Creating a Rural Surgery Track and a Review of Rural Surgery Training Programs

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OBJECTIVE: The objective of this study was to present the process of developing a rural surgery training track within an established residency program and review the current rural surgery training programs in the nation.

DESIGN: This study reviews current rural surgery training opportunities at Accreditation Council for Graduate Medical Education accredited surgical residencies in the United States and presents the process of creating the University of Minnesota's rural surgery training track.

SETTING: This study was performed at the University of Minnesota, in Minneapolis, Minnesota, and at Essentia Health—Saint Mary's Medical Center, in Duluth, Minnesota.

PARTICIPANTS: Accredited general surgery residencies were reviewed. The creation of a designated rural surgery training track added an additional rural-designated surgical resident during each postgraduation year and created a required postgraduation year 2 rural surgery rotation for all categorical surgical residents.

RESULTS: Two hundred sixty-eight surgery residency programs were reviewed. Twenty-seven had required rural rotations, 10 offered only elective rural rotations, and 4 had dedicated National Resident Matching Program codes for rural training tracks. After review of national rural surgery training opportunities, the University of Minnesota's process of creating a designated rural surgery training program required attention to 5 main components: needs assessment and review of local opportunities, surgery residency review committee approval, funding, surgical education, and clinical/operative education.

CONCLUSIONS: Increasing opportunities for surgical residents to train in rural settings may help with recruitment of medical students and retention of surgeons pursuing careers in rural surgery. (J Surg Ed 76:459–468. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Curriculum, Resident education, General surgery, Workforce issue

COMPETENCIES: Systems-Based Practice

INTRODUCTION

It has been estimated that by 2025, the shortage of general surgeons is predicted to be between 23,100 and 31,600 physicians with a particular impact on availability of rural surgeons.[1] The same need has been identified by national surgical and educational organizations such as the American College of Surgeons and the Accreditation Council for Graduate Medical Education (ACGME). The American College of Surgeons Advisory Council on Rural Surgery defines rural surgery as practicing in a city with a population of ≤50,000.[2]

Similar to national needs, a March 2011 report to the Minnesota Department of Health from the Rural Health Advisory Committee identified a critical need for general surgeons in rural Minnesota. The committee's recommendations included improving "workforce infrastructure," "Minnesota's education, training, and residency programs," and "recruitment and retention."[3]

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For rural hospitals or health care systems, recruiting a surgeon can be a difficult and costly endeavor. Retention is another issue. As data suggest, doctors are more likely to practice near the location where they train.[4,5] Therefore, it is reasonable to suspect that surgeons who receive residency training in a rural environment may be more likely to practice in such a setting.

In this study, rural surgery training is categorized as it currently exists in the United States and the process of creating the rural surgery training track at the University of Minnesota is described.

METHODS

A review of rural surgical training programs and rural surgery experiences was completed by residency website review from fall 2016 to summer 2017. A comprehensive list of 268 ACGME accredited general surgery residencies was obtained and all residency programs offering rural surgery opportunities in the United States were identified. A review of each program's website was completed, with particular attention to listed rural surgery opportunities. National Resident Matching Program (NRMP) codes were also reviewed for rural-focused surgical training programs. Programs were included if located in rural areas (defined as a population $\leq$50,000) or if a "rural rotation" was part of the curriculum (confirmed to be located in a rural area). The rural location was further categorized into large rural (10,000-50,000 population) and small rural (<10,000 population).[2] Programs in which the main hospital location or "rural rotation" were not in a rural area as defined above were excluded from review.

For the development of their rural surgery training track, the University of Minnesota, Department of Surgery partnered with Essentia Health, a large, primarily rural based, healthcare system. The process of creating a rural track (including detailed considerations) as specifically described in Results section. The process of creating a rural surgery training track began with (1) a needs assessment and evaluation of potential training opportunities within the state of Minnesota. Following this step, the rural surgery training track required approval from the (2) ACGME surgery residency review committee (RRC-Surgery). (3) Funding was then established. Finally, a rigorous (4) surgical education curriculum was developed and a well-rounded (5) clinical/operative curriculum was established.

RESULTS

Current Rural Surgery Training Opportunities Across the Nation

The 268 reviewed ACGME accredited residencies provide opportunities for rural surgery training through a variety of models. Rural surgical training opportunities were categorized as follows: intrinsically rural surgery residency, elective rural surgery rotations, required rural surgery rotations, and designated rural residency.

Eleven programs were classified as intrinsically rural (Table 1), 10 offered elective rural rotations (Table 2), 27 had required rural rotations (Table 3), and 4 had dedicated NRMP codes for rural training tracks (Table 4). Programs with required rural rotations were not dually classified in the subgroup offering elective rural rotations, even if those opportunities existed. Intrinsically rural residencies have residents complete the majority of their training at hospitals located in rural areas with a population of $\leq$50,000. Programs offering elective or required rural rotations are mostly $\leq$3 months in duration, and most are completed in the clinical postgraduate year (PGY) 2 to 4 of residency. Nine noninherently rural programs offered more extensive (>6 months over duration of residency) rural opportunities. Programs with designated NRMP codes for rural training tracks tend to offer more robust experiences with $\geq$9 months spent training in rural settings.

Needs Assessment and Evaluation of Training Opportunities

Options for developing a rural surgery program include obtaining new accreditation from the ACGME or partnering with an existing residency program. As a land grant institution, the University of Minnesota has a commitment to the state as a whole. It was that commitment that fostered the partnership with Essentia Health in Duluth, MN to add a rural track to the established general surgery residency training program at the University of Minnesota in Minneapolis, MN.

Moreover, Duluth became a clear choice of a rural surgery training location as it is also home to a regional campus of the University of Minnesota Medical School. The mission of the Duluth campus is to matriculate students who are primarily interested in family medicine, rural, and Native American health.[6] Students spend the first 2 years of medical school at the Duluth campus and complete their clinical experiences at the Twin Cities campus and/or in a variety of Longitudinal Integrated Clerkships, many of which are located in rural towns.

TABLE 1. "Intrinsically" Rural Programs

Name	Location	Residents per Year	Program Population	Small/Large Rural
Bassett Medical Center	Cooperstown, NY	3	<10,000	Small
Conemaugh Memorial Medical Center	Johnstown, PA	3	<30,000	Large
Dartmouth-Hitchcock Medical Center	Lebanon, NH	4	<20,000	Large
Geisinger Health System	Danville, PA	4	<10,000	Small
Geisinger Health System (Wilkes Barre)	Wilkes Barre, PA	4	<50,000	Large
Grand Strand Regional Medical Center	Myrtle Beach, SC	3	<30,000	Large
Marshall University	Huntington, WV	4	<50,000	Large
Marshfield Clinic	Marshfield, WI	3	<20,000	Large
Robert Packer Hospital/Guthrie Program	Sayre, PA	3	<10,000	Small
Spartanburg Regional Healthcare System	Spartanburg, SC	3	<40,000	Large
York Hospital	York, PA	4	<50,000	Large

Several of the Essentia surgeons spend time teaching at the Duluth campus of the Medical School. Recruitment of future rural general surgery trainees has the potential to begin at the Duluth Campus.

St. Mary's Medical Center (SMMC) is the tertiary referral center for the Essentia Health system that includes critical access hospitals, primary care clinics, and extended care facilities in Northeastern Minnesota, Northwestern Wisconsin and the western portion of the upper peninsula of Michigan. SMMC is a 380 licensed (350 staffed) bed hospital located in Duluth, Minnesota, a small city with a population of 86,000 surrounded by rural farmland, small iron ore mining towns, and unpopulated wilderness. SMMC was planned to serve as the primary training location and eventually an integrated training site. The use of a regional multispecialty medical center allows for the advanced training necessary for senior surgical residents while serving as a hub between rural communities where further rural surgical training would occur. This also provides support for rural surgical faculty with colleagues to support the training experience.

As a trial of the experience at Essentia in Duluth, a 5-week second year residency rotation at SMMC was developed as part of the regular rotation schedule. This established a trainee presence in the surgical environment of a hospital previously without surgical residents and allowed evaluation of the learning environment and faculty. The rotation provided a living experience for surgical residents, which is reflective of greater Minnesota. Residents also spent several days working with surgeons in a 25 bed, rural hospital located 60 miles away in Virginia, MN. Essentia Health provides housing for residents while on rotation in Duluth and Virginia. No weekend call was required to accommodate residents working 150 miles away from the main campus in Minneapolis.

After successful implementation of a junior resident rural rotation, development of a designated rural track began. The plan for the rural track was to add an additional resident to the University of Minnesota's categorical general surgery cohort. While the first 3 years of training would be indistinguishable from the experience of the other categorical residents in the Twin Cities, the fourth and fifth year of training would be primarily based within the Essentia Health system with an emphasis on rural surgery.

RRC-Surgery Approval

Specific points found in surgery program requirements[7] needed clarification with the ACGME Surgery Program Review Committee prior to developing a rural track. These items of discussion included: (1) site restrictions

TABLE 2. Programs Offering Elective Rural Rotations

Name	Primary Location	Residents per year	Rural Duration (Months)	PGY*	Rural Location	Rural Population	Small/Large Rural
Central Iowa Health Systems (Iowa Methodist Medical Center)	Des Moines, IA	4	1	4	Pella, IA	<20,000	large
Gundersen Lutheran Medical Foundation Program	La Crosse, WI	3	0-2	3,4	Prairie du Chien, WI	<10,000	small
Indiana University School of Medicine	Indianapolis, IN	10	0-2	3,4	Corydon, IN	<10,000	small
Medical Center of Central Georgia/Mercer University	Macon, GA	4	1	2	Cordele, GA	<20,000	large
Medical College of Wisconsin	Milwaukee, WI	7	2	3	Grafton, WI	<20,000	large
Oregon Health and Science University	Portland, OR	13	0-12	4	Grants Pass & Coos Bay, OR	<40,000	large
University of California (Davis) Health System Program	Sacramento, CA	9	3	4	South Lake Tahoe, CA	<30,000	large
University of Colorado Program	Aurora, CO	10	1.5	4	Montrose, CO	<20,000	large
University of Louisville	Louisville, KY	9	2	2, 3, 4	Madisonville, KY	<20,000	large
University of North Dakota	Grand Forks, ND	4	1.5	3	Minot, ND	<50,000	large

*PGY: Post graduate clinical year during which residents participate in rural rotations.

TABLE 3. Programs with Required Rural Rotations

Name	Primary Location	Residents per Year	Rural Duration (Months)	PGY*	Rural Location	Rural Population	Small/Large Rural
Carilion Clinic – Virginia Tech Carilion School of Medicine	Roanoke, VA	4	5	4,5	Blacksburg, VA	<50,000	Large
Drexel University College of Medicine/Hahnemann University Hospital	Philadelphia, PA	6	2	4	Wilkes Barre & Langhorne, PA	<50,000	Large
East Tennessee State University	Johnson City, TN	6	8	1,2,3,4,5	Bristol, TN	<30,000	Large
LSU – Shreveport	Shreveport, LA	8	9	2,3,4,5	Monroe, LA	<50,000	Large
Mayo Clinic – Rochester	Rochester, MN	10	1.5	3	Owatonna, MN	<30,000	Large
Medical University of South Carolina	Charleston, SC	5	3	2,4	Florence, SC	<40,000	Large
Ochsner Clinic Foundation	New Orleans, LA	6	8.5	1,2,3,4,5	Houma, LA	<40,000	Large
Southern Illinois University Program	Springfield, IL	4	3	3,4	Carbondale, IL	<30,000	Large
Texas Tech University Health Sciences Center (Permian Basin) Program	Odessa, TX	4	4	4	Big Spring, TX	<30,000	Large
University of Arizona College of Medicine-Tuscon Program	Tucson, AZ	8	1	2	Tuba City, AZ; Winslow, AZ	<10,000	Small
University of Illinois College of Medicine at Peoria	Peoria, IL	4	10	1,2,3,4	Canton, IL	<20,000	Large
University of Iowa Hospitals and Clinics	Iowa City, IA	6	2	3	Mason City, IA	<30,000	Large
University of Kansas SOM	Kansas City, KS	5	2.5	4	Hays, KS	<30,000	Large
University of Kentucky COM	Lexington, KY	7	4	2	Morehead, KY	<10,000	Small
University of Massachusetts	Worcester, MA	6	2	3	Milford, MA	<30,000	Large
University of Minnesota	Minneapolis, MN	7	1	2	Brainerd, Virginia, Detroit Lakes, MN	<20,000	Large
University of Mississippi Medical Center	Jackson, MS	5	5	3,4	Tupelo, MS	<40,000	Large
University of Nebraska Medical Center COM	Omaha, NE	5	1	3	North Platte, NE	<30,000	Large
University of New Mexico	Albuquerque, NM	6	2	3	Alamogordo, NM	<40,000	Large
University of Oklahoma Health Sciences	Oklahoma City, OK	5	1	3	Elk City, OK	<20,000	Large
University of Oklahoma School of Community Medicine (Tulsa)	Tulsa, OK	4	2	3	Stillwater, OK	<50,000	Large
University of South Dakota SOM	Sioux Falls, SD	3	4	2,4	Yankton, SD	<20,000	Large
University of Tennessee COM (Chattanooga)	Chattanooga, TN	5	3	3	Athens and Etowah, TN	<20,000	Large
University of Tennessee Medical Center (Knoxville)	Knoxville, TN	5	1.5	4	Morristown, TN	<30,000	Large
University of Vermont Medical Center	Burlington, VA	3	1	2	Berlin, VT	<10,000	Small
University of Virginia	Charlottesville, VA	6	1	4	Fishersville, VA	<10,000	Small
Vidant Medical Center/East Carolina University	Greenville, NC	5	1	3	Edenton, NC	<10,000	Small

*PGY: Post graduate clinical year during which residents participate in rural rotations.

TABLE 4. Programs With Separate NRMP Code for Rural Track

Name	Primary Location	Residents per Year	Rural Residents	Rural Duration (Months)	PGY*	Rural Location	Rural Population	Small/Large Rural
Mayo Clinic – Rochester	Rochester, MN	10	1	12	3,4,5	Red Wing, MN	<20,000	large
						Owatonna, MN	<30,000	Large
						Mankato, MN	<40,000	Large
University of Minnesota	Minneapolis, MN	7	1	12	4,5	Brainerd, MN	<20,000	Large
						Virginia, MN	<10,000	Small
						Detroit Lakes, MN	<10,000	Small
University of North Dakota	Grand Forks, ND	4	2	~9	2,3,4	Williston, ND	<30,000	Large
						Perham, MN	<10,000	Small
						Minot, ND	<50,000	Large
University of Wisconsin	Madison, WI	6	1	12 to 18	2,3,4,5	Neenah, WI	<30,000	Large
						Waupan, WI	<20,000	Large

*PGY: Post graduate clinical year during which residents participate in rural rotations.

for chief residents, (2) number of new resident positions, and (3) rural designation.

First, chief residents are restricted to locations designated as "integrated sites" (several requirements including substantial contribution to education).[7] Because of the previously established rotation at SMMC, faculty teaching credentials and other requirements for integrated status were already complete and expedited the process. Faculty at SMMC therefore demonstrated the standard as determined by the ACGME similar to other integrated sites. The primary teaching faculty at each of the rural sites is American Board of Surgery certified, with the exception of junior faculty who has not yet completed certification. Only 6 of the 37 faculty members at all 4 sites hold an academic appointment with the medical school, all 6 faculty members practicing in Duluth.

Secondly, the number of new resident positions needed to be confirmed. To include a new categorical resident on a rural track, the resident cohort would only have to be increased by 3 (one in each of the third, fourth, and fifth years of training). Pre-existing preliminary resident positions for years 1 and 2 were replaced with a categorical rural track resident. When the application for the new residents was approved, a unique NRMP number for the position was obtained. The position was then added to the Department of Surgery website and a program description was added to Fellowship and Residency Electronic Interactive Database Access System.

The final point of clarification was rural designation. Duluth, MN does not meet the federal definition of rural area, but sits in close proximity to areas that are considered rural under federal and state definitions. Since SMMC is located in downtown Duluth, rotations were designated at rural hospitals outside of Duluth to offer a truly rural experience in a hub and spoke model (Fig. 1). This required a waiver from the RRC-Surgery to allow fourth year rotations at SMMC to count as "chief rotations," allowing the chief (fifth-year) resident to complete rotations in rural but not "integrated" hospitals. All chief rotations are located at SMMC though some are completed in the fourth year of residency. The "flexibility in training effort"[8] supported by both the RRC-Surgery and the American Board of Surgery allowed for approval of this alteration.

Funding Sources for Rural Track

A variety of resources were used to fund the 5 years of salary, benefits, and training of the rural track resident. An addition of a full 5-year categorical position was not possible because each of the teaching hospitals had reached its Medicare limit. Therefore, only 3 positions were added and funds were redirected from 2

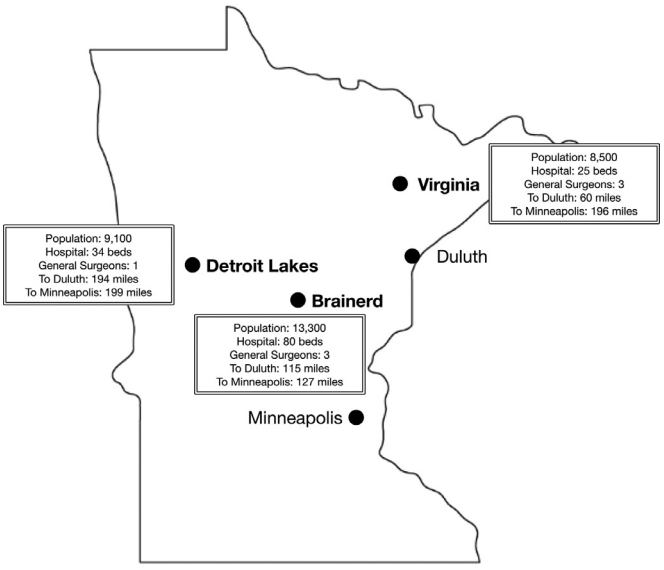

FIGURE 1. Rural Track Hospital Locations.

preliminary resident positions to fund 2 categorical rural positions. Essentia Heath committed to fund the 3 additional positions, despite only having 2 residents in their system. Finally, a grant was obtained from the Minnesota Department of Health to expand primary care training opportunities in rural Minnesota, which will defray salary, benefits, and administrative costs over 3 years.

Surgical Education Curriculum

To ensure that the rural track residents participate in didactic educational experiences, video conferencing capabilities were established in the main surgery conference room in Minneapolis so residents and faculty can attend and present at meetings such as Department of Surgery Grand Rounds and Morbidity & Mortality conference. One of the benefits of rural and small community hospitals is that teleconferencing facilities are often of higher quality due to the need for remote communications. The didactic core curriculum is delivered locally in Duluth but follows the same schedule as the Twin Cities residents; some sessions are also delivered via videoconference with the main resident cohort. Most formal testing (such as the American Board of Surgery In-Training Exam) is still completed with the entire resident cohort and requires the rural residents to travel to Minneapolis.

Clinical/Operative Curriculum

The clinical curriculum includes exposure to a wide variety of surgical responsibilities required of surgeons in rural environments inclusive of general surgery competencies but also including: resource appropriate obstetrics, gynecology, endoscopy, emergency and trauma surgery triage, stabilization and transport, thoracic, vascular, urologic, and otolaryngology surgery among others. Residents are part of the caesarian section call rotation at each site. They also have increased interaction and support roles with primary care colleagues, many of whom are Family Medicine physicians who practice full-scope obstetrics.

Rotations outside of Duluth are completed in Virginia, Brainerd and Detroit Lakes, Minnesota (Fig. 1). Residents spend over 9 months at rural sites over the course of 2 years in their designated rural training while keeping the same rotation schedule as the traditional University of Minnesota residents during years 1 to 3 (Fig. 2). All 3 rural locations are training sites for the University of Minnesota Medical School's Rural Physician Associate Program and preceptor sites for medical students at the Duluth Campus, which provides the opportunity for surgery residents to interact with medical students. This provides additional mentorship and encouragement for medical students consider a career in rural surgery. Thus, an academic training environment is created within the confines of a rural setting.

Outcomes

Because the rural track within the University of Minnesota was recently started, there are few outcomes that can be reported. The first graduate of the program is currently working in a rural community and the second resident who will graduate this year is only interviewing in rural communities. The ABSITE scores cannot be listed because of confidentiality.

Rural Year	Block 1	Block 2	Block 3	Block 4	Block 5	Block 6	Block 7	Block 8	Block 9
PGY1	Gen Surg	Colorectal	Gen Surg	Nightfloat	Burn	Nightfloat	Gen Surg	Gen Surg	Colorectal
PGY2	Gen Surg	Ped Surg	Gen Surg-D	Surgical ICU	MIS	Nightfloat	Acute Care Surg	Trauma	Gen Surg
PGY3	CT Surg	Elective	Surg Onc	Gen Surg/MIS	Burn	TACS Nights	Elective	Thoracic	
PGY4	TACS-D	Gen Surg-D	Gen Surg-B*	HPB/Thoracic-D	Gen Surg-D	Gen Surg/Endo- DL*	Ob/Gyn Surg-D	Gen Surg/Endo-V*	Vascular-D
PGY5	MIS-D	Gen Surg- B*	HPB/Thoracic-D	Gen Surg/Endo-V*	Vascular-D	Breast/Colorectal-D	Gen Surg/Endo-V*	Gen Surg-D	Gen Surg-D

Electives: Colorectal, Transplant, Plastics.

Abbreviations: TACS = Trauma & Acute Care Surgery, MIS = Minimally Invasive Surgery, CT= Cardiothoracic, HPB= Hepatobiliary, Endo= Endoscopy.

Designates rural rotation (D= Duluth, V= Virginia, B*=Brainerd, DL*=Detroit Lakes).

FIGURE 2. Rural Track Rotation Schedule.

Despite adding an additional resident, case numbers of the junior residents had minimal changes with the addition of a rural resident to the cohort. There were no changes to the number in the PGY1 cohort, as the rural resident replaced a preliminary position. Average case volume for PGY2 and PGY3 residents slightly decreased after adding the designated rural resident but volume was well within the required 250 cases (PGY2 residents had completed 395 average cases versus 356 after rural addition and PGY3 residents completed 593 average cases versus 571 after rural addition).

While data are only available for 1 resident, the case volume of the rural resident is similar to the traditional program in the Twin Cities. A significant number of cases are completed in a rural setting, but cannot be compared directly to total major case numbers because of the inclusion of endoscopy in the total case numbers for rural sites (Table 5).

DISCUSSION

The purpose of this study was to review the current rural surgery training opportunities within the United States, and present the process and considerations undertaken by Minnesota to expand the current cohort of resident to include a rural surgery training track.

General surgeons are an important part of the rural healthcare workforce; a study surveying surgeon openings in 2 states found that nearly half of positions were in rural locations and only 18% required fellowship training.[9] The number of rural general surgeons has remained stable over the years, but there is an aging rural general surgery workforce, suggesting an urgent future need.[10] There has been a response of some surgery training programs to meet this need; however, this response is not universal across the United States.[11]

Success has been demonstrated in medical schools for recruiting to family practice and rural medicine;[4,6,12] in general surgery, those with rural backgrounds, medical students choosing rural clerkships, and residents in rural-focused surgery training programs have been shown to correlate with choosing a rural practice.[13] In this rural surgery training track, the choice of a senior resident rural experience was purposeful since it is believed that the clinical exposure in the last years of training are more likely to drive the location of future practice.[5,14]

Rural general surgery can be considered primary care[10,15] and can be very different than the type of surgery training completed at metropolitan centers,[16,17] often with minor procedures and endoscopy comprising a majority of the rural surgery caseload.[18] General surgeons are beneficial to rural hospitals and communities, not only for the fiscal reasons, but also for increasing services provided and for the general well-being of the community.[15,16] Specialty services offered by general surgeons such as trauma care[19] can be of utmost importance to smaller communities. The awareness that rural surgeons fall within the realm of primary care opened new funding opportunities for this rural surgery track.

This program was also fortunate to secure funding for 3 residents though Essentia Health despite only 2 senior residents being at their hospitals. The incentive for Essentia to make such a commitment was a desire to recruit surgeons interested in working in a rural environment. Additionally, the presence of trainees allows SMMC to potentially qualify as an American College of Surgeons verified Level I trauma center. Such a designation may increase hospital revenue by the addition of new responsibilities, and therefore, patients.

This is the first study to describe the process of adding a rural surgery track to an established residency program. One criticism of this process and newly established rural track is that the rural-designated residents spend a large portion of their time at SMMC, which is a tertiary care hospital and does not qualify as a rural hospital or critical access hospital.[21] However, SMMC is often the location where regional critical access hospitals refer; at times, SMMC needs to subsequently refer to the University of Minnesota Medical Center. Developing the judgment regarding who and what can be cared for in a rural setting is vital to the training of a future rural surgeon. Moreover, several of the SMMC-based surgeons

TABLE 5. Rural Case Volume

	Traditional Residency (mean)	Rural Track (n)	Brainerd (n)	Detroit Lakes (n)	Virginia (n)	Total Rural (n)
PGY4	968	837	117	148	81	346
PGY5	1515	1570	206	148	212	566

Grey boxes include endoscopy and cannot be directly compared with total major cases.

have rural outreach aspects to their practice and residents will participate in those experiences, providing another opportunity to understand how surgeons serve in rural capacities.

There was a study in 2009 describing 25 programs that met at least one of 3 criteria for producing rural surgeons; rural location (using rural urban commuting area codes), rural-focused curriculum, and self-identified interest in rural training.[20] While this study uses different methodology for identification of rural programs, it is apparent that the number of programs focusing on rural surgery has increased over the past decade. Additionally, there may at times be a disconnect between the definition of a rural community and a rural-focused residency program. There are some instances where programs located in a rural area have the resources and the referral base of a larger academic center. While it is the goal of many of these programs to offer rural experiences or electives, some programs, particularly those that are classified as "intrinsically rural", may not see rural general surgery as their educational mission. Similarly, there were also programs with excellent community training opportunities that were excluded because their "rural" training opportunities occurred in communities that were slightly larger than the 50,000 used as the cutoff for this analysis.

Finally, while this program was developed and established at a single institution, the components above provide a framework to develop a rural general surgery curriculum within an established residency program, and may help surgical educators to meet the nation's upcoming need[10] for rural surgeons.

CONCLUSIONS

There are few programs that offer a designated rural surgery training track. The goal of the new Rural General Surgery Residency Track at the University of Minnesota is to train general surgeons to meet the current and future workforce needs of rural communities throughout Minnesota and the rest of the United States. Residents in the rural track receive exposure to the full gamut of rural and urban experiences by the time they complete the 5-year clinical program, with the goal to be "practice-ready" upon completion of training.

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