douglas	Mecklenburg	Botetourt
		Skamania	New Kent	Brunswick
		Wahkiakum	Northampton	Buckingham
			Nottoway	Caroline
			Patrick	Carroll
			Shenandoah	Charles City
			Smyth	Charlotte
			Warren	Chesterfield
			Bedford	Clarke
			Emporia	Cumberland
			Franklin	Dinwiddie
			Hopewell	Floyd
			Lexington	Fluvanna
			Portsmouth	Goochland
			Suffolk	Grayson
				Greene
				Greensville
				Henry
				Isle of Wight
				James City
				King and Queen
				King George
				King William
				Louisa
				Lunenburg
				Madison
				Mathews
				Middlesex
				Nelson
				Northumberland
				Orange
				Pittsylvania
				Powhatan
				Prince George
				Rappahannock
				Richmond
				Rockingham
				Scott
				Southampton
				Stafford
				Surry
				Sussex
				Westmoreland

				York
				Bristol
				Buena Vista
				Clifton Forge
				Colonia Heights
				Covington
				Fairfax
				Falls Church
				Fredericksburg
				Lynchburg
				Manassas Park
				Poquoson
				Roanoke
				Waynesboro
				Winchester
WA	Ferry		Clallam	San Juan
	Garfield		Grays Harbor	
	Grant		Lewis	
	Lincoln			
	Pend Oreille			
	Stevens			
WV	Pocahontas	Pendleton	Barbour	Clay
		Tucker	Berkeley	Doddridge
			Boone	Gilmer
			Calhoun	Hancock
			Grant	Hardy
			Hampshire	Lincoln
			Lewis	Monroe
			Mason	Pleasants
			Morgan	Ritchie
			Nicholas	Wayne
			Preston	Wirt
			Putnam	Wyoming
			Summers	
			Taylor	
			Tyler	
			Wetzel	
			Wood	
WI	Burnett	Bayfield	Adams	Marquette
	Rusk	Buffalo	Barron	
	Sawyer	Florence	Calumet	
	Taylor	Forest	Chippewa	
	Washburn	Iron	Clark	
		Menominee	Columbia	
			Dodge	
			Fond du Lac	
			Grant	
			Green Lake	
			Iowa	
			Juneau	
			Langlade	
			Lincoln	
			Manitowoc	
			Marathon	
			Pepin	

			Polk	
			Sheboygan	
			Trempealeau	
			Vernon	
			Waushara	
WY	Big Horn	Niobrara		
	Crook	Sublette		
	Johnson			
	Lincoln			
	Park			
	Platte			
	Teton			
	Weston			

Data Sources:

(1) List of Frontier Counties from the 2000 Census, Frontier Education Center (Frontier Education Center 2000b);

(2) Nurse Shortage Counties, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services (Bureau of Health Professions, no date);

(3) Counties without hospitals based on 1999 American Hospital Association Annual Survey (Cecil B. Sheps Center for HealthServices Research 2004).

APPENDIX C: MAPS

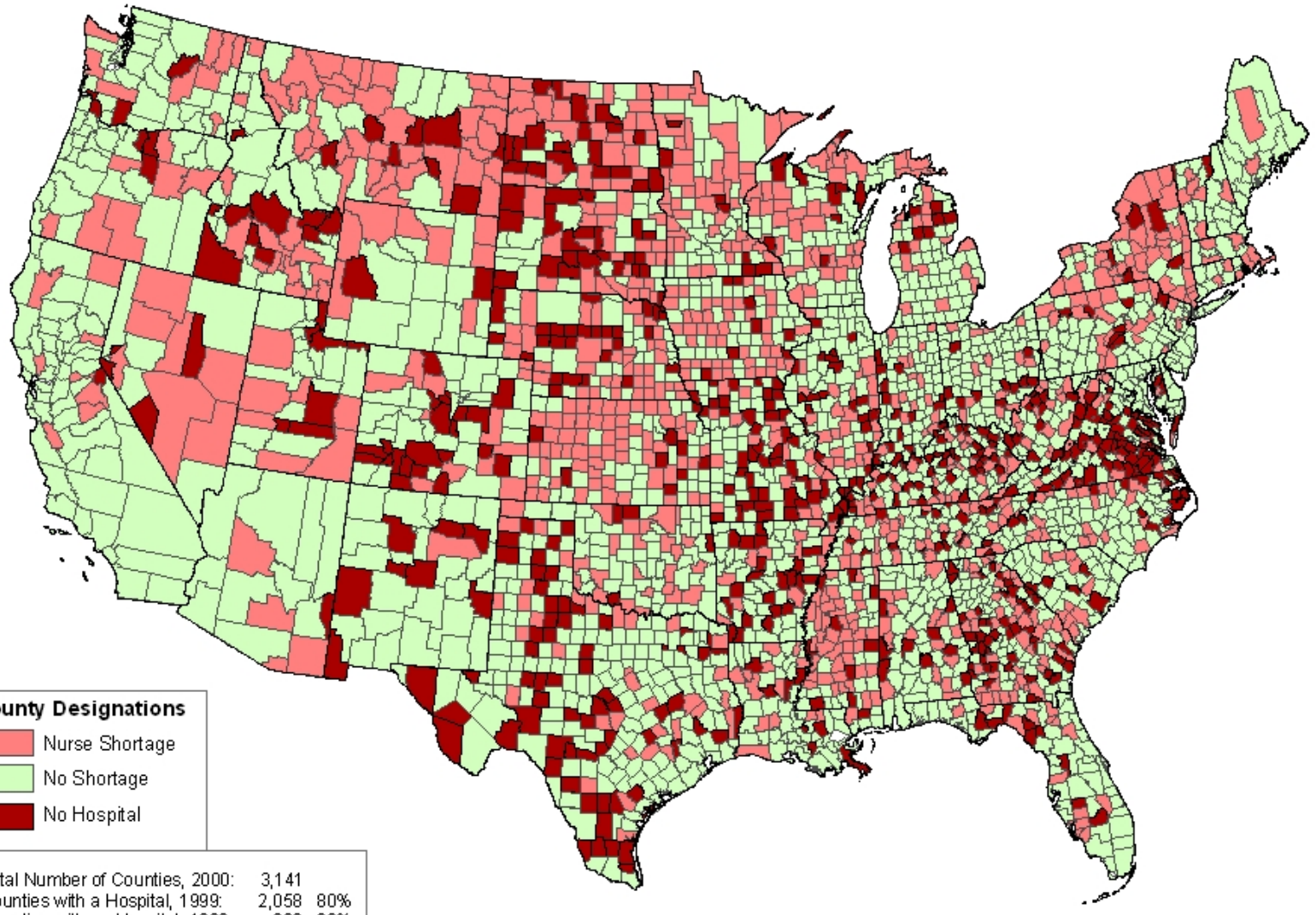
Map 1: Hospital-based Nurse Shortage Counties (Contiguous 48 States)

Map 2: Hospital-based Nurse Shortages in Frontier Counties (Contiguous 48 States)

Map 3: Hospital-based Nurse Shortage Counties (All 50 States)

Map 4: Hospital-based Nurse Shortages in Frontier Counties (All 50 States)

Hospital-based Nurse Shortages, by County



County Designations

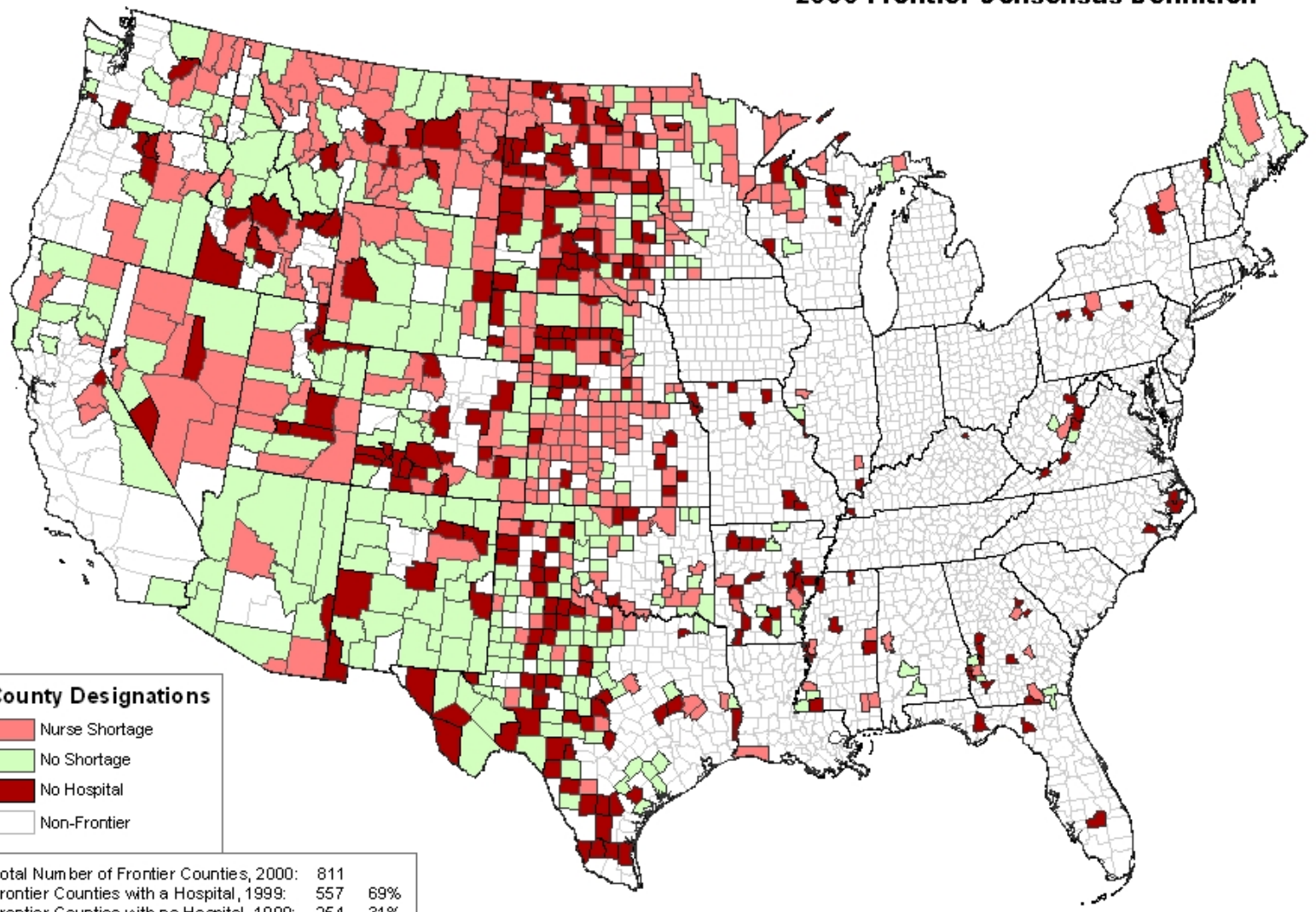
- Nurse Shortage
- No Shortage
- No Hospital

Total Number of Counties, 2000:	3,141	
Counties with a Hospital, 1999:	2,058	80%
Counties with no Hospital, 1999:	633	20%
Nurse Shortage Designation among Counties with a Hospital:	880	35%

Data Sources: The 1999 AHA Annual Survey; and Nurse Shortage Counties, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services

Hospital-based Nurse Shortages in Frontier Counties

2000 Frontier Consensus Definition



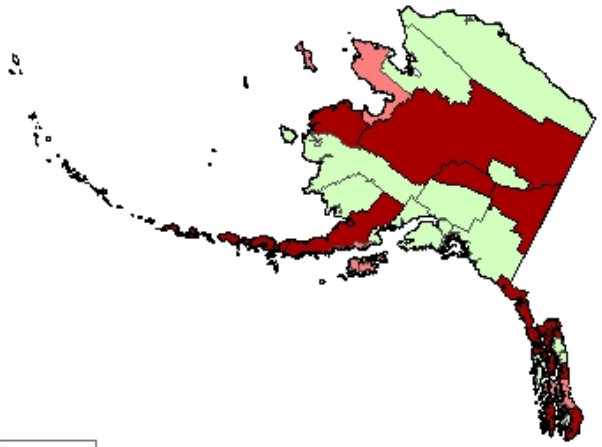
County Designations

- Nurse Shortage
- No Shortage
- No Hospital
- Non-Frontier

Total Number of Frontier Counties, 2000:	811	
Frontier Counties with a Hospital, 1999:	557	69%
Frontier Counties with no Hospital, 1999:	254	31%
Nurse Shortage Designation among Counties with a Hospital: Frontier Counties:	287	52%
non-Frontier Counties:	593	30%

Data Sources: The 1999 AHA Annual Survey; and Nurse Shortage Counties, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services

Hospital-based Nurse Shortages



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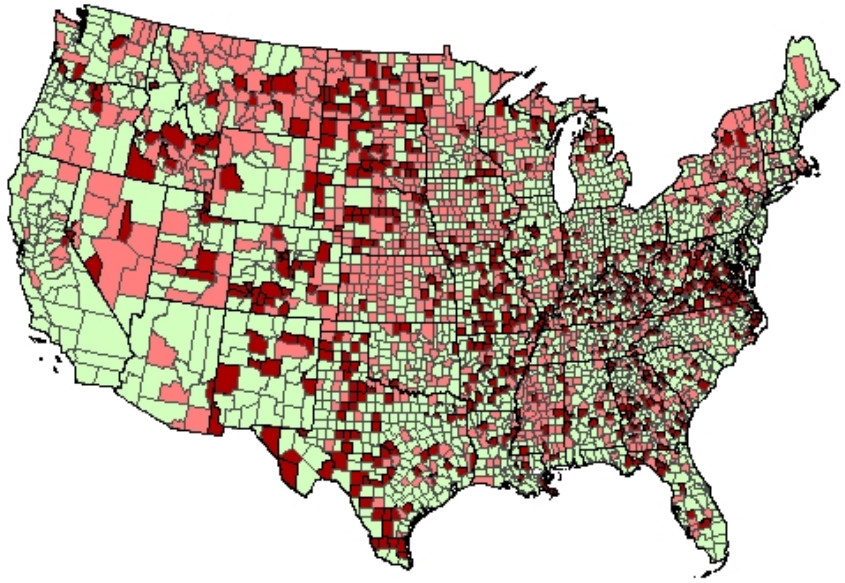
- No Shortage
- No Hospital



Data Sources: The 1999 AHA Annual Survey; and Nurse Shortage Counties, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services

Hospital-based Nurse Shortages in Frontier Counties

2000 Frontier Consensus Definition

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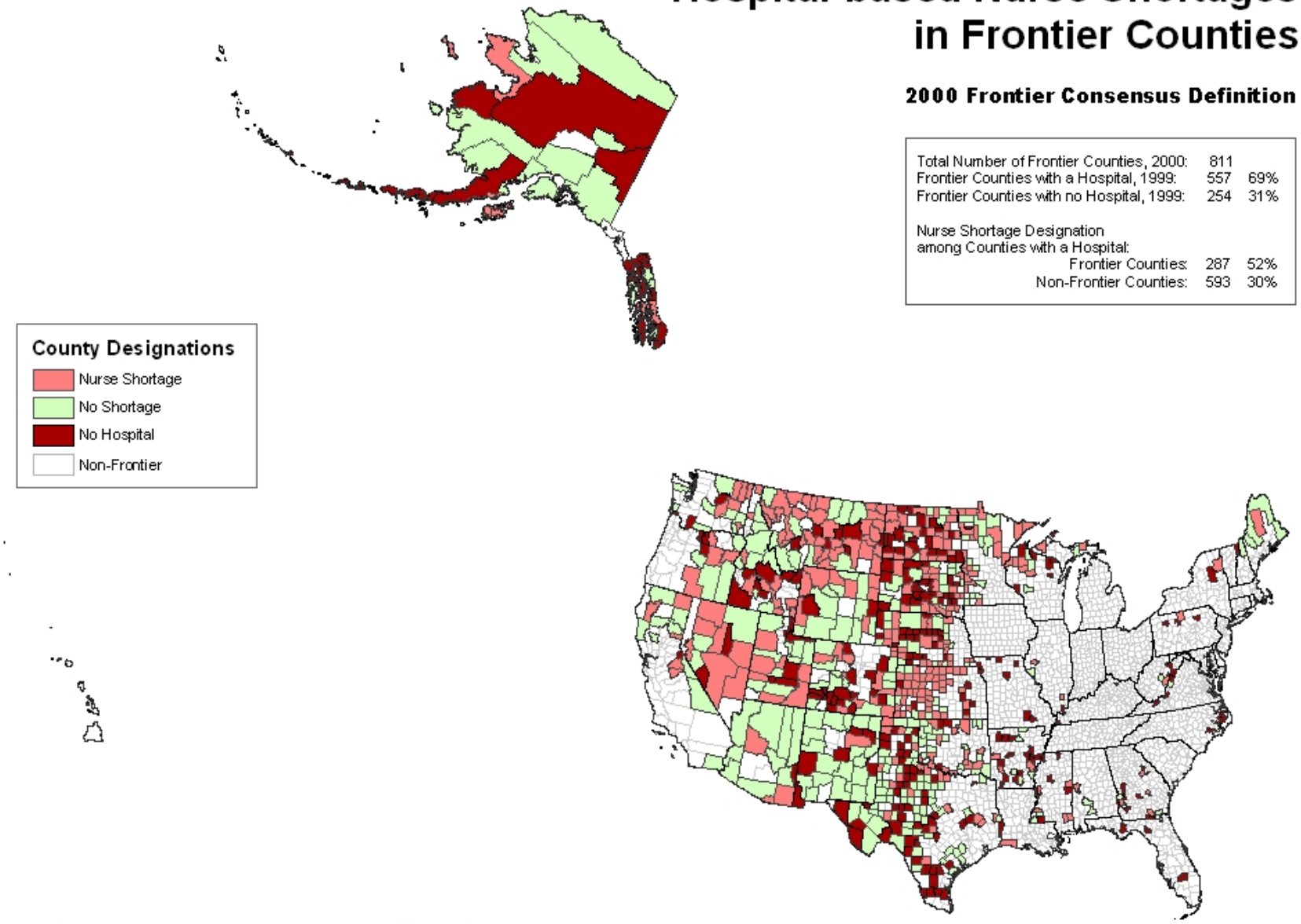

Data Sources: The 1999 AHA Annual Survey; and Nurse Shortage Counties, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services