

Rural Dentists of the Future: Dental School Enrollment Strategies

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Abstract: The purpose of this study was to determine the relationship, if any, of a dental student's 1) state of residency and 2) gender to his or her practice location in a rural Nebraska community after graduation. Previous research has demonstrated that dental students generally locate their practices near their place of rearing and that male graduates are more likely than female graduates to locate in rural areas. Dental student data for all University of Nebraska Medical Center College of Dentistry graduates from 1989 to 2008 (n=879) were analyzed. Descriptive and quantitative analyses were performed utilizing SPSS software (version 17.0). Chi-square and odds ratio analyses were also conducted. In contrast to previous research, women dentists who remained in the state after graduation were more likely to locate their practice in a rural community than were male dentists: 59 percent and 48.5 percent, respectively. Nonresidents who remained in the state after graduation were also more likely to locate in a rural community than were residents: 69 percent and 51 percent, respectively. Dental schools may find this information useful as state officials and policymakers look to dental schools for leadership in addressing dental workforce needs, especially in rural/underserved areas.

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Research demonstrates that the presence of a dental school within a state, as well as the percentage of in-state dental students, significantly correlates with the number of dentists in the state.¹⁻⁴ Nationally, the in-state enrollment in dental schools is approximately 67 percent.⁵ In-state enrollment is substantially higher for public dental schools (78 percent) compared to private dental schools (34 percent).⁵ Therefore, state officials and policymakers may view dental schools as having the ability to improve local access to dental care needs, especially in rural underserved areas, by enrolling additional in-state students.

Of the 179,504 professionally active dentists in the United States, 13,736 (7.65 percent) practice in rural counties with a population of less than 50,000.⁶ The U.S. Census Bureau defines a rural community as having a population of 50,000 or less.⁷ Approximately 20 percent of the U.S. population lives in a rural community.⁷ Although the percentage of the U.S. population living in a rural community has been decreasing, the actual number of people living in rural communities is increasing.⁸ Understanding the degree of influence, if any, gender and a dental student's hometown have upon where dentists prac-

tice after graduation could significantly affect future access to care, especially in rural underserved areas.

Of the 1,011 professionally active dentists in Nebraska, approximately 34 percent (350) practice in rural communities.⁹ Approximately 87 percent of the dentists in Nebraska are graduates of one of the two dental schools in the state: the University of Nebraska Medical Center (UNMC) College of Dentistry and Creighton University School of Dentistry.⁹ Annually, UNMC and Creighton enroll approximately forty-five and ninety first-year pre-doctoral dental students, respectively. The UNMC College of Dentistry is a public school located in the city of Lincoln, which has a population of 251,624. Creighton's School of Dentistry is a private school located in Omaha, which is forty-five miles east of Lincoln and has a greater metropolitan population of 837,925. Approximately 90 percent of Creighton dental students are from outside Nebraska,¹⁰ whereas 40 percent of UNMC dental students are from outside the state. Currently, 85 percent (280) of the rural dentists in Nebraska are graduates of the UNMC College of Dentistry.⁹ The remaining 15 percent (seventy) of rural dentists are graduates of various midwestern dental schools.

U.S. dental workforce studies have documented that women dentists are less likely to practice in rural areas than are male dentists.^{11,12} Nationally, women dentists comprise 20 percent of the dental workforce, though their numbers are increasing.¹² Recent U.S. dental student enrollment data indicate that approximately 44.6 percent of all dental students are women.¹³ In Nebraska, women dentists comprise approximately 17 percent of the dental workforce.⁸

The purpose of this study was to determine, among UNMC College of Dentistry students who remain in Nebraska after graduation, if 1) Nebraska residents are more likely than nonresidents to practice dentistry in a rural community and 2) male dental students are more likely than female dental students to locate in a rural community.

Methods

The study analyzed twenty years of data for all UNMC dental graduates from 1989 to 2008 (n=879). Because most rural dentists (85 percent) in Nebraska are UNMC graduates, this study analyzed only UNMC dental student data. The data set contained no personal identifiers for the dental graduates.

Descriptive and quantitative analyses were performed utilizing Statistical Package for the Social

Sciences software (version 17.0, SPSS, Chicago, IL). Frequency, chi-square, and odds ratio testing were also conducted. Cross-tabulations for in-state and out-of-state student residency status and gender were performed. Data elements included the annual number of graduates, Nebraska residents, non-Nebraska residents, gender, percentage of students who stayed in Nebraska after graduation, location of any postdoctoral training, and current practice location. Data were sorted by year of graduation and grouped in five-year increments for reporting purposes. Data were analyzed to determine both the percentage of in-state and out-of-state students, as well as the percentage of female and male students who remained in Nebraska after graduation and located in a rural community.

Results

From 1989 to 2008, the UNMC College of Dentistry graduated a total of 879 dentists. Approximately 60 percent (534 graduates) were residents of Nebraska, and 40 percent (345) were not. As shown in Figure 1, from 1989 to 1993 approximately 50 percent of the graduates were from Nebraska. The number of students graduating during each of the five-year reporting periods varied from a maximum

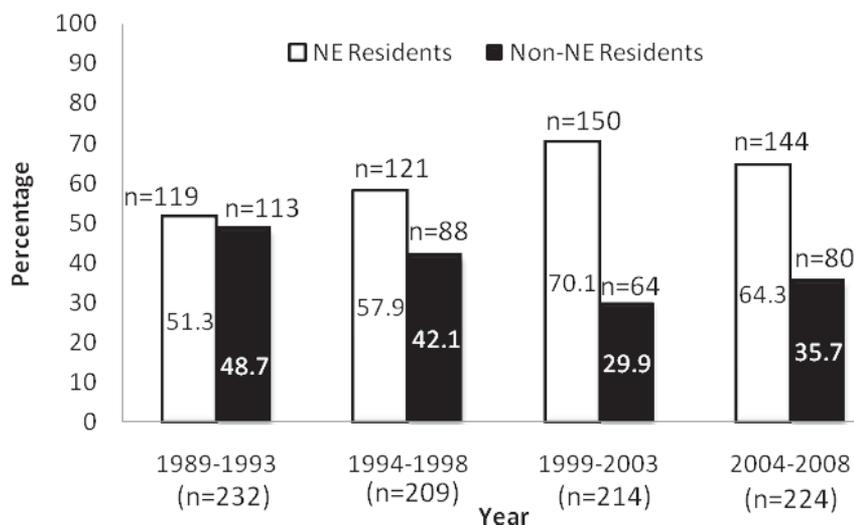


Figure 1. UNMC dental school graduates from within and outside Nebraska (NE), 1989–2008

of 232 students in 1989–93 to a minimum of 209 in 1994–98. Over the twenty-year period of the study, an increasing percentage of Nebraska residents have been accepted. Consequently, by 2004–08 the percentage of in-state graduates increased to approximately 65 percent.

Of the 879 dentists who graduated from the UNMC College of Dentistry from 1989 to 2008, approximately 30 percent (266) were female, and approximately 70 percent (615) were male. As shown in Figure 2, the percentage of female dental students graduating from the UNMC College of Dentistry from 1989 to 2008 steadily increased. In 1989–93, fewer than 25 percent of the dental graduates were female. By 2004–08, nearly 40 percent were female.

Of the 879 students who graduated from the UNMC College of Dentistry from 1989 to 2008, approximately 35 percent (311) have remained in Nebraska. Of those 311 graduates who remained in Nebraska, 282 were residents, and twenty-nine were nonresidents. Sixty-nine percent of nonresident students who stayed in Nebraska located in rural communities. Fifty-one percent of Nebraska residents who settled in Nebraska chose a rural location. As shown in Figure 3, the percentage of graduates who are remaining in Nebraska has grown steadily over the twenty-year study period.

Of the UNMC-educated dentists who remained in the state after graduation, 59 percent of women and 48.5 percent of men located their practices in rural communities. As shown in Table 1, the number of women graduates locating in rural areas during the past twenty years has outnumbered those locating in urban areas. The estimated odds of graduates locating in rural Nebraska are 2.16 times higher when graduates came from outside Nebraska (95 percent CI, 0.95 and 4.91).

Discussion

While 20 percent of the U.S. population live in rural communities, 42 percent of Nebraska's population reside in rural communities.^{5,8} During the next decade, national workforce studies indicate that two dentists will retire for each one who graduates.¹⁴ Nebraska dental workforce studies in 2001 found that 30 percent of dentists planned to retire by 2013.¹⁵ The consequences of these retirements, especially in rural areas, may significantly reduce access to dental care. Dental schools may recruit more students from rural communities to try to increase the number of dental

graduates returning to their hometown or another rural community to practice. This practice, however, may or may not achieve the desired results.

Historically, enrollment policies at UNMC have focused upon candidates' state residency status as well as their qualifications to complete the program successfully. There have been no special efforts to target more women or men for the program. The number and strength of resident applications have improved over the twenty-year period of our study. In 1989–93, approximately 50 percent of the dental students enrolled at the UNMC College of Dentistry came from outside Nebraska. By 2004–08, however, this percentage decreased to approximately 35 percent of the students. In addition, the UNMC College of Dentistry has had interstate admission agreements with the states of Wyoming and South Dakota over the twenty-year study period. Two or three students from Wyoming and three to five students from South Dakota are recruited annually. The college has also focused recruitment on rural areas of bordering states such as Kansas where there are no dental schools. There are no mandated limits on the number of out-of-state students the college can recruit. Recruitment efforts in these less populated states and rural areas may have contributed to the finding that a higher percentage of nonresidents than residents located in the rural areas of Nebraska for practice.

Over the study period, the majority of nonresident students accepted were from these surrounding states. Nonresidents from these predominantly rural states therefore may be willing to practice in a rural Nebraska community because they are very familiar with rural living and a rural Nebraska community may actually be larger than their rural hometown. Although our study did not analyze the size of the dental student's hometown compared to the size of the town where they located their practice, further study of this variable may be appropriate.

Another factor contributing to the greater percentage of out-of-state dental students locating in rural areas of Nebraska may be that dental students are most likely to locate in the state where they received their dental education.² A national study of physicians, for example, found that 51 percent began practice in the state where they received their graduate medical education (range of 6 to 71 percent among states) and 63 percent practiced in the same geographic region.¹⁶

Although there are two dental schools in Nebraska, our public dental school and the private

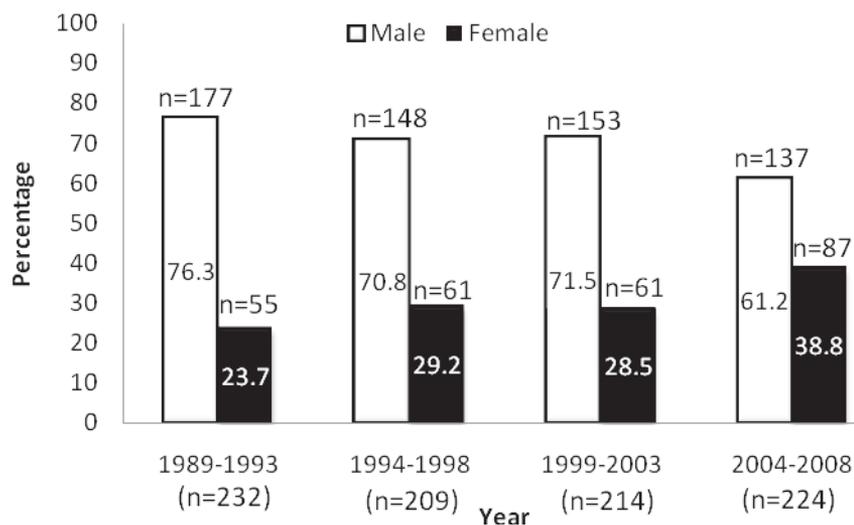


Figure 2. UNMC dental school graduates by gender, 1989–2008

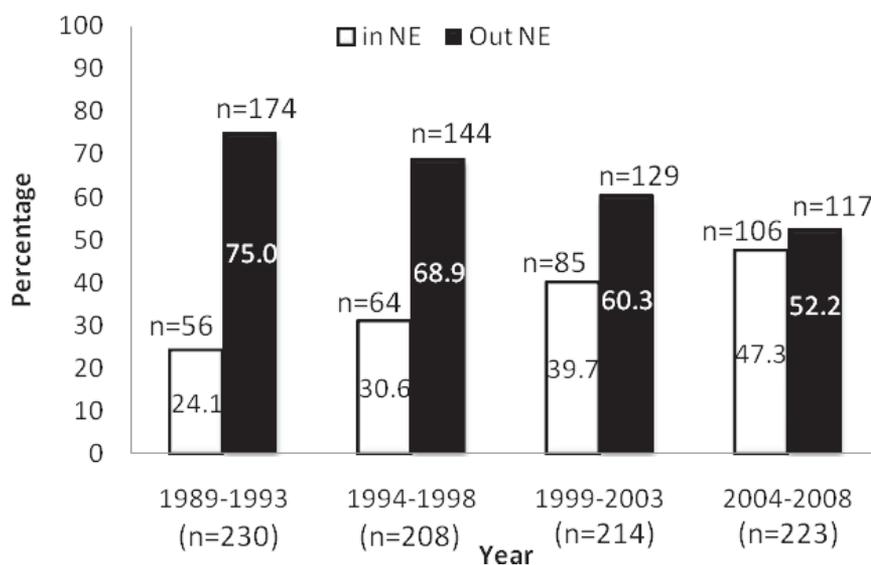


Figure 3. UNMC dental school graduates practicing within and outside of Nebraska (NE), 1989–2008

Note: Some of the percentages do not total 100% because some graduates are now deceased.

Creighton School of Dentistry, we limited our study to data only from the public school. In general, private dental schools do not enroll as many in-state applicants as do public dental schools.⁴ From 1989 to 2009, Creighton School of Dentistry graduated 1,665 dental students, 1,485 of whom were from outside the state of Nebraska.¹⁰ Approximately 8 percent of the

Creighton students (139) remained in Nebraska after graduation to practice.¹⁰ Nebraska dental workforce studies show that 85 percent of the rural Nebraska dentists graduated from UNMC. That finding is not surprising, given the mission of the UNMC College of Dentistry to recruit applicants from rural communities and the state of Nebraska.

Table 1. Number of male and female 1989–2008 UNMC graduates practicing in rural and urban Nebraska

Year	Male		Female		Total
	Rural Practice	Urban Practice	Rural Practice	Urban Practice	
1989–93	16	19	18	3	56
1994–98	19	25	11	9	64
1999–2003	32	25	16	12	85
2004–08	28	32	23	23	106
Total	95	101	68	47	311

Historically, more than 80 percent of the practicing dentists in the United States have been men. Dental workforce data, however, indicate the percentage of women in the workforce has been steadily increasing for the past twenty years.^{9,17} The same is true of UNMC graduates. While women comprised approximately 25 percent of the dental school graduates from 1989 to 2003, they comprised approximately 40 percent by 2004–08. In contrast to previous workforce studies by Wall and Brown in which women dentists were identified as less likely to practice in rural areas than men,¹² we found that women dentists remaining in Nebraska were more likely than their male colleagues to locate their practice in a rural community. Women dentists are now graduating in sufficient numbers to draw meaningful conclusions regarding their practice patterns. Also, the novelty of a women dentist, especially those practicing in a rural community, may be waning. The general public may no longer consider it unusual to receive care from a female dentist, thereby making it possible for women dentists to successfully operate a private practice in a rural community.

Other factors contributing to both women and out-of-state dental students locating in rural communities are the state student loan and loan repayment programs. These programs are available to dentists who locate in rural or underserved areas of the state. According to a survey conducted by the American Dental Education Association (ADEA), more than 90 percent of dental school graduates have student loan debts.¹⁸ The average debt load for a dentist graduating in 2007 was \$172,627. A 2005 study of twenty-seven state loan repayment programs for dentists by the National Conference of State Legislatures (NCSL) concludes that “loan repayment is cost-effective, is increasing the number of providers in underserved areas, and is enhancing access to oral health in those communities.”¹⁹ In 2008, 96 percent of the UNMC dental students graduated with student loan debt

averaging \$149,271. The Nebraska Student Loan Program and Loan Repayment programs make available annually \$20,000 and \$40,000 respectively to those dentists who locate in a rural/underserved county. These programs may be a significant contributing factor for out-of-state dentists and women dentists to locate in rural Nebraska communities. Further study of the state student loan and loan repayment programs is warranted.

Conclusion

Analysis of twenty years of dental school data from the UNMC College of Dentistry found that a higher percentage of nonresident dental students and female dental students who remained in Nebraska after graduation were more likely to practice dentistry in rural Nebraska communities than in-state and male dental students. This information may be especially important as Nebraska policymakers look to dental schools for leadership in addressing local access to care needs. To ensure future access to dental services in rural underserved areas, additional research is needed to determine if these findings are unique to Nebraska or if they apply to other dental schools.

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