The Rural Emergency Physician Workforce

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Introduction

One of the primary challenges of rural emergency medicine (EM) is assembling an appropriate workforce to meet the needs of individual communities. Because rural emergency departments (EDs) vary greatly in patient volume, geographic isolation and acuity, finding the best mix of ED clinicians and sub-specialists for the individual site can be difficult. This task requires understanding current staffing models, strategies for recruitment and retention, and ability to adapt to a changing demographic and workforce landscape. Optimizing these factors will help to improve the quality and safety of emergency care in rural communities.

The key questions for you to contemplate are:

1. **What are the provider workforce challenges faced by rural emergency departments?**
2. **What are the effects of rural workforce shortages on communities and individual patients?**
3. **What techniques are being employed nationally to address recruitment and retention in rural communities**

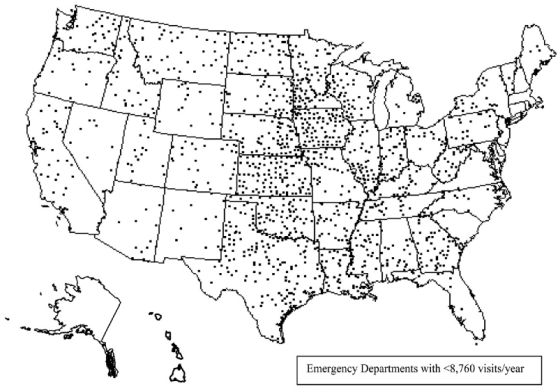
Description of Rural Emergency Departments

Approximately 42% of the estimated 4,874 EDs in non-federal hospitals in the United States (U.S.) are located in rural counties. In addition, rural populations have a higher incidence of ED visits, compared to urban populations (47.1 visits per 100 persons vs. 42.0 visits per 100 persons[1]). However, as expected with lower population density in the surrounding communities, rural EDs saw only 17.0% of the estimated 129.8 million U.S. ED visits in 2010. Still, these EDs serve a wide geographic area in the United States and comprise an important component of the medical safety net.

Amongst rural EDs, there is significant variation in patient volume. Sixty-nine percent of all EDs see, on average, at least 1 visit per hour (8,760 visits per year). Of these higher-volume EDs, 25% are in rural areas. The remaining 31% of all EDs see fewer than 1 visit per hour on average (Figure 1). Of these low-volume EDs, most (79%) are in rural areas.[2] There are not enough EM board-certified physicians to staff all U.S. EDs, particularly low volume rural EDs. As of 2008, 69% of physicians practicing in EDs were emergency medicine (EM) board-certified or EM residency trained, with an overall density of 8.8 per 100,000 population. However, this density varied substantially with rurality, as urban areas had 10.3 EM board-certified or EM residency trained physicians per 100,000 population, but this density dropped to 5.3 for large rural areas and 2.5 for small rural areas.[3]

While no definitive patient volume has been established to mandate staffing by board-certified EM physicians these high volume rural EDs may derive particular benefit, because there would be adequate volume to support and utilize the specialized expertise

Figure 1: US EDs with <8,670 visits per year in 2001



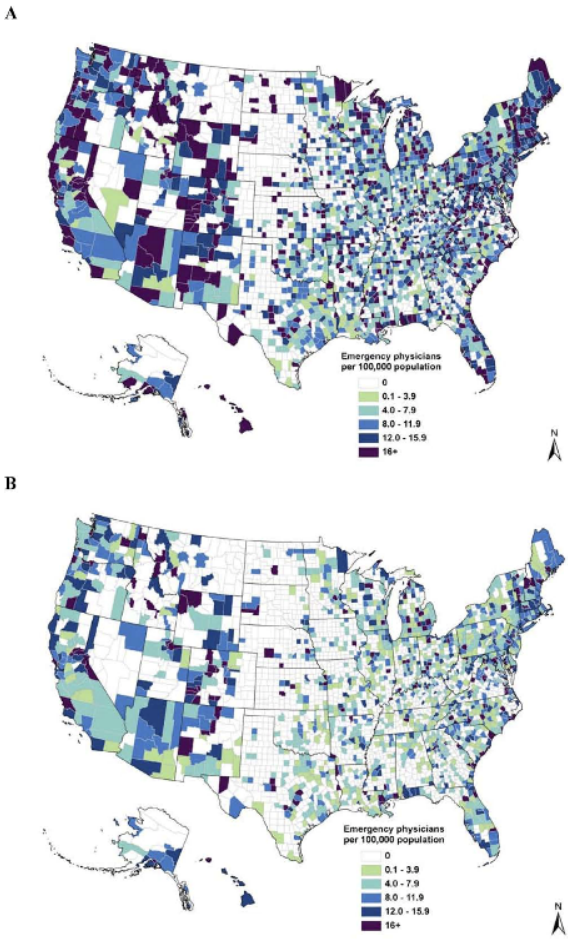
Sullivan et al. A profile of US emergency departments in 2001. Ann Emerg Med (2006) vol. 48 (6) pp. 694-701. Reproduced with permission of the original source.

Although all EDs are defined as places that provide round-the-clock care for all kinds of patients, differences in ED capabilities exist. A classification scheme for EDs has been identified as an important first step in regionalizing all emergency care, similar to what has been attempted for trauma care.[4] Categorization may include designation and/or third-party accreditation, and may allow for distribution of specialized knowledge (as poison centers provide).[5] These systems would help patients and pre-hospital providers determine capabilities of local EDs across a range of conditions. However, categorization of EDs is controversial and economic, political and social barriers exist. Financially disadvantaging smaller hospitals, unnecessary self- referral to higher levels of service, disruption of continuity of care, and violation of anti-trust laws are some of the considerations that face proponents of regionalization. Successful categorization, designation, and regionalization would require substantial efforts to define levels of care, distribute resources and expertise, and would likely require incentives and payment systems that reward such collaboration and ensure that all key entities remain financially sustainable.[5]

Current Staffing of Rural Emergency Departments

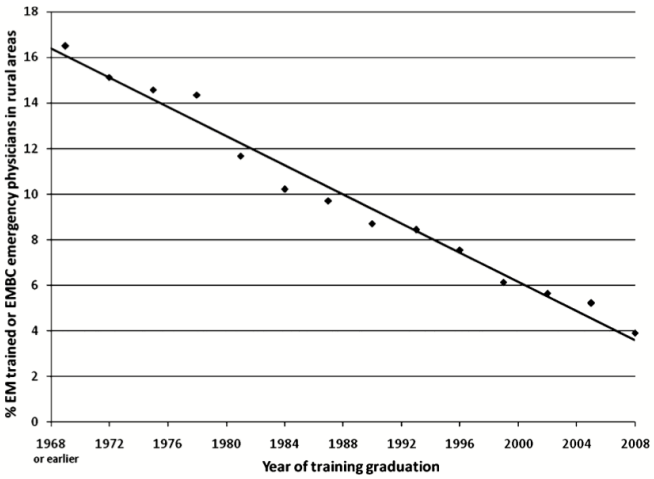
Board certification in EM is recognized as the criterion standard for ED providers, and consensus statements of all major EM organizations reflect this. The 2011 policy paper "The Future of Emergency Medicine"[6] stated "emergency care should be provided by physicians who are board certified by ABEM/AOBEM in emergency medicine or residency trained in emergency medicine. There is no substitute for residency training in emergency medicine." However, the consensus group continues to recognize that "during the upcoming years, when much of the emergency medicine workforce will continue to be non-emergency medicine residency–trained/ board-certified providers, the specialty must discover innovative approaches to raise the level of care, as well as the cognitive and technical skills of all emergency providers."[7] Indeed, the shortage of EM board-certified physicians is forecasted to persist for at least several decades, [8] and is more far more pronounced in rural areas (Figure 2). [3,9] Although there has been a steady increase in the number of EM residency trained physicians, these new graduates are largely not choosing to practice in rural areas. Physicians practicing in rural EDs are older as a group and it is projected that the rural emergency physician (EP) shortage will become more pronounced as they leave the workforce faster than they are being replaced (Figure 3).[3] Additionally, many emergency medicine physicians are choosing to further subspecialize (e.g., pediatric emergency medicine, toxicology). While effective emergency physicians will have strong command of knowledge and skills in pediatrics and toxicology, it is unlikely that this subspecialization would add significant value in the rural setting given the relatively low volumes. Instead, physicians with a broad EM training background are likely to be most effective given the limited subspecialty back-up in rural EDs.[10]

Figure 2: Emergency physician density per 100,000 population by county in 2008



Emergency physician density per 100,000 civilian population by county. A. All emergency physicians.
B. Emergency medicine–trained or emergency medicine board-certified emergency physicians. (Four hundred fifty nine (1%) emergency physicians had missing county data and could not be classified.)
Ginde et al. National study of the emergency physician workforce, 2008. *Ann Emerg Med* (2009) vol. 54 (3) pp. 349-59. Reproduced with permission of the original source.

Figure 3: Proportion of EM-trained or EM board-certified (EMBC) hysicians currently practicing in rural EDs by time since training graduation.



Adapted from **original data in** Ginde AA, Sullivan AF, Camargo CA Jr. National study of the emergency physician workforce, 2008. *Ann Emerg Med.* 2009; 54:349–59. Figure from **Ginde et al. Regionalization of Emergency Care Future Directions and Research: Workforce Issues. *Acad Emerg Med.* (2010) vol. 17 (12) pp. 1286-1296. Reproduced with permission of the original source**

As a result, the present and foreseeable future of rural EM includes providers other than EM board-certified physicians. These include physicians trained in family practice, internal medicine, and other specialties; physicians with internship only; and mid-level providers (nurse practitioners and physician assistants). Rural EDs also face a shortage of on-call specialists, which further limits access to emergency care.[11] Based on 2003 Medicare claims data, EM board-certified physicians provide 75% of all ED care, but only 48% in the most rural counties.[3] The likelihood of seeing an EP decreases as rurality increases, and the likelihood of seeing a family physician, PA, or other clinician increases as rurality increases.[12] This is a source of controversy among emergency medicine governing bodies,[13] however in recent years both urban and rural ED patients have seen an increase in care by midlevel providers.14 Recent research demonstrates that PAs practicing in rural areas report a broader scope of practice: more frequently managing critically ill patients and performing advanced procedures then their urban peers. They also report more autonomy and less access to physician supervision.[15]

Little data exists to address whether or not EM physicians provide a higher quality of care with regards to mortality, efficiency, and cost-effectiveness. Given the complexity of this large and diverse group, data regarding skills, training, and patient outcomes would likely be very difficult to obtain and fraught with confounders. Proxy measures such as chart documentation, decreased test ordering, and improved success of intubation have all been shown to be improved with the implementation of emergency medicine residency training,[16,17,18] though these studies were small, single-center and had pre/post designs. A study of closed malpractice claims from a single insurer revealed that the cost per physician-year of malpractice coverage for EPs was half that of non–residency-trained physicians staffing EDs.[19] A recent study found that PAs and NPs practicing without direct supervision provided lower-quality care for acute asthma than when supervised directly or when compared to physicians.[20] All of which seem to indicate that the quality of ED care is related to EM residency training/board certification. Further comparative studies regarding quality and cost of care will help clarify capabilities and limitations.

However, since care is being provided in these settings by non-board-certified EM physicians, a patient-centered approach would ensure that these individuals have additional training, oversight, and continuing medical education specific to provision of emergency care. This is particularly important for low-volume, high-risk procedures (such as intubation and tube thoracostomy) as well as low-frequency, high-acuity patient complaints (obstetric emergencies, major pediatric trauma).[6] When evaluating primary care trained physicians practicing in rural areas, they do express less confidence in dealing with certain emergency presentations, particularly pediatric emergencies.[21] Several programs have been developed to standardize training and increase provider confidence in dealing with emergent presentations, including Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support, and Pediatric Advanced Life Support. Amongst smaller rural hospitals, ACLS training is more common than in other courses, and maintenance of several certification courses has been challenging for rural emergency providers.[22]

To address some of these issues, a Comprehensive Advanced Life Support course has been developed for rural providers.[23] The focus of the course is to teach providers in remote areas to anticipate, recognize and treat life threatening emergencies. It does this through reviewing emergency skills/knowledge, clarifying appropriate equipment, developing effective provider teams, and helping develop hospital systems like triage and record-keeping.[24] Additionally, the American College of Surgeons developed the Rural Trauma Team Development Course (RTTDC)[25] to help rural hospitals improve the quality of trauma care by developing and practicing a team approach to stabilization of the trauma patient based on the resources available in specific communities.

There are also non-accredited, one-year long fellowships in EM for family physicians. According to the American Association of Family Practioners[26], there are ten emergency medicine fellowships for physicians who have completed a residency in family medicine (FM). Fellowships offer between 1 and 8 positions per year. Although these do not lead to board

certification in EM, they do provide additional organized training in emergency care.[11] Although positive from the perspective of improving rural EM care, it is not likely to have a large impact on the rural physician workforce given the small numbers. Two combined EM/FM residency programs also offer board certification in both specialties.[27]

Finally, a limited number of EDs have applied a model where an EM board-certified physician acts as medical director for a group where all physicians are not EM board-certified.[11,28] The impact and feasibility of such staffing on the quality of emergency care has not been formally evaluated.

Strategies to Recruit and Retain Emergency Physicians to Rural Emergency Departments

In order to ensure robust staffing of rural EDs, there is significant interest in how best to recruit and retain rural EPs. Because the vast majority of recent EM residency graduates are currently starting practice in urban areas,[3] attracting these new EPs to rural areas would improve the workforce shortage. Many motivations for rural practice are not amenable to change. For example, one of the stronger predictors of rural practice is having spent childhood in a rural area.[29-31] This would be difficult to change in the short term, but a longer-term solution may be to preferentially recruit residents with a rural background.

One factor amenable to change is rural experience during EM residency. Only 5% of programs have a required rural rotation.[32] Although a majority of programs allow elective rural rotations, 69% do not have pre-designated sites, meaning that the residents must locate and design their own elective. EM residents at programs with rural elective rotations at pre-designated sites were almost twice as likely to partake in a rural rotation than if there were no pre-designated site. Forty-four percent of recent EM graduates choosing urban practice state they would have participated in a rural rotation during residency, had it been available. These same residents felt that exposure to practice environments with fewer specialists makes residents better prepared; indeed, EM residents choosing rural practice attach less importance to access to specialists, and more importance to autonomy.[30]

Requiring a rural ED rotation is associated with improved match ranking for applicants with a rural background or planned rural practice, and no significant negative impact.[33] Additionally, residencies with required rural rotations have a greater proportion of residents enter rural practice.[32] There are barriers to setting up a rural rotation for program directors. Several recent publications address how to overcome the key barriers, including ensuring: appropriate supervision, patient volume/acuity, funding and longitudinal educational experiences for residents while on a rural rotation.[34,35] (Table 1)

Table 1. Overcoming barriers for implementing a rural rotation for residents
• Ensuring appropriate supervision—identify sites with EM board certified physicians
• Ensuring adequate volume/acuity—sites should have at least 10,000 patient visits annually
• Ensuring longitudinal education experiences—teleconferencing for didactic teaching

Other potentially modifiable factors in provider recruitment include loan repayment programs, signing bonuses, improved access to specialists, and access to continuing medical education.[30,36] (Table 2) These have been modestly effective for primary care recruitment, but their effect on EM recruitment is relatively unknown. Changes to residency models that may improve recruitment to rural areas include urban programs in rural states, more rural or hybrid urban/rural programs, and dual family medicine/EM training programs.[28]

Table 2. Strategies to recruit EM providers to rural areas
• Rural rotations for EM residents
• Loan repayment programs
• Signing bonuses
• Improved access to specialists (telemedicine)
• Continuing medical education
• Rural and hybrid rural/urban residency programs
• Recruiting medical students from rural communities

Retention of rural providers is another important piece of the puzzle and slightly different factors affect retention. A 2010 study that surveyed rural EPs at least 5 years post-training, found that the most important factors in choosing a practice area were lifestyle, family/spouse, and quality of hospital resources. While these same factors remained important in physician retention, they now found an increased emphasis on support of colleagues and salary.[31] In one 2014 survey, the average total annual salary of staff rural emergency physicians was slightly lower ($302,727) compared with their urban peers ($311,500).[37] A qualitative study suggests that once basic needs for familiarity, sense of place, community involvement are met, physicians tend to weigh costs and benefits in the decision to stay.[29] Further research is needed to better understand what specific factors promote retention, and what policy changes would be most beneficial.

Rural Emergency Physician Workforce: The Future

Because the uneven distribution of EPs is likely to continue for at least several decades, creativity in staffing models, and regionalization of care may help to improve the quality of emergency care to rural Americans in the foreseeable future. Potential staffing models include expanding the role for EPs as medical directors for rural EDs, having academic medical centers staff rural EDs part-time, or having physicians with a blended rural/urban practice.[28] Using EPs as medical directors allows knowledge transfer while recognizing that full-time EP coverage is not currently feasible for many

smaller EDs. Using academic medical centers can provide experienced EPs to these settings and may allow residents to be supervised by EM board-certified physicians (a Residency Review Committee requirement). This would require physicians be comfortable with the nuances of rural EM practice (no consultant back-up, more limited resources, etc) and distinctly different work envirnoment in order to ensure the safety and quality of care delivered. Blended urban/rural practices could augment the rural workforce while allowing EPs to also practice in high-volume environments that allow them to maintain skills with high acuity presentations and procedures. Other models for financial sustainability include using EPs for coverage in other parts of the hospital, providing off-hours emergency response or procedural expertise while other physicians are not in-house.11,28 This provides the opportunity for EPs to generate additional revenue and support their salaries, particularly in lower volume settings.

Regionalization of rural emergency departments could also help optimize the distribution of the workforce. Categorization of EDs, as is done with trauma centers, could provide quick reference to the capabilities and staffing of EDs for the public and for EMS. Other important steps include the establishment of call centers to facilitate transfer, establishing agreements for specialist care, and establishing telemedicine links for specialized care. Call centers in combination with established agreements can free the EP of the burden of multiple calls to arrange transfer. This is particularly important for time-sensitive conditions, such as major trauma, acute coronary syndrome, stroke, sepsis, and acute airway or other major procedural needs. Telemedicine links may allow patients with specific conditions (for example, stroke or trauma) to be managed in rural hospitals with cognitive, but not procedural, expertise from specialists.[38] A recent retrospective analysis[39] of 59 teleconsults for trauma and general surgery patients between 5 rural Arizona hospitals and a level I trauma center in Tuscan Arizona was performed. Overall, it was felt that telepresence of trauma surgeons both improved outcomes and reduced the cost of trauma care. Authors found that the resuscitation phase of management was changed in 83% of the trauma patients. For 6 of whom these consults were considered potentially lifesaving. They also found that in 29% of cases they were able to avoid an unnecessary transfer and instead these patients were kept in the rural hospitals, which avoided significant transfer costs (between $15,000-$25,000 per patient) and risks. This practically demonstrated that telemedicine/ teleconsult arrangements may make efficient use of both the EP and on-call specialist workforce.

Questions regarding staffing and regionalization require further research. These questions include the ideal distribution of EPs, quality differences between different providers, patient preferences regarding staffing, the best use of transfers, and different ways to improve on-call specialist coverage, such as acute care surgeons.[11] Further issues include ways to reimburse and measure emergency care networks,[40] organize and staff EMS to facilitate regionalization,[41] and address administrative hurdles to regionalization.[42]

Conclusions

Emergency medicine is a specialty born out of patient demand. It is consistently evolving along with the needs of the patients. There have been great strides made to improve access to and quality of care, but the specialty has to continue to evolve to meet the needs of rural America. By focusing attention on gaps in care; working to strengthen the workforce with additional training, enhanced recruitment/retention, and new collaborative models; and gathering additional data to inform policy solutions, the specialty can fill its promise to providing high quality emergency care to all Americans.

The key questions for you to contemplate are:

1. What are the provider workforce challenges faced by rural emergency departments?
Rural EDs have significant variation in patient volumes and acuity. As a result, determining the appropriate staffing patterns can be challenging. Beyond that, they frequently have a hard time attracting, retaining and being able to afford EM providers. As a result they have a lower density of EM-board certified EM physicians and consequently have a higher proportion of providers with other specialty training or primary staffing by midlevel providers.
2. What are the effects of rural workforce shortages on communities and individual patients?
Communities and patients rely on providers in EDs to provide them with the efficient, effective care for all their emergency needs. Shortages mean that this specialty care might not be as timely or high quality as it would in an urban environment. This is particularly important in time-sensitive conditions. The lower volumes seen be rural providers also frequently means that they are less comfortable with low volume-high acuity procedures like intubation and tube thoracostomy
3. What techniques are being employed nationally to address recruitment and retention in rural communities?
Solutions include loan repayments, signing bonuses, continuing medical education and changes to residency training including rural rotations and hybrid training programs. Some medical schools are starting "rural tracks" to mentor students with an interest in rural practice. Communities are identifying these providers early and providing scholarships to students who agree to return and practice in that community.

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