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The Relationship Between Nurse to Population Ratio and State Health Ranking

Jeri Bigbee
Boise State University

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Jeri L. Bigbee,
Department of Nursing, Boise State University, Boise, Idaho

Abstract

Objective: To evaluate the relationship between nurse to population ratio and population health, as indicated by state health ranking.
Design: Secondary analysis correlational design.
Sample: The sample consisted of all fifty states in the U.S.
Measurements: Data sources included the United Health Foundation's 2006 state health rankings, the 2004 National Sample Survey for Registered Nurses, and the U.S. Health Workforce Profile from the New York Center for Health Workforce Studies.
Results: Significant relationships between nurse to population ratio and state health ranking (rho = -.446, p =.001) and 11 of the 18 components of the overall ranking (motor vehicle death rate, high school graduation rate, violent crime rate, infectious disease rate, percentage of children in poverty, percentage of uninsured residents, immunization rate, adequacy of prenatal care, number of poor mental health days, number of poor physical health days, and premature death rate) with higher nurse to population ratios associated with higher health rankings were found. Physician to population ratios were also significantly related to state health ranking, but were associated with different components.
Conclusions: These findings suggest that greater nurses per capita may be uniquely associated with healthier communities, however further multivariate research is needed.

Key Words: state health ranking, nurse to population ratio

Introduction

The objective of this study was to explore the relationship between nurse to population ratio and population health indices. This study is highly relevant in light of the current global nursing shortage. According to the National Sample Survey of Registered Nurses conducted in March 2004, there were an estimated 2.9 million registered nurses in the United States. The national ratio of employed nurses per 100,000 population (the nurse to population ratio) as of March 2004 was 825, increased from 782 in 2000 (U.S. Department of Health and Human Services Health Resources and Services Administration, Bureau of Health Professions, 2006). Historically, the nurse to population ratio in the US has increased from 436/100,000 in the 1970's to 638 in the 1980's and 720 between 1990 and 1996 (Shih, 1999). The New England and Middle Atlantic regions consistently have the highest nurse to population ratios, while the Pacific, West North Central, and South Atlantic regions have historically had the lowest nurse to population ratios (Shih, 1999). According to the National Center for Health Workforce Analysis (2004), in 2000 the national supply of full time equivalent registered nurses was estimated at 1.89 million while the demand was estimated at 2 million, a shortage of 110,800 (6%). By 2010 that shortage is estimated to reach 17%, 27% by 2015, and an alarming 36% by 2020.

Although the variable of nurse to population ratio is widely cited in workforce literature and policy, there is very limited research to date examining population health outcomes in relation to nurse to population ratios. The simple question of whether more nurses per capita are associated with healthier communities has not been addressed in adequate depth. Very few studies have specifically addressed nurse to population ratios in relation to population health indices and the results are conflicting. Over thirty years ago, Miller's research (1975) indicated that infant mortality and age-sex adjusted death rate decreased consistently as the nurse to population ratio increased, but these relationships were reversed when analyzing the physician to population ratio and the number of hospital beds. Miller concluded that "physicians engage primarily in diagnosis and treatment which ... have definite built-in risks. While nurses do engage in some therapeutic activity, that would not appear to be their primary function ... nurses, particularly public health nurses, perform an educative and counseling service. In many instances, routine instructions on such things as infant hygiene would seem to have a genuine positive impact on health" (p. 10). Bigbee (2003) examined nurse to population data with county-based demographic and health status data for the state of Nevada and similarly found that nurse to population ratio was significantly correlated with the percentage of women obtaining early prenatal care and the accidental death rate, but not significantly related to self-reported health status, average life expectancy, age-adjusted death rate, number of sick days per year, or suicide rate. These Nevada findings suggest that higher numbers of nurses may be associated with some aspects of healthier populations, however the sample size was too small to reach definitive conclusions.

Other studies, however, have failed to demonstrate an association between nurse to population ratios and population health. Miller and his colleagues, in a larger follow-up study (1986) found that none of the health service indicators that were measured, including inhabitants per RN, inhabitants per LPN, inhabitants per physician, inhabitants per hospital and per capita health expenditures, were significant predictors of mortality. However, concentration of Aid to Families with Dependent Children (AFDC) recipients, population density, and dependency ratio were negatively related to health status, and the percent of the workforce in white collar occupations was positively related to mortality rates. Similarly, a 1994 study (reference blinded for review) examined nurse practitioner to population ratios in California's 59 counties in relation to distribution of nurse practitioners (NPs) and health status indicators of the population. Initially, the NP to population ratio was found to be significantly correlated with birth rate, percentage of women failing to receive early prenatal care, and the teen pregnancy rate, however these relationships were not statistically significant when race and poverty rate were controlled. International studies addressing nurse to population ratios as related to global population health data have also failed to demonstrate a significant association between nurse to population ratio and population health indices, however varying levels of nursing education and practice internationally must be considered (Chen & Lowenstein, 1985; Robinson & Wharrad, 2000).

Previous comparative research addressing the distribution of non-nursing providers in relation to population health indices has focused primarily on physicians and again has produced mixed findings. Several studies have shown that greater numbers of physicians per capita are not generally associated with higher levels of health in the population, especially in developed countries (Miller, 1975; Miller, Dixon, & Fendley, 1986; Wisso, Gittelsohn, Szklo, Starfield, & Mussman, 1988; Makuc, Haglund, Ingram, Kleinman & Felman, 1991; Chen & Lowenstein, 1985). Several of these studies again indicated that demographic characteristics such as age, ethnicity, income, and educational level distributions, are often more powerful predictors of population health than provider to population ratios (Miller et al., 1986; Robinson & Wharrad, 2000; Wisso et al., 1988; Makuc et al., 1991). More recent studies focusing specifically on primary care physicians, however, have indicated a positive association with population health, including all-cause, cancer, heart disease, stroke, and infant mortality; low birth weight; life expectancy; and self-rated health (Macinko, Starfield, & Shi, 2007). In contrast, Bigbee's (2003) findings from Nevada indicated that the primary care physician to population ratio was not significantly related to any county health indices except that greater numbers of physicians per capita were significantly associated with greater numbers of reported sick days among residents.

Thus, given the limited and conflicting findings to date related to the relationship between nurse to population ratios and the health of populations, it is clear that further study is indicated. In light of the current nursing shortage, this research is relevant in assessing the contribution of nursing professionals to the overall health of the population. The purpose of this study was to evaluate the relationship between nurse to population ratio and population health, using states as the unit of analysis. The hypothesis tested was: There is a positive relationship between nurse to population ratio and population health, as indicated by state health ranking.

The recently proposed concept of "Nurse Dose" served as the conceptual framework for this study. Brooten and Youngblut (2006) recently proposed this concept, based on previous research (Brooten & Naylor, 1995; Brooten, Youngblut, Kutcher, & Bobo, 2004). The concept includes three components: dose, nurse, and host response. Brooten and her colleagues define "dose" as the number of nurses or amount of care given by nurses; "nurse" as the education, expertise, and experience of the nurse; and "host" as the individual or aggregate culture and responsiveness to the nurse's care. Current research, most of which is hospital-based, has demonstrated that "differing nurse doses have been associated with both increases and decreases in patient mortality, morbidity, and health costs" (Brooten & Youngblut, 2006, p. 94). Brooten and Youngblut contend that in the macro view, examining nurse to population ratios related to geographic areas is consistent with their conceptual model. (In the macro view, "dose" is the number of nurses per capita, and "host" could be a community, a hospital, or another health care organization.) However, community-oriented population-based studies addressing the concept of nurse dose are extremely limited and no studies have specifically addressed the nurse dose concept in relation to population health indices.

Methods

A correlational secondary analysis was conducted, examining nurse to population data in relation to population health indices using states as the unit of analysis. State nurse to population ratios from the 2004 National Sample Survey of Registered Nurses (NSSRN) were used (U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, 2006). The NSSRN, conducted by the Gallop Organization, represents the most comprehensive dataset related to registered nurses who are licensed to practice in the United States. The 2004 sample consisted of 50,691 RNs and 35,724 responded (70.47% response rate). To ensure representativeness, a stratified nested design in which minority nurses and nurses in states with small populations were oversampled was used. The highest educational level of the nurses in the 2004 sample was 17.5% diploma, 33.7% associate degree, 34.2% baccalaureate, and 13.0% graduate degrees. The sample included 8.3% advanced practice nurses. Most of the nurses worked in hospitals (56.2%), while 10.7% worked in public/community health settings. Educational and practice data were not reported by state. The nurse to population ratios by state as reported in the NSSRN final report are included in Table 1.

For comparison purposes, state physician to population ratios for 2004 were also included in the analysis. The ratios for all physicians as well as only primary care physicians were included. These ratios were obtained from The United States Health Workforce Profile report, based on data from American Medical Association, the American Osteopathic Association and the U.S. Census Bureau (The New York Center for Health Workforce Studies, 2006). These ratios are also included in Table 1.

As the measure of population health, the 2006 American's Health Rankings, computed and published by the United Health Foundation in collaboration with American Public Health Association and Partnership in Prevention were used (United Health Foundation, 2006)[1]. The state rankings are included in Table 1. The component indices used to compute the rankings include both determinants (categorized as personal behaviors, community environment, public and health policies, and health services) and outcomes (including both length and quality of life measures). The eighteen components of the rankings are outlined in Table 2. Nurse to population ratios were not included in the component indices. Sources of the data used in the computation of the rankings included the U.S. Department of Health and Human Services, Commerce, Education, and Labor, the National Safety Council and the National Association of State Budget Offices. Each of the components is assigned a weighting, based on recommendations from a panel of experts. The score for each state is computed using the formula: score = [(absolute value/national mean) – 1.0] x 100. This computation produces a score for each state in relation to the national average. In addition, "to prevent an extreme value from excessively influencing a final score, the maximum score any state could receive for a component is limited to the national norm plus or minus two standard deviations (p. 108)". The state rankings are then formulated by ordering each state according to score. This methodology has received continuous review and refinement by the Scientific Advisory Committee review panel. These rankings have been computed annually since 1990.

The study data were analyzed using two-tailed Spearman rank order correlations due to the ordinal level of the ranking data with a level of significance of $p<.05$.

[1] America's Health Rankings™ – 2006 Edition, ©2006 United Health Foundation. All Rights Reserved.

Results

The correlational findings are presented in Table 3. The nurse to population ratio was significantly related to state health ranking (rho = -.446, p= .001), indicating that higher nurse to population ratios were associated with healthier state rankings, supporting the research hypothesis. Of the top five states with the highest nurse to population ratios (Maine, New Hampshire, North Dakota, South Dakota, and Massachusetts), all but South Dakota also rank among the top ten states in terms of health ranking. Among the five lowest states for nurse to population ratio, California, Nevada, Idaho, Utah and Texas, the rankings are more variable, with California 23rd, Nevada 38th, Idaho 19th, Utah 6th, and Texas 37th in state health rank. When the state nurse to population ratio was examined in relation to each of the components of the state rankings, the ratio was significantly correlated with all of the components except smoking rate, obesity rate, level of public health spending, and infant, cancer, cardiovascular, and occupational mortality rates (see Table 3). All of the significant relationships indicated that higher nurse to population ratios were associated with higher levels of health of the population. The public health nurse to population ratio specifically was then examined in relation to to the overall state ranking and each of the components. The public health to population ratio was significantly related to state health ranking (rho = -.334, p= .020), but was significantly correlated with only 3 of the 14 components: infectious disease rate (rho = -.299, p=.039), the percentage of children in poverty (rho = -.339, p=.019), and the percentage of uninsured residents (rho = -.328, p=.023). All of the significant relationships indicated that higher public health nurse to population ratios were associated with higher levels of health of the population.

Similar to the findings related to nurses, the total physician to population ratio

(rho =-.491, p=.000) and the primary care physician to population ratio (rho =-.613, p=.000) were also significantly related to the overall state health rankings. As the physician to population ratios increased the state rank improved. When total physician to population ratio was examined in relation to each of the components of the state rankings, the ratio was significantly correlated with all of the components except the high school graduation rate, crime rate, infectious disease rate, immunization rate, adequacy of prenatal care, number of poor mental health days, and cancer death rate (see Table 3). When the primary care physician to population ratio was examined in relation to each of the components of the state rankings, the ratio was similarly significantly correlated with all of the same components (with slightly stronger correlation coefficients), except that the primary care physician ratio was also significantly correlated with the number of reported poor mental health days (see Table 3). All of the significant relationships indicated that higher physician to population ratios were associated with higher levels of state health ranking.

Discussion

This study assessed the relationship between nurse to population ratio and population health, as indicated by state health rankings. The findings support the hypothesis that nurse to population ratio is positively related to state health ranking, with higher nurse to population ratios associated with healthier rankings. Similar relationships between physician to population ratios and state health rankings were found. These findings are consistent with some of the previous research that demonstrated positive relationships between provider to population ratios and population health indices, however, given the few studies specifically demonstrating a positive association between nurses and population health, these findings are noteworthy, particularly in light of the current nursing shortage.

In interpreting these correlational findings, caution must be exercised, particularly in drawing conclusions suggesting causation. The relationship between provider to population ratios and population health outcomes is complex, with multiple social and economic factors involved. Further multivariate research is needed, examining the nurse to population ratio in relation to population health over time while controlling for other influencing variables. The use of state level data also represents a limitation, in that the unique health profiles of rural areas might be overshadowed by more populous urban areas within the state. Using a county or zip code level of analysis would provide a more precise analysis. In addition, when considering varying levels of health among states, an alternative hypothesis could be proposed that some basic underlying factors, such as a positive health promotive culture, economy, and/or political environment, may serve to attract more nurses (and other providers) to live and practice in those states, as well as produce healthier population health characteristics. Identifying those possible underlying factors would be highly useful in both public health promotion as well as workforce planning. This study was also limited by the fact that the nurse to population and physician to population data were collected in

2004, while the varying state health indices used to compute the state health rankings reflected data ranging from 2001 to 2005. Additionally, the breakdown of nurses' educational preparation and practice settings by state was not available, which limited the depth of the analysis. The limited empirical basis for the Nurse Dose concept to date also limits the comparability of the findings.

The interdisciplinary findings from this study suggest that greater numbers of health professionals may be associated with the health of communities, but perhaps in different ways. The nurse to population ratio was associated with higher high school graduation rates, lower crime rates, lower infectious disease rates, greater immunization coverage, and greater adequacy of prenatal care, while the physician to population ratio was not. The physician to population ratio was associated with smoking rates, obesity rates, occupational fatality rates, public health spending, infant mortality rates, and cardiovascular death rates, while the nurse to population ratio was not. These differential findings suggest that nurses may perhaps influence the health of communities most strongly at the aggregate level (high school graduation, crime rate, infectious disease, immunization, and prenatal care rates), perhaps due to the emphasis on health promotion and public health in nursing education. In contrast, physicians, with a more individual-focused, biomedical approach may influence the health of communities more at the individual client level (smoking, obesity, and cardiovascular death rates). Certainly, however, there is considerable commonality in how nurses and physicians may be associated with the health of communities (e.g. motor vehicle death rates, poverty/uninsured rates, and number of sick days). Further research is needed examining how the various health disciplines optimally interact in their potential health promotive effects on communities as well as their unique contributions. It is also interesting to note that the nurse to population ratio was not significantly correlated with state public health spending levels, but the physician to population ratios were. Given the fact that nurses provide the majority of public health services, particularly in rural areas, these findings are somewhat puzzling. All but one of the top five states in terms of public health spending per capita (Wyoming, Hawaii, Alaska, New York, and Montana), are located in the western U.S. where the current nursing shortage is most acute, which may in part explain these results.

The findings also suggest that the "Nurse Dose" concept may be a useful theoretical approach for the study of nurse to population ratios and population health. This study primarily addressed the "dose" and "host response" aspects of the concept. Further research addressing the unified concept, including the "nurse" aspects (education, experience, and expertise), in relation to nurse to population ratio is indicated to fully assess the theoretical utility of the concept at the macro level. Examining specifically the "dose" of public health nurses in relation to population health indices would be particularly relevant, given their strong population focus. This study also demonstrated the value of the United Health Foundation's state health rankings for use in nursing research. These annual rankings reflect a broad view of the health of populations that is consistent with nursing's conceptual view. This longitudinal existing data source is a valuable resource for nursing research that could be more utilized in the future.

Conclusions

The results of this study suggest that more registered nurses per capita may be associated with healthier populations. From a public health perspective, these findings provide support for continued aggressive strategies to address the current nursing shortage. Evaluating the contribution of nurses to promoting the health of individuals, families and communities is an imperative for nursing research. In advocating for the need for more and better prepared nurses, evidence in support of nurses' invaluable role in building and maintaining healthy populations represents a critical influencing factor.

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Table 1: State Nurse to Population Ratios, Health Ranking, Physician to Population Ratio, and Primary Care Physician to Population Ratio

State	Nurse to 100,000 Population Ratio[a]	Health Ranking[b]	MD to 100,000 Population Ratio[c]	Primary Care MD to 100,000 Population Ratio[d]
Alabama	806	45	175.60	64.54
Alaska	1034	31	216.80	94.90
Arizona	681	34	191.00	67.59
Arkansas	731	46	171.84	66.37
California	590	23	209.92	76.23
Colorado	753	16	226.06	81.76
Connecticut	934	5	267.04	85.74
Delaware	1040	30	217.50	76.95
DC	2093		481.28	143.99
Florida	763	41	222.48	75.78
Georgia	753	42	184.57	66.41

State	Nurse to 100,000 Population Ratio[a]	Health Ranking[b]	MD to 100,000 Population Ratio[c]	Primary Care MD to 100,000 Population Ratio[d]
Hawaii	739	4	262.35	99.38
Idaho	628	19	168.60	63.95
Illinois	895	25	208.26	77.34
Indiana	876	33	184.17	66.56
Iowa	1106	11	171.88	72.13
Kansas	909	17	192.54	74.17
Kentucky	908	39	189.92	68.67
Louisiana	783	50	200.72	66.32
Maine	1145	9	255.76	101.95
Maryland	848	32	293.52	96.32
Massachusetts	1175	7	303.19	100.66
Michigan	840	27	214.21	80.40

State	Nurse to	Health	MD to	Primary

	100,000 Population Ratio	**Ranking**	**100,000 Population Ratio**	**Care MD to 100,000 Population Ratio**
Minnesota	1018	1	217.18	89.10
Mississippi	827	49	157.87	56.80
Missouri	997	35	202.98	72.10
Montana	854	22	217.18	82.21
Nebraska	1061	12	185.09	71.71
Nevada	604	38	176.81	63.65
New Hampshire	1283	3	226.16	83.96
New Jersey	839	14	254.64	87.94
New Mexico	713	40	194.77	78.29
New York	906	29	263.64	87.60
North Carolina	899	36	199.29	70.01
North Dakota	1180	8	206.66	84.97

State	**Nurse to 100,000**	**Health Ranking[b]**	**MD to 100,000**	**Primary Care MD to**

	Population Ratio[a]		**Population Ratio[c]**	**100,000 Population Ratio[d]**
Ohio	984	25	210.21	76.43
Oklahoma	694	44	167.70	66.55
Oregon	858	19	228.32	87.08
Penn	1024	28	237.15	82.10
Rhode Island	1052	13	267.44	94.39
South Carolina	732	48	189.18	67.60
South Dakota	1204	18	196.40	76.80
Tennessee	921	47	210.02	74.56
Texas	646	37	171.70	59.92
Utah	660	6	170.32	58.06
Vermont	1037	2	269.23	110.40
Virginia	760	21	215.33	78.27

State	**Nurse to 100,000 Population**	**Health Ranking[b]**	**MD to 100,000 Population**	**Primary Care MD to 100,000**

	Ratio[a]		Ratio[c]	Population Ratio[d]
Washington	780	15	221.86	85.09
West Virginia	884	43	197.26	78.22
Wisconsin	938	10	212.74	81.59
Wyoming	805	23	179.65	72.06

[a] Source: The Registered Nurse Population: Findings from the March 2004 National Sample Survey of Registered Nurses, U.S. Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, 2006.

[b] Source: America's Health Rankings™ - 2006 Edition, ©United Health Foundation, 2006.

[c] Source: The United States Health Workforce Profile, The New York Center for Health Workforce Studies, 2006

[d] Source: The United States Health Workforce Profile, The New York Center for Health Workforce Studies, 2006.

Table 2. America's Health Rankings Summary Description of Components (America's Health Rankings™ – 2006 Edition, ©2006 United Health Foundation. All Rights Reserved)

DETERMINANTS	**DESCRIPTION**
Personal Behaviors	
Prevalence of Smoking[a]	Percentage of population over age 18 that smokes on a regular basis
Motor Vehicle Deaths[b]	Number of deaths per 100,000,000 miles driven in a state
Prevalence of Obesity[c]	Percentage of the population estimated to be obese, with a BMI of 30.0 or higher
High School Graduation[d]	Percentage of students who graduate in four years from a high school with a regular degree
Community Environment	
Violent Crime[e]	The number of murders, rapes, robberies and aggravated assaults per 100,000 population
Occupational Fatalities[f]	Number of fatalities from occupational injuries per 100,000 workers
Infectious Disease[g]	Number of AIDS, tuberculosis and hepatitis cases reported to the Centers for Disease Control and Prevention per 100,000 population

DETERMINANTS	**DESCRIPTION**
Children in Poverty[h]	The percentage of persons under age 18 who live in households that are at or below the poverty threshold
Public & Health Policy	
Lack of Health Insurance[i]	Percentage of the population that does not have health insurance privately, through their employer or the government
Per Capita Public Health Spending[j]	The dollars spent on direct public health care services, community-based services and population health activities as defined by NASBO
Immunization Coverage[k]	Percentage of children ages 19 to 35 months who have received four or more doses of DTP, three or more doses of poliovirus vaccine, one or more doses of any measles-containing vaccine, three or more doses of Hib, and three or more doses of HepB vaccine
Health Services	
Adequacy of Prenatal Care[l]	Percentage of pregnancy women receiving adequate prenatal care, as defined by Kotelchuck's Adequacy of Prenatal Care Utilization (APNCU) Index

OUTCOMES	**DESCRIPTION**
Poor Mental Health Days[m]	Number of days in the previous 30 days when a person indicates their activities are limited due to mental difficulties
Poor Physical Health Days[n]	Number of days in the previous 30 days when a person indicates their activities are limited due to physical health difficulties
Infant Mortality[o]	Number of infant deaths (before age 1) per 1,000 live births
Cardiovascular Deaths[p]	Number of deaths due to all cardiovascular diseases, including health disease and strokes, per 100,000 population
Cancer Deaths[q]	Number of deaths due to all causes of cancer per 100,000 population
Premature Deaths[r]	Number of years of potential life lost prior to age 75 per 100,000 population

[a] Source: 2005 data, Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

[b] Source: 2005 data, National Safety Council

[c] Source: 2005 data, Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

[d] Source: 2002-2003 data, National Center for Education Statistics

[e] Source: 2005 data, Crime in the United States, Federal Bureau of Investigation

[f] Source: 2002-2004 data, Census of Fatal Occupational Injuries, Bureau of Labor Statistics

[g] Source: 2003-2005 data, Centers for Disease Control and Prevention

[h] Source: 2005 data, Current Population Survey, March 2006, U.S. Census Bureau

[i] Source: Source: 2005 data, Current Population Survey, March 2006, U.S. Census Bureau

[j] Source: 2003 data, National Association of State Budget Officers

[k] Source: 2005 data, National Immunization Program, Centers for Disease Control and Prevention

[l] Source: 2004 data. National Center for Health Statistics, Centers for Disease Control and Prevention

[m] Source: 2005 data, Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

[n] Source: 2005 data, Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention

[o] Source: 2004-2005 final and provisional data, National Center for Health Statistics, Centers for Disease Control and Prevention

[p] Source: 2001-2003 data, Centers for Disease Control and Prevention

[q] Source: 2001-2003 data, Centers for Disease Control and Prevention

[r] Source: 2001-2003 data, Centers for Disease Control and Prevention

Table 3. Spearman Rank Order Correlations Between Nurse and Physician-to-Population Ratios and State Health Rankings

	RN to Population Ratio	**Total Physician to Population Ratio**	**Primary Care Physician to Population Ratio**
State Health Ranking	**-.446 ****	**-.491****	**-.613****
• Smoking	.024	-.403**	-.414*
• MV Deaths	-.352*	-.648**	-.650**
• Obesity	.009	-.569**	-.527**
• High School Graduation	-.371**	-.165	-.287
• Crime	-.361*	-.084	-.235
• Occupational Fatalities	-.248	-.583**	-.493**
• Infections Disease	-.329*	.225	-.048
• Children in Poverty	-.327*	-.437**	-.505**
• Uninsured	-.727**	-.453**	-.524**
• Public health Spending	-.176	-.320*	-.325*
• Immunizations	-.599**	-.245	-.239
• Prenatal care	-.427**	-.089	.002

	RN to Population Ratio	**Total Physician to Population Ratio**	**Primary Care Physician to Population Ratio**
• Poor Mental Health Days	-.335*	-.225	-.404**
• Poor Physical Health Days	-.338*	-.361*	-.520**
• Infant Mortality	-.187	-.398**	-.520**
• Cardiovascular Deaths	-.192	-.545**	-.573**
• Cancer Deaths	.144	-.163	-.241
• Premature Deaths	-.349*	-.506**	-.597**

*p<.05, **p<.01