Rural Health Advisory Committee’s Report on General Surgery in Rural Minnesota

March 2011
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March 29, 2011

Edward Ehlinger, M.D.
Commissioner
Minnesota Department of Health
625 North Robert Street
St. Paul, Minnesota 55155

Dear Commissioner Ehlinger,

We are pleased to present this report from the Rural Health Advisory Committee: *General Surgery in Rural Minnesota*. In July 2010, the Rural Health Advisory Committee formed a work group to discuss access to general surgery services in rural areas of our state. Work group members and additional key informants included general surgeons, nurse anesthetists, surgical team members, primary care physicians, medical school educators, hospital association representatives, Critical Access Hospital administrators and other rural health advocates. This report is a result of their efforts and describes the practice of general surgery, key elements of successful models, and barriers to the availability of rural surgical services.

Access to modern surgical services continues to be a great challenge in rural Minnesota. Supporting the current general surgery workforce and providing adequate training for the next generation of rural general surgeons are primary concerns. The work group focused on: 1) patient issues, including delays in diagnosis and treatment 2) general surgeon issues, including declining numbers practicing in rural areas, and 3) hospital issues, including the financial impact of general surgery programs on rural hospitals, local trauma systems and communities. The recommendations highlight the need for awareness and coordinated efforts at state and national levels to address these issues.

We appreciate the opportunity to contribute this report to the important discussion of maintaining access to health care services in rural Minnesota. Thank you for your strong support in improving rural health.

Sincerely,

Jeffrey Hardwig, M.D.          Ray Christensen, M.D.
Chair                        Chair
Rural Health Advisory Committee  Rural General Surgery Work Group
April 8, 2011

Jeffrey Hardwig, MD, Chair
Rural Health Advisory Committee
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Dear Dr. Hardwig,

Thank you for the Rural Health Advisory Committee’s report, General Surgery in Rural Minnesota. We commend you, the Rural General Surgery Work Group and the entire committee for your efforts over the past eight months.

Providing access to safe and timely surgical services in rural communities is both a national and a Minnesota problem. Innovative models of care and workforce solutions are clearly needed. Minnesota must nurture integrated, coordinated community systems of health care and public health to accomplish our health reform goals; general surgery is a central component of well-rounded community and regional systems of care.

The work group thoroughly studied the provision of surgical services for rural residents and provided case studies highlighting best practices for rural general surgery programs, challenges to the development of new surgical programs, and the importance of training surgical team members in rural areas. The report documents workforce shortages that limit surgical coverage for rural Minnesota. In response to widespread barriers to rural surgical services, the report presents 10 compelling recommendations.

Thank you again for your excellent work. The Minnesota Department of Health is committed to finding solutions to ensure access to high quality medical care for rural Minnesotans. This report, with its practical and targeted recommendations, is an important step in moving toward these solutions. I look forward to working together to protect, maintain and improve the health of all Minnesotans.

Sincerely,

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Executive Summary

General surgeons are a vital part of any health care system, and perhaps more so in a rural health care system. General surgeons provide valuable and life-saving surgical care for patients of all ages and varied medical conditions. In rural areas, general surgeons are imperative for emergency operations. Trauma systems require access to general surgeons, and primary care providers rely on general surgeons to step in and provide urgent and emergency surgical care of their patients, especially obstetric patients.

The population of general surgeons has been stagnant relative to overall population growth.1 Fewer surgeons are choosing to practice general surgery. Of the estimated 1,000 general surgeons completing their residencies each year in the United States, 30 to 40 percent will actually practice general surgery. Many surgeons who start with a general surgery practice are choosing to specialize. Fewer International Medical Graduates are filling general surgery match openings. Retirement and early retirement for existing general surgeons adds to the dwindling number.

There are currently about 450 general surgeons in Minnesota. Of these, only 23 (5 percent) have practice locations in rural counties. Approximately 22 percent of general surgeons in Minnesota plan to stop practicing within the next five years. Nearly 50 percent of rural general surgeons in Minnesota plan to retire within six to 10 years.

Meanwhile, the need for general surgery services is increasing, especially in areas with aging populations. The decline in the number of general surgeons in rural areas, combined with the increased need for general surgery services, has led to a growing nationwide crisis.

Key Findings

Benefits. Significant benefits to general surgeons practicing in rural Minnesota include:

- **Early diagnosis and timely treatment.** Patients prefer local care and are more likely to undergo preventative surgical procedures in their own communities. Local access to surgical services reduces stress, financial costs and transportation barriers for rural general surgery patients.

- **Increased access to trauma care.** Surgical team availability is a crucial component to the provision of trauma care in rural areas. Rural trauma care requires a multi-disciplinary team approach often coordinated by general surgeons.

- **Support for primary care physicians.** Family practice physicians often limit the types of surgical services they are able and willing to perform. General surgeons work across many service areas in rural hospitals including gynecology, obstetrics,

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orthopedics, pediatrics, trauma care and urology. Availability of a local general surgeon may affect recruitment and retention efforts in rural hospitals.

- **Economic impact on rural hospital and community.** General surgery is a vital component of a rural hospital’s viability because surgical services generate a significant share of hospital revenues. These revenues are returned to the local community in the form of tax revenues, employment opportunities and the purchase of additional goods and services.

**Barriers.** Significant barriers to the provision of rural surgical services include:

- **General Surgeon Workforce Shortages.** There is a current shortage of practicing general surgeons. Growing aging populations in rural areas may increase the need for surgical services while fewer surgeons are choosing to practice general surgery.

- **Training and Residency.** Rural residency slots are limited. Most general surgery training programs are not preparing students adequately for practice in rural areas. Residency programs with a rural focus are not easily identifiable.

- **On Call and Lifestyle Considerations.** Rural hospitals have limited options for surgical coverage in times of sickness, vacations and emergencies. Rural general surgeons may experience professional isolation and less access to emerging technologies, continuing medical education or hands-on training experiences.

- **Low Medicare Reimbursement.** The model Medicare uses to set reimbursement rates puts rural general surgery programs with low patient volumes at a financial disadvantage. Medicaid and private insurance plans use this model as a basis for their payment systems, so these downward trends are reflected across the health care system.

- **Infrastructure Needs.** General surgeons need modern facilities and equipment to perform a range of procedures. Surgical technology is costly but adoption is essential for rural hospitals to offer advanced services. Surgical workforce concerns include the recruitment and training of surgical team members and coordination of care with referral providers, post-surgical care providers and nurse anesthetists.

**Recommendations**

The work group issued 10 recommendations for addressing and improving issues related to general surgery in rural Minnesota. The recommendations are a call for action to rural hospitals, rural health systems, medical colleges and universities, policymakers and additional stakeholders. These recommendations encompass:

- Awareness
- Best practices and innovative models
- Infrastructure components including workforce and technology
- Improvements in Minnesota’s education, training and residency programs
- Recruitment and retention
- Inclusion in emerging health care delivery models.

The continued provision of general surgery in Minnesota is at great risk. It is imperative that all residents of Minnesota have immediate access to general surgery in emergencies and within a reasonable time and distance for non-urgent surgeries. The following
recommendations address steps toward achieving equal access to surgical services throughout Minnesota:

A. **Expand awareness of the impact of general surgery on patient safety and quality.** Lack of access to general surgery may lead to delayed surgical intervention and/or recognition of life-threatening traumatic injuries. This impacts patient safety, quality of health, and may even result in otherwise preventable death. A shortage of general surgeons is on par with shortages of primary care providers. Rural health advocates, hospitals, associations and providers should raise this issue in appropriate forums and publications. Critical Access Hospitals should speak with a unified voice to consistently raise the urgency of rural general surgery issues and recommendations in appropriate forums. Keep abreast of national efforts to do the same.

B. **Include general surgery as a fundamental and necessary health service for rural communities in policymaking and health workforce planning efforts.** Ensure the inclusion of general surgery as a basic necessary service in new health care delivery models such as the Accountable Healthcare Organization. Include general surgery in discussions and policies regarding core medical services that should be available to every rural resident.

C. **Identify, evaluate and promote models of multi-hospital collaboration and rural surgery call coverage.** Organizations that provide funding, consultation and technical assistance for rural hospitals should encourage collaboration and mentorship models involving larger regional hospitals and small hospitals or groups of small hospitals. The purpose of the collaboration and mentorship is to provide support, consultation and perhaps call coverage to the general surgeons practicing in small rural hospitals. Some rural hospitals are developing relationships with neighboring hospitals with the goal of sharing surgical teams and services. Efforts to collaborate should be supported, and if models are deemed replicable, details of successful collaborations should be shared. This information should be accessible on a website such as the Office of Rural Health and Primary Care’s “Models” page, and promotion and enhancement of the information should be encouraged.

D. **Develop and financially support rurally-focused general surgery training and residency programs at institutions in and near Minnesota, including Hennepin County Medical Center, Mayo Clinic College of Medicine and the University of Minnesota.** The mission of these educational programs should include a commitment to serving rural and underserved citizens. Research and experience shows that medical students are far more likely to practice in rural areas if they experience at least part of their medical training in a rural setting. At minimum, Minnesota general surgery residency opportunities need to be expanded specifically for rural settings. General surgery programs in Minnesota should include a one- to two-month rural experience at sites selected by the programs. Successful implementation of these programs is dependent upon state funding.
E. Support pre- and post-surgical care practices in rural hospitals. Many rural communities are served by a general surgeon who travels to their community on a scheduled basis. In these cases, medical and nursing staff must coordinate with the surgeon and provide pre- and post-surgical care. Family physicians, hospitalists, nurse practitioners and physician assistants should have opportunities for additional training in pre- and post-surgical care. Rural hospitals, continuing education programs and grant programs such as the Office of Rural Health and Primary Care’s Rural Hospital Flexibility Program should support this training.

F. Support the maintenance and expansion of funding (such as the Rural Hospital Capital Improvement Grant Program) to support the facilities and equipment necessary for general surgery services in Minnesota’s rural hospitals. Many of Minnesota’s rural hospitals struggle to maintain and keep up with necessary surgical suite and equipment needs. The work group recommends that a portion of grant funding be dedicated to facility and equipment improvements and upgrades to support general surgery programs.

G. Expand awareness of the economic implications of general surgery in rural communities and hospitals. Hospitals and health systems are usually among the top employers in rural communities, providing jobs and contributing greatly to the overall economy. Within hospitals, general surgery often generates a profit. Without a general surgery program, rural hospitals may be in jeopardy of losing other valuable services such as obstetrics, causing a trickle effect of financial loss. Rural hospitals should promote awareness of the importance and impact of general surgery within their communities and collectively within the state.

H. Develop and designate Rural General Surgery Shortage Areas. The Bureau of Health Professions, Health Resources and Services Administration under authority given in the Public Service Act designates Health Professional Shortage Areas (HPSA) and Medically Underserved Areas. HPSA designations are awarded in primary care, dental and mental health. Through these shortage designations, high need sites can meet eligibility criteria for a number of state and federal assistance programs such as the State Loan Forgiveness Program and National Health Service Corps. The work group recommends pursuing a new category for areas with a shortage of general surgeons. In addition to standard provider per population ratios, shortage areas should be determined by additional factors such as call coverage and age of population. This recommendation is supported by rural hospitals throughout the nation. Minnesota’s Office of Rural Health and Primary Care should support pursuit of this HPSA revision through its membership in the National Organization of State Offices of Rural Health.

I. Support continued improvements to Medicare reimbursement for general surgery and nurse anesthetist services. The Minnesota Department of Health, along with stakeholder groups such as the Minnesota Hospital Association, National Organization of State Offices of Rural Health and National Rural Health Association,
should advocate for continued support and improvements in Medicare reimbursement for general surgery and nurse anesthetist services in rural areas.

**J. Support general surgery teams’ involvement in educational offerings that supplement their trauma skills.** Programs such as Comprehensive Advanced Life Support (CALS), a nationally-recognized Minnesota program that trains rural medical teams in emergency and trauma skills, should be promoted and made available to all medical and nursing staff involved in and supporting a general surgery program. The CALS program has been credited for improving emergency health care delivery and even saving lives of countless patients in rural communities. Current state funding for the program should, at minimum, remain at current levels.

**K. Promote supportive technologies.** Surgical practices will continue to be interlaced with technological tools. These and other technologies should be promoted and made available by Minnesota’s telehealth networks and organizations that provide information and technical assistance regarding telemedicine as tools to maintain and increase access to general surgery in rural Minnesota. Technological advancements may provide means for addressing some barriers to rural general surgery. Televideo is a central tool for rural general surgeons to provide peer consultations, telesurgery and pre-or post-surgical care. Information systems and electronic medical records will ease communication with and about patients.
Rural General Surgery Work Group

The Rural Health Advisory Committee (RHAC) is a 15-member, governor appointed committee charged with advising the Commissioner of Health and other state agencies on rural health issues. After an environmental scan of rural health issues and concerns in Minnesota, rural general surgery was identified as a priority issue on the 2010-2012 RHAC work plan and a statewide work group was formed to address this issue.

Work Group Charge

The Rural Health Advisory Committee charged The Rural General Surgery Work Group with:
- Studying general surgery in rural Minnesota
- Developing recommendations for addressing issues and barriers.

The work group’s understanding of the issues and facts included: (1) there is a shortage of practicing general surgeons in rural Minnesota; (2) access to general surgery services is imperative for rural Minnesotans; and (3) the availability of general surgery significantly impacts the local hospital and health care system.

Work Group Activities

The Rural General Surgery Work Group’s tasks were completed between July 2010 and February 2011. First, a work group composed of general surgery professionals and key informants from a variety of backgrounds met four times between July 2010 and December 2010. After an initial brainstorming session, three main focus areas for discussion emerged:

1. **Patient Issues:** limited access, delay in diagnosis or treatment, lack of surgical specialties (trauma, obstetrics/gynecology, orthopedics), post-operative care
2. **General Surgeon Issues:** number of practitioners, workforce and demographic concerns, scope of practice, lifestyle preferences
3. **Hospital Issues:** financial impact of general surgery services, impact on availability of other health services, trauma system development.

Second, work group staff conducted interviews with key informants to gain greater awareness of the challenges and opportunities to implementing and maintaining general surgery programs in rural Minnesota.

Third, a survey of Critical Access Hospitals in Minnesota was completed to determine the availability of certified nurse anesthetists (C.R.N.A.s) and how this relates to the delay of surgical procedures or transfer of surgical patients to larger facilities.

Fourth, work group staff reviewed web-based and scientific literature to identify current research, programs and policies that could influence the practice of general surgery in
rural areas.

Fifth, work group staff created maps, charts and graphs to illustrate Minnesota-specific data related to rural general surgery resources.

**Work Group Members**

A complete list of work group members, additional contributors, work group staff and Rural Health Advisory Committee members is on pages 6-8.
Rural General Surgery Overview

General surgery is a vital component of the rural health system. It has been described as the “primary care” of surgery, especially in rural areas where general surgeons perform basic procedures in the areas of trauma, orthopedics, urology and gynecology. The rurally located general surgeon is likely to have an independent practice, have a large and varied caseload, and work in more than one location. The benefits that draw a general surgeon to rural areas may come with a cost to the surgeon and rural health facility: professional isolation; less exposure to technological advances; and limited surgical coverage in times of sickness, vacations, emergencies or continuing medical education.

Core procedures performed in a rural general surgery program include adhesions, appendectomy, breast biopsy and central line placements. Occasional elements may include breast surgery, cholecystectomy (removal of the gall bladder), colorectal surgery, endocrine surgery, gastric surgery, hernia repair, orthopedic surgery, surgical gynecology, surgical oncology, surgical urology, trauma surgery and vascular surgery. Although family practice physicians may perform core surgical procedures, some abstain from more complex surgeries.

Rural general surgeons may have the greatest impact in the areas of emergency care, obstetric care and procedures common in elderly populations. When patients are confronted with a surgical emergency, their quickest access to lifesaving care is through general surgeons working in emergency departments. Common reasons for emergency care include gallbladder disease, complications related to labor and delivery, gastrointestinal bleeding, appendicitis, heart disease, aneurysm and stroke. Patients injured in car accidents or work related accidents may require emergency surgeries. Rural general surgeons work closely with other trauma care team members to care for these patients.

General Surgery Patients

Patients in Minnesota’s small and isolated rural areas experience the greatest shortage of general surgeons. In Minnesota, 17 percent of the population lives in a small or isolated rural area. For these residents, access to surgical services may be challenging. Patients may jeopardize their health by delaying preventative surgical procedures. Studies have shown that rural residents prefer to have local care and will accept a greater mortality risk in order to have surgery locally. The financial costs and stress associated with traveling to have surgery can be overwhelming for patients and their families.

The lack of access to a general surgeon affects more than the patients in need of the core surgical services listed above. Without general surgeons to back them up, family physicians

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cannot deliver babies, and emergency obstetric cases may need to travel to reach a general surgeon, risking healthy outcomes for the baby and mother. The consequences of not having surgery services available for trauma victims and emergency surgery patients may be life-threatening. When patients are transferred by ambulance or helicopter to larger communities, there are additional costs and quality of care concerns.

### Rural General Surgery Crisis

Despite an aging population and overall population growth in recent decades, there has been no increase in the number of general surgery residents in the United States. The recruitment and retention of rural general surgeons is a challenge. More than 60 percent of general surgery residency graduates choose subspecialty training immediately after residency, further limiting the availability of general surgeons. Most general surgeons in rural areas are older males who are likely to choose early retirement options. International Medical Graduates (IMGs) also serve as rural general surgeons in relatively high proportions, but their obligation to rural practice locations is time limited.

Failure to address the rural general surgery crisis will create a wide array of negative consequences within the local health care system. First, a lack of rural general surgeons may cause some rural hospitals to close, which would result in large underserved areas. Patients in need of surgical care will delay treatment or neglect it altogether. Patients will be required to travel great distances to undergo necessary surgeries. Second, a lack of rural general surgeons has negative effects on the recruitment and retention of other health professionals. This is especially true in the areas of family practice and obstetric care. Third, a lack of rural general surgeons can compromise statewide trauma systems. An increase in time of patient transfers to locations with adequate surgical intervention capabilities will result in poorer patient outcomes. Ineffective triage of trauma patients will overwhelm existing trauma hospitals serving large rural regions.

### Economic and Financial Impact

General surgery is a vital component of a rural hospital’s viability. Some small rural hospital administrators report the financial dependence upon the surgical program is such that the hospital would be forced to close if surgery was no longer available at their facility. In addition to their role as the community health care hub, rural hospitals contribute greatly to the local economy. Often one of the largest employers in the area, rural hospitals draw consumers and other businesses to the community.

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General surgery cases represented 36 percent of all discharges in Minnesota’s Critical Access Hospitals in 2008.\textsuperscript{7} These surgical services often contribute significantly to hospital revenues, with some reports showing up to 68 percent of revenues attributed to surgery alone (not including the ancillary services such as lab and radiology). A general surgeon practicing in rural America is likely to generate more than $1.3 million for a hospital.

Revenues generated by a rural general surgeon are returned to the local community in the form of tax revenues, employment opportunities, and the purchase of additional goods and services to support the practice. An additional $1.4 million and 25.9 jobs are generated in the community in which the general surgeon practices.\textsuperscript{8}

Loss of general surgery services in a rural hospital leads to additional economic losses in the hospital and community. Patients traveling to other communities for surgery are likely to have related lab and diagnostic tests and some post-operative care done there. Medical conditions for which surgical back up is necessary may no longer be safe to provide. Transportation to other hospitals for services that could be provided locally is expensive, time consuming, and potentially life-threatening for patients. As more patients travel to regional health care centers, this becomes the norm for members of the local community and impacts revenues as well as perceptions of quality.

At the tail end of this decline in general surgery services, rural health care systems are in jeopardy of collapse with significant economic ripple effects across the local community. Usually, 10 to 15 percent of jobs in rural counties are in health care, and hospitals are typically the second largest employer in rural counties (behind local school systems).\textsuperscript{9} Beside the direct loss of jobs in the local health care industry, other businesses and residents may consider relocation due to a depressed local economy.

\textsuperscript{7} 2008 Hospital Discharge Data, Minnesota Department of Health.
\textsuperscript{8} Eilrich, F. et al. (2010). The Economic Impact of a Rural General Surgeon and Model for Forecasting Need. National Center for Rural Health Works, Oklahoma State University.
General Surgery in Rural Minnesota

Rural Minnesotans depend on their community hospital to provide services that meet their medical needs. At minimum, emergency medicine and primary (including preventive) care must be available. Most rural hospitals also provide some surgical, procedural and specialty care. In addition to surgery, general surgeons provide some primary care services in rural communities.

Critical Access Hospitals (CAHs) serve the most rural areas of the state. CAHs are rural hospitals licensed for 25 or fewer inpatient beds. The designation was created to preserve access to primary and emergency care in rural communities. Minnesota has 79 CAHs (Map 1, Appendix A) and most provide some surgical care. Most CAHs are located in small or isolated rural areas under the Rural-Urban Commuting Area (RUCA) classification system (Map 2, Appendix A). Table 1 shows the types of surgery performed in Minnesota’s CAHs in 2008 by their location category. General surgery accounts for 36 percent of all surgeries performed at CAHs.

Table 1

<table>
<thead>
<tr>
<th>Type of Surgery</th>
<th>Rural</th>
<th>Urban</th>
<th>Large Rural</th>
<th>Small Rural</th>
<th>Isolated Rural</th>
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<td>General Surgery</td>
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<td>Orthopedics</td>
<td>34.7%</td>
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<td>29.1%</td>
<td>26.3%</td>
<td>21.9%</td>
<td>22.1%</td>
<td>23.3%</td>
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<td>Cardiac and Vascular</td>
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<td>1.3%</td>
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<td>ENT</td>
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<td>0.5%</td>
<td>0.4%</td>
<td>0.3%</td>
<td>0.4%</td>
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<tr>
<td>Neurology</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.3%</td>
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<tr>
<td><strong>Total Surgery Discharges</strong>*</td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
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*Totals may not add up to 100% due to rounding.

Further, general surgery is a larger proportion of all surgeries at hospitals in small and isolated rural areas. It is important to note that some general surgeons perform surgeries outside of those categorized as general surgery (e.g., a general surgeon may perform a cesarean section, which may be categorized as obstetric surgery).

Within the category of general surgery, appendectomies and cholecystectomies (removal of the gall bladder) account for 42 percent of all general surgeries in Minnesota CAHs (see Table 2). Many of the general surgery procedures performed in these hospitals are emergent; patients are at risk of increased pain, emergency travel, and even death, if local hospitals cannot provide basic general surgery services.
Table 2

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendectomy</td>
<td>736</td>
<td>23.6%</td>
</tr>
<tr>
<td>Cholecystectomy</td>
<td>574</td>
<td>18.4%</td>
</tr>
<tr>
<td>Major Small and Large Bowel</td>
<td>452</td>
<td>14.5%</td>
</tr>
<tr>
<td>Bariatric Surgery for Obesity</td>
<td>334</td>
<td>10.7%</td>
</tr>
<tr>
<td>Hernia except Inguinal and Femoral</td>
<td>189</td>
<td>6.0%</td>
</tr>
<tr>
<td>All Other Procedures</td>
<td>839</td>
<td>26.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,124</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

*Totals may not add up to 100% due to rounding.

Reimbursement Issues

Parts of the Medicare payment system are problematic for general surgeons. General surgeons have seen a decrease in Medicare reimbursement over several years. Most private insurance plans and Medicaid programs use the Medicare physician fee schedule as the basis for their payment systems, so the lower reimbursement trends are reflected across the health care system.\(^{10}\) This results in further specialization as surgeons work in narrow fields dominated by elective services. This sub-specialization limits the types of services they are willing to perform. Common drops in services include pediatrics, trauma coverage and cranial procedures.\(^{11}\)

General surgeons encounter variable reimbursement rates depending on the locations where they provide services. Procedures performed in an office-based setting may be more financially rewarding to the general surgeon. The same procedures done in hospital operating rooms create revenue to support the local hospital. Providers’ responsibilities to their families and patients must be balanced with hospital administrators’ interests in capturing potential revenues. Balancing the interests of providers, their patients and community hospitals allows for financial arrangements where all parties can benefit.

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\(^{10}\) “A Growing Crisis in Patient Access to Emergency Surgical Care,” (2006). Division of Advocacy and Health Policy, American College of Surgeons.

\(^{11}\) American Association of Neurological Surgeons: Workforce Survey 2006.
Rural General Surgeon Demographics

General surgeons are the second most common type of physicians (after family physicians) practicing in rural areas. However, in many rural areas, there are far fewer general surgeons per population than the national average. The number of general surgeons practicing in rural areas is declining, mainly due to the combination of retirement and new surgical residents choosing to specialize in areas other than general surgery. Many rural residents do not have local access to general surgery.

Numbers and location of general surgeons

Surgical leaders and workforce planners have been issuing warnings of declining numbers of general surgeons for years. Between 1981 and 2005, the number of general surgeons per 100,000 people decreased by 25 percent, from 7.68 to 5.69. While there is some controversy over the appropriate numbers and types of physicians necessary to provide high quality health care, it is accepted that 7.5 general surgeons are needed for every 100,000 people to maintain the current level of care. The number of general surgeons practicing in some rural and urban areas falls well below this ratio, and adversely affects the health and well-being of residents of those areas.

Nationally, many large rural markets (large town core with a population between 10,000 and 50,000) have seven to nine general surgeons per 100,000 population. In Minnesota’s large rural areas, there are fewer (5.5 to 6.9 per 100,000 population). In small or isolated rural markets (towns with a population of 2,500 to 10,000 or areas without an urban core of at least 2,500), Minnesota has fewer than four general surgeons per 100,000 population, whereas the national average is four to five general surgeons per 100,000 population.

The distribution of general surgeons in Minnesota is similar to the distribution of other physicians in the state. Higher concentrations of general surgeons practice in areas with larger populations. Comparable numbers of general surgeons practice within the Twin Cities metro area (219) and in greater Minnesota (234). However, specific regions of the state (i.e., North Central and Upper Minnesota Valley) appear to have significantly fewer general surgeons than needed, given the aging and the increase of the population in those areas (Map 3, Appendix A).

Many general surgeons serving rural communities have primary practice locations in cities or large towns and travel to smaller communities to perform surgeries. It is common for rural hospitals to have arrangements with a general surgeon to perform scheduled surgeries and procedures on a monthly or bimonthly basis. Some urban-based general surgeons also provide emergency surgery for small towns located within 30 minutes of the surgeon’s primary practice. Many Critical Access Hospitals have surgical services available, but do not have a surgeon on staff or living in the community.

**Aging Surgeons**

Like the rest of the population, general surgeons are aging. In 2010, the median age of all general surgeons practicing in Minnesota was 48. General surgeons practicing in rural Minnesota were older, with a median age of 52. Thirty one percent of general surgeons located in small rural areas of Minnesota are 45 to 54 years old, 34 percent are over 55 to 64 years old, and 10 percent are 65 or older. Only 21 percent of general surgeons practicing in urban areas are 55 to 64 years old, and 6 percent are 65 or older. (Graph 2: General Surgeon Age Distribution Among Rural Urban Commuting Areas, 2010).

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General surgeons in rural Minnesota also plan to stop practicing sooner than those in urban or micropolitan areas of the state. According to a 2009 Minnesota Department of Health survey, half of Minnesota’s rural surgeons plan to stop practicing within six to 10 years. The majority of general surgeons practicing in urban and large rural areas plan to practice for 10 years or more. (Graph 3: General Surgeon’s Intended Duration in Practice Location, 2009)
Recruiting a general surgeon takes time. One study revealed the median length of time among rural facilities to recruit a general surgeon was 12 months, with some facilities reporting searching four years or more to fill a position.\textsuperscript{18} Minnesota’s rural hospitals are in a near constant state of recruiting general surgeons and the pool from which to draw is shrinking rapidly.

Lifestyle and reimbursement issues are often cited as barriers to attracting general surgeons to rural practice. Professional isolation, being on call frequently or always and lack of coverage for time away from their practice creates higher rates of dissatisfaction and burnout among rural general surgeons.\textsuperscript{19} New surgical residents carefully balance the needs of a rural surgical practice with family life.


Education, Training and Residency

Approximately 1,000 general surgeons complete residency training each year in the United States. Of those, about 300 are likely to choose general surgery practice.\textsuperscript{20} General surgeons enter the workforce after five years of postgraduate education, at around 34 years old, and often have $150,000 to $250,000 in educational debt.\textsuperscript{21} Most surgeons completing a general surgery residency choose to specialize in another area of surgery. Specializing is attractive for several reasons, including heightened expertise in fewer procedures, increased reimbursement and salary, and perceived lifestyle enhancements such as lack of emergency or trauma call.

The practice of surgery is increasingly advanced. The tools and technologies available to a general surgeon now lead to a much more intricate level of procedure than was possible with the traditional scalpel. Training residents in every acquirable skill is difficult and unrealistic. Residents are therefore likely to hone in on their areas of greatest interest and ability and develop specialized surgical niches. In addition, specialized surgeons in tertiary care settings administer most general surgery training programs. Studies show that residents are influenced by their mentors and attending surgeons, and often choose to specialize in similar areas.\textsuperscript{22} This lack of exposure to the nature of rural general surgical practice contributes to the growing unmet need for general surgery in rural communities.

Changes in the practice of general surgery have impacted the training and residency of general surgeons. Chief general surgery residents once practiced under limited immediate supervision, and their training prepared them for independent practice. This process has changed, largely due to Medicare reimbursement requirements. Effective January 2010, for Medicare to provide reimbursement, attending surgeons must be present for critical

\begin{itemize}
  \item Alimentary Tract and Endoscopy
  \item Abdomen and its Contents
  \item Breast, Skin and Soft Tissue
  \item Endocrine System
  \item Organ Transplantation
  \item Pediatric Surgery
  \item Surgical Critical Care
  \item Surgical Oncology, including Head and Neck Surgery
  \item Trauma/Burns and Acute Care Surgery
  \item Vascular Surgery
\end{itemize}


procedures. Operative notes that once were allowable from residents now must be dictated by the attending surgeon.\textsuperscript{23,24}

These limitations are likely contributing to general surgeons’ beliefs that their training did not provide enough exposure to subspecialties outside of general surgery. A 2005 survey showed surgeons practicing in rural areas perceived a higher need for additional training. Areas in order of greatest need were gynecology, cesarean sections, urology, thoracic, endoscopy, orthopedics, and plastic and hand surgery.\textsuperscript{25} Notably, these specialty areas mirror those in greatest need in rural areas. General surgeons are more likely than specialist surgeons to choose their career paths prior to residency. General surgeons also rank the length of training as an important factor in their practice choice.\textsuperscript{26}

Studies show that there are geographic differences in caseloads between rural and urban general surgeons. Rural general surgeons often perform a greater variety of procedures, whereas urban general surgeons have a more narrow scope of practice. Much of this difference may be attributed to the greater volume of endoscopic procedures performed by rural surgeons. In addition, rural general surgeons more commonly perform routine orthopedic, otolaryngologic, gynecologic and urologic procedures. These procedures are not often performed by urban general surgeons because of the availability of surgical specialists in urban areas.\textsuperscript{27,28}

### Choosing Rural Practice

The decision to practice medicine in a rural community is largely based on quality of life perceptions. Physicians with exposure to small towns or rural communities are more likely to practice-and stay practicing-there. Completion of medical school and selection of a residency program focused on rural general surgery preparation are strongly correlated with practicing in a rural area.\textsuperscript{29}

Although important, income, facility condition and sophistication of medical community are less important to rural general surgeons than to urban general surgeons. There are significant differences in call schedule and availability of vacation coverage between rural and urban surgeons. The realities of frequent call duty and infrequent vacation coverage for general surgeons pose some of the largest barriers to rural practice.\textsuperscript{30}

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\textsuperscript{28} Heneghan SJ et al. (2005).

\textsuperscript{29} Jarman, BT et al. (2009). Factors correlated with surgery resident choice to practice general surgery in a rural area. *Journal of Surgical Education*; 6(3): 319-324.

\textsuperscript{30} Jarman, BT et al. (2009).
Rural General Surgery Residency Programs

Few general surgery residency programs in the United States include a rural focus or option. One study found that approximately 10 percent of the nation’s general surgery residency programs are equipped to produce graduates likely to choose rural practice. These programs have varying levels of success with graduates practicing in rural areas. Less than half of the programs identified produced rurally practicing surgeons in the last 10 years. A significant issue is that residency programs with a rural focus are not easily identifiable to residents. Research studies recommend collaboration among similar residency programs to increase effectiveness.\(^\text{31}\) Several programs are highlighted in Appendix B: Rural General Surgery Residency Programs.

Minnesota’s General Surgery Programs

Minnesota has three general surgery training programs: Hennepin County Medical Center, Mayo Clinic College of Medicine, and the University of Minnesota. For the last several years, Mayo Clinic College of Medicine has maintained 11 residency slots in general surgery, the University of Minnesota six residency slots in general surgery, and Hennepin County seven residency slots in general surgery. None of these programs offer experiences in a rural community or exposure to rural general surgery practices.

According to the 2010 Physician Survey administered by the Minnesota Department of Health, the majority of general surgeons practicing in rural Minnesota completed medical school and/or training in the upper Midwest. Approximately one-third of Minnesota’s rural general surgeons completed medical school in Minnesota, and slightly more than one-third completed their residency training in Minnesota. About 8 percent were International Medical Graduates.

International Medical Graduates

Traditionally, about one-sixth of general surgeons practicing in the United States are International Medical Graduates (IMGs). Many of these surgeons have practiced in rural areas. In 2009, IMGs filled 11.8 percent of general surgery residency positions. In 2009, IMGs represented 11.6 percent of general surgeons practicing in large rural areas, and 16.3 percent of general surgeons practicing in small rural areas. The proportion of IMGs practicing in rural areas is decreasing as more opportunities arise for general surgeons in urban areas.\(^\text{32}\)


Minnesota is Not Alone

The shortage of general surgeons is a nationwide issue. Many organizations are studying the effectiveness of education, training and residency programs. A call for changing the general surgery training paradigm exists, with recommendations for narrowing the scope of practice, focusing on common procedures, reducing the length of general surgery training to four years, and adapting the SCORE (Surgical Council on Resident Education) curriculum.33

33 Charles, A. Can We Solve the Surgeon Shortage with a Surge in Residents Trained by Existing Residency Programs? Department of Surgery, University of NC and ACS HRPI. Retrieved 2/28/11 from www.aamc.org/download/122812/data/charles.pdf.pdf
Infrastructure and Technology

Rural general surgery programs require the necessary infrastructure to deliver safe and quality surgical services. This infrastructure includes surgical facilities and equipment, surgical workforce, trauma care system, and rural adoption of surgical technologies. Despite financial challenges, Minnesota’s rural hospitals work to update and modernize their surgical facilities to meet expectations for patient quality and safety.

Surgical Facilities and Equipment

Rural general surgeons need modern facilities and equipment to perform a range of surgical procedures. However, maintaining surgical suites is a challenge for many rural hospitals. Most of Minnesota’s small rural hospitals were originally built in the 1950s and 1960s. They must undertake needed, and in some cases required, modernization projects to expand, update and remodel their physical facility. Up-to-date rural facilities can meet the needs of patients and health care staff in a safe and appropriate manner and can decrease operating costs while increasing hospital revenues.

Hospitals with general surgery programs have a surgical suite designed to provide all surgical services to patients. This group of rooms includes surgery, preparation and anesthesia for the patient; sterile preparation of the surgeon; instrument and materials sterilization and storage; instrument cleaning; and a recovery room. Surgical suites have special adaptations depending on the range of surgical services the hospital offers.

Operating rooms are sterile environments that are brightly lit and have specific air handling systems to help prevent infection. Monitoring and anesthesia equipment is generally kept at the head of the patient’s bed near the anesthesiology provider who monitors the patient’s condition during surgery. An operating room has specific equipment such as patient monitors, diagnostic equipment, emergency resuscitative devices, and respiratory and cardiac support equipment.

Minimally invasive surgery utilizes equipment such as endoscopes and laparoscopes. Endoscopes are instruments for visualizing the interior of a body canal or organ and are frequently used in treatment and diagnosis, especially involving the digestive and female reproductive systems. Laparoscopes have integral cameras for transmitting images and are used in general surgery to examine the abdominal organs, including the gall bladder, bile ducts, liver, appendix and intestines. Minimally invasive techniques may be used in conjunction with robotic systems or surgical lasers.

General surgeons need the right instruments to perform routine and emergency procedures. A full range of surgical instruments may include disposable or re-usable scalpels, blades and holders; dissecting and surgical scissors; surgical accessories such as anesthesia instruments, blood collection instruments, suction tubes and surgical applicators; and visual aids such as binocular microscopes.
Surgical Workforce

An essential component of a successful rural general surgery program is recruiting and training staff. The surgical team may include anesthesia providers, surgical technicians, surgical registered nurses, advanced practice nurses, coordinators of surgical services and additional medical and nursing staff responsible for post-surgical care. The availability of a range of surgical procedures results in a corresponding rise in the use of associated services such as labs, radiology and pharmacy. Adequate staff capacity in these departments is essential to support a rural general surgery program.

Referral Providers

There is a strong interdependence between general surgeons and primary care physicians in rural communities. Rural patients depend on referrals from family physicians to access many surgical services. Educational seminars for regional primary health care providers expand a rural general surgery program’s referral base. Patient education seminars also generate awareness of locally available services.

Referral guidelines for primary care physicians have been shown to be effective in improving patient access and the appropriateness of referrals. The range of procedures performed in rural hospitals depends on the referral patterns between rural surgeons and larger tertiary care settings. Rural hospitals may lack the infrastructure (e.g., advanced technologies or intensive care units) to support some surgical procedures.

Loss of a general surgeon in a rural community can alter referral patterns and the market share of local primary care physicians. One study estimated that eight to 10 referring physicians is the minimum to support a rural general surgeon.34 Rural hospitals may consider expansion of a referral base to support a full-time local surgeon rather than rely on itinerant general surgeons.

Post-surgical Care Providers

Itinerant surgery is defined as surgeries performed by a surgeon whose base is outside the community where the surgery is performed and post-operative care is left to another care provider. Ethical guidelines require that surgeons make a personal determination of the diagnosis and adequacy of post-operative care. The operating surgeon should provide this care unless delegating it to a health professional who can ensure the patient will receive proper continuity of care. A surgeon of comparable credentials may not be available, particularly in rural areas, so nurse practitioners or clinical nurse specialists often provide post-surgical care.

Changes in health care delivery have drawn increasing numbers of nurses into expanded and advanced practice roles in the surgical arena. Pressures to expedite patient discharges, shortages of on-call staff, and increased complexity of care have led to the need for surgical advanced practice nurses to coordinate patients’ surgical experiences. However, these changes do not replace the need for general surgeons. Several common procedures such as central line placements and drainage of abscesses may lie outside the scope of practice or comfort zone for some advanced practice nurses.

Certified Registered Nurse Anesthetists

General surgery programs require the expertise of anesthesiologists (physicians who are board certified in anesthesiology) or certified registered nurse anesthetists (C.R.N.A.s). Nurse anesthesia services are crucial to rural health care because C.R.N.A.s are the sole anesthesia providers in the majority of rural hospitals. Without C.R.N.A. services, many rural hospitals, especially Critical Access Hospitals, would not be able to offer surgical care at all.

C.R.N.A.s work as anesthesia providers in a variety of different practice models. These vary according to the level of autonomy C.R.N.A.s have in their practice. In some settings, C.R.N.A.s function independently without an anesthesiologist present. They can provide and bill for anesthesia services. In other settings, C.R.N.A.s practice with medical supervision. In a team practice model, C.R.N.A.s share responsibilities with anesthesiologists. Research shows there are similar anesthesia outcomes regardless of the composition of the anesthetic care team.

Regulations state that C.R.N.A.s must be under the direct supervision of a physician when administering anesthesia. However, the Centers for Medicare and Medicaid Services (CMS) adopted a rule in 2001 allowing states flexibility in regulating the administration of anesthesia services in hospitals and ambulatory surgical centers. Under the new rule, state governors may opt out of participation in the supervision requirement rules. Minnesota officially opted out in April of 2002. Since that time, C.R.N.A.s have been allowed to practice independently. Sixteen states have opted out of the supervision requirement. This flexibility to allow C.R.N.A.s to practice without immediate supervision is very important for rural surgery programs, as few anesthesiologists practice in rural areas.

For decades, the Medicare reasonable cost based pass-through program ensured the availability of C.R.N.A. services in rural hospitals for Medicare beneficiaries. Through this program, qualifying rural hospitals are reimbursed the reasonable and necessary costs of anesthesia services provided by C.R.N.A.s. Recent CMS rulings have denied rural hospitals’ claims even though these payments are necessary to rural hospitals’ emergency care and trauma stabilization capabilities. Traveling long distances to the nearest hospital is not an option when dealing with stabilization and obstetrical care, or for elderly patients requiring diagnostic and pain management care.

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General Surgery and Trauma Care

Trauma care in rural areas is complicated for many reasons. First responders must navigate rural roads, which may be dangerous and lack proper signage or maintenance. This increases the travel time and actual mileage necessary to reach their patients. There are less coordinated communications systems in rural areas, including GPS limitations and fragmented local dispatch areas. Factors such as increasing trauma volumes, an aging population, limited continuity of care, fewer attending surgeons willing to care for emergency general surgery and trauma patients, and the addition of acute care general surgery coverage by trauma surgeons may result in worse outcomes for trauma patients.37

The “golden hour,” referring to the first hour after a person sustains a traumatic injury, is the optimal time for early intervention and stabilization. Positive outcomes for trauma patients are associated with dedicated trauma systems, shorter pre-hospital times, and shorter times to definitive care following severe injury.38 Therefore, coordinated triage systems, patient stabilization and transportation, and surgical team availability are key to success in the trauma care environment.

Rural trauma care requires a multidisciplinary team approach often coordinated by general surgeons. C.R.N.A.s in rural facilities must also be prepared to manage trauma teams. Airway management, resuscitation and stabilization are necessary skills in all cases, including transferring trauma patients to larger trauma centers. Coordination of the trauma care team may involve credentialing, development of quality assurance processes, development of protocols for pre- and post-surgical care, and training on team communication and patient transfer best practices.

Minnesota Trauma System

Minnesota’s Trauma System is a voluntary, inclusive network of trained and equipped trauma care providers throughout the state ensuring that optimal trauma care is available and accessible everywhere. The goal of the trauma system is to decrease injured patients’ time to definitive care by ensuring their medical needs are appropriately matched with hospitals’ resources. There are four designation levels for this system, based on available trauma care resources. Level I and II hospitals have the most resources, with level II providing definitive care for most critical patients, and level I for every kind of injury.

Most rural hospitals will be designated as level III or level IV facilities. A level III trauma designation requires a general surgeon be available within 30 minutes to assist with the resuscitation and to provide surgical intervention. Level III facilities must have intensive care units and some degree of orthopedic surgical services. Complex patients and those requiring surgical subspecialties must be transferred to level I or level II trauma hospitals. Level IV

facilities provide initial resuscitation and stabilization, but do not have surgical services available, so patients are transferred to higher level facilities for definitive care.

Factors related to these trauma designation levels, such as surgical on-call requirements at level III facilities, certainly affect general surgeon recruitment and retention. In the near future, as data from the statewide trauma system is analyzed, it will be important to ascertain whether or not requirements related to general surgeon coverage improve the safety and quality of care provided in level III settings.

Of the 79 Critical Access Hospitals in Minnesota, six have received a trauma level III designation; the majority (60) is categorized at trauma level IV. Eleven Critical Access Hospitals are not currently designated. Statewide, there are 14 level I and II hospitals, 30 level III hospitals, 75 level IV hospitals and 19 hospitals with no designation (Map 3, Appendix A: Trauma System Hospitals and General Surgeons in Minnesota).

**Technological Advances in Surgery**

Rural hospitals are evolving to bring surgical care and advanced surgical technology to their communities. It is easier to recruit general surgeons to rural hospitals with electronic health records (EHR), telemedicine and adequate primary care services in place. The latest EHR technology allows surgeons to work in a robotic surgery suite with full access to patient information. In the near future, surgeries may be done remotely utilizing robotic technology with nurse practitioners and physician assistants in central roles working independently to provide pre- and post-operative care.

The groundwork has been laid in rural Minnesota for technology-assisted surgical procedures and post-operative care. St. Joseph’s Medical Center in Brainerd purchased a robotic system to compete with robotic surgery programs in three micropolitan facilities 70-150 miles away. Ortonville Hospital is one of several Critical Access Hospitals considering implementing a robotic surgery program. In the near future, Avera Health will offer telehealth services to provide post-operative consults for patients in rural hospitals. Demand for remote consults would expand as follow up through clinics becomes less of a manageable option for rural general surgeons and their staff.

Minimally invasive surgery is a technique for reducing pain, side effects and scarring. It results in shorter hospital stays and a faster return to normal functioning than traditional or open surgery. The earliest developments in minimally invasive surgery involved the laparoscope, a miniature telescope-like instrument connected to a video camera and light source. Video monitors in the operating room allow the surgeon to see inside the body. Robotics was the next advance in minimally invasive surgical technology and has become a standard in many large hospitals today. Robotic surgery provides the surgeon with a three-dimensional view and improved dexterity in addition to the benefits of laparoscopic surgery. Ergonomic advantages help to decrease fatigue, reduce the loss of instrument

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control, and increase the surgeon’s ability to focus on the procedure with minimal
distractions. The robot’s manipulators duplicate the surgeon’s hand motions and can filter out
hand tremors. Surgeons can reach into confined spaces while performing very precise and
delicate maneuvers.

Currently, the FDA mandates that a surgeon, in the same room as the patient, control all
surgical robots. However, this is likely to change with proven success in remote surgical
technologies. An exciting research and development area is in-vivo robotics in which a
surgeon remotely controls small robots directly inserted into the body.

Robotic surgery programs can provide rural hospitals with financial and competitive
advantages while offering improved access to surgical services and better patient outcomes.
Health care administrators must examine market share information to determine if a robotics
program will be financially successful. Upfront investment in robotic surgery equipment is
$1-2.5 million, although researchers are working to create alternatives that cost around
$250,000. Rural hospitals will need to develop several surgical practice areas based on
local demand to support a robotic surgery program in a low volume environment.

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41 Francis P. (2006). Evolution of robotics in surgery and implementing a perioperative robotics nurse specialist
42 “Lower cost, portable surgical robots could be smooth operators.” Retrieved 2/28/11 from
Rural General Surgery Models

Models of surgical training and care delivery in rural areas continue to evolve. This section focuses on Minnesota-based models that address local needs:

- The Wabasha Certified Registered Nurse Anesthetist (C.R.N.A.) Intern Program trains nurse anesthetist students in a rural setting and highlights the importance of rural training opportunities.
- The Lac Qui Parle Shared General Surgeon model describes the development of a surgery program in a rural area and highlights the need for collaboration.
- The Minnesota Institute for Minimally Invasive Surgery model outlines the components of a successful rural surgery program and the role of innovation in shaping the future of rural general surgery programs.

Wabasha C.R.N.A. Intern Program

Saint Elizabeth’s Hospital in Wabasha serves a population of approximately 14,000 in western Wisconsin and southeast Minnesota. Through their rural rotation at Saint Elizabeth’s, Wabasha C.R.N.A. interns see the need for anesthesia providers in local hospitals. They experience rural hospitals delivering quality care for a variety of surgical procedures. They work in collaboration with physicians and other advance practice nurses.

Saint Mary’s University students from Winona and Twin Cities campuses are offered various rotations during their clinical experience and need a certain number of cases to graduate. The Saint Elizabeth rotation gives them an opportunity to see what a C.R.N.A. solo practice is like, including the challenges and rewards of an independent C.R.N.A. practice. One of the greatest strengths of the rural rotation is experiencing continuity of care from pre-op visit to discharge from the floor. A number of C.R.N.A. student interns have decided that rural practice settings appeal to them.

Through the program, students gain experience preparing patients for anesthesia with minimal assistance and become more comfortable managing patients as they emerge from anesthesia. Students see the patients post operatively and witness the results of their anesthesia care. They also help in the emergency room. Students realize the value C.R.N.A.s bring to a rural hospital beyond the operating room environment.

This rural C.R.N.A. opportunity is part of a “grow your own” philosophy to support regional health care workforce development. The C.R.N.A. intern program also matches the goal of national and state level associations to provide students with experiences in a variety of practice settings, including large and small hospitals with various anesthesia care team models or independent C.R.N.A. practices.

There are several challenges to maintaining the C.R.N.A. intern program. Saint Elizabeth’s receives a small stipend through the state Medical Education and Research Costs (MERC) fund to help offset some of the training costs, but it must be subsidized by other sources.
Another challenge is the paperwork needed for insurance. One of the biggest challenges is related to housing and living costs for students travelling from the Twin Cities or moving to Wabasha for the eight- to 12-week rotation.

The C.R.N.A. intern program requires leadership and dedication to maintain the success of the program. The hospital administrator has been a great support in keeping student nurse anesthetists coming to Saint Elizabeth’s. The C.R.N.A. instructors who mentor the students are key players in this endeavor. The winners will be the rural patients who will receive excellent anesthesia care in their hometown hospitals from the new graduates of local nurse anesthesia programs.

**Lac Qui Parle Shared General Surgeon Model**

Shared general surgeon models are fairly common in small rural hospitals in Minnesota. Park Rapids and Fosston in the northwestern region, Mille Lacs and Moose Lake in the northeastern region, and Aitkin and Crosby in the north central region have implemented shared general surgeon programs. Madelia, New Ulm and Fairmont have also utilized this approach. The Lac Qui Parle model highlights the opportunities and challenges for three Critical Access Hospitals in the initial stages of adopting a shared general surgeon program.

The Lac Qui Parle Network of Appleton, Dawson and Madison successfully implemented shared network agreements for health information technology planning and infrastructure. With the waves of change health reform is bringing and the realities of a struggling economy, the Lac Qui Parle Network believed continuing their work together was essential. This led to discussions about expanding services they could jointly offer.

The Lac Qui Parle Network hired a health care consulting firm to explore the possibility of a shared general surgery program that would expand services currently limited to a couple times a month. The consultant performed a feasibility study, examined local volumes and market share, and drafted a model contract for a shared surgeon. Strategic planning and the local case mix indicated a need for additional general surgery services. All three locations had similar volumes and could utilize a three-way split of a general surgeon’s time. Through a six-month process a strategic plan was created to maximize access to additional services, including general surgery.

The shared general surgeon would be centrally located in Madison and cover Appleton, Dawson and Madison locations. A surgery suite at the Dawson location was updated to allow for orthopedic procedures and a recovery room was designated near the nurses’ station. Ideally, the surgeon would work collaboratively within a broader hospital network to cover call and perform surgical procedures in other contract locations.

Workforce planning included identification of potential surgical team members. A local father-son C.R.N.A. team currently shares a contract with several hospitals and is based in Ortonville. Additional C.R.N.A. capacity could be subcontracted from Canby. The Network identified nurses with previous surgical team experience within each facility. The strategic plan showed it would be too expensive to have staff on call for surgery, so they considered
having a surgery crew travel with the general surgeon or surgical staff in each hospital and a smaller travelling surgical crew. Either would offer patients the advantage of location options for surgical services. Another possibility would be to market and promote different surgical specialties at each location.

The specific needs, preferences and opinions of the shared general surgeon are so important in recruitment and retention that once the surgeon is hired, Lac Qui Parle partners will allow the general surgeon to design any changes to the surgical suites. The general surgeon may have preferences for equipment and have opinions about the ideal number and type of surgeries. The surgeon may prefer surgical suites at multiple locations or the use of one suite with consults offered at other locations.

An important lifestyle consideration is creating a manageable call schedule, such as an agreement with a surgeon in Montevideo or Marshall to temporarily handle the surgical case load. Another key to successful recruiting is getting candidates to the area and being a match to their lifestyle choices. Local high school and early college-age residents are more likely to return to the west central region than recruits from other states or other parts of Minnesota. The Network has already identified two potential candidates.

With the pool of available general surgeons dwindling, recruitment may be the biggest challenge to bringing the Lac Qui Parle shared general surgeon model to fruition. The Network’s willingness to work together to meet shared goals may overcome this and other obstacles to establishing a shared rural general surgery program.

The Minnesota Institute for Minimally Invasive Surgery

The Minnesota Institute for Minimally Invasive Surgery (MIMIS) is pioneering a sustainable rural surgery program. It provides consultation services to health facilities and systems concerned with the provision of surgical care in rural communities. Its parent organization, Cuyuna Regional Medical Center, is a Critical Access Hospital in Crosby. Surgical services are also offered at Riverwood Health Care Center, a Critical Access Hospital in Aitkin.

Creators of the MIMIS believe the conventional rural surgery model of providing basic trauma, cesarean sections, hernia/gallbladder surgery and basic gynecologic and orthopedic surgery will have limited and decreasing sustainability in the future. Conventional programs may meet basic local needs and retain patients in local health care systems, but without advanced surgical services, their growth and ability to compete is limited. The Minnesota Institute for Minimally Invasive Surgery has outlined a four-component successful rural surgery program. First, educational programs to increase public awareness of locally available surgical options are essential. Education of community members and primary health care providers in the region creates visibility for the surgical program while expanding the referral base. Education of surgical patients is important for optimal outcomes and ongoing patient surveys help monitor safety and performance improvement goals.

Second, as local surgeons gain success and expertise in a given area, it is important to share this expertise with colleagues in surrounding areas. For example, as MIMIS developed a
regional reputation in advanced laparoscopic surgery, it began to teach courses and offered on-site proctoring and credentialing verification. Although competition may at first appear to be more beneficial, collaboration ultimately results in the retention of patients and an increase in the surgical capacity across the region.

Third, participation in education and training programs for medical students interested in rural general surgery promotes the regional medical system and provides an avenue for recruitment. MIMIS provides one-month rotations in flexible endoscopy for residents in regional family practice residency programs. MIMIS also developed a one year fully accredited fellowship program in minimally invasive techniques, bariatric surgery and flexible endosurgery.

Finally, one of the most important components of a rural general surgery program is connection to a thriving primary care program. Primary care doctors serve as the central referral network in the region. Partnerships and open communication are essential for successful surgical outcomes and enhanced pre- and post-operative continuity of care.

An important finding is that rural surgery programs are most successful when they are surgeon directed and centered on modern surgical practice. This requires rural adoption of minimally invasive surgery techniques, such as the use of endoscopes and laparoscopes. Advanced diagnostic procedures performed locally create demand for advanced surgical interventions. Rural general surgery programs may be involved in the evaluation and implementation of a wide variety of surgical tools and techniques. Surgical standards of care and supportive technologies continue to develop. MIMIS’s success demonstrates that rural surgical practices need to be forward thinking and adopt modern approaches to be successful.
Summary and Recommendations

General surgery is a vital component of the rural health system. The rurally located general surgeon is likely to practice independently, have a large and varied caseload, and may work in more than one location. The benefits that draw a general surgeon to rural areas come with a cost to the individual surgeon and rural health facility: professional isolation, less exposure to technological advances, and limited surgical coverage in times of sickness, vacations, emergencies or continuing medical education.

The number of general surgeons practicing in rural Minnesota is declining. The median age of rural general surgeons is significantly older than general surgeons practicing in metropolitan areas. Rural general surgeons plan to retire sooner than those in metropolitan areas. Minnesota’s medical education and training institutions are producing fewer general surgeons overall and are not providing rural residencies in most cases.

The rural general surgery crisis will create a wide array of negative consequences if not addressed. Patients in need of surgical care may delay treatment or neglect it altogether. Patients may be required to travel great distances to undergo necessary surgeries. A lack of rural general surgeons may lead to reduced service offerings and revenue loss at some already fragile rural hospitals. It is even more difficult to recruit family practice physicians without the availability of a general surgeon. A lack of rural general surgeons can compromise the statewide trauma system, which may lead to poor patient outcomes.

Rural Minnesotans depend on their community hospital to provide medical services that meet their medical needs. General surgery is among the core services needed to keep residents safe and healthy. Few medical students are choosing to practice general surgery. Fewer will practice in rural communities. Minnesota’s medical colleges, hospitals and communities have challenges to address in order to restore the practice of general surgery throughout the state.

Recommendations

The continued provision of general surgery in Minnesota is at risk. It is imperative that all residents of Minnesota have immediate access to general surgery in emergencies and within a reasonable time and distance for non-urgent surgeries. The following recommendations address steps toward achieving equal access to surgical services throughout Minnesota:

A. **Expand awareness of the impact of general surgery on patient safety and quality.** Lack of access to general surgery may lead to delayed surgical intervention and/or recognition of life-threatening traumatic injuries. This impacts patient safety, quality of health, and may even result in otherwise preventable death. A shortage of general surgeons is on par with shortages of primary care providers. Rural health advocates, hospitals, associations and providers should raise this issue in appropriate forums and publications. Critical Access Hospitals should speak with a unified voice to consistently raise the urgency of rural general surgery issues and
recommendations in appropriate forums. Keep abreast of national efforts to do the same.

B. Include general surgery as a fundamental and necessary health service for rural communities in policymaking and health workforce planning efforts. Ensure the inclusion of general surgery as a basic necessary service in new health care delivery models such as the Accountable Healthcare Organization. Include general surgery in discussions and policies regarding core medical services that should be available to every rural resident.

C. Identify, evaluate and promote models of multi-hospital collaboration and rural surgery call coverage. Organizations that provide funding, consultation and technical assistance for rural hospitals should encourage collaboration and mentorship models involving larger regional hospitals and small hospitals or groups of small hospitals. The purpose of the collaboration and mentorship is to provide support, consultation and perhaps call coverage to the general surgeons practicing in small rural hospitals. Some rural hospitals are developing relationships with neighboring hospitals with the goal of sharing surgical teams and services. Efforts to collaborate should be supported, and if models are deemed replicable, details of successful collaborations should be shared. This information should be accessible on a website such as the Office of Rural Health and Primary Care’s “Models” page, and promotion and enhancement of the information should be encouraged.

D. Develop and financially support rurally-focused general surgery training and residency programs at institutions in and near Minnesota, including Hennepin County Medical Center, Mayo Clinic College of Medicine and the University of Minnesota. The mission of these educational programs should include a commitment to serving rural and underserved citizens. Research and experience shows that medical students are far more likely to practice in rural areas if they experience at least part of their medical training in a rural setting. At minimum, Minnesota general surgery residency opportunities need to be expanded specifically for rural settings. General surgery programs in Minnesota should include a one- to two-month rural experience at sites selected by the programs. Successful implementation of these programs is dependent upon state funding.

E. Support pre- and post-surgical care practices in rural hospitals. Many rural communities are served by a general surgeon who travels to their community on a scheduled basis. In these cases, medical and nursing staff must coordinate with the surgeon and provide pre- and post-surgical care. Family physicians, hospitalists, nurse practitioners and physician assistants should have opportunities for additional training in pre- and post-surgical care. Rural hospitals and grant programs such as the Office of Rural Health and Primary Care’s Rural Hospital Flexibility Program should support this training.

F. Support the maintenance and expansion of funding (such as the Rural Hospital Capital Improvement Grant Program) to support the facilities and equipment
necessary for general surgery services in Minnesota’s rural hospitals. Many of Minnesota’s rural hospitals struggle to maintain and keep up with necessary surgical suite and equipment needs. The work group recommends that a portion of grant funding be dedicated to facility and equipment improvements and upgrades to support general surgery programs.

G. Expand awareness of the economic implications of general surgery in rural communities and hospitals. Hospitals and health systems are usually among the top employers in rural communities, providing jobs and contributing greatly to the overall economy. Within hospitals, general surgery often generates a profit. Without a general surgery program, rural hospitals may be in jeopardy of losing other valuable services such as obstetrics, causing a trickle effect of financial loss. Rural hospitals should promote awareness of the importance and impact of general surgery within their communities and collectively within the state.

H. Develop and designate Rural General Surgery Shortage Areas. The Bureau of Health Professions, Health Resources and Services Administration under authority given in the Public Service Act designates Health Professional Shortage Areas (HPSA) and Medically Underserved Areas. HPSA designations are awarded in primary care, dental and mental health. Through these shortage designations, high need sites can meet eligibility criteria for a number of state and federal assistance programs such as the State Loan Forgiveness Program and National Health Service Corps. The work group recommends pursuing a new category for areas with a shortage of general surgeons. In addition to standard provider per population ratios, shortage areas should be determined by additional factors such as call coverage and age of population. This recommendation is supported by rural hospitals throughout the nation. Minnesota’s Office of Rural Health and Primary Care should support pursuit of this HPSA revision through its membership in the National Organization of State Offices of Rural Health.

I. Support continued improvements to Medicare reimbursement for general surgery and nurse anesthetist services. The Minnesota Department of Health, along with stakeholder groups such as the Minnesota Hospital Association, National Organization of State Offices of Rural Health and National Rural Health Association, should advocate for continued support and improvements in Medicare reimbursement for general surgery and nurse anesthetist services in rural areas.

J. Support general surgery teams’ involvement in educational offerings that supplement their trauma skills. Programs such as Comprehensive Advanced Life Support (CALS), which trains rural medical teams in emergency and trauma skills, should be promoted and made available to all medical and nursing staff involved in and supporting a general surgery program. The CALS program has been credited for improving emergency health care delivery and even saving lives of countless patients in rural communities. Funding for the program provided by the Minnesota Department of Health should, at minimum, remain at current levels.
K. **Promote supportive technologies.** Surgical practices will continue to be interlaced with technological tools. These and other technologies should be promoted and made available by Minnesota’s telehealth networks and organizations that provide information and technical assistance regarding telemedicine as tools to maintain and increase access to general surgery in rural Minnesota. Technological advancements may provide means for addressing some barriers to rural general surgery. Televideo is a central tool for rural general surgeons to provide peer consultations, telesurgery and pre-or post-surgical care. Information systems and electronic medical records will ease communication with and about patients.
Appendix A: Maps

Map 1: Critical Access Hospitals in Minnesota
Map 2: Rural-Urban Commuting Areas (RUCAs) in Minnesota
Map 3: Number of General Surgeons and Critical Access Hospitals
By Economic Development Region in Minnesota
Map 4: Trauma System Hospitals and General Surgeons in Minnesota

Legend

Trauma Level

- Level I & II (14)
- Level III (30)
- Level IV (75)
- No Designation (19)

General Surgeons
Appendix B: Rural General Surgery Residency Programs

Gundersen Lutheran – La Crosse, WI
www.gundluth.org/?id=642&sid=1
The Gundersen Lutheran general surgery residency program includes rotations available in two towns with populations less than 8,000. For residents who pursue a rural surgical career, the program arranges for electives to be performed at their chosen practice location. The resident is immersed in rural practice and can hone particular skill sets in advance of joining a rural practice.

Mithoefer Center of Rural Surgery – Cooperstown, NY
www.centerforruralsurgery.org
The Mithoefer Center for Rural Surgery was established to train general surgery residents interested in rural practice. Residents train at the program’s affiliated hospital, Bassett Medical Center. The Center works with State University of New York to offer a Shadow-A-Surgeon program for college students to become more familiar with the hospital environment and gain a realistic view of the rural surgeon’s life.

Oregon Health & Science University – Portland, OR
www.ohsu.edu/ohsuedu/academic/som/surgery/divisions/general-surgery/TrainingPrograms/Residency/residency.cfm
The Oregon Health & Science University School of Medicine offers the only general surgery residency in Oregon. The curriculum was revised in 2002 to include a residency opportunity at Three Rivers Community Hospital, a rural community three and a half hours south of Portland. This rural surgery residency experience focuses on continuity of care and practice models in which residents interact with surgical team members and referral physicians. Additional surgical training for optimal rural practice includes gynecology, endoscopy, trauma, orthopedics, urology and ENT basics.

University of North Dakota – Grand Forks, ND
www.med.und.edu/surgery/residency.html
The University of North Dakota general surgery residency program provides a range of clinical and academic training to produce well-trained, competent general surgeons. Six teaching institutions are partners in the residency program, including sites in a rural community and a Veteran’s Affairs hospital. The annual Rural Surgery Symposium helps rural surgeons improve patient care and enhance their surgical practices.

University of Tennessee College of Medicine – Chattanooga, TN
www.utcom chatt.org/subpage.php?pageId=493
All surgical residents at the University of Tennessee College of Medicine participate in a three-month rotation in rural general surgery. Three former graduates serve as faculty members in rural settings and offer private practice experiences in their offices and at rural hospitals in Athens and Etowah, located within an hour of Chattanooga.