

## ORIGINAL RESEARCH

# The impact of a rural emergency department rotation on applicant ranking of a US emergency medicine residency program

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## A B S T R A C T

**Introduction:** Few US emergency medicine (EM) residency programs have been located in rural states due to program requirements for emergency department (ED) patient volume. Recent revision to the program requirements now permits 'educationally justifiable exceptions' to the patient population requirement, 'such as clinical sites in a rural setting', and some EM residency programs now plan to offer rural ED clinical experiences as a required curricular component. The impact of a required rural EM rotation on the ranking decisions of applicants is important to residency programs seeking to attract the most desirable applicants.

**Objective:** To assess the impact of a required rural ED rotation on applicant ranking of an EM residency program in the US National Resident Matching Program (NMRP).

**Methods:** All applicants to the study's EM residency program completing the interview portion of the application process received a mailed and emailed survey following the release of the 2004 NMRP results. The survey included questions addressing the rural/non-rural classification of the location of the applicants' childhood home, medical school, and anticipated future practice.



**Results:** Of 46 eligible subjects, 32 (69.6%) completed the survey. Of subjects with a rural childhood, 73.3% reported a positive impact on rank order (95% CI 50.9-95.7%) and 26.7% reported no impact (CI 4.3-49.1%); 81.3% of subjects with non-rural backgrounds reported no impact (CI 62.2-100%), 12.5% higher rank (CI 0-28.7%), and 6.3% lower (CI 0-18.2%). If planning a future practice in a rural community, 83.3% reported positive impact (CI 62.2-100%) and 16.7% no impact (CI 0-37.8%); 78.9% of subjects anticipating future practice in non-rural communities reported no impact (CI 60.6-97.3%), 15.8% higher rank (CI 0-32.2%), and 5.3% lower (CI 0-15.4). Of the subjects attending medical school in rural states, 52.2% reported a positive impact (CI 31.8-72.6%) and 47.8% no impact (CI 27.4-68.2%), while 75% of graduates of medical schools in non-rural states reported no impact (CI 32.6-100%) and 25% (CI 0-67.4%) a negative impact.

**Conclusion:** The presence of a rural ED rotation did not adversely impact EM residency applicants' ranking of the program.

**Key words:** emergency medicine, National Resident Matching Program, rural emergency department rotation, USA.

## Introduction

Most US emergency medicine (EM) residency programs are located in urban emergency departments (EDs) in large metropolitan areas, accessing the high patient volumes required to train multiple EM residents. Because the choice of practice location following completion of residency training favors the geographic area in the vicinity of the location of the training program<sup>1</sup>, the resulting distribution of EM residency graduates typically concentrates in these large urban areas. Rural areas, however, experience difficulty in recruiting residency trained emergency physicians and studies addressing the credentials of ED physicians confirm that few rural practitioners possess American Board of Emergency Medicine (ABEM) certification and still fewer have completed an EM residency<sup>2,3</sup>. Few EM residency programs are located in rural states<sup>4</sup>. Prior attempts to establish ED clinical rotations in rural areas have failed to meet the program requirements for annual ED patient volume. A recent revision of the program requirements now allows for 'educationally justifiable exceptions' to the patient population requirement of greater than 30 000 per year, 'such as clinical sites in a rural setting'<sup>5</sup> and some EM residency programs now plan to offer rural ED clinical experiences as a required curricular component. The impact of a required rural EM rotation on the ranking decisions of applicants is important to residency programs seeking to attract the most desirable applicants. The purpose of our

study was to determine the impact of the rural ED rotation on National Residency Matching Program (NRMP) ranking decisions of applicants to our EM residency program.

## Methods

The study was granted exempt status by the Institutional Review Board of the University of Nebraska Medical Center because it involved the use of surveys that did not include any identifying information for the subjects. In addition, all subjects received a cover letter indicating the study's exempt status, as well as an outline of the study protocol ensuring subject confidentiality.

The study setting was a university based EM residency program utilizing both an urban primary ED and a rural secondary ED as clinical training sites. The primary ED is located in an urban center with a population of 397 713 and a five-county metropolitan area population of 792 144. The rural ED is located in a community with a population of 14 732 and a county population 36 631. The rural ED is located 774 km (481 miles) from the primary institution and 175 km (109 miles) from the nearest metropolitan area. The required residency curriculum includes a one-month rotation during the second and third years of training at the rural site.

Subjects included all applicants to the study's EM residency program completing the interview portion of the application



process in the first recruiting season for the new program. Each subject received a mailed and emailed survey following the release of the 2004 NRMP results. Non-responders received a subsequent email and telephone request for survey completion. The survey included questions addressing the rural/non-rural classification of the location of the applicant's childhood home, medical school, and anticipated future practice, and the impact of the rural rotation on program rank order. We calculated 95% confidence intervals for each response.

## Results

The study EM residency program interviewed 46 applicants for the 2004-2005 academic year. Of these 46 eligible subjects, 32 completed the survey for a response rate of 69.6%.

A large majority of subjects with a rural childhood background reported a positive impact with 73.3% (95% CI 50.9-95.7%) ranking the program higher, and 26.7% (95% CI 4.3-49.1%) reporting no impact on rank order. No subject with a rural childhood reported a negative impact on ranking. Of the subjects with non-rural childhoods, 81.3% (95% CI 62.2-100%) reported no impact on rank order of the residency program, 12.5% (95% CI 0-28.7%) ranked the program higher, and 6.3% (95% CI 0-18.2%) lower.

The rural rotation positively impacted those applicants with future plans to practice EM in a rural community, with 83.3% (95% CI 62.2-100%) ranking the program higher, 16.7% (95% CI 0-37.8%) reporting no impact on rank, and no subjects ranking the program lower. Most important to any residency program considering the institution of a rural ED training site, 78.9% (95% CI 60.6-97.3%) of residency applicants planning to practice in a non-rural setting reported no impact on rank order, and a larger percentage would rank the program higher rather than lower in this group: 15.8% (95% CI 0-32.2%) versus 5.3% (95% CI 0-15.4%), respectively.

Attending medical school in a state with greater than 30% rural population positively impacted the ranking of the residency program for 52.2% (95% CI 31.8-72.6%) of the subjects, and did not impact ranking for 47.8% (95% CI 27.4-68.2%). No applicants graduating from medical schools in rural states ranked the program lower as a result of the rural ED rotation. Of the applicants graduating from medical schools located in non-rural states, 75.0% (95% CI 32.6-100.0%) reported no impact on rank order, and one applicant out of four reported a negative impact (25%, 95% CI 0-67.4%).

The remote location of the rural ED rotation 774 km (481 miles) from the primary institution, did not adversely affect ranking of the program. No subject reported a negative impact on rank order.

## Discussion

The standard accepted credential necessary for the practice of EM in the USA is certification by the American Board of Emergency Medicine (ABEM) and EM residency programs in the USA currently provide the only pathway to such certification. For initial certification by ABEM, a physician must successfully complete an accredited residency in EM, pass a written qualifying examination, and then pass an oral certification examination. Accredited EM residency programs in the USA require 3-4 years of postgraduate training in the specialty. Most EM residency programs involve clinical experiences of approximately one month's duration in fields relevant to ED practice (such as anesthesia, cardiology, orthopedics, and obstetrics/gynecology) in addition to clinical EM during the first postgraduate year. The second postgraduate year typically includes increased critical care experience (pediatric and adult intensive care) and at least 6 months of clinical ED experience. Residents in the third and fourth postgraduate years of training may receive training in EM administration, toxicology, and/or hyperbaric medicine in addition to continued increasing ED clinical experience.



Medical school graduates wishing to pursue specialty training in EM in the USA must complete an application, interview with prospective programs, and then submit a list of desired training programs to the NRMP. The applicants rank order lists programs from the most desirable to the least desirable but still acceptable for postgraduate training. Programs that are deemed unsuitable for an individual's future training are not listed. Factors impacting rank order of residency training programs directly impact a program's ability to attract and match desirable resident candidates.

The importance of staffing EDs with EM residency-trained physician specialists depends on ED patient volume and the types of clinical problems presenting to rural hospitals. Overall, 42% of US EDs are located in a non-metropolitan statistical areas<sup>6</sup>, but many of these smaller rural EDs may lack the patient numbers and acuity to support an ABEM certified group of emergency physicians. A profile of US EDs in 2001 demonstrated that 28% of 'higher volume EDs' (EDs with annual census of 8760, or one patient per hour) were located in rural areas<sup>7</sup>. In addition, a study examining the frequency of elderly patients' ED use and subsequent hospital admission in rural and urban areas revealed no significant difference<sup>8</sup>. Although further research is necessary to determine whether urban and rural ED patients present with different clinical problems, these studies suggest that a significant number of rural EDs have patient volumes and acuities comparable to some of their urban or suburban counterparts.

The current distribution of residency trained EPs strongly favors large urban areas while rural communities are relatively under served<sup>3</sup>. All Americans deserve quality ED care, but the disparity in the distribution of residency trained physicians inevitably results in a disparity of ED care between urban and rural areas. The relative discrepancies between urban and rural EM practice led the American College of Emergency Physicians (ACEP) to sponsor a rural EM summit held on 29-3 March 2003 in Albuquerque, New Mexico to consider strategies to improve the delivery of emergency care in rural areas. Recommendations from the summit addressing the residency training of rural ED

physicians included developing models of rural EM rotations for medical students and residents, providing rotation opportunities to rural sites for all EM residents or as an optional elective rotation, and educating EM faculty in selecting residents interested in rural ED practice. In addition, the recently released Institute of Medicine (IOM) report emphasized the need to provide rural citizens with levels of care similar to that available to their urban counterparts<sup>9</sup>. The Society for Academic Emergency Medicine IOM Task Force intending to outline specific measures to improve rural emergency care, recommended institution of rural ED rotations similar to ours and called on the Residency Review Committee-EM to allow for extension of these clinical experiences<sup>10</sup>.

For medical students, participation in a rural clinical experience is a strong predictor of future practice in a rural community<sup>11</sup>. Likewise, residency programs with rural training tracts also demonstrate an increased likelihood of rural practice in their graduates<sup>12</sup>. The recommendation to develop models of rural EM rotations and provide ED rotations at rural sites is currently followed in Nebraska, and we hope to encourage rural EM practice in our residents by allowing them to experience rural EM during the course of their training. While the geographic location of the program where a resident received training seems to correlate most strongly with the site of initial EM practice<sup>1</sup>, it is not entirely clear if the same will hold true for a rotation of one or 2 months' duration. Future research should address the impact of a rural ED rotation on the choice of practice environment, but the relative lack of current EM rural sites limits the opportunities to conduct studies in this area.

Studies addressing medical students' eventual choice of practice location suggest that the most consistent predictor of future rural practice in primary care is a rural background prior to entering medical school<sup>13</sup>, and the same is true for family medicine residents with rural backgrounds<sup>14</sup>, but we are unaware of any studies addressing EM resident rural background and future practice location. In our study, the rural rotation positively impacted most applicants with rural backgrounds, leading to a higher program rank in almost



three-fourths of this group, perhaps reflecting the findings of the prior studies in family medicine in EM applicants with rural roots.

Emergency medicine residency programs that wish to encourage future practice in a rural community must weigh the advantages and disadvantages of instituting a rural rotation. The chief concern at our institution was that a rural focus or the presence of a rural rotation may negatively impact the NRMP rank order for some of our applicants, and a study of family medicine rural residencies confirms that rural tracts have greater difficulty recruiting residents<sup>15</sup>. Interestingly, for EM residency applicants, the inclusion of a rural ED rotation in the residency curriculum did not impact rank order for all but one medical student, and positively impacted ranking for the majority of applicants. While we acknowledge that our predominantly rural location may lead to an overrepresentation of applicants with rural backgrounds and planning a rural practice, the key finding of a lack of impact on the majority of applicants from non-rural communities and not planning a rural practice, suggests that EM residency programs may encourage rural practice through a required rural rotation without limiting or adversely impacting their applicant pool. The logistical problems of a rural rotation include distance from the primary training site and the stress associated with less familiar living circumstances. The ED utilized by our program for rural training is located 774 km (481 miles) from the primary institution. Despite the inconvenience of this considerable distance, no applicant cited this as a factor in their final program rank.

## Limitations

The findings of this study are limited by the small number of subjects and by the biases inherent in the study due to certain preferences of applicants when considering application to potential programs. The first limitation, the small number of subjects, most likely results from three factors: (i) applicant reluctance to apply to a program that is new or (ii) is implementing unfamiliar clinical experiences, and (iii) the lack of other potential study sites due to the unique nature of

the new clinical experience under study. The first factor, the limited pool of potential subjects for a new program, is well-known to residency training programs recruiting applicants for the first time. Applicants may be more likely to apply to and complete an interview with a well-established program rather than a new program, limiting the number of subjects for our study. Second, the presence of a rural ED rotation itself may have limited the number of potential subjects. Our EM residency program was the only program at the time of the study that required a rural ED rotation. Emergency medicine residency applicants were likely to be unfamiliar with this type of clinical experience and may have been reluctant to participate in a new and untested clinical experience, until the success of such a program is well-documented and accepted by the EM community. And, lastly, at the time of the study no other EM residency program existed that required a rural rotation, limiting the possibility of increasing the number of subjects through the inclusion of additional study sites. A second limitation of our study may result from the potential for subject self-selection. The location of our EM residency program in a predominantly rural state may have led to an increased number of applicants with rural backgrounds resulting in a selection bias favoring a more positive impact of the rural rotation on program ranking.

## Conclusion

The presence of a rural ED rotation did not adversely impact EM residency applicants' ranking of the program, and contributed to a higher rank for many applicants.

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