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Rural General Surgery: A Review of the Current Situation and Realities from a Rural Community Practice in Central Nebraska

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Abstract

Purpose: To examine the reasons fewer students and residents are entering general surgery, to educate residents about the realities of rural general surgery based on the experience of three general surgeons in central Nebraska, and to suggest a strategy for individual general surgeons and for residency programs to maintain the rural surgical workforce.

Methods: A systematic literature review of surveys, review articles, and editorials through PUBMED was performed. Relevant studies were included in a review of the current literature on the rural general surgery workforce, general surgery residency, fellowship training, and rural surgery education.

Findings: There is an insufficient supply of general surgeons in many parts of the country, particularly in rural settings. More general surgery residents are entering into subspecialty fellowship training and fewer are practicing general surgery than in the past. Residents may have inaccurate perceptions about rural general surgery practice. Those residency programs with dedicated rural and community surgery rotations have had more success in producing rural general surgeons.

Conclusions: Although specialization in surgery has many positive effects, maintenance of a general surgical workforce in rural America is crucial to the health care of many citizens. Increasing the numbers of mentoring and training programs could provide medical students and general surgery residents with more educational opportunities that may lead to increased interest in rural surgery.

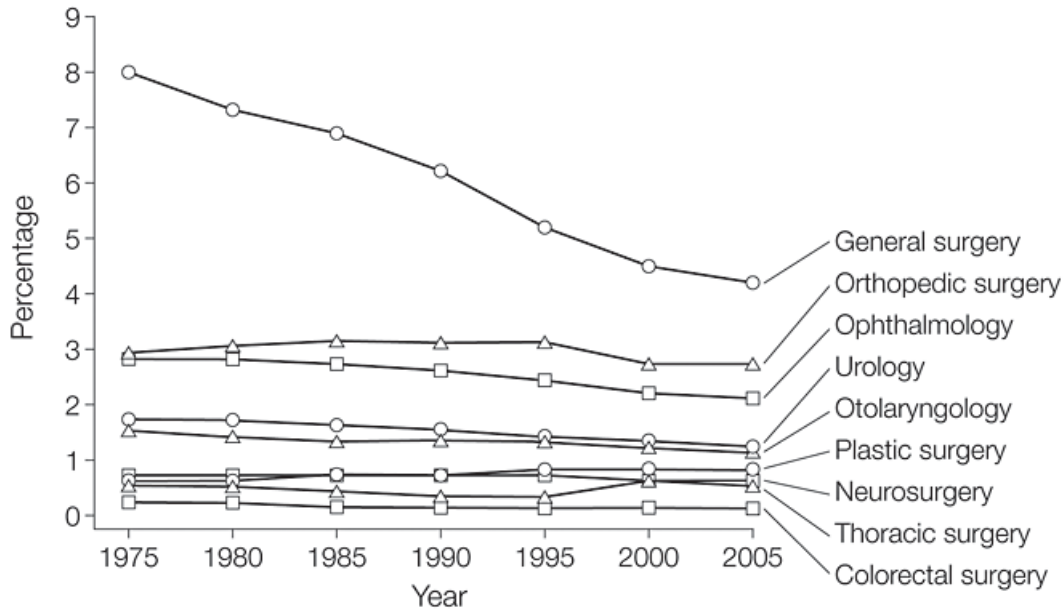
Introduction

Fewer graduating general surgery residents are now choosing to practice general surgery, as increasing numbers pursue subspecialty fellowship training.[1] Increasing specialization within surgerical education has created a tendency to devalue the "generalist," creating shortfall in recruiting students and keeping residents in general surgery.[2,3,4] The insufficient supply of general surgeons may have a particularly adverse effect on both patient care and economic viability of health care systems in the rural setting. given that These surgeons provide general and subspecialty surgical services, endoscopy, trauma coverage, and critical care that are often major economic forces supporting community and rural hospitals.[5,6,7,8,9,10] This review aims to examine the reasons fewer students and residents are entering general surgery, educate residents about the realities of rural general surgery based on the experience of three general surgeons in rural Nebraska, and suggest a strategy for individual general surgeons as well as residency programs to maintain the rural surgical workforce.

Trends in General Surgery

The number of general surgeons has not increased with the growing U.S. population (Figure 1), as approximately 1,000 residents have completed general surgery residency training each year since 1980.[11,12] The overall number of general surgeons per 100,000 citizens has declined by 25% since the mid 1980's. Rural areas have significantly fewer general surgeons per 100,000 citizens than urban areas.[13,14] In rural and small community hospitals that care for over 50 million patients in the U.S., general surgeons are essential to patient care, performing a wide variety of surgical procedures and care for emergencies and trauma.[15,16,17,18] Contrasting the decline in rural surgeons, emergency department visits have increased 26% since 1993, and 75% of hospitals report inadequate on-call surgical coverage.[19] So, as the population of general surgeons is decreasing (Figure 1) and fewer general surgeons are practicing in rural settings, patient care may suffer.

Figure. Specialty as Percentage of Total Physician Workforce Source: Physician Characteristics and Distribution in the US, 2007.18.



Fischer, J. E. JAMA 2007;298:2191-2193

JAMA

Figure 1. Specialty as Percentage of Total Physician Workforce Source: Physician Characteristics and Distribution in the US, 2007.18

Increasing sub-specialization among surgical residents further confounds workforce shortages in general surgery since surgeons narrow their spectrum of procedures provided within focused, subspecialty practices. Thus, if sub-specialization continues to increase as it has, a larger surgical workforce will be needed to provide the breadth of services encompassed by the traditional general surgeon.[20] Importantly, many fellowship trained surgical specialists choose not to take emergency general surgery or trauma call, adding to the potential crisis in emergency surgical coverage.[21,22,23,24,25,26,27,28] Presently, approximately 70% of graduating surgical residents pursues specialized fellowship training, and this percentage may be increasing.[29] Many residents have decided on a field of specialization by the end of their second or third year of surgical residency training and are already planning on fellowship training.[30]

This combination of 1) a growing U.S. population with a nearly static number of general surgeons being trained, 2) a decreasing number of surgeons practicing in rural settings, and 3) more surgeons entering subspecialty practice instead of true general surgery may be detrimental to rural patient care and the economic viability of rural health care systems.

The insufficient surgeon population also poses a threat to the economic health of rural hospitals which rely, in part, on surgical services for their survival.[31,32,33] Hospitals need general surgeons to perform a wide range of surgical procedures, and also to be available to respond to surgical emergencies and trauma. Specialization has decreased the number of surgeons available to provide this breadth of service. Insufficient rural general surgeon supply could lead to lowered revenues for these hospitals, which may force rural facilities to close due to financial instability.[34,35,36] More than 40% of the revenue of some community and rural hospitals depends on cases performed by general surgeons.[37] Rural and community hospitals profit from the ability to provide surgical services; many times provided only by general surgeons.[38] Reports suggest that each general surgeon is worth between 1 and 2.4 million dollars in annual revenue to their institution.[39] A recent survey showed that 38% of over 100 rural hospital administrators perceived their surgical program to be very important to the financial viability of their hospital and stated that they would reduce services if the hospital were to lose its surgery program.[40] More than one-third of hospital administrators are currently searching for a surgeon and 34% of hospitals expect to have a surgeon leaving within the next 2 years.

Perspectives of Surgical Residents

One cause of the decreasing number of general surgeons is that more surgery residents are entering fellowship training and subspecialty practice. This may be driven by residents' perceptions that fellowship training is necessary to be competitive and successful. Recent surveys attempting to characterize the attitudes of general surgery residents have shown that the majority of residents are apprehensive about the practice of general surgery and believe in the necessity of further specialization.

A 2009 survey of general surgical trainees from 248 of 249 US residency training programs showed that among the respondents (82.4% of all general surgery residents),

* 38.6% agreed or strongly agreed that they worry that the field of general surgery will become obsolete,

* 56% agreed or strongly agreed that the modern general surgeon must become specialty trained to be successful,

* 61% agreed or strongly agreed that they worry that other specialties will take over procedures that general surgeons do,

* 62.7% agreed or strongly agreed that if they complete specialty training after general surgery residency they will have a better lifestyle, and

* 63.8% agreed or strongly agreed that they must become specialty trained after finishing general surgery residency in order to be competitive in the job market.[41] Another cross-sectional national survey administered at the 2008 American Board of Surgery In-service Training Examination that included all US categorical general surgery programs showed that among 4,586 respondents (75.0% of general surgery residents), 28.7% believe general surgery is becoming obsolete and 55.1% believe specialty training is necessary for personal success.[42] Another recent

survey completed by 61.2% of the 735 general surgery residents performing full-time research during residency during the 2007-2008 academic year and by 62.4% of the 1,099 non-research third year surgical residents found that 63.1% of research residents and 55.3% of non-research third year surgical residents believe that surgeons need to be specialty trained in order to be successful and that 73.6% of research residents and 66.2% of non-research third year surgical residents believe that specialty training makes surgeons more competitive in the job market.[43]

These survey results demonstrate that the majority of current general surgery residents believe that general surgery is becoming obsolete and that fellowship training is necessary to be competitive in the job market, to continue to perform a variety of procedures, and to obtain a better lifestyle.[44,45,46] This perception is likely a driving force steering residents away from general surgery practice and contributing to the declining number of rural general surgeons.

The number of general surgery residents entering general surgery practice has decreased as more graduating residents enter fellowship training. Survey responses from over 11,000 fifth year surgical residents taking the American Board of Surgery In-Training Examination from 1993 to 2005 show that over this 13-year span of residency training, the percentage of residents choosing fellowships increased from 67% to 77%. The percentage of residents not choosing fellowship training decreased from 27% to 18%. Among those residents training at community programs—many of whom have traditionally gone on to practice as general surgeons—the percentage choosing to undergo fellowship training rose from 57% to 78%, while the percentage not choosing fellowship training dropped from 36% to 18%. This report demonstrates a marked increase, over more than a decade, in the percentage of residents entering fellowship training following general surgery residency.[47]

Realities of Community General Surgery Practice

The reality of general surgery practice in the rural setting stands in contrast to the belief of the majority of current general surgery residents, based on recent surveys, that general surgeons are performing fewer procedures and are becoming obsolete and non-competitive without fellowship training.[48,49,50] In the experiences of our three practicing general surgeons in a town of 25,000 in a rural community hospital in central Nebraska over the last 30 years, the practice of true general surgery with a broad scope of procedures is both vital for the community hospital, and in high demand in a rural setting. This practice environment affords a general surgeon the opportunity to perform a wide variety of cases, and serves as an integral member of the health care team and the trauma team leader. The demand for community general surgeons will increase as the population grows, more surgeons specialize, and fewer graduating residents enter practice as general surgeons in the rural setting. Thus, rather than losing relevance, the field general surgery in our rural and community setting will likely continue to be in demand.

It has been pointed out that the broadly trained general surgeon, practicing general surgery, has the opportunity for a varied, interesting, and stimulating career in rural settings.[51,52,53] Indeed, The American Board of Surgery has reported data on general surgeons taking the recertification examination which has shown that rural surgeons do more procedures in a year and perform a greater variety of cases than urban surgeons.[54] While a number of surveys have shown that the practice of rural surgeons is more varied than the practice pattern of urban surgeons,[55,56,57,58,59,60]

other data indicates that at least is some areas, urban surgeons perform a greater number of different types of procedures.[61] More urban general surgeons have subspecialty training, which may add to the number of procedures one has the ability to perform if one does not limit procedures to only those in an area of sub-specialization. It has been our experience at Mary Lanning Memorial Hospital, a 161-bed community hospital in rural central Nebraska that our three general surgeons are able to perform all the procedures we feel trained and want to do, and the hospital provides the necessary equipment to do so. Our procedures include upper and lower endoscopy, a wide variety of open and laparoscopic surgical cases, and trauma care. From 2008-2010, each of our general surgeons performed an average of nearly 1,700 procedures (423 inpatient and 1,261 outpatient) – 561 procedures per year. The ten most commonly performed procedures by general surgeons at Mary Lanning Hospital between 2008-2010 were:

1) Colonoscopy & Esophagogastroduodenoscopy,

2) Laparoscopic & Open Cholecystectomy,

3) Insertion of Venous Access Port,

4) Hernia Repair,

5) Laparoscopic Appendectomy,

6) Exploratory Laparotomy and Bowel Resection,

7) Debridement of Lower Extremity,

8) Breast Lumpectomy,

9) Mastectomy, and

10) Laparoscopic Colon Resection.

In addition to these most common procedures, our general surgeons perform adrenalectomies, thyroidectomies, splenectomies, dialysis catheter and fistula procedures, central line placement, thoracostomy tube placement, common bile duct exploration, and major amputations. Thus, community general surgeons in this setting perform a wide variety of procedures without competition from sub-specialists, a major advantage of rural or community practice. As long as a surgeon feels competent and trained to perform procedures, the full scope of general surgery is a realistic practice in this setting.

Our scope of practice shows that general surgeons play an integral role in the rural community hospital. Based on our experience, specialty training in the community setting in unnecessary, compared to the larger need for the general surgeon with a broad-based practice.[62,63,64] Our general surgeons are vital to the hospital and community by providing this breadth of surgical care along with trauma coverage.

Residents and students may also have an erroneous perception of the lifestyle of rural general surgeons. Lifestyle is a frequently cited reason for students choosing not to enter general surgery and for surgery residents choosing to further sub-specialize.[65,66,67,68] In a recent survey 78.1% of general surgery residents agreed or strongly agreed that completing specialty training after general surgery residency will lead to a higher income and 62.7% agreed or strongly agreed that if they complete specialty training after general surgery residency they will have a better lifestyle,[69] yet the reality is that for many surgeons, general surgery in the rural setting offers a better than reasonable lifestyle and compensation.[70,71,72]

Our experiences parallel other descriptions of rural general surgery in terms of case breadth, volume, and lifestyle. Rural group practices have resulted in systems that improve surgical care and retain attractive factors of practicing in a rural community. Rural surgeons cite the ability to perform not only a wide variety of general surgery procedures, but also cesarean sections, endoscopy, trauma, and a mixture of minor orthopedic, urologic, gynecologic, plastic surgery, and ear-nose-throat procedures.[73,74] Training for such a wide variety of procedures often occurs intentionally either during residency training or from mentoring within a rural group practice. Therefore, dedicated rural rotations for surgery residents would be necessary for surgeons to meet the challenges of rural practice. In short, the perceptions of residents and students do not match reality. The solution may well be exposure to rural and community surgery for all students and residents in this country. Several programs have pioneered such rotations.

Solutions for Producing More Rural General Surgeons

Training for Rural General Surgery

One way to address the growing problem of undersupply of rural general surgeons would be to convince more residents and medical students to practice general surgery instead of entering subspecialty fellowship training. Practicing general surgeons and residency programs could make an explicit effort to educate surgical residents and medical students about the current and growing need for as well as benefits and realities of becoming a practicing general surgeon in the rural setting. A few general surgery residency programs have a stated interest in training surgeons for rural practice and have had good results. However, many residents lack the opportunity to see the true scope of community and rural general surgery.

Importantly, many surgical residents, particularly those in academic university-based programs, are exposed nearly exclusively to sub-specialists during residency and may simply choose to emulate their mentors.[75] Other specialties such as family medicine have made intentional efforts to expose and train residents for rural medicine and have a track record of placing graduates in rural settings. Having a stated interest in training rural physicians, a curriculum that includes rural medicine education and rural practice elective opportunities are contributing factors in placing graduates in rural practice.[76] A handful of general surgery residencies have an explicit and documented interest in training rural general surgeons and have all been successful in graduating surgeons who practice in rural settings.[77,78,79,80,81,82,83]

Some residency programs have seen a dramatic shift in the scope of practice of their faculty from being mainly ‘‘traditional’’ general surgery including breast, vascular, gastrointestinal, and

hernia operations to highly specialized and fragmented practices consisting of mostly one area such as breast, vascular, or bariatric surgery.[84] At some institutions, surgical residents move from one specialty rotation to another, without any exposure to role models practicing broad based general surgery, in contrast to many surgeons do in non-academic rural and community practice. Dedicated rural surgery rotations could fill this void by exposing residents to practices composed of traditional general surgeons in rural locations, providing value in exposure to this career option, and allowing rich experiences in gastrointestinal endoscopy and surgical procedures normally performed by specialists in the academic setting.

In an anonymous survey of residents from the University of Tennessee College of Medicine–Chattanooga surgery residency, completion of a dedicated rural surgery rotation was reported to be a highly influential experience.[85] Residents on a three-month rural rotation perform over 200 cases including endoscopy, otolaryngology (tonsillectomy), endocrine surgery (thyroidectomy, parathyroidectomy), gynecology (oophorectomy, hysterectomy), urology (nephrectomy, vasectomy, circumcision), colorectal surgery (colectomy, APR, hemorrhoidectomy) and breast surgery (mastectomy, stereotactic biopsy). Such a rotation allows residents to see firsthand the relevance, breadth, and satisfaction of rural or community general surgery practice. Indeed, this survey shows a substantial increase from pre-rotation to post-rotation in the number of residents who planned to pursue a rural surgery career.

Other institutions have also shown that a rural surgery rotation contributes greatly to a resident's exposure to procedural breadth and career options. The experience of residents from the Oregon Health and Science University surgery residency on a dedicated year-long rural surgery rotation includes endoscopic procedures, a broad range of general surgery operations, and direct experience with evaluation and management of emergencies including obstetrics/ gynecology, orthopedics, otolaryngology, and urology.[86] Specifically, these residents have had the opportunity to learn to manage ovarian masses, ectopic pregnancies, tubo-ovarian abscesses, and pelvic inflammatory disease, to perform cesarean sections, laparoscopic tubal ligations, and oophorectomies, to reduce and cast fractures, evaluate and manage hand injuries, and excise peritonsillar abscesses, and to manage nephrolithiasis, evaluate hematuria, perform vasectomies, and orchiectomies. In this institution's experience, of the 10 residents who have spent a year in the rural surgery rotation, six have completed their residency and have entered practice while three entered and completed a fellowship. Of the 10, two are practicing general surgery in a rural setting, and three more are in small community practices of general surgery. Only one is practicing a surgical specialty exclusively in an urban setting. Regardless of future career and fellowship goals, residents benefit from a training rotation that provides extensive exposure to procedures unique to a rural practice.

Other programs have had similar success in placing graduates in rural and community settings after rotating in rural practices during residency. Over the last 25 years, 41% of surgical residency graduates of the University of North Dakota School of Medicine practice general surgery in rural or small communities.[87] In this institution with no other surgical trainees, such as obstetrics and gynecology or any surgical fellowships, general surgery residents have almost unlimited access to all general surgery and specialty cases. Additionally, a one-month rural surgery experience in each of the first two years of residency provides residents with experience in simple and complex general surgery, urology, thoracic surgery, and endoscopy. In these

settings, caesarian sections, nephrectomies, ileal loops, thoracotomies, rotation flaps and other head and neck procedures historically considered part of general surgery are cases performed by general surgery residents. In most large institutions, rotation by general surgery residents is a frequent requirement and generates fierce competition with other residents and fellows for surgical specialties. Thus, an explicit and dedicated rural rotation is necessary to support rural medicine as an option.

Gundersen Lutheran Health System has designed a residency program to specifically address issues in response to the institution's studies on the spectrum of procedures performed by rural surgeons,[88] the role of rural general surgeons functioning within trauma systems[89,90] and the unique challenges of training rural surgeons.[91] High operative volume and autonomy, upper and lower endoscopy, and vital involvement in critical care and trauma management are emphasized in training surgery residents. Elective rural rotations can be arranged and are encouraged that allow residents to experience being fully immersed in rural surgery and to determine the additional skill sets that would be useful to acquire before establishing a similar rural or community practice. As a result, 76% of this program's graduates over the last 35 years have directly entered the practice of general surgery.[92]

Another institution with a noted interest in rural surgical training, Bassett Medical Center, offers broad procedural experience parallel to that of the institutions mentioned above.[93] Nearly 70% of its graduates who practice general surgery remain in a rural area.

The educational rationale for a dedicated rural surgery rotation is to help reverse the decreasing number of rural surgeons by exposing them to the benefits of rural practice and by training residents to gain skills that would allow them to practice effectively in the rural setting.[94] With explicit exposure to a rural surgery practice in contrast to the typical residents experience in an urban, academic setting, a more informed decision can be made about future career goals.[95] A handful of general surgery residencies have a described interest in training rural general surgeons and have been successful in graduating surgeons who practice in a rural place. Organized and formal coordination among general surgery programs who intentionally train surgeons for rural practice, as well as development of more programs with such an interest, has been proposed as a useful first step in the process of fulfilling the surgical needs of rural America.[96] General surgery programs should continue to innovate educational experiences such as those discussed to expose and train residents for rural and community practice.

Mentoring the Next Generation

Mentoring, education, and early exposure to rural surgery have been proposed as crucial activities to encourage more medical students and residents to enter general surgery practice.[97,98,99,100,101] It has been noted in the literature that after educating residents about the realities of general surgery practice in the rural or community setting, it would be readily apparent that rural America offers a setting and lifestyle in which to raise a family, enjoy a reasonable lifestyle, and to set up a successful, connected, and sophisticated surgical practice with a wide scope free from the competition experienced in many urban and academic areas.[102] Career choice among surgical residents has been shown to be influenced by mentors.[103,104] Additionally, a recent survey administered at the American Board of Surgery In-Training

Examination (ABSITE) garnered over 80,000 responses and showed that first year surgical residents rarely predict accurately their post-residency fellowship choices.[105] Therefore, mentoring residents early in their residencies may have a significant effect on career choice. Mentoring residents as to the realities of general surgery may attract more future practitioners, given that mentors would have the chance to expose students and residents to the variety of procedures in general surgery.

In a recent survey study, it was found that general surgeons in rural practice were significantly more likely than their urban counterparts to have completed a rural clerkship during medical school.[106] They were also significantly more likely to have chosen a surgical residency program committed to rural training. A survey of 99 graduates of a university general surgery program between 1985 and 2006 found that general surgeons were significantly more likely (60%) than those who specialized (4%) to have chosen their career paths prior to entering residency.[107] Graduates in rural practice often cited the "broad scope of practice" as an important reason for their decision. Completing a rural clerkship during medical school and choosing a residency program committed to rural general surgery preparation are strongly correlated with rural practice so may help formulate strategies to increase recruitment and retention of rural general surgeons.[108] These findings suggest that the response to the decreasing numbers of general surgeons should include mentoring of students about the opportunities available in rural general surgery.[109]

The Necessity of Sub-specialists

While we clearly feel the general surgeon is crucial in the rural setting, we recognize the necessity of fellowship trained surgical sub-specialists in academic and urban centers. As technology and knowledge drive surgery progress and pioneer new techniques, the broadly trained surgeon will become less able to competently treat the entire spectrum of organ systems traditionally addressed by general surgeons.[110] Patients and practitioners alike should continue to support sub-specialization in order to produce the focused surgical experts needed in tertiary care centers. Significant experience with complex operations produces better outcomes for patients,[111] supporting the value of a focused subspecialty practice. Therefore, rural and community surgeons must deal with the challenge of performing procedures that they may not perform as often as they would like and for which they received minimal training during residency.[112]

As surgeons begin their careers, they must self-assess the capability of their hospital setting and surgical training when structuring their practices. Clearly, we need highly trained surgical specialists. But, many patients, particularly in the rural and emergency settings, need broad-based general surgeons, who are in short supply.[113] Additionally, the fragmentation of general surgery into a set of specialties may come at a cost to patient care.[114] For the traditional broad based general surgeon, care of the patient as a whole is the primary responsibility. As a surgeon concentrates on a single disease or organ system and becomes more specialized, he becomes less competent in treating the entire patient, becoming disease-centered rather than patient-centered.[115]

Conclusion

With a growing population, greater rate of sub-specialization, and fewer graduating surgery residents choosing to practice in rural locations, the supply of general surgeons may not be able to meet patient care demands in the future. Although many residents feel general surgery is losing relevance and that fellowship training is necessary, in our experience many positive aspects of rural general surgery practice exist, including a broad scope of procedures. Exposing medical students and residents to the realities of rural general surgery through mentorship and dedicated rural rotations could become influential strategies in the effort to help shape the future of surgery and ensure that rural communities will have surgical care.

End Notes: Anderson, Robert LeRoy and Mark Allen Anderson. "Rural General Surgery: A Review of the Current Situation and Realities from a Rural Community Practice in Central Nebraska." *Online Journal of Rural Research & Policy* (7.2, 2012).

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