

Standardized Comprehensive Education for Rural Emergency Care Providers Certification & EM Workforce Section Newsletter, May 2011

Standardized Comprehensive Education for Rural Emergency Care Providers: The Role of the CALS Rural Emergency Medical Education Program

Darrell Carter, MD; Kari Lappe, RN; and Suzanne Schoenfelt, MA

A recent study documents that about 38.4 million people in the United States, a significant portion of the population, do not have access to trauma care within an hour's drive (~ 30 miles).¹ Trauma centers—shown to reduce morbidity and mortality for injured patients of all ages—are key elements in the basic structure of the US health care system.



Renee Hsia, MD, assistant clinical professor in the Department of Emergency Medicine at the University of California, San Francisco and the study's author, stated, "Patients with time-sensitive conditions, particularly trauma, have better outcomes when they receive timely care. Patients with severe injuries who are further from trauma centers are less likely to be admitted to trauma centers. This means that patients in rural areas, especially, are at higher risk of poorer outcomes if they cannot receive timely access to care."

Even though rural communities may have established relationships for aeromedical transport to urban trauma centers, greater physical distances and the potential for adverse weather often increase the time required to transport rural patients to specialized urban medical centers. Prompt transfer of seriously injured trauma patients has a distinct survival benefit (33% lower risk of death within 30 days) if patients are stabilized locally and rapidly transferred to level I or II trauma centers versus if they are not transferred.² Due to the necessity determined by geographic isolation and distance from urban trauma centers, rural level III and IV trauma centers (or critical access hospitals [CAHs] without trauma designation) must provide a large portion of the initial emergency care in rural communities but frequently are poorly prepared or do not have specialty staff trained to perform initial trauma stabilization.

Rural trauma victims experience greater morbidity and mortality rates³ and have a 50% greater likelihood to die from trauma than their urban counterparts.^{4,5} Motor vehicle crash death rates in Minnesota, for example, are more than twice as high for rural patients in the 15- to 24-year-old and 25- to 64- year-old age groups compared to metro area residents.⁶

Resource limitations, including the lack of well-trained emergency care teams, contribute to difficulty in access to trauma centers and place rural communities at a distinct disadvantage.^{1,7} When asked how physicians who staff rural hospital emergency departments (EDs) are impacted by difficult access to trauma centers, Dr. Hsia replied, "Being a provider in a rural area is probably one of the most difficult jobs there are. Rural providers must have an even better 'crystal ball' than non-rural providers since they must forecast how a patient's injuries or conditions may evolve, and with fewer resources."

Given the limited resources of rural settings, as well as the increasingly common resource shortfalls in our health care environment, how can we improve patient outcomes, particularly in rural settings where resources are scarcer? How can we make the best use of the resources that are available?

Training Providers in Rural Emergency Care

The supply of emergency medicine physicians who are residency-trained and board-certified has been predicted not to meet demand in the near future.⁸ Given the resource limitations implicit in rural settings, rural hospitals are hard hit by these physician shortfalls, and will be even more so in the future.

Rural emergency care is often dependent on the skill and knowledge of one primary care physician or physician extender along with a small number of supporting team members. These physicians and physician extenders are often trained as generalists in patient care and lack the necessary training to respond to the broad range of critical conditions that may present to a rural ED.

Training generalist providers in the knowledge and skills required to identify and treat critical patients is one rapidly expanding approach to improving patient outcomes in rural settings. Increasing reliance on physician extenders to help emergency physicians to better handle an escalating number of patients has also been suggested.⁹

To complicate the issue of diminishing physician supply is an ever-greater responsibility for exponentially increasing expertise. Over the past decade, the education and experience needed to respond in critical emergency situations has expanded dramatically, requiring not only specialized skills but also much greater depth and breadth of knowledge in emergency care.

To make the ever-growing body of knowledge accessible in an organized fashion so that the evolving complex treatment plans can be applied at times of greatest stress, numerous advanced life support courses have been generated.¹ While each is an excellent review of specific topics, none cover the breadth of treatment plans expected to be quickly accessible in the armamentarium of modern emergency care providers when confronted with a critically ill or injured patient.

Given the discrepancies comparing treatment results of rural versus urban institutions,³⁻⁶ it has become apparent that currently available educational opportunities for preparing rural emergency teams have not been successful enough to reduce the disparate patient care outcomes observed in rural versus urban settings. Even when providers pursue multiple advanced life support courses, none of these courses—studied singly or in combination—has been successful in covering all the bases.

CALS Rural Emergency Medical Education

A 2007 Institute of Medicine report¹⁰ on the future of emergency care in the United States cites the Comprehensive Advance Life Support (CALs) Program as a model for collaborative training in emergency medicine. The CALs Course provides a single, comprehensive curriculum that includes home study, a scenario-based provider course, and advanced skills training as needed, especially for care of trauma patients. The curriculum combines into one course the information covered in many advanced life support courses, but expands the breadth and depth of emergency training with special emphasis on additional training in advanced airway management. The CALs Course, designed to address the limitations in rural and remote settings, helps health care providers to become skilled in treating undifferentiated emergencies by presenting emergency/critical care situations that providers may confront in emergency settings.

The CALs Course is specifically designed to teach rural emergency care teams the knowledge, skills, and treatment systems to rapidly evaluate, stabilize, and transport critical patients to higher levels of care,

including trauma centers. The CALS Course focuses on identifying life threats and stabilizing patients by addressing their critical needs. The core of CALS education centers on the following key training issues:

1. To the degree possible, use of a **Universal Approach** to care for critically ill or injured patients rather than teaching providers to remember different approaches for each emergency situation
2. Teaching and practicing **teamwork**, where the roles and work of each provider are recognized as intricate and valuable parts essential to the success of the treating emergency medical team
3. Teaching a **system of care** (or approach) to patients focusing on the individual patient's needs rather than the supposed diagnosis
4. Education in use of proper **equipment** needed to care for patients
5. Providing a **core of knowledge** needed to stabilize patients, even when the definitive diagnosis may not be known
6. Teaching and practicing emergency care **skills** needed to stabilize patients afflicted with a broad range of critical conditions. Special emphasis in skills training is to provide the rural team with a wide variety of backup airway management skills so as to ensure that even a patient with a difficult airway can be managed.

Results of CALS Education

While controlled outcome studies to demonstrate the value of CALS education have not yet been completed, numerous unpublished studies show greatly improved emergency treatment provider skills as well as improved treatment results after CALS training as follows:

- According to the 2000 CALS Benchmark Lab Survey,ⁱⁱ after CALS training, an increased number of timely emergency intubations were being performed by rural provider course participants, demonstrating an enhancement of the quality of airway management in rural communities. Specifically, there was a 99% success rate in endotracheal intubation and a 90% success rate in the first advanced airway technique attempted when intubation failed (skills rarely used, but lifesaving when needed and implemented).¹¹
- In rural communities that have received CALS training, transport teams and referral centers observed improvement in patient airway management.¹¹
- A CALS Central Minnesota site visit conducted in 2003 by the Minnesota Department of Health, Office of Rural Health and Primary Care,¹² found the following themes regarding the impact of CALS education:
 - CALS education provides a comprehensive, realistic, team-based approach to handling emergency medicine in rural hospitals;
 - CALS education teaches all team members to anticipate and prepare for a patient's needs prior to arrival, improving the speed and efficiency of treatment and leading to better patient outcomes;
 - CALS Benchmark Skills Lab increases the comfort levels of rural emergency personnel by exposing them to procedures and skills that, although perhaps rarely previously encountered on the job, are imperative during certain emergency situations that may arise;
 - CALS education provides a rural-based standard for assessing the medical equipment needs of small hospitals and clinics; and
 - CALS education enhances the speed and efficiency of transferring critical patients to higher levels of care.

- Granite Fall Hospital is a small CAH in Granite Falls, a rural west central Minnesota town, where all hospital staff that render care to patients in the ED are certified in CALS. After CALS training, the following observations were noted¹³:
 - CALS education increased the efficiency of handling time-sensitive patient disorders, such as acute coronary syndrome, strokes, trauma, sepsis, and critical airway management.
 - Door-to-transfer time (to a trauma center) of critically injured patients was reduced by 60% compared to the time required pre-CALS training. In 1990, the average time from patient arrival at the Granite Falls Hospital until transfer to a trauma center was 133 minutes. In 2008, after CALS training, the average time until transfer to a trauma center was less than 60 minutes, and in 2010 the average time was 48 minutes.¹⁴
 - Door-to-drug time in acute stroke patients was 47 minutes.¹⁴ (The national goal is less than 60 minutes.¹⁵)
 - During times of critical emergencies, the comfort level and confidence displayed in the CAH was dramatically improved compared to pre-CALS training.

- In a 2009 Wisconsin CALS Impact Study,¹⁶ the overwhelming majority of providers reported that taking the CALS course:
 - Improved teamwork in the ED,
 - Improved provider skills for tending to or treating critically ill/injured patients,
 - Improved the team's comfort and confidence in managing emergent patients,
 - Improved "patient packaging" for transport to higher levels of care, and
 - Improved patient care in their facility.

The following improvements in the ED following CALS training were noted:

- Better equipment and supplies,
- More organized approach to the patient,
- More effective teamwork, and
- Fewer delays in the performance of critical procedures.

Conclusion

Approximately 38.4 million people in the United States, a significant portion of the population, do not have access to trauma care within an hour's drive (~ 30 miles), imposing an access barrier for rural area residents.¹ Patients with time-sensitive conditions, particularly trauma, have better outcomes when they receive timely care. If patients in rural areas, especially, cannot receive timely access to care, they are at higher risk of poorer outcomes.

Additional training in key emergency procedures for family physicians currently staffing many US EDs as well as the use of physician extenders have been advocated as ways to address the shortfall of emergency medicine residency-trained board certified physicians⁹ and is potentially helpful in overcoming the consequences of the trauma care access barrier for rural communities.

Rural emergency care teams are, by necessity, front-line emergency care providers who stabilize critically injured trauma patients before transfer to level I and II trauma centers. In light of the rural access barrier to trauma centers,¹ additional training is particularly important in rural community hospitals, often defined as CAHs.

A 2007 Institute of Medicine report¹⁰ on the future of emergency care in the United States cites the CALS Program as a model for collaborative training in emergency medicine. Although no controlled outcome studies have yet shown the value of CALS education, numerous unpublished studies have demonstrated positive results, including the following: development of provider skills, improvement in appropriate management of compromised airways, improved handling of time-sensitive patient conditions, increased speed and efficiency in transfer of critical patients to higher levels of care, improved teamwork, proper use of equipment, as well as reduced provider anxiety, increased provider comfort levels, and increased provider confidence in skills and abilities.

About CALS: The CALS Program was started in 1996 in Minnesota by a grassroots coalition of volunteer health care providers who had the goal of improving patient care and outcomes in rural settings. Now in its sixteenth year, the CALS Program has developed comprehensive advanced life support satellite programs in three other states (Wisconsin, Missouri, and Texas) and has hosted courses in 3 additional states and 8 countries. The CALS Program extends its reach in training all US embassy medical personnel around the globe for the US Department of State. The CALS Program is designed for physicians, physician assistants, nurse practitioners, RNs, LPNs, and allied health care professionals (eg, nurse anesthetists and paramedics) who work in rural or remote settings. Additional information about the CALS Program is available on the CALS website at www.calsprogram.org.

References

1. Hsia R, Shen Y-C. Possible geographical barriers to trauma center access for vulnerable patients in the United States: an analysis of urban and rural communities. *Arch Surg*. 2011;146:46-52.
2. Garwe T, Cowan LD, Neas B, Cathey T, Danford BC, Greenawalt P. Survival benefit of transfer to tertiary trauma centers for major trauma patients initially presenting to nontertiary trauma centers. *Acad Emerg Med*. 2010;17:1223-1232.
3. Bowman SM, Zimmerman FJ, Sharar SR, Baker MW, Martin DP. Rural trauma: is trauma designation associated with better hospital outcomes? *J Rural Health*. 2008;24:263-268.
4. Grossman DC, Hart LG, Rivara FP, Majer RV, Rosenblatt R. From roadside to bedside: the regionalization of trauma care in a remote rural county. *J Trauma*. 1995;38:14-21.
5. Rogers FB, Shackford SR, Osler TM, Vane DR, Davis JH. Rural trauma: the challenge for the next decade. *J Trauma*. 1999;47:802-821.
6. Office of Rural Health and Primary Care. Minnesota Department of Health. The health and well-being of rural Minnesotans: a Minnesota rural health status report, May 2005.
7. Carter DL, Lappe KD, Schoenfelt SJ. CALS training for rural emergency health care provider teams. <http://www.acep.org/content.aspx?id=44306>. Accessed March 23, 2011.
8. Camargo CA Jr, Ginde AA, Singer AH, et al. Assessment of emergency physician workforce needs in the United States, 2005. *Acad Emerg Med*. 2008;15:1317-1320.
9. Filling the ER void. Available at: <http://www.massgeneral.org/about/newsarticle.aspx?id=1473>. Accessed April 24, 2009.
10. Committee on the Future of Emergency Care in the United States Health System. The Emergency Care Workforce. Hospital-based emergency care: At the breaking point. Board on Health Care Services. Institute of Medicine of the National Academies. Washington, DC: The National Academies Press, 2007. <http://www.nap.edu/catalog.11621.html>. Accessed March 2, 2011.
11. Carter D, Ruiz E, Lappe K. Comprehensive advanced life support – a course for rural emergency care teams. *Minnesota Medicine*. 2001;84(11).
12. Office of Rural Health Primary Care. Minnesota Department of Health. CALS Central Minnesota Site Visit 2003. <http://www.health.state.mn.us/divs/orhpc/pubs/calsvisitsummary.pdf> Accessed April 22, 2011.

13. Tedrick, Scott. Competent, seamless care is the difference at Granite Falls Hospital. *Advocate Tribune*, May 13, 2010.
<http://www.granitefallsnews.com/news/business/x1381043158/Competent-seamless-care-is-the-difference-at-Granite-Falls-Hospital>. Accessed April 21, 2011.
14. Granite Falls Hospital Trauma Review, 2008, 2009, 2010 (unpublished data).
15. Emergency Cardiac Care Committee, Subcommittees and Task Forces of the American Heart Association. 2010 American Heart Association guidelines for cardiopulmonary resuscitation and emergency cardiovascular. *Circulation*. 2010;122(18 suppl 3):S819.
16. Wisconsin CALS Impact Study, 2009 (unpublished data).

Q&A: A conversation with Dr. Darrell Carter

Q1: What is the participant time commitment and preparation for the CALS Provider course?

A: The participant time commitment needed to properly prepare for the CALS Provider Course varies with the individual provider's background, experience, and previous participation in CALS or other Advanced Life Support Courses. A study Guide is included with the pre-course material which helps participants better focus their preparation time and maximize the value they obtain from attending the CALS Provider Course. While some participants only spent a few hours preparing for the course; many participants, especially in preparation for their first CALS Course, will spend anywhere from 10 to 20+ hours reading and reviewing the core CALS material. Up to this point we have not been able to provide additional CME credit for the pre-course preparation time, but we hope in the future to be able to offer CME credit not only for the classroom time but also the preparation time by the utilization of online preparatory materials.

Q2: I know that the CALS educational program targets rural and remote areas, but how might these principles and approach to care apply to low volume urban and suburban EDs?

A: You are correct that the value of CALS principles and guidelines to emergency care are not restricted to just rural and remote providers. The importance of the utilization of the Universal Approach to the patient and Teamwork are very valuable to all emergency care providers, no matter how large or small their institution may be. While CALS emphasizes in its training a method of emergency care which will work in rural and remote health care facilities where the care is being provided by physicians, physician extenders, and nurses who are generalists rather than specialists in any given field; these same techniques are useful in almost any given situation, including in the more urban and suburban EDs. In fact we have had many emergency care providers who work in urban or suburban EDs attend the CALS Courses and we have conducted a number of CALS Courses in suburban and even urban hospitals.

Q3: How do you view or envision the contribution of CALS to the training of non-EMRT physicians who practice emergency medicine?

A: The education of non-emergency medicine residence trained physicians, and other non-emergency trained team members, has been the primary focus of CALS training from its inception. By teaching the needed emergency skills, knowledge, the proper use of basic emergency equipment, and a systems approach to the critically ill/injured patient; CALS is able to enhance the quality of emergency care

provided by the non-EMRT physician and their team, even in situations where specialists are not readily available and advanced equipment is limited.

Q4: What are the prospects for growth and evolution of the CALS education program in the next ten years?

A: The need for emergency care training of physicians, and their team members, who have not been specifically trained in Emergency Medicine is not going to go away in the next decade. In fact, it appears that with the growing utilization of the EDs and the lack of adequate numbers of EMRT physicians; the need for the CALS Program will continue to grow. We are seeing an increase in the interest in the CALS Program from a growing number of states as the value of CALS training becomes better known. Outside of the borders of the United States the potential value of CALS training, especially in the developing countries of the world where emergency care is virtually non-existent, the potential for the growth of CALS education is almost limitless. While great strides are being made in the outcome of emergency medical care, these advances are largely limited to the more urban or suburban regions of the world. For even a limited number of these advances to be realized in the rural or remote regions of the United States or for the non-urban populations of the developing countries of the globe, emergency care training of generalist physicians and team members requires a CALS form of education. Thus the need for CALS type of training is staggering and is likely to continue to grow.

Editor Comment:

I originally heard Dr. Carter address this section meeting during 2009 ACEP Scientific Assembly. He has prepared the article for publication in this issue. The CALS educational program provides "additional training in key emergency procedures". Specifically, it teaches team approach, universal care algorithm, and procedural skills with proper equipment result in rapid stabilization of time-sensitive patient conditions. The CALS program and experience make an important contribution to the growing body of knowledge on the educational needs and training criteria for non-EMRT physicians who work in rural, small town and remote area EDs across this country.

BOD Liaison Comment:

The best practices for rural emergency care have not been well studied. Most emergency medicine research has occurred in urban centers at academic emergency departments. Thus we do not have a clear understanding of why victims of trauma in rural locations have a worse outcome than those in urban outcomes, but there are likely many factors including the time to arrival at an emergency department and the resources for care and expertise of the providers in the rural setting as well as the long transport times to definitive care. The CALS program provides an organized approach to emergency care which can be a substantial improvement in many rural environments. Like all courses it is not a substitute for residency training but is rather an adjunct that when used in an appropriate environment may improve the knowledge and skills of providers and the organization of the emergency care system.

David Sklar, MD, FACEP

ⁱ A partial list of these courses includes: Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support (ATLS), Trauma Nurse Core Course (TNCC), Emergency Nursing Pediatric Course (ENPC), Advanced Life Support in Obstetrics (ALSO), Neonatal Resuscitation Program (NRP), and Rural Trauma Team Development Course (RTTDC).

ⁱⁱ The CALS Benchmark Lab was developed by Ernie Ruiz MD, former chair of the Emergency Department at Hennepin County Medical Center (in Minneapolis, Minnesota) as well as former chair of the Emergency Department at the University of Minnesota Medical School. The 2000 CALS Benchmark Lab Survey was conducted by Dr. Ruiz as well.